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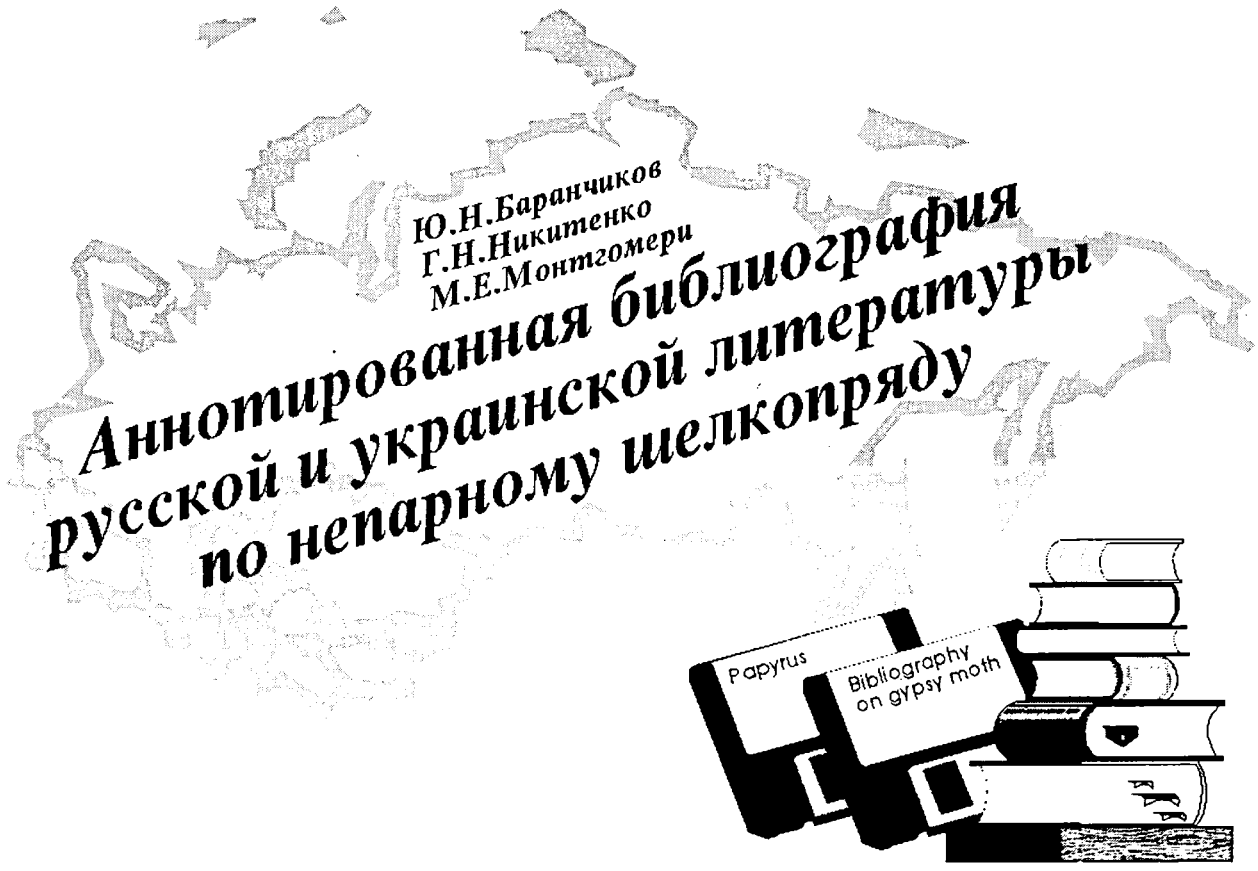
Russian and Ukrainian Literature on the Gypsy Moth: An Annotated Bibliography

Yuri N. Baranchikov
Galina N. Nikitenko
Michael E. Montgomery



Abstract

This bibliography contains 1185 references to literature on the gypsy moth published from 1837 to 1991 in the territory occupied by the former U.S.S.R.. The bibliography is designed to assist researchers within and outside the former U.S.S.R. to identify, locate, and correctly cite the original Russian or Ukrainian references in English. The bibliography contains publications on gypsy moth ecology, physiology, biochemistry, distribution, behavior, and control. The bibliography also presents indices of key words and natural enemies are cross-referenced to the citations. Introductory remarks give information on locating gypsy moth and other literature in libraries of the former U.S.S.R., bibliographic styles used in the U.S.S.R., transliteration of the Cyrillic alphabet to the Latin alphabet, and a listing of Soviet and pre-Soviet journals with papers on forest entomology and forest protection.

The Authors

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CONTENTS

Introduction

The gypsy moth, *Lymantria dispar* (L.) (Lepidoptera: Lymantriidae), is found throughout much of the territory of the former Union of Soviet Socialist Republics (U.S.S.R.). This territory extends from the Baltic Sea and the Carpathian Mountains in Europe to the Pacific Ocean in the Far East of Asia.

The gypsy moth also is an important pest in western and central Europe and in North America. Female moths in these populations lack flight, whereas in the former U.S.S.R. the females are capable of flight. Other differences include feeding behavior and morphology between "western" and "eastern" populations of gypsy moth (Montgomery and Wallner 1988).

The accidental introduction of gypsy moth from the Far East of Russia to the West Coast of North America in 1991 provided an impetus for researchers in Russia and the United States to share information on the gypsy moth.

This is the first detailed compilation of the Russian and Ukrainian literature on the gypsy moth. Previous bibliographies published in the West included only a small portion of the literature published in the U.S.S.R. and many references contain errors that make it impossible to identify and locate the original source.

Sources of Information

Library Holdings and Catalogues

All published material in the former U.S.S.R. was deposited in central libraries and cataloged. Most of the references cited here can be found in the Central Agricultural Library located in Moscow and the library of the Sukachev Institute of Forest, Krasnoyarsk, Russia. To facilitate location and retrieval of the publication, we have provided the full, unabbreviated source name that a librarian in the central libraries would need.

Bibliographic cards in the librarian's catalogue (Fig. 1) give full bibliographical descriptions.

Card fields

1	**Иванов А.М.**
2	Рост гусениц непарного шелкопряда при питании хвоей лиственницы
3	// Экология. - 1989. - № 6. - С. 59-65.
4	Рез. англ.
5	Табл. 2. Ил. 2. Библиогр.: 12 назв.
6	- - 1. Шелкопряд непарный - Питание.
7	УДК 595.78:591.532
8	№ 313392
9	15 № 1784

Figure 1.-- Example of a Russian library card for an article in a journal. Card fields: 1 - author last name and initials; 2 - title of the article; 3 - journal title, year, issue number, pages; 4 - language of the article's abstract; 5 - number of tables, figures, and references; 6 - key words; 7 - subject classification number; 8-9 - library's number.

Bibliographic Descriptions

State standards for bibliographic descriptions in the former Soviet Union, (e.g., GOST 7.1-84; GOST SEV 2012-79 and others) remain in effect in Russia.

Many Ukrainian and Russian language journals did not have a volume number, only the number of the issue for that year. Pagination of journals often was issue-based. Bibliographic citations published before 1960 often omitted the number of pages of the article, chapter, or book. The titles of periodicals and books are lower case except for the first word and proper nouns. For those journals without volume numbers, we have given the issue number in parentheses and do not give a mock volume number. Some "Western" bibliographies will give the year of publication as the volume number.

Most of articles cited in this bibliography were published by academic institutes as collections. Generally, these collections were published as volumes of an institute's yearly proceedings. These articles have complex, three-level, bibliographical citations that treat the paper as a chapter in a book with a unique collection name, which is followed by the name of the series of the proceedings of the institute. Publication frequency could be several times a year, yearly, or irregularly. These are commonly titled "proceedings of..." or "scientific proceedings" (the latter is "nauchnyye trudy" in Russian and "naukovi protsi" in Ukrainian). There are also collections (sborvik), news (izvestiya), transactions (zapiski), annals (izvestiya), and other terms that refer to the published collections of reports. Abstracts (tezisy) are often published by conferences.

An institute may divide its output into separate series based on a general subject matter such as zoology. Each series may have an issue on a specific topic such as entomology; these are part of the numbered volume that represents all of the institute's output for a specific period. The results of this are complex, multi-level bibliographical citations. Often, one or two parts of these complex bibliographical descriptions are omitted when Russian authors list references in their publications. Libraries file these publications variously by the issue title, proceeding title, or the title of the institute and, thus, can be difficult to locate without the full title.

The editor of a proceedings or collections usually is not included in a Russian citation or listed in catalogue files. If editors are given in a proceedings, they often are the administrative officials of the institute. The publisher of a proceedings is often not listed in Russian citations. The publisher often is the institute and can be inferred from the title of the proceedings.

In this bibliography, information was not included on the editor and publisher of proceedings or other collections by institutes. If an editor is given, it usually is the responsible official of the institute rather than the subject editor.

Resources Consulted

The bibliography was compiled from the authors' personal collections and three major resources:

1. Referativnyy Zhurnal, Tom Biologiya - [The Journal of References, Vol. Biology] - This is a collection of annotated references of current world literature published monthly, beginning in 1961, by the All Union (now Russian) Institute of Scientific Information (VINITI) in Lubertsy, near Moscow.

2. Catalogs and stacks of books of the main libraries

- In Russia:

- Central Agricultural Library, 3 Orlikov Pereulok, Moscow, 107804 Russia;
- Central Scientific Library of Russia (former Lenins's Library), 3 Novy Arbat, Moscow, 121019 Russia
- Library of Zoological Institute of Russian Academy of Sciences, 1 Universitetskaya Nabereznaya, Saint Petersburg, 199034 Russia
- Library of the Zoological Museum of Moscow State University, 6 Ul. Gertsena, Moscow, 103109 Russia
- State Public Scientific and Tecnical Library of Siberian Branch, Russian Academy of Sciences, 15 Ul. Voskhod, Novosibirsk, 630200 Russia
- Library of V.N.Sukachev Institute of Forest, Siberian Branch, Russian Academy of Science, Akademgorodok, Krasnoyarsk, 660036 Russia

- In Ukraine:

- Library of I.I. Shmalgausen Institute of Zoology, Ukrainian Academy of Science, 15 Bogdan Kchmelnitskiy Str., Kiev-30, 252000, Ukraine
- S.I.Vernadskiy Central Scientific Library, Ukrainian Academy of Sciences, 49, 40 Let Octabrya Prospect, Kiev-39, 252650, Ukraine
- Ukrainian Central Public Library, 1 Grushevskiy Str., Kiev-1, 252000, Ukraine
- Ukrainian Central Agricultural Library, Goloseevo, Kiev, 252000, Ukraine
- Library of Ukrainian Institute of Plant Protection, 33 Vasilkovskaya Str., Kiev-127, 252000, Ukraine
- Library of Kiev State University, 58 Vladimirakaya Str., Kiev, 252000, Ukraine

- In Moldovia:

- Central Scientific Library of Moldovian Academy of Sciences, 1 Lenin Prospect, Kishinev, 277612, Moldovia

3. Personal libraries of V.I. Benkevich, V.A. Kolibin, A.F. Krishtal, A.G. Kotenko, V.M. Yanovskiy, V.P. Pospelov, E.A. Zverozomb-Zubovskiy

We also checked for Russian literature in the bibliographies by Campbell et al. (1978), Griffiths (1980), and Schaefer et al. (1988) and found three citations that were new to our list. We also searched the electronic data

bases (AGRICOLA, BIOSIS, CAB, AGRIS, CA search) for literature on *Lymantria* (*Porthetria*) (*Ocneria*) (Liparis) *dispar* published between 1978 and 1987 and found a total of 118 citations from the U.S.S.R., of which 13 were new to this data base.

Nearly 70 percent of the cited publications were examined in the original. Those not examined in the original were published mainly before World War II and were obtained from reference journals, reviews, and other sources.

Several of the journals cited in the bibliography are important sources of information on entomology in the former U.S.S.R. Appendix 1 lists the Russian transliteration of the title, the English translation of the title, and the number of articles on the gypsy moth we found in the journals.

Preparation of the Bibliography

Transliteration

Names of the authors and the sources (book, journal, etc.) in the bibliography are transliterations of Cyrillic characters to Latin characters. There are many systems to transliterate or romanize Russian and other Slavic languages. Since transliteration depicts the sound of a Russian word using the Latin alphabet, spellings are different for English, French, or German systems. Thus, there can be several different transliterated spellings of the same Russian word. To provide consistency, we used the system of the United States Board on Geographic Names (BGN System) (Table 1). This system is preferred by "The Chicago Manual of Style" (University of Chicago Press 1993) and the "United States Government Printing Office Style Manual" (U.S. Government Printing Office 1984). Transliterations of word endings are given in Table 2.

Table 1.—Russian alphabet and BGN transliteration

Cyrillic	Latin	Cyrillic	Latin	Cyrillic	Latin
Аа	a	Кк	k	Хх	kh
Бб	b	Лл	l	Цц	ts
Вв	v	Мм	m	Чч	ch
Гг	g	Нн	n	Шш	sh
Дд	d	Оо	o	Щщ	shch
Ее	ye[1], e	Пп	p	Ъъ	" [3]
Ёё	yë[2], ë	Рр	r	Ыы	y
Жж	zh	Сс	s	Ьь	' [4]
Зз	z	Тт	t	Ээ	e
Ии	i	Уу	u	Юю	yu
Йй	y	Фф	f	Яя	ya

[1] *Ye* initially, after vowels, and after Ъ, Ь.
[2] *Yë* as for *ye*. The sign Ё is not considered a separate letter of the alphabet, and the "¨" is often omitted.
[3] " double apostrophe.
[4] ' apostrophe.

Table 2.—Endings of Russian words and their transliteration

Cyrillic ending	Transliteration	Cyrillic ending	Transliteration	Cyrillic ending	Transliteration
ай	ay	юй	yuy	ные	nyye
ей	ey, yey	яй	yay	ние	niye
ий	iy	ще	shche	кий	kiy
ой	oy	щий	shchiy	кая	kaya
уй	uy	же	zhe	щийся	shchiysya
ый	yy	жать	zhat'	щаяся	shchayasya
эй	ey	ся	sya	ное	noye

The "linguistic" system uses j, ju, and ja for y, yu, and ya of the BGN system. For example, the Yankovich cited herein could be the same Jankovich referred to in other citations. The BGN system gives Chaykovskiy for the composer Tchaikovsky, and Moskva for the city Moscow. The familiar spelling, rather than the BGN spelling, usually is preferred for names that are well known to English speakers.

Classification of Reference Type

It was necessary to classify each reference into categories recognized by the bibliographic software we used. The references were placed in four main categories: (1) Journal article, (2) Book, (3) Chapter in a book, and (4) Thesis (see Table 3).

It was very difficult to determine if a reference belonged to a unique collection, a series, or a journal. We considered the publication to be a journal if it had the word "journal" in its title or subtitle or was published under the same title more than once per year. Publications in journals represented less than one-third of the references in this bibliography.

A "book" is a bound volume cited in its entirety. It may be a monograph by one author or a collection of papers where the authors of the book are editors and the book is cited as a whole. For each book reference, the English translation of the title is given in bold face followed by the transliteration of the original title in parentheses. Less than 5 percent of the references were books and many are general discussions of local pests.

The "book" category includes "Deposited Documents", a popular, paper-saving mode of scientific publication in the former U.S.S.R. that is still in use. These pamphlets present research findings too lengthy to be published in U.S.S.R. journals. They are assigned a number by the depository. There are only a few official places for deposition. The main one is VINITI in Moscow, which publishes a monthly catalog of deposited documents. Copies of the Deposited Documents can be obtained from VINITI for a fee.

The "chapter" category includes publications from collections of papers, institutes' proceedings, and proceedings of conferences. A popular form of publication was collections of abstracts. Many of the abstracts have promising titles, but provide little information. Some abstracts, though, provide details that may be useful to others and we have provided lengthy translations of these.

The "thesis" category includes résumés of scientific degree dissertations that are published in a standard booklet of 24 pages. These can be retrieved from libraries by asking for "Avtoreferat dissertatsii ..." and the author and year. The dissertation itself is lengthy and is held in the former Lenin's library and VINITI, both in Moscow. A photocopy can be obtained from the latter for a fee.

Table 3.—Types of publications and citations formats

Type of publication	Example of Russian citation	English translation	Citation in this bibliography
Journal article	Иванов А.А. Непарный шелкопряд // Зоолог.журн. 1989. - Т. 56. - Вып 5. - С. 90-95.	Ivanov A.A. The gypsy moth // Zoological Journal. 1989. - V. 56. - Issue 5. - P. 90-95.	Ivanov, A.A. 1989. **The gypsy moth.** Zoologicheskiy zhurnal. 56(5):90-95.
Book	Иванов А.А. Непарный шелкопряд. Новосибирск: Наука, 1989. - 125 с.	Ivanov, A.A. The gypsy moth. Novosibirsk: Science Publ., 1989. - 125 p.	Ivanov, A.A. 1989. **The gypsy moth.** (Neparnyy shelkopryad.) Nauka, Novosibirsk. 125 p.
Thesis resume	Иванов А.А. Непарный шелкопряд. Автореферат диссертации ... кандидата биологических наук. Красноярск: Ин-т леса СО АН СССР, 1989. - 24 с.	Ivanov, A.A. The gypsy moth. Thesis of dissertation... of the kandidate of biological sciences. Krasnoyarsk: Institute of Forest SB USSR AS., 1989. - 24 p.	Ivanov, A.A. 1989. **The gypsy moth.** Avtoreferat dissertatsii kandidata biologicheskih nauk. Institute of Forest, Siberian Branch, USSR Acad. Science, Krasnoyarsk. 24 p.
Report in a series of an institute	Иванов А.А. Непарный шелкопряд // Тр. по зоологии [Вып.] 12, Энтомология. 1989. - С. 3-45. (Учен. зап. Тарт. гос. ун-та; Вып. 306).	Ivanov, A.A. The gypsy moth // Proceedings of zoology [Issue] 12, Entomology. 1989. P. 3-45. (Scientific Transactions of Tartu State University; Issue 306).	Ivanov, A.A. 1989. **The gypsy moth.** In: Uchenyey zapiski Tartuskogo universiteta, vyp. 306. Trudy po zoologii, vyp. 12. Entomologiya. Tartu: 3-45.
Article in a book	Иванов А.А. Непарный шелкопряд // Экология волнянок. Новосибирск: Наука, 1989. - С. 94-105.	Ivanov, A.A. The gypsy moth // Ecology of tussock moths. Novosibirsk: Science Publ., 1989. - P. 94-105.	Ivanov, A.A. 1989. **The gypsy moth.** In: Ekologiya volnyanok. Nauka, Novosibirsk: 94-105.

Geographic Location of References

Because the territory of the former U.S.S.R. is so vast and has populations of gypsy moth that may differ in behavioral and morphological features, we divided the territory into regions (Fig. 2) and keyed each reference to its region. The first keyword for each reference refers to the regions shown in bold on the map.

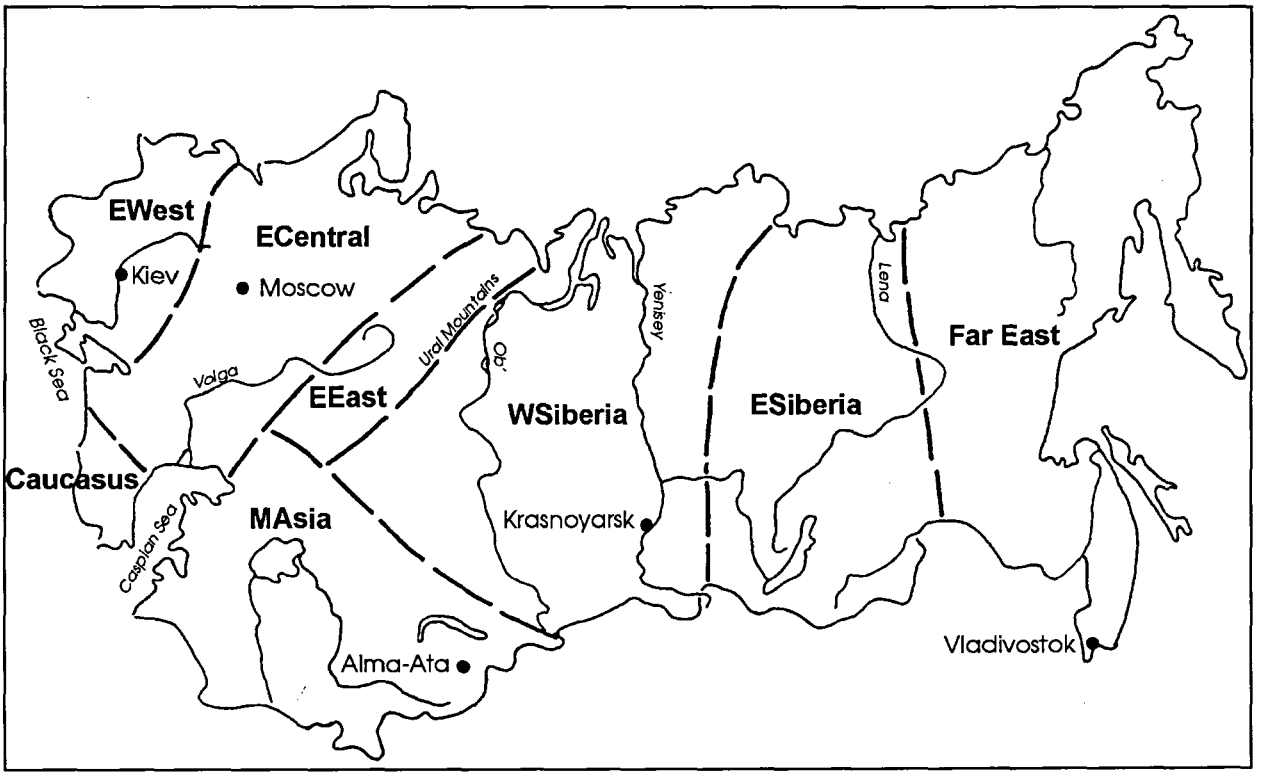


Figure 2.--Geographical regions in the former Soviet Union of the bibliographic entries: **EWest** = west European, includes the former republics of Ukraine, Moldova, Belarus, Latvia, Lithuania, and Estonia; **ECentral** = central European, includes Moscow, Leningrad and the west European part of the Russian Federation; **EEast** = east European, includes the Ural Mountains, east European part of the Russian Federation, Republics of Bashkirtostan and Tatarstan and the Sverdlovsk, Perm' and Orenburg Oblasts; **Caucasus** = includes the former republics of Georgia, Azerbaijan and Armenia, and the northern Caucasus part of the Russian Federation; **MAsia** = Middle Asia: includes the former republics of Kazakhstan, Tajikistan, Uzbekistan, Turkmenistan, and Kyrgystan; **WSiberia** = West Siberia, from the Ural Mountains to the eastern border of Krasnoyarsk Kray; **ESiberia** = East Siberia, from the eastern border of Krasnoyarsk Kray to the Lena and Aldan Rivers; **Far East** = eastern parts of Yakutskaya Republic, Chita Oblast, Khabarovsk and Primorsky Krays, Amurskaya and Magadanskaya Oblasts.

List and Index of Natural Enemies

Appendix 2 lists the scientific nomenclature of the parasites and predators listed in the abstracts. This list is organized into taxonomic groups and includes synonyms or alternate names used in the abstracts as well as the preferred nomenclature. The Arthropod Name Index (ANI) on CD-ROM (CAB International 1996) was used to determine the preferred name for most species. For the Diptera, the nomenclature of Kolomiets and Artamonov (1994) was followed. These authors place species in the genera *Bellieromonaea, Kramerea, Parasarcophaga,* and *Robineauella*, whereas the ANI-CD uses the genus *Sarcophaga*.

To produce an index of the natural enemies, a separate field for the preferred taxon was created in the electronic database. This was used to produce an index sorted by the specific name (Appendix 3). Names in the abstracts are as they appeared in the original article, except for correction of obvious misspellings or typographical errors.

Altogether, there are 167 references that mention parasites and 97 of these give scientific names in the abstract. Review articles with long lists of natural enemies were not included in the index because the species usually were listed in the primary reference. Articles cited in the bibliography with good summaries of natural enemy species include Il'inskiy (1959) and Khitsova and Isaeva (1986) for European U.S.S.R., Zerova et al (1989) for species in the southwestern part of the U.S.S.R., and Kolomiets (1987) for species in the Asian part of the U.S.S.R., and Zimin and Kolomiets (1984) for Diptera.

Keywords

Keywords (Appendix 4) were used to identify the most important subject areas of a reference. They were chosen from a list of 97 general terms.

More than one-fourth of the references mention control of the gypsy moth. Many of these are general with little specific information while others refer to a type of control such as using virus as a pesticide. Control was used as a keyword if the article discussed control in general or several types of control. If a specific control method and details were provided, more specific keywords were used; e.g., microbial pesticide, bacteria. By far, the most prevalent control method was destruction of egg masses by physical removal or direct treatment with petroleum or insecticides.

Many articles were lists of several pests of several pests or insects that included the gypsy moth. These are designated as pest lists or faunal lists. Many of these contain little research information about gypsy moth, but document its pest status and distribution.

More than 10 percent of the references give host plant information. Only the common name of host plants was available usually because the Latin binomial was not provided in the original or abstract. Although common names of host plants were not listed as keywords for each abstract, we generated an index to host plant names as a subcategory under host plants in the keyword index.

Literature Cited

CAB International. 1996. **Arthropod name index on CD-ROM.** Wallingford, UK: CAB International.

Campbell, R.W.; Levitan, L.C.; Sobecki, E.R.; Tardiff, M.F., 1978. **Population dynamics of the gypsy moth: an annotated bibliography.** Gen. Tech. Rep. NE-48. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 124 p.

Griffiths, K.J. 1980. **A bibliography of gypsy moth literature. Vol. 1 and 2.** Report O-X-312. Sault Ste. Marie, ON: Canadian Forestry Service, Great Lakes Forest Res. Centre. 350 p.

Kolomiets, N.G.; Artamonov, S.D. 1994. **Diptera as entomphags of forest silkworm moth (in Russian).** Nauka, Novosibirsk. 151 p.

Montogmery, Michael E.; Wallner, W.E. 1988. **The gypsy moth: a westward migrant.** *In* Berryman, A.A., ed. Dynamics of forest insect populations. New York: Plenum. 353-375.

Rafats, J. 1992. **Gypsy moth (*Lymantria dispar*) and its control.** January 1979 - October 1991. Quick Bibliography Series: QB 92-17. Beltsville, MD: National Agricultural Library. 57 p.

Schaefer, P.W.; Ikebe, K.; Higashiura, Y. 1988. **Gypsy moth, *Lymantria dispar* (L.), and its natural enemies in the Far East (especially Japan).** Annotated bibliography and guide to the literature through 1986 and host plant list for Japan. Delaware Agric. Exp. Stn. Bull. 476. Newark, DE: University of Delaware. 160 p.

United States Government Printing Office. 1984. **United States Government Printing Office style manual.** Washington, DC: U.S. Government Printing Office. 436-441.

University of Chicago Press. 1993. **Transliterated and romanized languages.** *In*: The Chicago manual of style, 14th ed. Chicago: University of Chicago Press: Chicago: 345-348.

Annotated Citations

1 Abdullaev, A.A. 1968.
Effect of pseudoallicin on gypsy moth larvae. In: Naukovi pratsi USGA. Dostidzhennya z fitopatologii ta entomologii. Kiev: 100-101.
-- Pseudoallicin, a synthetic analogue of allicin, was bioassayed in the laboratory on instar II-IV gypsy moth. Treatment with pseudoallicin caused growth inhibition and death of the larvae. The signs of poisoning are described in detail.
MAsia; BIOASSAY, NATURAL PLANT PRODUCTS, PHYSIOLOGY

2 Abdullaev, A.A. 1969.
Irregular larval activity in the gypsy moth and tent caterpillar caused by pseudoallicin. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 24 p.
-- The effect of allicin-type compounds on larvae of gypsy moth and tent caterpillars was studied by applying phytoncide solutions to the foods and body of the insects. The experiments showed significant changes in behavior, slower growth and development, lower fertility, and reduced egg vitality. In addition, pseudoallicines cause histophysiological changes in the neurohumoral system including an increase in the amount of protective and pathological cells. Prolonged application leads to the death of the insects.
MAsia; BIOASSAY, HISTOLOGY, NATURAL PLANT PRODUCTS

3 Abdullaev, A.A. 1976.
Effect of experimental lots of microbial preparations on the gypsy moth. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 34-36.
-- The study of experimental lots of the biological preparations, entobacterin-17 and -K, dendrobacillin, beauverin, and exotoxin, on instar III-IV gypsy moth showed entobacterin-K and dendrobacillin to be the most effective preparations for infecting gypsy moth. Both caused 100% mortality of the insects at a concentration of 0.5 billion spores/ml. Entobacterin-17, at 0.5 billion spores/ml, caused 60% mortality of the larvae, while exotoxin and beauverin were weaker and less toxic.
MAsia; BACTERIA, FUNGI, BIOASSAY, MICROBIAL PESTICIDES

4 Abdullaev, A.A. 1979.
The effect of microbial preparations on pathologic changes in the hemolymph and gypsy moth survival. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 15-17.
-- Experimental lots of entobacterin-K, dendrobacillin, exotoxin, and entobacterin caused drastic changes in the structure and ratio of hemocytes, as well as death of treated third-instar gypsy moth. Low concentrations of the preparations caused similar, but more delayed, pathological responses of hemocytes.
MAsia; BACTERIA, HEMOLYMPH, MICROBIAL PESTICIDES

5 Abdullaev, A.A. 1980.
Modification of smear coloration for cytological studies of insect hemolymph. Vestnik zoologii. (4):75-76.
-- Intensity and quality of Romanovsky staining of hemocytes of gypsy moth larvae with azure-eosine were studied at different pH of the medium, using acetone and phosphate buffer solution. Distinct staining of nucleus chromatin and hemocyte cytoplasm was attained on phosphate buffer at pH = 6.55 in the presence of small amounts of acetone. The structure of hemocyte nucleus was seen very clearly as compact dark violet or violet-red chromatin granules. Cytoplasm of young cells and enocytoids were stained different shades of violet depending on the stage of development and the physiological condition of the cells. Enocytoid granulation became intensely violet, eosinophil granules turned dark red.
MAsia; HEMOLYMPH, HISTOLOGY

6 Abdullaev, Ye.N. 1966.
Egg parasites of the gypsy moth (*Lymantria dispar* L.). Uzbekskiy biologicheskiy zhurnal. (4):57-60.
-- Development of biological control is proposed in Samarkand Province since chemical and mechanical controls of the gypsy moth are labor intensive and inefficient. The parasites *Telenomus phalaenarum, Telenomus* sp., *Gryon howardi, G. dichropterum* destroyed gypsy moth eggs in several foci in the Amankutan Forest Enterprise. The chalcids, *Anastatus disparis* and *Ooencyrtus flavofascuitis* also parasitized eggs of the gypsy moth. *Ascolus saarovi, A. grandis*, and *Idris* sp. are parasites of insects but only use gypsy moth egg masses for overwintering.
MAsia; BIOLOGICAL CONTROL, EGGS, PARASITES

7 Abdullaev, Ye.N. 1966.
Entomophages of the gypsy moth (*Ocneria dispar* L.) in Uzbekistan. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Samarkand. 16 p.
-- The gypsy moth is a major pest of fruit stands in Uzbekistan, particularly in mountainous localities. Data are presented on the phenology of the pest in the region. Oviposition usually took place on rocks and tree butts, but egg masses also were found on the trunks at a height of up to 4 meters. The favored food plants were poplar, elm, sweetbrier, and the fruit trees such as apple, apricot, and alycha. The author found 31 entomophages of the gypsy moth, 13 beetle species, 6 fly species and 12 lepidopterous species. The most effective egg parasites were *Telenomus phalaenorum, Habronotus howardi,* and *Anastasus disparis.* The most effective parasites of larvae and pupae were *Exorista rossica, Pimpla instigator* and *Brachymeria intermedia.* Predators of greatest importance were *Attagenus seniculus* and *Megatoma conspersa* which attack eggs, and *Calosoma sycophanta* and *C. auropunctatum dzungaricum* that attack larvae and pupae. The main task of gypsy moth control in Uzbekistan is to

enhance the efficacy of local entomophages by sowing additional nectariferous plants and timing the dates of chemical treatments to account for the flight season of major entomophages.
MAsia; BIOLOGICAL CONTROL, HOST PLANTS, OVIPOSITION SITE, PARASITES, PREDATORS

8 Abdullaev, Ye.N. 1967.
Egg parasites of the gypsy moth, *Lymantria dispar* L. (Orgyidae, Lepidoptera) with special reference to Samarkand Province. In: Poleznyye i vrednyye bespozvonochnyye zhivotnyye Uzbekistana. Tashkent: 25-29.
-- The species of egg parasites found during investigations carried out in 1963-1965 are given. The rate of infestation of gypsy moth egg masses varied greatly in the various forests and gardens. In general, *Telenomus phalaenarum, Habronotus howardi,* and *Anastatus disparis* appeared to be the most effective parasites and measures should be taken to introduce them to different parts of the area.
MAsia; EGGS, PARASITES

9 Abdullaev, Ye.N. 1967.
Biological characteristics of the gypsy moth in the forests of Samarkand Province. In: Voprosy zashchity rasteniy. Tashkent: 80-82.
-- Gypsy moth larvae in Samarkand Province start hatching after April 20 when the mean temperature is 14.1°C and relative humidity is 70%. Larval development takes 55-59 days. The first pupae appear in nature in mid-June and general pupation is observed at the end of June. Imago emergence and oviposition usually occur from the 1st to the 20th of June. The major food plants of the gypsy moth in Samarkand Province are apple, apricot, elm, willow, sweetbrier, hawthorn, poplar, and nut.
MAsia; DEVELOPMENT, HOST PLANTS, PHENOLOGY, TEMPERATURE

10 Abdullaev, Ye.N. 1970.
Some biological features of the gypsy moth in Uzbekistan. In: Vrediteli sel'skokhozyaystvennykh kul'tur Uzbekistana i ikh entomofagi. Tashkent: 118-120.
-- Observations carried out in 1964-1966 in Uzbekistan forests showed that nearly all the foci of gypsy moth are located along streambanks. Larvae damaged the trees and shrubs of 11 species. The major food plants were apricot, apple, poplar, and willow. Cherry, mulberry, and juniper were not damaged by the gypsy moth. Data on the pest phenology and places for oviposition are given, as well as a list of predators and parasites.
MAsia; FOCI, HOST PLANTS, OVIPOSITION SITE, PARASITES, PREDATORS

11 Abdullaev, Ye.N. 1972.
Some lepidopterous pests and their enemies in certain regions of Uzbekistan. In: Ekologiya i biologiya zhivotnykh Uzbekistana. Tashkent: 140-143.
-- Data are given on the biology and harmful effects of gypsy moth, grisette, leaf cutter and budworm and also the efficacy of parasites and predators of these pests.
MAsia; GENERAL BIOLOGY

12 Abdullaev, Ye.N., Popova, Ye.A., Norkulov, U. 1990.
Biological and ecological peculiarities of gypsy moth in Zeravshan valley. In: Uspekhi entomologii v SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 136-138.
MAsia; GENERAL BIOLOGY

13 Abdurakhmanov, G.M. 1971.
Ecological and faunistical characteristics of pest insects of fruit crops in Dagestan Autonomous Republic (USSR). Avtoreferat dissertatsii kandidata biologicheskikh nauk. Makhachkala. 21 p.
-- In the gardens of Dagestan, the author found 137 pest species including 49 lepidopterous species. The gypsy moth is regarded as a secondary pest, attacking fruit plants only during outbreaks when its favored food plants are consumed.
Caucasus; PEST LIST

14 Abramenko, I.D., Samilyak, S.I. 1983.
Oak dieback in the ancient oak forest reserve Les ne Vorskle and in surrounding forest steppe woodlands. Lesovodstvo i agroleso-melioratsiya. 76:36-40.
EWest; TREE HEALTH

15 Ado, N.Yu., Petrov, N.B., Filippovich, Yu. B. 1985.
Repeating and unique DNA sequences in some species of Lepidoptera. Zhurnal evolutsionnoy biokhimii i fiziologii. 21:115-121.
-- Genome sizes of nine lepidopterous species were determined by measuring the reassociation kinetics of short DNA fragments. Genome sizes varied from 0.72 to 1.46 pg, with a modal value of 0.8 to 1.0 pg. The content of unique component does not exceed 50% of the genome. The size of the gypsy moth genome is 1.03 pg.
ECentral; GENETICS

16 Adzhemyan, L.A., Mirzoyan, V.S. 1989.
Protein fractions of the gypsy moth during feeding on various food species. In: Vklad uchenykh po zashchite rasteniy v nauchno-teknicheskiy progress. Erevan: 91-93.
Caucasus; BIOCHEMISTRY

17 Agafonova, P.S., Kvint, V.L., Timchenko, G.A. 1978.
The use of virin-ENSh preparation against a gypsy moth population. Lesnoye khozyaystvo. (1):86-88.
-- The work was carried out in Kherson Province in a 30-year-old stand of bastard acacia. The focus (initiation of the outbreak) appeared in 1972 and reached the outbreak phase in 1976. Egg masses were treated in about 5% of the area. The authors attribute the high mortality in the control and 100% mortality in the treatment areas to natural polyhedrosis in a collapsing pest focus rather than to the application of the preparation.
EWest; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

18 Akimtseva, N.A. 1975.

The use of biopreparations in the gypsy moth foci. Zashchita rasteniy. (9):44.
-- Entobacterin and dendrobacillin were used to control the gypsy moth in Zakarpatye. Entobacterin was tested in the field for 10 years, from 1964 to 1974, and dendrobacillin was tested once, in 1973. The former preparation was highly efficient while the latter had low efficacy.
EWest; BACTERIA, MICROBIAL PESTICIDES

19 Aleksandrina, G.I. 1981.
Some patterns of the gypsy moth life cycles. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 118-119.
-- Changes in the duration of larval instars, dates of pupation, and emergence of adults were shown to be regulated by the neurohumoral system. A genetically determined factor seems to provide adaptation to certain ecological changes, preventing inbreeding when larvae hatch from one egg mass simultaneously. Biological rhythms affect the extraction into hemolymph of the activation hormone from the cardial bodies and determine the periodicity of the action of the molting hormone.
WSiberia; ENDOCRINOLOGY, GENETICS

20 Alekseeva, Ye.Ye. 1969.
The gypsy moth, *Ocneria dispar* L. (Lepidoptera, Orgyidae) in Buryatian ASSR. In: Trudy Buryatskogo filiala SO AN SSSR. Glavneyshiye vrediteli drevesnykh i kustarnikovykh porod Zabaykal'ya. Buriatskyi Filial SO AN SSSR, Ulan-Ude: 182-195.
-- Data are presented on gypsy moth outbreaks in Buryatia (1948-1951, 1954-1957, 1963-1966), gypsy moth biology, enemies, and economic significance. A list of 20 food plants is given. Larch is a favored food plant, followed by birch and willow, and primary foci occur in the stands of these three tree species. Larvae hatch in May, pupate at the end of July, and adults fly in late August to early September. Mortality in the foci due to entomophages and diseases was 80%. The author considers deposition of egg clusters on bare mountain slopes to be connected with ethological peculiarities of first instar gypsy moth (large scale dispersion).
ESiberia; DISPERSAL, HOST PLANTS, OUTBREAKS, OVIPOSITION SITE, PHENOLOGY

21 Aliev, A.A. 1967.
Entomophages of some garden pests in Nukhazakat zone of the Azerbaijan SSR. In: Materialy sessii Zakavkazskogo soveta po koordinatsii nauchno issledovatel'skikh rabot po zashchite rasteniy. : 432-433.
-- A complex of parasites was studied that attack larvae and pupae of the gypsy moth, apple leaf-trumpet moth, and garden leaf-rollers in Nukha-Zakatal region (Azerbaijan). The gypsy moth is considered to be one of the major garden pests in the area under study; it also attacks many forest plants. The main food plants are apple, cornel, oak, hornbeam, hawthorn, and medlar. In 1965 there was an outbreak of this pest, with more than 120 larvae and pupae of gypsy moth per tree. The following parasites were found: *Pimpla examinator*, Brachymeria sp. (Hymenoptera); *Exorista noctuarum*, and *Carcelia excisa*, along with sarcophagid and muscid flies (Diptera). Over 34% of larvae and pupae were attacked by flies and <2% by other parasites.
Caucasus; BIOLOGICAL CONTROL, NUMERICAL DATA, OUTBREAKS, PARASITES

22 Aliev, A.A. 1968.
On studying gypsy moth entomophages in Nukhazakat zone of Azerbaijan. In: Materialy sessii Zakavkazskogo soveta po koordinatsii nauchno issledovatel'skikh rabot po zashchite rasteniy. : 412-413.
-- Principal data on gypsy moth biology and entomophages are given.
Caucasus; GENERAL BIOLOGY

23 Aliev, A.A. 1984.
Some biocenotic interrelations among the main folivorous pests in the forests of Azrebaijan. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 21.
-- Twenty-four parasites of gypsy moth, 25 parasites of leaf rollers and 12 parasites and predators of miners were found. The efficacy of entomophages of the gypsy moth and green oak leaf roller was 89%. Analysis of meteorological data showed that two gypsy moth outbreaks (1974-1978 and 1980-1983) occurred in warm, dry weather. Despite the high efficacy of gypsy moth entomophages, elimination of the foci of this pest in 1978 resulted mainly from the change in meteorological conditions, a temperature of 13.8° C, instead of the normal 17.5° C, which is usual for this season, and heavier than normal precipitation (an increase from 38 to 109 mm).
Caucasus; OUTBREAKS, PARASITES, TEMPERATURE, WEATHER

24 Aliev, A.A., Effendi, R.Ye., Mamedov, Z.M. 1974.
Little known gypsy moth entomophages in Zakavkazye. Zashchita rasteniy. (5):36.
-- In the northeast of Azerbaijan, at the shores of the Caspian Sea, a gypsy moth outbreak was observed in 1971-1972 in 15,000 ha of beech and oak forests which also contained some alder, hornbeam, elm, poplar and wild fruit-bearing trees. Under certain conditions in March and April, small Lepidopteran larvae (possibly of the family Zyganidae) intensively fed on the eggs and hatched larvae of the gypsy moth. A fourth-instar could completely devour an egg mass of up to 800 eggs within 48 hours. The great numbers and voraciousness of predaceous lepidopteran larvae allows us to consider them as important enemies of the gypsy moth (in Azerbaijan). This species previously had not been regarded as entomophagous and cannibalistic. Gypsy moth egg masses also were heavily attacked by *Dermestes ater* and *D. lardarius* while larvae were consumed by *Calosoma sycophanta*.
Caucasus; EGGS, PREDATORS

25 Aliev, A.A., Mamedov, Z.M. 1970.
Results of investigation of garden pests entomophages in Azerbaidzhan. Doklady Akademii nauk Azerbaidzhanskoy SSR. 26(12):34-36.
-- Parasites of gypsy moth were: *Itoplectis alternatus, Pimpla turionellae, Pimpla inquisitorius, Meteorus*

versicolor, Apanteles melanoscelus, Brachymeria intermedia, Exorista larvarum, Parasetigena silvestris, Senometopia excisa, Blepharipa pratensis, Parasarcophaga portschinskyi.
MAsia; PARASITES

26 Al-Kabili, A.A. 1977.
A comparative study of the effect of organic phosphorous compounds and biopreparations on the tent caterpillar and the gypsy moth. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 25 p.
-- Some organic phosphorous compounds, microbiological preparations, and their binary mixtures affected the hemolymph, neurosecretory cells of the superesophageal ganglion, and the fat body of tent caterpillar and gypsy moth larvae. The effect of these preparations on insect development, survival, and fecundity also was studied. Individuals that had been exposed to treatment differed from the control in all of the biological parameters examined. Drastic changes in the hemolymph hemocytes occurred; i.e. the structure was disrupted, the ratio of forming elements was altered, and the amount of protective and pathological cells increased. Drastic pathological changes in the neurosecretory system of the larvae treated with insecticides show that insecticides inhibit hemolymph protective functions, destroy the neurohumoral complex, and exhaust the energy stores of the body.
EWest; CHEMICAL INSECTICIDES, TOXICOLOGY

27 Amirkhanov, D.V. 1976.
Gypsy moth in Bashkirian ASSR and experiments on disparlure application. In: Ispol'zovaniye khimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Moscow: 4-5.
-- To detect, count, and forecast gypsy moth populations with disparlure, experiments were done to determine effective concentrations. Two types of traps were used: cylinders with cone-shaped inserts, and flat sheets with a sticky surface. The experiments showed the cylinder to be the better trap and the optimum amount of pheromone to be 5.0 micrograms per trap.
EEast; PHEROMONE TRAPS

28 Amirkhanov, D.V. 1980.
Results of application of pheromone sticky traps for studying ecological patterns of the gypsy moth flight dynamics. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 4-5.
-- Pheromone traps were used to establish that in Bashkiria gypsy moth males fly most vigorously at a temperature of 16°C and higher and at a relative air humidity of 60% and lower. Low density populations in pure stands have a shorter flight season and are more energetic than high density populations in mixed stands. During the latent period, the gypsy moth does not disappear in some areas, remaining at a low population density; these are referred to as survival stations.
EEast; FLIGHT, MALES, PHEROMONE TRAPS, TEMPERATURE

29 Amirkhanov, D.V. 1981.
The study of biological activity of disparlure and prospects of its application for gypsy moth control. In: Sbornik nauchnykh trudov Bashkirskoy lesnoy opytnoy stantsii. Ufa: 97-106.
-- Efficacy of different concentrations of disparlure in gypsy moth foci was studied. For long-term counting of the pest population, cylindrical cone-end traps are more effective because the attractant is better preserved in them. The abiotic factors, temperature and wind force, as well as the state of the focus, influence the number of moths caught in traps. Pheromone traps can be used to predict pest population dynamics so that measures can be taken as soon as the population starts to increase.
EEast; PHEROMONE TRAPS, TEMPERATURE, WEATHER

30 Amirkhanov, D.V. 1983.
Biological activity of a disparlure and prospects of its application for gypsy moth control. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Leningrad. 22 p.
-- Disparlure, a sex attractant of the gypsy moth, was tested at concentrations from 0.05 to 5.0 micrograms in traps of different types. Cylindrical traps baited with 5.0 micrograms of pheromone per trap were most effective. Disparlure can be particularly effective in controlling the pest population in a latent period and it can be used to control changes in the population dynamics of the gypsy moth.
EEast; PHEROMONES

31 Amirkhanov, D.V., Zubov, P.A., Krivonogov, V.P., Tur'yanov, P.A., Chernikova, O.P. 1981.
The use of disparlure and olefin for disorientation of male gypsy moth. In: Tezisy dokladov Vsesoyuznoy nauchno-tekhnicheskoy konferentsii. VNIILM, Moscow: 9-10.
-- In the experiments on disorientation of gypsy moth males carried out in Bashkiria, both disparlure and its predecessor, olefin, were used. The amount of disorientation was based on the number of moths caught with disparlure sticky traps in the plots exposed to treatment compared to the number in the control. Disorientation was 99.6% in the plot treated with disparlure and 100% in the plots treated with olefin. Olefin has a repellent effect for gypsy moth males, so it can be used together with disparlure to decrease the population density of the pest. The density of egg masses in the plot treated with olefin was always lower than in the control plot, but no reliable difference from the control was observed in the plot treated with disparlure. The authors attribute the lack of sterile egg masses in the experimental plots to males responding to both chemical and visual signals produced by the females in nature.
EEast; MATING DISRUPTION, PHEROMONES

32 Amirkhanova, S.N. 1962.
Nutritional substances in the leaves of vigorous and weakened gypsy moth hosts. In: Issledovaniya ochagov vrediteley lesa v Bashkirii. Ufa: 81-95.
-- According to data presented in the literature, gypsy moth larvae can feed on more than 275 plants species.

However, in Bashkiria, they prefer oak, birch, and aspen. It was noted that larvae concentrate in great numbers and develop better in the crowns of weakened trees. The chemical composition (proteins, soluble sugars, and starch) of healthy and weakened (diseased, injured) oak leaves was affected by unfavorable weather conditions and tree injuries.
EEast; FOLIAGE CHEMISTRY, HOST PLANTS

33 Amirkhanova, S.N. 1962.
Plant chemistry and gypsy moth survival. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 3-7.
-- The effect of nitrogen content in the leaves of food species on survivorship of gypsy moth larvae was studied. Admissible nitrogen content was found to be in the range of 12-23%, the optimum range being 17-18%. First-instar gypsy moth consumed somewhat more nitrogen (up to 23%). The optimum amount of nitrogen is different depending on the adjustment of the metabolism of different insect species. Activity of the enzyme systems of oak and birch after injury also was studied. Larvae were found to develop better on injured trees, but died on trees that earlier had been completely defoliated. Also considered is the role that specialized plant substances such as alkaloids, tannins, etc., play in the processes of feeding stimulation and metabolism of phytophages.
EEast; ENZYMES, FOLIAGE CHEMISTRY, NUTRITION

34 Anderson, M. 1880.
The gypsy moth in the second part of Schipovaya pine wood in Voronezh Region. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (2):125-131.
-- Detailed ecological characteristics of the gypsy moth life cycle are given. Females were found to oviposit on all sides of tree trunks and prefer dead, standing trees to living ones. There were no egg masses in young stands. Destruction of egg masses was suggested as the principal control measure.
ECentral; CONTROL, EGG MASSES, OVIPOSITION SITE, STAND COMPOSITION

35 Anderson, M. 1895.
Pest insects in the forests of Saratov Region. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (2):121-126.
ECentral; PEST LIST

36 Andreev, I.I. 1959.
Some biological patterns of the gypsy moth. In: Trudy Moskovskogo obshchestva ispytateley prirody im. N.K. Krupskoy. O pochvakh, dubravakh, neparnom shelkopryade i shmelyakh. Moscow: 57-61.
-- The gypsy moth is listed along with other pests of deciduous trees, primarily oaks, in the forests of Saratov Province.
ECentral; GENERAL BIOLOGY

37 Andreev, V. 1916.
Garden pest insects and yield prospects in Podol Region in 1916. Podol'skiy khozyain. (7-8):29-31.
-- The gypsy moth is listed among the pests of fruit-bearing species of Podolsk Province.
ECentral; PEST LIST

38 Andreeva, G.I., Lyashenko, L.I., Molchanova, V.A. 1976.
Vinylfosfat - a prospective insecticide. Zashchita rasteniy. (12):26.
-- Vinylphosphate, an analogue of Gardona™ (tetrachlorvinphos), is a contact stomach poison. When used against early gypsy moth instars it causes 96% to 98% mortality. Vinylphosphate was more efficacious than other preparations because of its longer residual activity.
EWest; CHEMICAL INSECTICIDES

39 Anichkova, P.G. 1971.
The theory of application attractants for gypsy moth control. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Moscow: 9-12.
-- Data are given on sexual activity of the gypsy moth in the Voronezh district, the number of copulations from males, the effect of repetitive matings on oviposition, and time of sexual activity of adults over a 24-hour period. These data form the basis for use of attractants to manage and control gypsy moth populations.
ECentral; MATING

40 Anichkova, P.G. 1972.
Study of the mating activity of the gypsy moth and the green oak tortrix for forest protective purposes. In: Trudy Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk. Zashchita lesa ot vrediteley i bolezney. Moscow: 102-105.
-- Females and males of the gypsy moth reach sexual maturity at different times after eclosion. It takes at least 7-9 hours after eclosion before males can mate, while females can mate immediately. Males are most active 25-30 hours after eclosion. To oviposit, gypsy moth females need one, and sometimes two matings. More matings disturb normal oviposition. Males can copulate 7-8 times and fertilize 5-6 females.
ECentral; MATING

41 Anichkova, P.G. 1982.
Pheromones and their application for gypsy moth management and control in oak groves in the Central Chernozemye zone. (Feromony i ispol'zovaniye ikh dlya nadzora i snizheniya chislennosti neparnogo shelkopryada v dubravakh Tsentral'nogo Chernozemnogo rayona.) Voronezhskii Lesotekhnicheskii Institut, Voronezh. 31 p. (Deposited Document. VINITI N 2009-82 dep.)
-- Data are given on use of sex pheromones of gypsy moth for determining the flight season and control of population dynamics. During the eruption phase of an outbreak, disparlure at a concentration of 0.5 microgram and xylene extracts from wild and laboratory-reared females can be used. During the prodromic phase, disparlure concentration must be increased to 5-50 micrograms. The number of males caught in traps depended on weather conditions, time of the day, kind of attractant, and phase of species gradation. The numerical relationship between the number of males and the population density of the species in the stand (by egg masses) and the threat of defoliation was determined.

When the number of egg masses is 1.3-1.5 per tree and more than 300 males per trap are caught during the flight season, the threat of defoliation is 25-30% . When the number of gypsy moth egg masses decreases to 0.7-0.8 per tree and up to 100 males are caught in traps during the flight season, there is no threat of defoliation.
ECentral; EGG MASSES, MODELS, NUMERICAL DATA, PHEROMONE TRAPS, PROGNOSIS, SAMPLING

42 Anikina, Z.L. 1980.
Gypsy moth management. Zashchita rasteniy. (1):40.
-- It is suggested that traps with disparlure, a gypsy moth pheromone, should be widely used. Traps can be used to outline exactly the borders of the pest population over a large territory, to detect the beginning of an outbreak, and to predict harmful effects. A drawing of the trap is given.
ECentral; PHEROMONE TRAPS

43 Anonymous 1893.
The gypsy moth. In: Opisaniye naiboleye vrednykh lesam nasekomykh v yuzhnoy polose Rossii. Lesnoi departament, St.Petersburg: 7-8.
-- Twelve pest species, including the gypsy moth, are briefly described. Color tables are given.
ECentral; PEST LIST

44 Anonymous 1949.
The gypsy moth, *Ocneria dispar* L. In: Vrednyye zhivotnyye Sredney Azii. (Spravochnik). Moscow: 181-182.
-- The gypsy moth is regarded as a serious pest. Its ecology and ocurrence in Middle Asia are outlined.
MAsia; GENERAL BIOLOGY

45 Anonymous 1957.
The gypsy moth and measures for its control. (Neparnyy shelkopryad i mery bor'by s nim.) Vserossiiskoe obshchestvo sodeistviya okhrane prirody i ozeleneniju naselennykh punktov, Ramenskoe. 8 p.
-- General article that gives recommendations for gypsy moth control.
ECentral; CONTROL

46 Anonymous 1981.
A guide on methods of controlling the gypsy moth and on predicting its numbers in Moldavian forests. (Rukovodstvo po metodam nadzora za neparnym shelkopryadom i prognoza ego chislennosti v lesakh Moldavii.) Lesokhozyaistvennoe nauchno-proizvodstvennoe ob"edinenie "Moldles", Kishinev. 14 p.
-- Data are given on gypsy moth biology, phenology, and behavior in the forests of Moldavia. Also included is information on major food plants, survival stations, methods to monitor the period between outbreaks to predict future outbreaks, and pest control measures.
EWest; CONTROL, HOST PLANTS, PROGNOSIS

47 Anonymous 1988.
Detailed instructions for use of virus preparation virin-ENSh against gypsy moth in the garden. (Metodicheskiye ukazaniya po primeneniyu virusnogo preparata virin-ENSh v zashchite sada ot neparnogo shelkopryada.) OOP Ukrinformagroproma, Kiev. 10 p.
-- The pest is briefly characterized, and problems of biological methods, particularly application of a virus preparation, are discussed. Properties of the preparation of virin-ENSh and application technology are described. Methods are suggested to inventory gypsy moth, to estimate biological efficacy of the preparations, and to detect residual activity in the environment. The focal method of application of the virin-ENSh preparation was very effective, with pathogens remaining in the foci for 3 years. Economic and social implications are significant, since chemical treatments are reduced.
EWest; FOCI, MICROBIAL PESTICIDES, VIRUS

48 Apostolov, L.G. 1981.
Pest insect fauna of forest biogeocenosis of Central Pridneprovie region. (Vrednaya entomofauna lesnykh biogeotsenozov Zentral'nogo Pridneprov'ya.) Vischa shkola, Kiev. 231 p.
-- Gypsy moth foci in the Central Dnieper Region are described on pages 99-104. Fecundity ranges from 114 to 1015 eggs per cluster with an average of 394 eggs. In the ordinary black soil subzone, most egg masses are located on the butt of tree trunks, less than 1 m from the soil. In the brown soil subzone, gypsy moth females prefer to oviposit on the trunks of shrubs, *Acer tatarica* in particular. The northwestern side of trunks is preferred for oviposition. Species commonly defoliated are *Quercus robur* L. (early form), *Ulmus* spp., and cultivated Rosaceae trees. Moderately defoliated species are *Robinia pseudoacacia* L., and *Populus nigra* L. Less defoliated species are *Acer platanoides* L., *A. pseudoplatanus* L., *Tilia* spp., and the late form of *Q. robur* L. No defoliation occurred on *Fraxinus excelsor* L., *Gleditsia triacansha* L., and the shrubs *Syringa vulgaris* L., *Euonymus verrucosa* Scop., *E. europaea* L., *Amorpha fruticosa* L., and *Caragana arborescens* Lam. In the soil subzone, pupation takes place mainly in the lower part of the crown while in the brown soil subzone, it occurs in cracks and under loose bark of the trunk. Pupal development takes 15-22 days. Adult flight occurs mainly from mid-June to mid-July, but some males were seen at the beginning of August. There were seven predators of gypsy moth, especially *Calosoma sycophanta* L., *C. inquisitor* L., *Xylodrepa quadripunctata* L., and *Dermestes lardarius* F. There were fourteen parasites, especially *Anastatus disparis* Rusch. and *Meteorus versicolor* Wesm.
EWest; FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PARASITES, PREDATORS

49 Aristov, M.T. 1932.
The gypsy moth. In: Vrednyye nasekomyye plodovogo sada. Sel'khozgiz, Moscow and Leningrad: 122-124.
-- All gypsy moth life stages are outlined. The author relates the occurrence of this pest in the USSR with the distribution of oak. Besides oak, the following food plants are mentioned: linden, birch, aspen, poplar, willow, alder, maple, beech, nut, apple, pear, cherry, plum, apricot, and ash. Herbaceous plants and conifers are eaten when the store of other food plants is exhausted. In Turkestan and Crimea, adults fly in June, in the middle part of the USSR they fly in July, and in the north (Kostroma, Leningrad

Province) they fly in late July. Egg masses are located mainly at the butt of the trunk, on the southern, windward side. The maximum size of an egg mass is 500 eggs. Hatching is observed to be prolonged and newly-hatched larvae stay in clusters and later disperse. Control measures include destruction of egg masses and chemical treatment of the trees when larvae are feeding.
EWest, ECentral, MAsia; CONTROL, EGG MASSES, HOST PLANTS, LIFE STAGE DESCRIPTIONS, OVIPOSITION SITE

50 Arkhangelskiy, P.P. 1925.
Studies on insect pests in Turkestan and plant protection against pests. Byulleten' postoyannogo bjuro Vserossiiskikh entomologicheskikh s'ezdov. 2(1):12-18.
MAsia; PEST LIST

51 Arkhangelskiy, P.P. 1941.
Fruit crop pests in Uzbekistan. (Vrediteli plodovykh nasazhdeniy Uzbekistana.) Gosizdat Uzbekskii SSR, Tashkent. 51 p.
MAsia; PEST LIST

52 Artamonov, S.D. 1980.
Landscape and biotopic location and trophic relations of the Far East sarcophagids. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. 10(2):29-35.
-- *Agria punctata, Robineauella pseudoscoparia, Parasarcophaga harpax, Parasarcophaga tuberosa*, and *Parasarcophaga uliginosa* are among the gypsy moth parasites listed.
Far East; PARASITES

53 Artamonov, S.D. 1985.
The predaceous flesh flies (Diptera, Sarcophagidae) in the southern Far East. In: Fauna i ekologiya nasekomykh Primor'ya i Kamchatki. DNTs AN SSSR, Vladivostok: 11-24.
-- Trophic relations, geographical distribution, biotic fitness, and behavioral traits are considered for the larvae and adults of 21 species of Sarcophagidae. Eight species are gypsy moth parasites, *Agria monachae, A. affinis, Parasarcophaga harpax, P. subharpax, Robineauella pseudoscoparia, Kramerea schuetzei, Phallosphaera konakovi*, and *Sarcorohdendorfia antilope*. The species most active in gypsy moth foci are, *P. harpax, R. pseudoscoparia*, and *K. schuetzei* which destroyed from 25 to 44% of the pupae. In some foci, sarcophagids destroyed 92-93% of the pupae. Sarcophagids also attacked such dangerous pests as *Dendrolimus sibiricus*, fruit miner, and leaf-hopper. The author does not recommend the use of sarcophagids as a biological agent to control pests as they are inclined to synanthropization, with all the resulting consequences.
Far East; BIOLOGICAL CONTROL, PARASITES

54 Artyukhovskiy, A.K. 1958.
Examination of artificial infection of the gypsy moth larvae with the soil mermithid, Hexamermis albicans Sieb. In: Tezisy dokladov na Vsesoyuznom soveshchanii po pochvennoy zoologii. Izd. AN SSSR, Moscow: 37-40.
-- Mermithids of phyllophagous lepidopterous insects in the forests of Voronezh Province have been studied since 1952. Nine species of helminths in six genera were found. The gypsy moth was attacked by *Hexamermis albicans* and *Complexomermis elegans*. In the pest foci, total infection was 20%. Infection by mermithids was 20%, 20%, 15%, 4%, 1%, and 0%, respectively, for the first to the sixth instars. Less infection of the older larvae is accounted for by the emergence of the helminths. There were from 1 to 8 helminths per host. After the helminths emerged, 100% of the hosts died.
ECentral; NEMATODES, NUMERICAL DATA

55 Artyukhovskiy, A.K. 1960.
Biology of the nematode *Hexamermis albicans* Sieb., a parasite of some lepidopterous pests in Voronezh region. In: Nauchnyye zapiski Voronezhskogo lesotekhnicheskogo instituta. Voronezh: 49-52.
-- The biology is given of the mermithid, *Hexamermis albicans*, a parasite of gypsy moth, winter geometrid, green oak leaf roller, and other lepidopterous pests of deciduous species in the steppe zone. In some cases, 20 to 30% of caterpillars were parasitized and there were 7 to 8 parasites per host. Life cycle of this nematode lasts for a year and consists of 5 stages, embryonic, preparasitic, parasitic, and postparasitic (larval and imaginal). All life stages of the parasite are described.
ECentral; NEMATODES

56 Artyukhovskiy, A.K., Kharchenko, N.A. 1971.
Mermithid introduction within an area as a method of biological control of forest insect pest. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Moscow: 14-18.
-- Mermithids are effective parasites of many insects such as Orthoptera, lamellicarn beetles, and Lepidoptera including the gypsy moth. From 40 to 100% of the hosts are infested with up to 30 parasites per host. Introduction of mermithids is a preventive measure for limiting the pest population. When parasites are introduced into different parts of the area, it is important to consider their ecological needs of soil quality, humidity, and vegetation cover.
ECentral; BIOLOGICAL CONTROL, NEMATODES, PEST LIST

57 Ashimov, K.S. 1987.
Distribution patterns of gypsy moth egg masses in nut forests of south Kirgizia. In: Ecologiya i zashchita lesa. Leningradskaya lesotekhnicheskaya akademiya, Leningrad: 61-64.
MAsia; OVIPOSITION SITE, SAMPLING

58 Ashimov, K.S., Marushina, N.G. 1986.
Gypsy moth in nut forests of south Kirgizia. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 138-140.
-- Reports are given of aggregations of various pest species in the nut forests of Kirgizia, with their subsequent invasion into agrocenoses. High concentrations of pests on different plant species, including orchards, is due to the purity of stands as well as to heavy application of chemical insecticides that kill parasites and predators.

Data on certain species in connection with the dates of treatment also are included.
MAsia; CHEMICAL INSECTICIDES, STAND COMPOSITION

59 Avakyan, G.D. 1956.
Entomofauna of forest shelter belts in Armenia. In: Zoologicheskiy sbornik. Erevan: 59-124.
-- The gypsy moth is mentioned as a pest of forest shelter belts in Armenia. Its favored host is Elaeagnus angustifolia. An outline of the pest ecology is included.
Caucasus; ECOLOGY, HOST PLANTS

60 Avdeeva, Ye.A. 1936.
Leaf chewing pest insects of silvicultural plantations of the USSR. In: Glavneishiye vrediteli i bolezni sel'skokhozyaystvennykh kul'tur v SSSR, obzor za 1935 g. Leningrad: 382-396.
-- The gypsy moth is listed among seven major phyllophages. Its outbreaks were observed in eastern parts of forest steppe and steppe regions of the USSR (Ukraine, the Volga banks, Georgia, Kazakhstan, Uzbekistan). There are foci with very high population density and 100% defoliation. High population density of the pest is predicted for 1936.
EWest, ECentral, MAsia; DISTRIBUTION

61 Averin, V.G. 1912.
Pest damage expected in 1913. Entomologicheskiy i fitopatologicheskiy zhurnal Khar'kovskoy gubernii. (1):1-6.
-- The gypsy moth is mentioned along with other agricultural and forest pests. The increase in its population density in some foci is considered to be a potential source of forest injury.
EWest; PROGNOSIS

62 Averin, V.G. 1912.
Pest group described in Charkov Region in 1912. Entomologicheskiy i fitopatologicheskiy zhurnal Khar'kovskoy gubernii. (1):10-65.
-- The gypsy moth is mentioned as one of the pests of tree and shrub stands in Kharkov Province. Ecology and morphology of the pest, the principal food species, and control measures such as scraping off egg masses and treating them with petroleum, are described briefly.
EWest; GENERAL BIOLOGY

63 Averin, V.G. 1913.
Pest control on fruit trees in autumn. Entomologicheskiy i fitopatologicheskiy zhurnal Khar'kovskoy gubernii. (7):1-4.
-- Collecting and burning of egg masses of the pest or treating egg masses with petroleum are recommended measures of gypsy moth control.
EWest; CONTROL, EGG MASSES

64 Averin, V.G. 1919.
The main pests of silvicultural plantations and their control. (Vazhneyshiye vrediteli sel'skokhosyaystvennykh kul'tur i mery bor'by s nimi.) Izdatel'stvo Sojuz, . 142 p.
-- The gypsy moth is listed among 12 species of lepidopterous pests of plantations. Data on the species ecology are given in brief, and the outbreak of 1910-1911 is described. Recommended ways to control gypsy moth are collecting and destroying the egg masses, and putting sticky belt traps around tree trunks during the hatching period.
EWest; CONTROL, ECOLOGY

65 Averin, V.G. 1925.
What do we expect in 1925? Zakhyst roslin. (1-2):8-11.
-- Prediction of the population levels of some agricultural pests including the gypsy moth is made. Considerable increase in the population of the gypsy moth has been observed in the stands of Kharkov Province where previously only individual specimens could be found. It is suggested that an outbreak could occur and that attention should be given to the situation.
EWest; PROGNOSIS

66 Averkiev, I.S. 1939.
Study of the gypsy moth in the forests of Middle Povolzhye. Lesnoye khozyaystvo. (11):50-53.
-- Gypsy moth population dynamics were followed in several regions of the European USSR in the 1930s. In the Crimea, outbreaks were noted in 1930-1931. In 1932-1935, high population levels of the pest were observed in the lower reaches of the Volga River, in Kuibyshev, Gorki, and Odessa Provinces, and in Tatar, Chuvash, Mari, and Bashkir Autonomous Republics. A second, weaker outbreak was observed in Tataria in 1937. Both outbreaks in Tataria occurred after dry years. Data are given on phenology of the pest in Tataria, behavior of females during oviposition, and the locations where foci take shape. Parasites are noted as causing significant damage to the pest population; more than 80% mortality was observed in the foci due to entomophages and diseases. Injured trees had a loss of increment but no tree mortality was observed in the foci.
ECentral, EEast; FOCI, OUTBREAKS, TREE HEALTH

67 Averkiev, I.S. 1939.
On role of the common hill ant, *Formica rufa* L., in the foci of gypsy moth, *Porthetria dispar* L. Priroda. (10):70-71.
-- From brief observations made during a gypsy moth outbreak, it was concluded that foraging of the red ant, *Formica rufa* L., destroys a great number of tachinid parasites of the gypsy moth, but the ant does not attack the pest larvae. Hence, the author believes that in the foci of the gypsy moth, ants have a positive effect on the pest population.
ECentral; PARASITES, PREDATORS

68 Averkiev, I.S. 1939.
Study of egg masses and eggs of the gypsy moth (*Porthetria dispar* L.). In: Sbornik trudov Povolzhskogo lesotekhnicheskogo instituta. Yoshkar Ola: 76-88.
ECentral; EGGS, EGG MASSES

69 Averkiev, I.S. 1940.
Gypsy moth oviposition sites. In: Sbornik trudov Povolzhskogo lesotekhnicheskogo instituta. Yoshkar Ola: 110-122.
-- Data are given on the distribution of gypsy moth egg masses in the stands of the Middle Reaches of the Volga

River. Females are noted to oviposit mainly on the butt of the tree (20 cm to 25 cm). Oviposition above 1 m was observed in "plavnis" (willow stands) and could be due to higher humidity. Females also appeared to prefer sheltered places for ovipositing. When they oviposited on exposed tree trunks, they chose the south side. In foci, gypsy moth egg masses can be found on every tree species, but birch and linden are preferred. The food plant most preferred by the gypsy moth is oak, followed by birch, apple, and aspen. The population level of the pest first increases on the southern slopes of hills and at the forest edges. In the course of an eruptive phase, foci shift to the northern slopes and to the plains. Parasites and diseases are of great importance for controlling the population.
ECentral; HOST PLANTS, OVIPOSITION SITE, SITE CONDITIONS

70 Averkiev, I.S. 1984.
Atlas of the most dangerous forest insects. (Atlas vredneyshikh nasekomykh lesa.) Lesnaya promyshlennost', Moscow. 72 p.
-- A reference book with 32 color tables depicting more than 100 species of the most harmful forest insects, including the gypsy moth. Distribution, behavior, and control measures are given.
EWest, ECentral, EEast; PEST LIST

71 Avetyan, A.S. 1952.
***Porthetria dispar* L. (*Lymantria, Ocneria dispar*) - the gypsy moth.** In: Vrediteli plodovykh kul'tur Armyanskoy SSR. Izd. AN Armyanian SSR, Erevan: 120-121.
-- This pest can be found almost everywhere in Armenia. It attacks forest species and orchards, including apple, pear, quince, plum, elaeagnus, and cherry. The distribution of egg masses is different in different years. Usually, egg masses were located on the trunks and thick boughs, but some egg masses were found under loose stone walls, and contained from 75 to 332 eggs. Larvae hatched in late April or early May, pupation took place from late June to early July, and adults fly in August. Larvae fed at night and during the day found shelter under loose bark at the butt of the tree, in stone walls, and other dark places in clusters of 20 to 30 individuals; pupation takes place under stones. Larvae generally feed on leaves, but during outbreaks they also eat fruit.
Caucasus; FECUNDITY, HOST PLANTS, OVIPOSITION SITE

72 Avramenko, I.D., Prokopenko, N.I., Mezentsev, A.I., Kucheryavenko, V.I., Minyaylo, V.G. 1981.
Effect of insect pests on the establishment and productivity of oak stands. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnjus: 4-6.
-- The sequence in the decline in health of English oak in the Ukraine is described as beginning with defoliation in May and June followed by mildew of 80% of the new leaves. This causes loss of resistance to xylophages and fungi, no late wood formation and loss of resistance to low temperatures.
EWest; TREE HEALTH

73 Avtukhovich, Ye.V., Belov, A.N. 1988.
Effect of defoliation on radial wood growth of an oak tree. Izvestiya Timiryazevskoy sel'skokhozyaistvennoy akademii. (2):192-196.
-- Radial growth dynamics of wood was studied in middle-aged second oak growths in the Saratov Province that are attacked every year by a phyllophagous complex, primarily the green oak leaf roller and the gypsy moth. The degree of leaf injury caused by phyllophages and the hydrothermal conditions in May and June were regressed on the growth loss. Total growth loss was 63.4%, of which more than half was accounted for by the regression analysis on the activity of phyllophagous insects.
ECentral; TREE GROWTH

74 Azimov, T.N. 1982.
Entomophages of the gypsy moth. Zashchita rasteniy. (2):1-41.
-- Natural enemies in the families Telenomidae, Braconidae, Pteromalidae, Dermestidae, and Carabidae, were most effective in the mountain ranges of Uzbekistan. *Calosoma* spp. were especially important. In 1977, an outbreak of the gypsy moth in Tashkent Province was almost completely suppressed principally by *Calosoma sycophanta*. On each tree infested by gypsy moth larvae, there were 3 to 8 beetles. When given a choice in the laboratory, *C. sycophanta* always preferred gypsy moth larvae to silkworm, hawthorn moth, and leaf-trumpet larvae.
MAsia; PARASITES, PREDATORS

75 Baganich, M.I. 1968.
The ecological and biological features of the main leaf-eating insects in the forests of Carpathians. In: Zakhist Karpats'kikh lIslv vid khvorob i shkldniklv. Uzhgorod: 31-37.
-- There are as many as 300 oak-related insect species but in Zacarpatye Province the following species are of the greatest importance: gypsy moth, tent caterpillar, oak eggar, browntail moth, winter geometrid, and green oak leaf roller. In Zacarpartye Province, the gypsy moth is heavily attacked by Diptera sp. and Hymenoptera sp. parasites. The tent caterpillar is often attacked by parasites and diseases, and leaf rollers are often attacked by ichneumonids and tachinids.
EWest; PARASITES, PEST LIST

76 Baganich, M.I. 1968.
Prospects of biological control of folivorous forest pests. In: Zakhist Karpats'kikh lisi vid khvorob i shkidnikiv. Uzhgorod: 83-88.
-- The biopreparation, entobacterin-3 from *Bacillus cereus galleriae*, was used in its pure form and with insecticides on larvae of the gypsy moth, the browntail moth, and the green oak leaf-roller. In the laboratory, the mortality of larvae living in the open was 100%, the mortality of early instars of the leaf roller instars was 80% to 90%, the mortality of late instars was 20% to 40%. In the field, the mortality of leaf roller larvae was 30% to 45%. When pesticides were added, mortality increased. Entomophages of the pests did not die when bacterial preparations were used.
EWest; BACTERIA, MICROBIAL PESTICIDES,

MORTALITY

77 Baganich, M.I. 1981.
Oak defoliators and their control measures in the conditions of Zacarpatye Region. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnjus: 6-9.
-- About 40 insect species, 30 of which are Lepidoptera, are considered to be pests of oak in Zakarpatye Province. One of the most important phyllophages is the gypsy moth, which has regular outbreaks in the forests of the Province. Chemical control has not reliably protected oak groves because the complex of phyllophages present has asynchronous development. Moreover, application of highly toxic insecticides resulted in the elimination of most entomophages, thus causing deterioration of the state of forest cenoses and longer outbreaks. The author suggests using biological preparations in their pure form or with small amounts of pesticides to control a complex of lepidopterous pests.
EWest; CONTROL, PEST LIST

78 Baganich, M.I. 1988.
The gypsy moth, a pest of oak groves in the Carpathians. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Krasnoyarsk: 21-22.
-- In the region of the Ukrainian Carpathians, the gypsy moth is abundant in Zakarpatye and Chernovtsy Provinces. As a rule, its harmful effect is manifested in the weakening of broad-leaved forests growing close to towns and villages. The favored food plant is oak but when the population level is high larvae also feed on the leaves of other available species: hornbeam, beech, linden, wild fruit- bearing trees, hawthorn, blackthorn, and even on the grass in the forest. Hatch takes place in late April-early May when early oaks come into leaf and blackthorn is in blossom. If there is a choice of food species larvae prefer the one on which their parental generation developed. Late instars are mostly dark-grey and light-grey, there are fewer red-yellow larvae, and few individuals have only a black stripe along the back. Pupation lasts from mid-June to mid-July under various shelters. Female fecundity is up to 1500 eggs, with an average egg weight 0.49-0.82 mg. The main parasites are *Parasetigena silvestris, Compsilura concinnata, Apanteles liparidis, A. solitarius, Pimpla* sp., *Apechtis* sp., and *Trogus* sp. This complex of parasites destroys up to 90% of the pest population. Active predators are bugs *Allothrombium fuliginosum, Calosoma* and *Xylodrepa quadripunctata* beetles.
EWest; COLOR POLYMORPHISM, FECUNDITY, HOST PLANTS, PARASITES, PREDATORS

79 Baganich, M.I., Meshkova, V.L. 1980.
The use of the virin-ENSh virus preparation for gypsy moth control in oak groves of Zakarpatye Region. In: Tezisy dokladov 2-go s"yezda Ukrainskogo entomologicheskogo obshchestva, Uzhgorod. Issledovaniya po entomologii i akarologii na Ukraine. Kiev: 176-177.
-- The preparation was effective when egg masses were sprayed before the greater part of gypsy moth larvae hatched. The efficacy was 84-86 %. Treatment of egg masses made hatching more active but larvae stayed on the surface of egg masses longer, started feeding unwillingly, and lagged behind control larvae in growth and development. Insects died throughout the life cycle of the pest.
EWest; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

80 Bahmetyev, P.Ye. 1902.
The gypsy moth. Trudy Russkogo entomologicheskogo obshchestva. 35:356-466.
-- Gypsy moth adults were common during July-August in Sofia, Bulgaria. In the spring of 1900, 45 foresters officially reported that larvae were numerous in a many forests but they died due to wet, cold weather.
EWest; WEATHER

81 Bakhvalov, S.A. 1989.
The use of baculovirus and the bacterial prepapation "lepidocide" for suppression the nun moth foci *Lymantria monacha* L.: results and perspectives. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Moscow: 139-145.
-- Nuclear polyhedrosis virus and "lepidocide" were tested in the pest foci in pine stands of West Siberia and Kazakhstan. It was only in the foci at the eruption phase that protective measures using a nuclear polyhedrosis virus were successful. Efficiency of lepidocide was highest (79.4%) at the eruption phase of an outbreak. The advantage of lepidocide is that it has a shorter incubation period (about 5 days) than the nuclear polyhedrosis virus. Lepidocide, however, has a slight negative effect on natural enemies of the pest while nuclear polyhedrosis virus is harmless for parasites and predators. A combined application of a nuclear polyhedrosis virus and lepidocide was better than their separate applications.
WSiberia, MAsia; MICROBIAL PESTICIDES, VIRUS

82 Bakhvalov, S.A., Bakhvalova, V.I., Larionov, G.V. 1981.
Development of virus infection in hemocytes of gypsy moth larvae and their hemogram dynamics during nuclear polyhedrosis disease. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 133-136.
-- In gypsy moth larvae, a nuclear polyhedrosis virus first affects plasmocytes, then granulocytes and endocytes. The work was carried out on a laboratory culture. The course of disease was observed for larvae infected in the third-instar and for larvae exposed to an extreme temperature, 2° C, for 48 hours. No differences in hemocyte injury dynamics or virus morphogenesis in the larvae of either group were found. When the larvae were infected or when the latent infection was activated, high variability of the hemocyte formula was observed; therefore no statistically reliable data were obtained.
WSiberia; HEMOLYMPH, HISTOLOGY, VIRUS

83 Bakhvalov, S.A., Bakhvalova, V.I., Larionov, G.V. 1981.
Nuclear polyhedrosis in the gypsy moth (*Lymantria dispar* L., Lepidoptera: Lymantriidae): development of virus infection in hemocytes and dynamics of hemogram changes. Izvestiya Sibirskogo otdeleniya

Akademii nauk SSSR, seriya biologicheskikh nauk. 15(3):132-140.
-- Larvae under experiment were either infected with polyhedrosis, fed with food treated with polyhedral suspension, or latent virus infection was activated by exposure to cold temperature. Two days after infection, withdrawal of hemolymph was started and hemograms were made. After 4 days, definite changes in the hemogram were observed, which is evidence of developing virus infection. The course of disease is similar in both cases, but it is slower when the latent virus is activated.
WSiberia; HEMOLYMPH, VIRUS

84 Bakhvalov, S.A., Bakhvalova, V.N., Larionov, G.V. 1982.
The polykarycytes in the hemolymph of gypsy moth, *Lymantria dispar*, larvae with nuclear polyhedrosis. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. 2:125-129.
WSiberia; HEMOLYMPH, VIRUS

85 Bakhvalov, S.A., Devet'yarova, S.V. 1980.
Morphogenetic features of baculoviruses during general polyhedrosis of some Lepidoptera at infection. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (1):58-65.
-- Insects were orally infected with nuclear polyhedrosis viruses administered with food or with a micropipette. Disease signs become evident when the virus invades large numbers of fat body cells, tracheal epithelium, hypodermis and hemocytes. No virus replication was observed in muscle or nerve cells, precursors of sex cells, cells of silk glands, or Malpighian tubules.
WSiberia; HISTOLOGY, VIRUS

86 Bakhvalov, S.A., Larionov, G.V., Bakhvalova, V.N. 1982.
Microscopic study of induced baculovirus infection dynamics in the gypsy moth larvae (*Lymantria dispar* L., Lepidoptera: Lymantriidae). Molekulyarnaya biologiya. 31:64-73.
-- After latent virus infection is activated in the larvae by cooling, nuclear polyhedrosis virus replication starts in epithelial cells of the trachea and the fat body. Somewhat later, a similar process occurs in the hypodermis and hemocytes. First, the virus multiplies in solitary tissue cells mosaically as islands, later infection spreads throughout the tissue. Still later, the virus multiplies in epithelial cells of tracheas and trophocites inside different organs, thus providing further generalization of infection. No synthesis of the virus in muscle, nerve, or sex cells, as well as silk gland cells and Malpighian tubules was observed. In some virotropic cells the virus multiplied in cytoplasm.
WSiberia; HISTOLOGY, VIRUS

87 Bakhvalov, S.A., Larionov, G.V., Bakhvalova, V.N. 1982.
Recovery of *Lymantria dispar* L. (Lepidoptera: Lymantriidae) after artificial virus infection. Entomologicheskoye obozrenie. 61(4):755-758.
-- Some part of the insects infected with a nuclear polyhedrosis virus stopped developing. Although the virus multiplied in hemocytes after infection, no virus was found in the imaginal stage. No reliable differences in the fecundity of the insects or of the controls after infection were revealed.
WSiberia; FECUNDITY, HISTOLOGY, VIRUS

88 Ballion, Ye.Ye. 1873.
The most dangerous agricultural insects in Kherson Region. In: Sbornik Khersonskogo zemstva. Kherson: 21-26.
-- Among other major pests of horticulture, the author mentions the gypsy moth.
EWest; PEST LIST

89 Bal'man, R.A., Azizbekyan, P.P. 1988.
Physical and chemical peculiarities of bacteriophages in crystal forming microorganisms used for gypsy moth control. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 34-35.
-- The strains of *Bacilus thuringiensis* H-I-insectus used to control gypsy moth populations are resistant to many phages of other serotypes of the species. To extend the range of phages lysing certain strains, 14 phage strains were extracted from different elements (soil, litter, needles) of forest biocenoses in Tuva. By the phage reference, they have morphology of groups A-I, B-I. According to their structural peculiarities, phages are divided into 3 subgroups. The study also has shown that phages that are morphologically analogous, belonging to one bacterial species, can have certain domains of homology in DNA molecules.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

90 Balog, A.Ya. 1968.
Changes in neurosecretory brain cells of lepidoptera during insecticide application. In: Naukovi pratsi USGA. Borot"ba z shkidnikami ta khvorobami roslin. USKhA, Kiev: 74-79.
-- When fifth-instar browntail moth, gypsy moth, tent caterpillar, and silkworm are treated with DDT or chlorophos rogor, changes occur in the structure and morphology of medial neurosecretory cells. Protoplasm granulation becomes much less pronounced, and neurosecretory granules coalesce to yield a structureless homogenous mass. Neurosecretory cells swell and eventually become partially elongated. Medial neurosecretory cells of normal larvae are observed to produce neurosecreta; this is not seen in larvae treated with insecticides.
EWest; CHEMICAL INSECTICIDES, NEUROLOGY

91 Baranchikov, Yu.N. 1980.
Effect of feeding preference in phytophagous insects: energetic approach. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 8-9.
-- Experiments carried out on larvae of satin moth, gypsy moth, and *Dendrolimus sibiricus* showed that insects developing on a certain plant species utilized the food

more effectively than those fed leaves of different plant species. When the food species is changed, digestive and detoxication systems of the larvae are "readjusted" and a certain amount of energy is needed each time. Having a choice, Lepidoptera larvae often were observed to refuse to change to new, even more favorable food, preferring to feeding on the one previously offered.
WSiberia; BEHAVIOR, ENERGETICS, FEEDING, NUTRITION, REARING

92 Baranchikov, Yu.N. 1981.
Energy expenditures in gypsy moth, *Lymantria dispar*, larvae during food plant change. Vestnik zoologii. (1):81-82.
-- A significant decrease in relative growth rate due to increased metabolic costs was observed when 4th instar gypsy moth were switched from birch leaves to larch needles. No such decrease occurred when larvae were switched from bird cherry to larch. Bird cherry and larch have more biologically active secondary compounds than birch.
WSiberia; BEHAVIOR, ENERGETICS, FEEDING

93 Baranchikov, Yu.N. 1981.
Mechanisms of preadaptation to new food plants by the larvae of dendrophilous Lepidoptera. In: Biologicheskiye aspekty izucheniya i ratsional'nogo ispol'zovaniya zhivotnogo i rastitel'nogo mira. Riga: 319-321.
-- Experiments have shown that energy losses occurring when food of the larvae is changed depend on the activity level of insect microsomal oxidases, which are induced by a set of secondary compounds (allelochemicals) of the previous food plant. For the larvae to switch from biologically active food containing a lot of allelochemicals to a more "biologically passive" food plant is less energy consuming than vice versa. The study confirmed the fact that microsomal oxidases become more active as gypsy moth larvae grow older. This phenomenon is also observed in larvae of other dendrophilous Lepidoptera. Less energy is consumed by older larvae in adapting to a different food substrate. This can be regarded as preadaptation to extending the range of food plants. This phenomenon also may account for higher survivorship of late instars treated with organic insecticides compared to survivorship of early instars.
WSiberia; ENERGETICS, NUTRITION, PHYSIOLOGY, REARING

94 Baranchikov, Yu.N. 1982.
Patterns of food consumption and utilization by the gypsy moth during artificial change of food plant species. In: Nepamyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 19-35.
-- When the food plants are changed in experiments on gypsy moth larvae, consumption and utilization of the food undergo considerable changes. Larvae fed on a new species consume more food on the second day than on the first day. Previous food effects consumption as well as its contribution to growth. In addition to the peculiarities mentioned, some other ethological and physiological responses to food change are discussed.
WSiberia; ENERGETICS, FOLIAGE QUALITY, NUTRITION

95 Baranchikov, Yu.N. 1983.
Intrapopulation differences in development of induced trophic behavior in the gypsy moth. In: Dinamika chislennosti i rol' nasekomykh v biogeotsenozakh Urala. UNTs AN SSSR, Sverdlovsk: 3-4.
-- After a week of feeding either on willow leaves or on larch needles, the diet of first instar Siberian and Ukrainian gypsy moth populations was changed to larch needles. As a result, the larvae exhibited induction of feeding preference in relation to the original food plant. Different levels of adaptation to feeding on larch determined the direction of trophic induction in the individuals of different populations. It caused preference induction in Siberian larvae and rejection induction (food aversion learning) in Ukrainian larvae.
WSiberia, EWest; BEHAVIOR, FEEDING

96 Baranchikov, Yu.N. 1983.
Sensory basis of feeding preference induction in gypsy moth larvae. In: Issledovaniye komponentov lesnykh biogeotsenozov Sibiri. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 6-7.
-- Realization of feeding preference induction is experimentally shown to be determined by the information input on maxilla taste receptors of fifth instar gypsy moth larvae.
WSiberia; BEHAVIOR, FEEDING, PHYSIOLOGY

97 Baranchikov, Yu.N. 1983.
The efficiency of consumption of detached needles of the Siberian larch by insects. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (3):112-115.
-- The efficiency of consumption of detached larch needles (the weight of ingested biomass divided by the weight of detached needles) by different species of insects is correlated with their feeding specialization: monophages are more effective. Polyphagous gypsy moth larvae drop to the ground a biomass of needles that is 700 times higher than they consume during instars 1-3, and a biomass that is 10 times higher during instars 5-6.
WSiberia; BEHAVIOR, ENERGETICS, FEEDING

98 Baranchikov, Yu.N. 1983.
Ecological heterogeneity of forest plant shoots and insect herbivory. In: Rol' vzaimootnosheniy rasteniye-nasekomoye v dinamike chislennosti populyatsiy lesnykh vrediteley. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 49-72.
-- The nutritional value of an individual leaf depends not only on its age, but also on its position on the shoot. The author studied the dynamics of leaf growth and changing biochemical composition of neighboring leaves on shoots of trees and shrubs in Siberia. It was shown that the higher the number of the leaf on the shoot (counting from its base), the lower the secondary metabolite concentrations; their growth rate and maturing (comparing the equal stages of leaves' development) also is slower. In free choice tests, final instars of polyphagous lepidopterans (gypsy moth among them) prefer mature leaves, while those of oligo- and monophages prefer

young ones. This tendency is pronounced when using leaves of different ages from the basic part of the shoots. As the position number of the young leaf on the shoot becomes higher, its repellent effect on polyphages significantly decreases. The change in abundance of young and mature leaves during plant growth caused a seasonal shift in polyphages/oligophages ratio: the maximal occurrence of oligophages usually is shifted to the beginning of the vegetation period, while that of polyphages shifted to the end.
WSiberia; FOLIAGE QUALITY, NUTRITION

99 Baranchikov, Yu.N. 1985.
The gypsy moth in the USA. *Lesnoye khozyaystvo.* (9):70-72.
-- Data on the history of gypsy moth introduction and dispersal in the USA are given. The species was accidentally introduced into the country in 1869; the first outbreak was recorded in 1889. During the 1980s, the total forest area infested by the gypsy moth amounted to more than 13 million acres. Preferred food species of the gypsy moth on the continent are American oaks, which are less resistant to the action of the pest than European oaks. The gypsy moth also intensively attacks apple, alder, different birch species, poplar, willow, and some other plants. Since the time when outbreaks started, there have been three complementary directions in gypsy moth control in the USA: biological methods, including introduction of the most promising parasites from the natural habitats of the pest, application of bacterial and viral preparations, pesticides, and sex pheromones. Complex investigations proved that elimination of the gypsy moth on the continent was impossible and internal the quarantine was lifted. Management and control measures should be taken continuously.
REVIEW

100 Baranchikov, Yu.N. 1986.
Study of feeding and growth in two lepidopterous species - birch consumers with different levels of trophic specialization. Zhurnal evolutsionnoy biokhimii i fiziologii. 22(6):584-586.
-- Feeding and growth parameters of late instars of *Lymantria dispar* (a broad polyphage) and Endromis versicolora (a narrow polyphage) were determined when larvae were reared on mature leaves of *Betula pendula*. In the latter species, utilization of food consumed had a more pronounced effect on body tissue growth due to a higher consumption rate. Gypsy moth larvae consume more food, thus compensating for lower efficiency of digestion. As a result, its growth rate is as high as that of *Endromis versicolora*.
WSiberia; BEHAVIOR, ENERGETICS, FEEDING, REARING

101 Baranchikov, Yu.N. 1986.
The role of trophic specialization in feeding efficiency of lepidopterous larvae. Avtoreferat disertatsii kandidata biologicheskikh nauk. Institute of Forest and Wood, Siberian Branch, USSR Academy of Sciences, Krasnoyarsk. 24 p.
WSiberia; ENERGETICS, FEEDING, HOST PLANTS

102 Baranchikov, Yu.N. 1986.
Trophic specialization and efficiency of feeding on leaves of rosaceous shrubs by larvae of two Lepidopterous species. Zoologicheskiy zhurnal. 65:361-368.
WSiberia; ENERGETICS

103 Baranchikov, Yu.N. 1987.
Trophic specialization in lepidopterans. (Trophicheskaya spetsializatsiya cheshuekrylykh.) Instutut Lesa i Drevesiny SO AN SSSR, Krasnoyarsk. 171 p.
-- This monograph discusses experimental studies on the trophic specialization of phytophagous lepidopterous insects. The gypsy moth serves as a standard polytrophic species. Specialized and non-specialized lepidopterans are shown to achieve the optimum growth rate in different ways: quantitative, as a result of increased consumption for polyphages, and qualitative, as a result of effective food utilization for oligophages and monophages. To transfer a unit of energy to the second trophic level, the gypsy moth population (polyphagous) expends more energy than any oligotrophic consumer population. This great expenditure of energy by the gypsy moth is compensated for by flexible behavioral adaptations of the insect determined by the processes of learning and forming of temporary relationships. Asian gypsy moth populations are more polytrophic than European ones, which is due to the increased migratory ability of the species in the eastern part of the area and adaptation to unpredictable environmental conditions.
WSiberia; ENERGETICS, FEEDING, GEOGRAPHIC VARIATION, NUTRITION

104 Baranchikov, Yu.N. 1987.
Energy flow in the habitats of oligo- and polytrophic Lepidoptera - pests of trees. In: Ecologicheskaya otsenka mestoobitaniy lesnykh zhivotnykh. Nauka, Novosibirsk: 40-50.
-- Energetics of polyphagous late instar gypsy moth and oligophages on conifers such as the Siberian moth (*Dendrolimus superans sibiricus*) were compared in the laboratory and in nature. There were significant differences between the two species in the efficiency of utilization of detached needles of larch (*Larix sibirica*). In gypsy moth, 10% of detached needle biomass fell to the ground, 59% formed excrements, 9% were used for larval biomass production, and 22% for metabolism. In the Siberian moth, these figures were 5, 52, 21 and 22, respectively. A brief review of the literature revealed the same tendency when comparing the number of leaf-eating lepidopterans with the more specialized needle-eating ones.
WSiberia; ENERGETICS, FEEDING

105 Baranchikov, Yu.N. 1988.
The gypsy moth: results and prospects of investigations. (Neparnyy shelkopryad: itogi i perspektivy issledovaniy.) Institut Lesa i Drevesiny SO AN SSSR, Krasnoyarsk. 52 p.
-- Included are 45 abstracts presenting information on results of studies of gypsy moth biology and population ecology in various geographical zones of the USSR.

Methods of pest population monitoring and control are considered. Data on parasitic complexes of the gypsy moth in the forests of the European part of the country also are given.
REVIEW

106 Baranchikov, Yu.N. 1988.
Ecological mechanisms of evolutional strategy in gypsy moth population of Northern Eurasia. In: Nepamyy shelkopryad: itogi i perspectivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 6-7.
-- Intraspecies differentiation of the gypsy moth results in formation of ecological races adapted to different habitats and maintaining their independence due to the isolating effect of natural selection. Parapatric divergence is typical both of European and Asian gypsy moth populations, but for the latter it is hindered by high migratory activity of moths and larvae. The study has shown certain differences in the evolution strategy of European and Asian pest populations. Their comparative studies can provide a basis for finding out the role of ecological mechanisms in evolutionary transformations of phyllophagous insect populations.
ESiberia, ESiberia, Far East; GENETICS, GEOGRAPHIC VARIATION, REARING

107 Baranchikov, Yu.N., Doinenko, O.A. 1981.
Diurnal rhythm of feeding in gypsy moth larvae. In: Biologicheskiye aspecty izucheniya i ratsional'nogo ispol'zovaniya zhivotnogo i rastitel'nogo mira. Riga: 321-323.
-- Gypsy moth larvae from a Bashkirian population exhibited a rhythmic character of food consumption (bird-cherry leaves) and body biomass increment, with a clearly defined maximum of 10:00 p.m. and a minimum of 6:00 a.m. Food utilization rate and efficiency of the food conversion for biomass growth were found to have a reliable inverse relation; i.e., the more food utilized within a given time period, the smaller the part of the utilized food converted for body biomass. This may mean that larvae have some compensatory mechanism that provides a relative daily stability of growth processes.
EEast; BEHAVIOR, FEEDING, ENERGETICS

108 Baranchikov, Yu.N., Gurov, A.V. 1984.
Strategy of plant consumption by entomo-consortium in forest biocenosis. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 44.
-- Analysis of distribution dynamics of the phyllophage trophic activity in tree crowns is a fruitful method for establishing functional relations between major trophic levels in a forest biocenosis. While specific interrelations of producers and consumers in any forest community are many and varied, phyllotrophic insects tend to utilize resources stepwise, which suggests that antibiotic factors appear in an injured organ. To avoid them, insects tend to expend energy for the transfer. The phenomenon can be observed as a rigid sequence of the stages by which insects utilize tree leaves independent of the tree species.
ESiberia; FOLIAGE QUALITY

109 Baranchikov, Yu.N., Kravtsov, B.A. 1980.
Morphological analysis of geographic gypsy moth populations by the set of features. In: Kolichestvennyye metody v ecologii zhivotnykh. Nauka, Leningrad: 18-20.
-- An analysis of gypsy moth geographic populations was made on the basis of comparison of indices characterizing relationships of some pairs of uncorrelated parameters of females' forewings. Comparison of populations in pairs by each index produced contradictory results. An attempt was made to compare the samples under study by the set of parameters using Fisher discriminant analysis.
WSiberia; GEOGRAPHIC VARIATION, HOST PLANTS, MORPHOLOGY

110 Baranchikov, Yu.N., Kravtsov, B.A. 1981.
An attempt of morphomethric analysis of geographic gypsy moth populations by the set of features. In: Prostranstvenno-vremennaya structura lesnykh biotsenozov. Nauka, Novosibirsk: 96-112.
-- Ecological and ethological variations of geographical populations of gypsy moth in the temperature zone of the Holarctic region are described. Using multidimensional classification, the authors have shown that the morphological similarity of gypsy moth adults of both sexes in the absolute values and indices of forewing parameters is largely determined by the homogeneity of ecological conditions during preimaginal stages of insect development. In females the wing size and shape have no relation to its functions and are not heritable, unlike other functions.
EEast, WSiberia; FEMALES, FLIGHT, GENETICS, GEOGRAPHIC VARIATION, MORPHOMETRICS

111 Baranchikov, Yu.N., Safonova, L.V., Rizhkova, T.S., Kudashova, F.N. 1991.
Balance of energy and nitrogen in gypsy moth larvae fed on needles of larches, grazed by mining insects. Ekologiya. (6):56-62.
-- Needles of larch (*Larix sibirica*) contain less nitrogen and more phenolics and monoterpenoids after defoliation by mining larvae of larch casebearer (*Coleophora sibiricella*). This decreases the relative growth rate of gypsy moth larvae by decreasing relative rates of plant biomass and nitrogen consumption.
WSiberia; ENERGETICS, FOLIAGE CHEMISTRY, NUTRITION

112 Baranchikov, Yu.N., Vshivkova, T.A. 1979.
Changes in gypsy moth feeding and development after a single DDT application. In: Vliyanie pestitsidov na tayezhnykh zhivotnykh. Institut Lesa i Drevesiny SO AN SSSR, Krasnoyarsk: 66-78.
-- A single treatment of a sublethal dose of DDT to 5th instar gypsy moth significantly reduced the amount of food consumed, the pupal weight, and moth fecundity; the hatching rate did not change compared to the control. Male larvae subjected to the treatment had higher food utilization, while their growth rate decreased, as did the conversion of the ingested food. Differences from the control for female larvae were insignificant.
ESiberia; BIOASSAY, CHEMICAL INSECTICIDES, ENERGETICS, REARING

113 Baranovskiy, P.M., Tinyakov, G.G., Pashovskiy, K.A. 1950.
The gypsy moth - *Porthetria dispar* L. In: Nasekomyye - vrediteli lesov Kazakhstana i mery bor'by s nimi. Izd.AN Kaz.SSR, Alma-Ata: 3-86.
-- Morphology of all life stages is outlined. The flight season of adults is in July-August, and females have low vagility. There are up to 1000 eggs in an egg mass and oviposition occurs at the tree base of various deciduous species. Sometimes eggs are laid on higher parts of the trunk, on stumps, in the litter, on the ground, on stones, etc., with pupation occurring in June. In Kazakhstan, deciduous species (except ash) and conifers are attacked. Oak, linden, maple, bastard acacia, elms, poplar, birch, willow, aspen, larch, pine, and fruit-bearing trees are most often defoliated. A single defoliation results in the loss of growth and no nut crop for a period of 2 years. Multiple defoliation causes weakening, infestation by secondary pests, and death of the tree. Control measures include aerial chemical treatment in late April- May, oiling and collecting of egg masses, as well as applying sticky bands, and activity of insectivorous birds. The level of disease incidence and parasitism should be taken into account; if 50% of the larvae are infected or parasitized no chemical treatment is needed.
MAsia; BIRDS, CONTROL, HOST PLANTS, LIFE STAGE DESCRIPTIONS, OVIPOSITION SITE, TREE GROWTH

114 Bardges, G.D., Hassi, N.U. 1976.
Microorganisms in the control of pest insects and mites. (Microorganizmy v bor'be s vrednymi nasekomymi i kleshchami.) Kolos, Moscow. 546 p.
-- Russian translation of the book on the use of microorganisms in many countries of the world for protecting plants against insects, including the gypsy moth.
MICROBIAL PESTICIDES, PEST LIST, REVIEW

115 Barteneva, Ye.V., Gostjunin, I.V., Persidskaya, L.T. 1974.
Effect of temperature on the feeding rate of gypsy moth larvae. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moskva: 93-96.
-- To establish dates for forest stand treatment determined by weather conditions, optimum temperatures at which gypsy moth larvae fed most actively were tested in the laboratory. Second instars were studied in a climatic chamber and oak seedlings were used as a food plant. As a result, gypsy moth larvae were found to start feeding at a temperature of about 10° C. They fed intensively and their weight increased at temperatures ranging from 15°C to 28°C. Maximum food consumption was observed at a temperature of 27°-28°C. Any treatment with intestine preparations should be made at a mean day temperature of 15°C and higher. At lower temperatures and rainy weather, treatment efficacy decreased.
ECentral; BEHAVIOR, FEEDING, TEMPERATURE

116 Barybkina, M.N. 1979.
Morphological and functional basis of response to sex attractants with special reference to *Lymantria dispar* males. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 22 p.
-- The mechanisms of gypsy moth response to pheromone and signal transmission path in the organism were studied. Numerous trichoid and basiconic sensillas of antennae were found to be the morphological basis for odor reception. They are highly selective, but some of them respond to disparlure, while others respond to similar compounds. After the primary analysis of the stimulus, the signal goes to tne olfactory lobe of the brain where there are two types of neurons. One type responds to disparlure only, the other responds to both disparlure and similar compounds. In the first system of gypsy moth males, two independent irritation transmission paths were found; a specific tract and a non-specific tract, which also had a different response to disparlure and its analogues. Locomotor response of males to the sex attractant differs from other odor stimuli as a result of differentiation of stimuli in the brain; it appears to be a mechanism of recognition of insects belonging to the same species.
ECentral; PHEROMONES, PHYSIOLOGY

117 Barybkina, M.N. 1980.
Ability of gypsy moth males to distinguish structurally similar compounds. In: Khemoretseptsiya nasekomykh. Vilnius: 99-107.
-- The ability to distinguish between odoriferous substances similar in their composition was investigated by studying selectivity of sensitive cells of sensillas and neurons of the brain olfactory lobe. Two types of receptor cells of different selectivity were found in trichoid sensillas on male antennae. There are "A" receptors responding to disparlure concentrations lower than those of its homologues, and "B" receptors similarly responding to the synthetic sex pheromone and structurally similar substances. Due to these specific receptor cells, the insect can differentiate the smell of the sex pheromone from other smells in its environment. After the primary analysis of chemical stimuli, the signal is transferred in impulses by sensitive cells to the central parts of the olfactory analyzer where further selection of useful information is made.
ECentral; NEUROLOGY, PHEROMONES, PHYSIOLOGY

118 Barybkina, M.N. 1988.
Basis of sex pheromone perception and ways of sensory information transformation in the nervous system of lepidopterans. In: Referaty 4-go Vsesoyuznogo simpoziuma po khemoretseptsii nasekomykh. Vil'njus: 11.
-- Gypsy moth males were used as an example to show that the primary analysis of odor stimuli is made in the periphery of the olfactory analyzer by the cells specific to sex pheromone. The information transferred from these receptors is subject to further analysis in interneurons of the deutocerebrum, which are capable of differentiating the sex pheromone from compounds similar in composition. A stereotype wing flutter response is started as a result of activation of special neurons generating the rhythm of the pterothoracic ganglion under the impact of signals from the specific neurons of deutocerebrum, which were, in turn, irritated by specific receptor cells.
ECentral; NEUROLOGY, PHEROMONES

119 Barybkina, M.N. 1988.
Morphological and functional principles of response to sex pheromone by gypsy moth males. In: Nepamyy shelkopryad: itogi i herspectivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 45.
-- Over 86% of all sensillae of gypsy moth antennae were found to have receptors of selective response to the sex pheromone odor. After the pheromone is perceived by peripheral nerve cells, axons of these cells transfer nervous impulses, without synaptic switching, to the olfactory lobe of the deutocerebrum where the final analysis of odor stimuli is made. It was shown experimentally that there are neurons in the deutocerebrum selectively responding to the sex pheromone. These neurons are more selective than olfactory receptors, which is exhibited in the ability of deutocerebrum cells to differentiate the smell of disparlure from structurallly similarl substances. By registering the impulse activity of pterothoracic ganglion interneurons, cells were found that transfer the signals from receptors to motor organs. A locomotor response is started by activating special neurons generating the rhythm under the impact of the brain olfactory lobe neurons activated by especially sensitive cells of the sensillae. Depending on the ways by which activation from receptors is transferred to motor organs, different behavioral responses of the insects to the action of an odor stimulus can be formed. The response of wing muscles to the sex pheromone is characterized by the uniformity of muscle potentials, which is the basis for forming a stereotype response, wing flutter. The author believes this system of perceiving sex pheromones is one of the most perfect detecting systems in the insect nervous system.
ECentral; MORPHOLOGY, NEUROLOGY, PHEROMONES

120 Basov, V.M. 1979.
The gypsy moth. Zashchita rasteniy. (7):59.
-- Data on food plants of the gypsy moth are outlined and a list of major food species is given. It is noted that the pest attacks more than 300 species. All life stages and general data on the species ecology are given. The gypsy moth prefers dry, light, well heated stands, mainly second growth or 20-year-old plants. General data on vertebrate enemies are given and it also is mentioned that more than 150 species of entomophages of the gypsy moth are known. General data on pest control also is included.
ECentral; STAND COMPOSITION

121 Batiaschvili, L.X., Bagdavadze, A.X. 1941.
The pest entomofauna of fruit gardens in eastern Georgia (Cartaliniya and Meskhetiya). In: Izvestiya Gruzinskoy STLZR, ser. B, Entomologiya. Tbilisi: 23-26.
-- Gypsy moth is one of the pests of gardens in eastern Georgia
Caucasus; PEST LIST

122 Bednyy, V.D. 1978.
Sticky attractive traps. Zashchita rasteniy. (12):27-29.
-- Disparlure-baited folding traps are suggested for forecasting gypsy moth populations. The work was done in Moldavia and in the Ukraine where only males were attracted. A capture of 1,000 gypsy moth males per trap is considered critical.
EWest; PHEROMONE TRAPS

123 Bednyy, V.D. 1979.
Assessment of attractive insecticidal traps for capture of the gypsy moth and the nun moth. In: Prostranstvennaya orientatsiya nasekomykh i kleshchey. Izdatel'stvo Tomskogo universiteta, Tomsk: 3-10.
-- Data on the question under study are discussed. Pheromone traps used for catching gypsy moths and nun moths are described. Advantages of attractant-insecticide traps compared to sticky traps are shown.
EWest; PHEROMONE TRAPS

124 Bednyy, V.D. 1979.
Results of disparlure application for control of gypsy moth. In: Biologicheski aktivnyye veshchestva v zashchite rasteniy. Moscow: 52-56.
-- Possibilities of gypsy moth control by "male vacuum" and disorientation methods are discussed. The "male vacuum" method is regarded as unsuitable. Forest treatment with disparlure at a rate of 1-25/ha sharply decreases male attraction to pheromone traps but pest population decrease was only observed in some experiments.
EWest; MATING DISRUPTION

125 Bednyy, V.D. 1981.
Disorientation of gypsy moth males with an optically active disparlure. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 23-24.
-- The fact that racemic disparlure did not appear to be effective enough for gypsy moth control in the experiments forces researchers to continue studying optically active disparlure. The experiments were carried out in an open-air cage with tree seedlings. The cage had an area of 60 sq m and a height of 2 m. A similar cage not treated with disparlure was used as a control. Under experimental conditions, mating was not observed during the 2 days after treatment. While the flight of males was sometimes active though not energetic, they did not approach females. After oviposition, 5 egg masses from the control and 5 from the experiment were analyzed. The rate of sterile eggs was 2.2% in the control and 100% in the experiment. Experimental egg masses were 3 times smaller in size than the controls (357 vs 1009 mm). The results of the experiment allow us to state that sex disorientation of gypsy moth males with optically active disparlure is possible.
EWest; MATING DISRUPTION

126 Bednyy, V.D. 1984.
Technology of disparlure application in forest protection. (Tekhnologiya primeneniya disparlula v zashchite lesa.) Shtiintsa, Kishinev. 167 p.
-- The methods of disparlure application in European populations of gypsy moth and nun moth are described. Numerous data are given on daily and seasonal activity of moths and their mating behavior.
EWest, ECentral, EEast; MATING, PHEROMONE TRAPS

127 Bednyy, V.D. 1988.
Biological backgrounds for application of gypsy moth pheromone in forest protection. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 46.
-- Gypsy moth control using pheromone traps is based on the dependence of the number of egg masses to the number of moths caught. This is determined by the population density and weather conditions in the flight season of adults. Just as important are other population and environmental parameters such as the level of perception by males of the synthetic pheromone. The author found gypsy moth populations in Moldavia to have significant differences in this parameter depending on the stage of their gradation. Enhanced response to the synthetic pheromone is typical of latent (sparse) pest populations. Different levels of male responses to synthetic pheromone were observed among gypsy moth populations with usual population dynamics at a depression stage of various levels. The ability of females to attract males also is different in different populations. It is concluded that criteria of forest pathology stand estimation using pheromone traps must be regional and must take into account the state of gypsy moth populations.
EWest; PHEROMONE TRAPS, BEHAVIOR

128 Bednyy, V.D. 1989.
Causes of unsatisfactory results of sexual disorientation of the gypsy moth (*Lymantria dispar* L., Lepidoptera, Lymantriidae) with disparlure. In: Biologicheskaya integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma. VPS MOBB, Moscow: 8-13.
EWest; MATING DISRUPTION

129 Bednyy, V.D., Chernichuk, L.L., Chekanov, M.I., Cherkizova, V.L. 1980.
The influence of preliminary storing of males of the gypsy moth in an atmosphere saturated with disparlure on their mating ability. In: Khemoretseptsiya nasekomykh. Vilnius: 123-125.
-- The lower sexual activity of gypsy moth males under standard conditions after being exposed to air saturated with disparlure for some time showed that this preparation primarily affects the threshold of chemoreceptor sensitivity to the pheromone. Other suggested causes affecting the male's searching ability such as closer orientation, camouflaging of a directional flow of the female pheromone, or physiological exhaustion, could be ignored.
Ewest; BEHAVIOR, PHEROMONES

130 Bednyy, V.D., Khazanov, Yu. L., Mirzoyan, S.A., Platunov, B.I., Anikina, Z.L. 1979.
Attractant traps for gypsy moth. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 3-12.
-- Three-cornered attractant-insecticide traps with 19.5 g of fumigating insecticide plates equivalent to 3.6 DDVP caught the same number of gypsy moths as attractant sticky traps. For the nun moth, attractant-insecticide traps are not practical since the adults of this species are reluctant to fly into closed traps.
EWest; PHEROMONE TRAPS

131 Bednyy, V.D., Kondorskiy, B.M. 1987.
Updating forest entomological monitoring by means of pheromone traps. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 25-31.
-- The gypsy moth is used as an example to show possible ways of perfecting pathological investigation of forest stands using pheromone traps to forecast insect population levels and the necessity for their control. Trapped moth data need to be corrected by taking into account the abiotic and biotic factors influencing them. Special attention is paid to the level of pheromone perceived by moths from the environment. Ecological and geographical gypsy moth populations are found to differ considerably in this parameter.
EWest; PHEROMONE TRAPS, PROGNOSIS

132 Bednyy, V.D., Kondorskiy, B.M. 1988.
Effect of composition of oak groves on gypsy moth larvae captured with pheromone traps. In: Referaty 4 Vsesoyuznogo simpoziuma po khemoretseptsii nasekomykh. Vilnius: 46.
-- The comparison of the numbers of males caught in traps showed English oak and pubescent oak stands to be an order of magnitude more infected than stands of durmast oak mixed with some other species. The population in durmast oak stands is at an innocuous level and it is not practical to use traps there. The proportion of durmast oak in oak groves can be the main parameter for determining entomological resistance of stands to the gypsy moth.
EWest; PHEROMONE TRAPS, STAND COMPOSITION

133 Bednyy, V.D., Kovalev, B.G. 1978.
Basis for the use of disparlure for determination and prediction of numbers of the gypsy moth. In: Khemoretseptsiya nasekomykh. Vilnius: 147-151.
-- Experiments carried out in 1973-1975 in 50-year-old thinned oak stands in the Yedinets Forest of Moldavia showed a direct dependence of the number of gypsy moth males caught to the numbers of a new generation of this pest in prodromic populations. Eruptive populations had no such dependence. Data on ways to place traps used to forecast the pest population level are presented. The optimum dose of disparlure per trap was determined to be 5 mkg. When this dose is increased to 1 mg, traps do not become more effective. The attractive power of disparlure traps is much lower than the attractancy of females.
EWest; PHEROMONE TRAPS, PROGNOSIS

134 Bednyy, V.D., Kovalev, B.G., Chekanov, M.I. 1977.
Use of disparlure for estimation and prognosis of population density in the gypsy moth *Porthetria dispar* L. Zoologicheskiy zhurnal. (11):1719-1724.
EWest; PHEROMONE TRAPS

135 Bednyy, V.D., Kovalev, B.G., Chekanov M.I. 1976.
Disparlure application. In: Ispol'zovaniye khimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Moscow: 11-12.
-- The optimum attractant dose was found to be 5 mkg per trap when applied to filter paper. Females were 2-4 times more attractive than synthetic disparlure. Direct

dependence of the number of males caught to gypsy moth population density allows disparlure traps to be used to assess and forecast gypsy moth population numbers. Their application is of practical importance when the population increases. To forecast gypsy moth population dynamics with the traps, the ratio of the number of males caught to the number of egg masses laid by females is determined. Peaks and recessions of active flight correlate with microclimatic parameters. Different populations are observed to have peculiar flight dynamics; i.e., the flight starts and finishes earlier in an eruption phase. For a reliable population count, attractant traps should be placed in the corners of a square of 1.1 km. Differences were observed when traps were placed at different heights. In depressive populations 2 to 3 times more males were caught at a height of 0.3 m than at 1.5 to 3 m. When the population level was high male catches at heights ranging from 0.3 to 3 m were the same. This can be accounted for by an even distribution of females along the tree in an outbreak phase. Belts were the most effective traps due to the behavior of males to fly around the trunk searching for females.
EWest; PHEROMONE TRAPS, PROGNOSIS

136 Bednyy, V.D., Platunov, B.I., Florinsky, A.N., Anikina, Z.L. 1980.
The use of pheromone traps for gypsy moth control in mountain forests of the Crimea. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 33-36.
-- Traps were found to give more reliable data on the pest population than a conventional method of counting egg masses
EWest; EGG MASSES, PHEROMONE TRAPS, SAMPLING

137 Bednyy, V.D., Tuganov, S.R., Anishchenko, B.I., Torchik, M.V. 1981.
Attractive capacity of disparlure and its analogue to the nun moth (*Porthetria monacha*). Zoologicheskiy zhurnal. 60(7):1024-1029.
-- The minimum quantity of disparlure necessary for attracting nun moth males to the traps is 50 mkg. The attractancy of nun moth females is variable: in some populations it is below the optimum dose of disparlure and higher in other populations.
EWest; PHEROMONES

138 Bednyy, V.D., Zhunku D.S. 1979.
The role of vision in mating behavior of gypsy moth males. In: Prostranstvennaya orientatsiya nasekomykh i kleshchey. Izdatel'stvo Tomskogo Universiteta, Tomsk: 11-15.
-- This is a review of literature on the role of vision of gypsy moth males in interspecies mating. Experiments showed that it was an olfactory response rather than a visual response that enabled a flying male to find the source of sex pheromone and land there. The possibility of gypsy moth control by the sex disorientation method is discussed.
EWest; MATING, PHEROMONE TRAPS, REVIEW

139 Bei-Bienko, G.Y. 1924.
Materials on gypsy moth biology in Altai Territory. In: Trudy Omskoy sel'skokhozyaystvennoy akademii. Omsk: 155-160.
WSiberia; FEMALES, FLIGHT, GENERAL BIOLOGY

140 Bekker, A. 1885.
A report on natural history for the year 1854 (in German). [Einige naturhistorische Mitteilungen von den Jahre 1854.] Byulleten' Moskovskogo obshchestva ispytatelei prirody. 2:460-481.
-- The author studied the Lepidoptera fauna in the Middle and Lower Reaches of the Volga River. A list of 403 lepidopterous species is given. The gypsy moth is mentioned as a common species in stands.
ECentral; FAUNAL LIST

141 Belanovskiy, I.D. 1929.
Insect pests at the Boyarsk research forest in summer 1927. In: Zapiski Kievskogo sel'skokhozyaystvennogo instituta. Kiev: 51-68.
-- As a result of pest outbreaks in the summer of 1927, the gypsy moth and other phyllophages (browntail moth, tent caterpillar) heavily injured hardwood species. Larvae and pupae were heavily parasitized by ichneumons and egg masses were destroyed by the dermestids *Dermestes lardarius* Hl., and *Attagenus piceus* Oliv. By the end of the larval stage, polyhedrosis infection was observed. In the first instar, larvae were heavily attacked by *Apanteles fulvipes* Hl. Larvae also were attacked by *Calosoma* sp., and burying beetle larvae. *Anthrax morio* L. was numerous and the author regards it as an important parasite.
EWest; PARASITES, PREDATORS

142 Belik, I.I. 1970.
Lepidopterous fauna in artificial plantations of Voroshilovograd Region and determination of its peculiarities. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Voroshilovograd. 17 p.
-- The gypsy moth is mentioned along with other serious pests of artificial stands consisting mainly of oak. Outbreaks occur and there are stable foci together with other pests: browntail moth, winter geometrid, tent caterpillar. The author believes that this is all due to unfavorable conditions for stand growth in Voroshilovgrad Province.
ECentral; FAUNAL LIST, STAND CONDITION

143 Belizin, A.P. 1946.
The gypsy moth and its control in Tadzhikistan. In: Narodnyyi komitet zemledeliya Tadzhikskoy SSR. Stalinabad: 3-7.
-- The gypsy moth is one of the most widespread pests of fruit and nut plants as well as of hardwood forests in the foothills and mountains of Tadzhikistan. Gypsy moth life stages, biology and control measures such as treatment with petroleum, collection of egg masses, collection of larvae, sticky belts, and chemical treatment are described.
MAsia; CONTROL

144 Belizin, A.P. 1948.
Insect pests of subtropical crops in Middle Asia. First report. In: Trudy Kirgizskogo sel'skokhozyaystvennogo

instituta. Frunze: 3-38.
-- The gypsy moth is a pest of walnut and pistachio. In 1930-1935, it attacked plants of both species in large mountain forest areas.
MAsia; HOST PLANTS, PEST LIST

145 Belizin, A.P. 1948.
The gypsy moth and its control. In: Vrediteli plodovykh sadov Kirgizii. Frunze: 3-8.
-- The gypsy moth is one of the most important pests of fruit and nut plants, and hardwood forests of Kirgizia. Apple, pear, quince, plum, and apricot are the most heavily attacked orchards. Pest life stages, and biology and control measures are described. Control measures include treatment with petroleum and collection of egg masses, application of sticky belts, autumn treatment of trees with 5% mineral oil emulsion, and spraying of trees with Paris green and DDT when larvae are feeding.
MAsia; CHEMICAL INSECTICIDES, CONTROL, HOST PLANTS

146 Belov, A.N. 1976.
Determination of criteria for gypsy moth control. In: Ispol'zovaniye khimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Pushkino: 13-15.
-- Spatial distribution was studied in oak groves of Penza Province in 1974-1975. Actual distribution of gypsy moth egg masses was found to agree with the negative binomial model, both at high and low population density levels. Mathematical regularities of relations between distribution parameters were established. As yet, there is no common opinion on the critical densities of gypsy moth populations. According to data from different authors, 4 to 25 egg masses per tree can cause complete defoliation. In the USA, a density level of 500 egg masses/acre (1.7-1.8 egg masses/tree) is a criterion for taking eradication measures. Less than 300 egg masses/acre (about 1 egg mass/tree) is regarded as an innocuous density. A table is included allowing conclusions to be made as to the density level of a specific population. Limiting values of the number of egg masses per certain number of trees, from 5 to 100, also are given. The table can assist in estimating the pest population density level as high or low. This method can reduce labor costs by 40-70%, while the probability of exact estimation of the density level is 95%.
ECentral; EGG MASSES, MODELS, NUMERICAL DATA, PROGNOSIS, SAMPLING

147 Belov, A.N. 1977.
The sample size, i.e., the number of trees, in counting population of insect pests. Lesnoye khozyaystvo. (1):76-78.
-- Penza Province was surveyed. At all levels of pest population, the sample corresponded to the negative binomial model.
ECentral; MODELS, SAMPLING

148 Belov, A.N. 1977.
Assessment of gypsy moth abundance by sequential sampling. In: Voprosy lesovodstva i lesozashchity. VNIILM, Pushkino: 71-75.
-- In forest protection it is not uncommon that exact estimation of a pest population is not needed. For instance, in determining if control measures are necessary, it is sufficient to find out if the population density is higher than a certain level. In this case, the sequential sampling method can be a time saver. In applying the method to the gypsy moth, the results of studying the spatial distribution of its egg masses in middle-aged oak shrubwood were used. These data, together with literature data on the degree of stand defoliation and the aim of control measures, allowed simple equations to be derived which can be used to work out the plan of sequential gypsy moth counts at any critical population level. There is an example of such a count, when complete defoliation could be caused by a population density which is more than 5 egg masses per tree. The sequential sampling method allows 1.5 to 2 times the reduction of labor and time expenditures on counts and ensures 95% probability of exact population level estimation.
ECentral; EGG MASSES, PROGNOSIS, SAMPLING

149 Belov, A.N. 1978.
Sample size when counting the gypsy moth egg masses in oak groves. Lesovedenie. (3):77-83.
-- Data on gypsy moth egg numerical counts in oak groves of Penza Province are analyzed. Actual egg mass distribution corresponds with the negative binomial model at high and low population density levels. At a low population density, egg masses are more aggregated as the role of interference is insignificant. However, the aggregation rate also is high in an outbreak phase. Mathematical regularities of relations between distribution parameters are found. Empirical formulae are suggested to calculate the necessary sample size and to count errors. Tables to find the sample size without calculations are given.
ECentral; EGG MASSES, MODELS, NUMERICAL DATA, SAMPLING

150 Belov, A.N. 1978.
Sequential sampling method of the gypsy moth. Lesnoye khozyaystvo. (4):88-90.
-- A plan of sequential count is presented in a table which gives the number of egg masses expected at high and low pest population levels. The method allows 1.5-2 times the reduction in the volume of counting work.
ECentral; EGG MASSES, MODELS, NUMERICAL DATA, SAMPLING

151 Belov, A.N. 1979.
Sampling gypsy moth egg masses on young growth and undegrowth. In: Itogi i perspectivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. VNIILM, Pushkino: 63-66.
-- Possibilities of counting using an indirect regression technique on the basis of the number of egg masses on trees are discussed. In a direct count in oak groves where oak density is more than 0.5, the most convenient elementary counting unit is the area of the crown projection of the tree under count and half the distance between crowns of neighboring trees if the crowns are not in contact. The sample size is established by the count plans suggested earlier to estimate the number of egg masses on the trees. When the counts are made in

thinned oak groves in areas with thick young growth and undergrowth, the count in plots with an area of 2.2-2.5 sq m is more suitable. If undergrowth is thin the plots should be of an area of 10-15 sq m.
ECentral; EGG MASSES, MODELS, SAMPLING

152 Belov, A.N. 1979.
Optimizing the frass trap method of estimating gypsy moth numbers. In: Itogi i perspectivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. Moscow: 59-62.
-- Using optimum count units minimizes the amount of count work and provides the required exactness for population estimates. The optimum size of excreta traps used in gypsy moth population counts was calculated based on data of larval distribution regularities in the stand and as a result of motion and time studies. If wooden excreta traps are used, the optimum area of one box is 0.0368 sq m; if excreta traps are made of polyethylene film, the area must be 0.055 to 0.075 sq m. The number of counts needed in the plots with a density of 0.7 and higher, with 10% error, ranged from 30-35 at a density of 100 larvae per tree, to 20 at a density of 400 larvae per tree.
LARVAE, NUMERICAL DATA, SAMPLING

153 Belov, A.N. 1980.
Microstatial pattern of distribution of the gypsy moth egg masses. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 40-47.
-- Peculiarities of gypsy moth oviposition in middle-aged shrubwoods in Penza and Saratov Provinces are discussed. Infestation of trees with egg masses was found to be determined by the trunk shape and diameter, tree species, shrubs near the tree and their density. In mixed oak-linden and oak-aspen stands, tree infestation with egg masses is determined by the proportion of the given species in the stand composition.
ECentral; EGG MASSES, OVIPOSITION SITE, SAMPLING, STAND COMPOSITION

154 Belov, A.N. 1981.
Some peculiarities of oak damage by the gypsy moth larvae. In: Rol' nauki v sozdanii lesov budushchego. Tezisy dokladov Vsesoyuznoy konferentsii, Pushkino. Leningrad: 154-155.
-- Leaf injuries caused by gypsy moth larvae decrease from the base to the top of the leading shoot. Incidence of injured leaves is positively related to the leaf blade area, but the proportion of the part consumed is inversely related to the whole leaf blade area. The number of leaves in a bunch on the shoot is inversely related to the injury rate of leaves in the bunch.
ECentral; BEHAVIOR, DEFOLIATION, FEEDING, NUMERICAL DATA

155 Belov, A.N. 1982.
Diurnal rhythm of the gypsy moth larval activity on oak trees in the southeastern part of the RSFSR. In: Molodyye uchenyye v sovershenstvovanii teorii i practiki vedeniya lesnogo khozyaystva. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva, Pushkino,1982. VNIILM, Pushkino: 135-138.
-- Peculiarities of a larval diel rhythm of feeding and migration in Saratov and Penza Provinces in 1974-1980 are discussed. Nocturnal feeding is common for larvae, but at high population density they start feeding around the clock. Larval migrations connected with diel activity rhythm tend to become longer as larvae grow. The local population is essentially different from populations in other regions where similar studies were made (Ukraine, North America) in that only few larvae (on the average, about 10%) migrate and migrations occur within the tree. When the studies were made, larvae did not move down to the litter regularly. Due to peculiarities of the diel rhythm of gypsy moth, numerical counts in the Southeast under standard conditions can be reduced to tree crowns and trunks, ignoring the litter.
ECentral; BEHAVIOR, DISPERSAL, GEOGRAPHIC VARIATION, LARVAE

156 Belov, A.N. 1983.
Time and space distribution of the gypsy moth on oak trees of the southeastern European part of the RSFSR. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 22 p.
-- Peculiarities of spatial-temporal distribution of gypsy moth were studied in Saratov and Penza Provinces in 1974-1982. A model is suggested for changes in the pest population dynamics determined by the population state during an outbreak. Regression equations are given for a short-term forecast of gypsy moth population dynamics.
ECentral; EGG MASSES, MODELS, POPULATION DYNAMICS, PROGNOSIS, SAMPLING

157 Belov, A.N. 1984.
Nomogram for determining increment losses in trees in *Lymantria dispar* L. foci. Lesnoye khozyaystvo. (12):50-51.
-- The nomogram allows an estimate of the wood increment losses in gypsy moth foci not only in terms of defoliation, but also with regard to stand condition, weather in the vegetative season, and other factors affecting tree growth.
ECentral; DEFOLIATION, STAND CONDITION, TREE GROWTH

158 Belov, A.N. 1984.
The use of a spatial distribution model of a population for forecasting number dynamics in abundant insect species. In: Lesnyye ekosistemy i voprosy modelirovaniya. Moscow: 20-26.
-- Variability of parameters of the gypsy moth distribution model is traced in oak groves of Saratov Province in connection with changes in the population qualitative composition during an outbreak. A regression equation is given for a short-term forecast of gypsy moth population.
ECentral; MODELS, POPULATION QUALITY, PROGNOSIS

159 Belov, A.N. 1985.
Sampling gypsy moth larvae in oak groves. Lesnoye khozyaystvo. (3):55-57.
-- A simplified method of larval counts based on the regularities of insect vertical distribution in tree crowns in

middle-aged oak shrubwoods is suggested.
ECentral; LARVAE, SAMPLING

160 Belov, A.N. 1985.
Vertical distribution of gypsy moth larvae on oak southeast of Europe. Izvestiya sel'skokhozyaystvennoy akademii. (3):143-148.
-- The author used an integrated parameter, comparing the proportion of larvae living in the lower crown area to their total number to develop a technique of inventory using only branches from the lower crown.
ECentral; LARVAE, MODELS, SAMPLING

161 Belov, A.N. 1985.
Effect of gypsy moth outbreaks on oak groves. Izvestiya Timiryazevskoy sel'skokhozyaistvennoy akademii. 6:183-185.
-- Investigations carried out in 1976-1982 in middle-aged oak shrubwoods of Saratov Province showed that leaf injuries caused by insects only led to death of trees in the most weakened stands. The proportion of dead trees was 2.9% higher than normal natural mortality. When the leaves were injured over 2 years, the first year of defoliation produced the greater effect on the tree's condition. A regression equation is given to characterize the mortality rate of the trees in phyllophagous insect foci in connection with the initial condition of oak groves and vigor and quickness of leaf consumption by insects.
ECentral; DEFOLIATION, MODELS, TREE HEALTH

162 Belov, A.N. 1986.
Effect of insect defoliators on oak growth. Lesnoye khozyaystvo. (4):67-69.
-- The northern part of the Saratov Province was surveyed. A regression equation of tree diameter increment in the foci of phyllophagous pests is suggested.
ECentral; DEFOLIATION, MODELS, TREE GROWTH

163 Belov, A.N. 1987.
Survey of gypsy moth abundance in large forest stands. Lesnoye khozyaystvo. (10):58-60.
-- Results of studying gypsy moth spatial distribution in middle-aged oak shrubwoods in Penza and Saratov Provinces are presented. A mathematically optimized plan of pest population count is suggested and a numerical forecast based on egg mass distribution is made. It is concluded that during an outbreak it is advisable to examine as many tree plots as possible, but the number of trees under count should be comparatively small. In the phases of depression, increase and crisis, the number of plots examined can be reduced and the sample size should be increased in every plot recognized as the primary pest focus. The count plan can be used to develop the optimum way to estimate gypsy moth populations in large forest areas taking into account specific conditions, time, and place.
ECentral; EGG MASSES, MODELS, PROGNOSIS, SAMPLING

164 Belov, A.N., Panina, N.B. 1983.
Impact of forest and ecological conditions on gypsy moth distribution. In: Progr. lesa i voprosy okhrany prirody. Moscow: 79-87.
-- Gypsy moth egg masses are more evenly distributed among individual trees under the closed canopy of highly productive stands due to less diverse ecological conditions than in medium or low density stands. Qualitative characteristics of these differences are given on the basis of studies made in oak stands of Saratov Province. Plans are made for sequential counts of gypsy moth populations with different required exactness of data.
ECentral; EGG MASSES, SAMPLING, STAND COMPOSITION

165 Belov, A.N., Panina, N.B. 1985.
Diurnal rhythm of gypsy moth larval activity in the South Krasnoyarsk Territory. Izvestiya Timiryazevskoy sel'skokhozyaistvennoy akademii. (1):132-139.
-- The results of observations of gypsy moth larval behavior in orchards of Krasnoyarsk Krai are analyzed. Larvae fed at night and rested during the day. In the morning, larvae were observed to move from leaves to "resting" places. The number of migrating larvae and the distance to "resting" places are proportional to the number and quality of these places. The use of artificial shelters to count larvae is considered.
WSiberia; BEHAVIOR, LARVAE, SAMPLING

166 Belov, A.N., Panina, N.B. 1985.
Spatial distribution of gypsy moth and its entomophages at population density fluctuations. Izvestiya Timiryazevskoy sel'skokhozyaistvennoy akademii. (2):112-119.
-- This work was performed in middle-aged oak shrubwoods of the third to fifth quality class in Penza and Saratov Provinces. The analysis of parasite pupae distribution in soil, and gypsy moth egg mass distribution among trees showed that the spatial distribution of these species populations was determined by fluctuations in the average density of the infestation at preferred microstations, and by the absolute number of individuals in them. A classification for aggregation rates is suggested. Suggestions are made for further improvement of methods of studying insect spatial distributions.
ECentral; EGG MASSES, MODELS, PARASITES, POPULATION DYNAMICS, SAMPLING

167 Belova, N.A. 1988.
Gypsy moth population dynamics in the Baikal Preserve. In: Neparnyy shelkopryad: itogi i perspectivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 7.
-- Observations were made in 1981-1987 in the Baikal Preserve. Major forest species of the area under study are Siberian pine, fir, birch, poplar, spruce, and aspen; in the undergrowth they are bird-cherry, willow, and subalpine alder. The results were based on light trap data and on visual counts of gypsy moth individuals during the course of the survey. Adults were observed from August 2 to 21. Almost every year, adults are observed flying to a light source. The overwhelming majority of individuals caught in light traps are mature females. Females oviposit on house walls, poles, and in the chinks of outhouses. No significant injury was found in preserve stands during the

observation.
ESiberia; FEMALES, FLIGHT, LIGHT TRAPS, PHENOLOGY

168 Belova, N.K., Nikolaevskaya, N.G. 1988.
Biological features of gypsy moth in stands of the city of Moscow. In: Neparnyy shelkopryad: itogi i perspectivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 7-8.
-- A gypsy moth outbreak was observed in Moscow in 1986-1987 and correlated with favorable weather conditions for the pest, droughts in April and June, and frosty winters from 1983-1985. Imago flight was observed July through August. The average potential fecundity was 302.8 eggs; the actual number was 274.2 eggs. Egg masses were mainly found at a height up to 30 cm (98.8%); females preferred southern sides. The relationship between the number of eggs, egg mass size, and weight was established and is described by equations $y = 62.86 + 0.917x$ (1) and $y = 117.9 = 0.989x$ (2) where y is the number of eggs per mass; x (1) is the mass size (mm); and x^2 is the mass weight (g). Hatching starts in early May. Larvae attacked the trees of 16 species, the optimum food plants being oak, apple, and birch. For the first time, larvae were observed feeding on thuya and blue spruce.
ECentral; EGG MASSES, MODELS, NUMERICAL DATA, PHENOLOGY

169 Benkevich, V.I. 1939.
Gypsy moth ecology. In: Tezisy dokladov konferentsii molodykh uchenykh posvyashchennoy 18 s"yezdu VKP(b). Akademiya sel'skokhozayistvennogo instituta im. K.A.Timiryaz'eva, Moscow: 2.
-- Data on the peculiarities of gypsy moth development in the vicinities of Moscow are given (egg mass distribution, phenology, major food plants).
ECentral; GENERAL BIOLOGY

170 Benkevich, V.I. 1950.
Gypsy moth ecology. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 22 p.
-- Data on gypsy moth biology and ecology in Moscow Province are presented. Investigations were carried out in stands of various types in 1983-1989. Egg mass distribution, phenology, biotope adjustment, effect of meteorological conditions and other peculiarities of gypsy moth development in Moscow Province were studied.
ECentral; GENERAL BIOLOGY

171 Benkevich, V.I. 1952.
Preferred oviposition sites by the gypsy moth. Les i stepi. 12:75-76.
-- Distribution of gypsy moth egg masses was studied in Moscow Province in 1938-1951. Stand infestation was found to depend on the stand type, its composition, age, density, and whether there was undergrowth. The number of egg masses is different on forest edges of different exposure, and there are more egg masses on forest edges than in the depth of a stand. For oviposition, the most favored species were old oak, spruce, young birch trees, larch, pine and linden, in decreasing order. As for biotopes, females prefer the most elevated sites, dry parts of the forest, and trees under which soil moisture is the lowest -- under oak and spruce. For pest population counts, it is advisable to examine the most elevated plots of stands in southern, southeastern and eastern parts of the forest.
ECentral; EGG MASSES, OVIPOSITION SITE, SAMPLING, STAND COMPOSITION

172 Benkevich, V.I. 1955.
Detection of tree trunks, forest plots and margins most infected with gypsy moth egg masses. In: Uchenyye zapiski Orekhovo-Zuyevskogo pedagogicheskogo instituta. Moscow: 177-185.
-- In Moscow Province, stand plots in the southern, southeastern, and eastern parts of the forests, with a background composed of old spruce and young birch, were the most heavily infected with egg masses. The reason for this is that such plots are less subject to cooling, more exposed to light, and it is easier for females to find shelter from the northerly and westerly winds which prevailed in the oviposition period. The majority of egg masses are located on the southern and eastern sides of trees. The number of egg masses on the trunks, absolute and relative infestation of plots and forest edges, is inversely related to the height at which egg masses are located above the soil surface.
ECentral; OVIPOSITION SITE, SAMPLING, STAND COMPOSITION

173 Benkevich, V.I. 1955.
The role of solar radiation energy in the heat balance of developing gypsy moth eggs. In: Uchenyye zapiski Orekhovo-Zuyevskogo pedagogicheskogo instituta. Moscow: 163-175.
-- Solar radiation provides additional energy which produces a considerable effect on the course and duration of embryonic development in spring. During 50-60 days, the thermal effect of radiation on egg masses makes the sum of effective temperatures about 30% higher than reported in meteorological data. This correction does away with an absurd notion of more rapid development of eggs in nature than in the laboratory. This correction is not valid if eggs masses are in shelters. Spring development of larvae is a special stage of embryonic development which is completed in 121 degree-days at a minimum temperature of 5.7°C, and at a photoperiod of 13.1-15.7 hours.
ECentral; DIAPAUSE, EGG HATCH, MODELS, TEMPERATURE

174 Benkevich, V.I. 1956.
The distribution of gypsy moth (*Porthetria dispar* L.) egg masses over territory of the mountain Altai. Zoologicheskiy zhurnal. 35(7):1013-1016.
-- Gypsy moth egg masses usually are found on sunny slopes and terraces of broad valleys. Southern and eastern slopes are the most heavily infected, while northern and western slopes are slightly infected. Plots infected with egg masses are always steppe-like, and tree stands are light, their major species being birch, fir, pine, larch, and spruce. The forests of river terraces and parklands also are heavily infected. Gypsy moth populations in Altai are characterized by the shift of

oviposition from trees to rocks. Females lay the maximum number of egg masses on the rocks if the steppization is high, there are few trees suitable for oviposition, and they are occupied first by other females. The average height of oviposition is 12 to 15 cm above the soil surface. In general, females can find a great diversity of oviposition sites depending on the location of their emergence, but they tend to seek shelters with the best microclimate.
ECentral; OVIPOSITION SITE, STAND COMPOSITION

175 Benkevich, V.I. 1957.
Determination of forest areas most preferred by gypsy moth as oviposition sites. In: Uchenyye zapiski Orekhovo-Zuyevskogo pedagogicheskogo instituta. Moskva: 65-70.
-- The distribution of gypsy moth egg masses was studied in Moscow Province. Trunk infestation with egg masses was found to be heavier at forest edges than in the middle of the forest. In addition, infestation decreased drastically as the trunk diameter increased. Moreover, infestation of a plot decreases sharply with closing of leaf canopy. In studying egg mass distribution by compass points, infestation decreased in the following order: south, east, west, north. For oviposition, the most suitable plots are those where favored food species prevail and the grass stand is low, particularly along the southern, southeastern, and eastern edges of such forests.
ECentral; EGG MASSES, OVIPOSITION SITE

176 Benkevich, V.I. 1957.
Plants damaged by gypsy moth at normal and maximum population densities. In: Uchenyye zapiski Orekhovo-Zuyevskogo pedagogicheskogo instituta. Moskva: 71-78.
-- In Moscow Province, species composition of favored food plants by larvae and those preferred for oviposition by adults was studied. For oviposition, females appear to prefer old spruce, young birch, and then, in decreasing order, pine, larch, linden, and old oak. For feeding, the most favored species are oak and linden, follow by poplar and birch. First instars migrate from the oviposition sites to preferred food plants. In the period between outbreaks, larvae feed on one or two food plants which, the author believes, makes insects more viable. During outbreaks, all larvae migrate to unfavored food plants. This feeding pattern makes the physiological condition of insects worse. Gypsy moth outbreaks can only occur in areas where favored food species and species favorable for oviposition are available.
ECentral; BEHAVIOR, FEEDING, HOST PLANTS, OVIPOSITION SITE

177 Benkevich, V.I. 1958.
Peculiarities of gypsy moth embryonal development on the southern shore of the Crimea. In: Uchenyye zapiski Orekhovo-Zuyevskogo pedagogicheskogo instituta. Moskva: 115-118.
-- Diapause of Crimean and Caucasian gypsy moth populations on the southern shore occurs at high, steadily lowering temperatures with the temperature decreasing from the annual average maximum to the lower development limit. The diapause of the northern pest populations, however, only takes its normal course at low temperatures. In the mountains, plain forests, and river valleys of the Crimea and Caucasus, diapause also occurs at temperatures below or close to 0 C. A conclusion is made about a different course of diapause in the southern shore population and other populations of the Crimea and Caucasus.
EWest, Caucasus; DIAPAUSE, GEOGRAPHIC VARIATION

178 Benkevich, V.I. 1958.
Various tree species and their age groups as a substrate for gypsy moth oviposition. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (4):26-30.
-- The author notes that fertilized gypsy moth females become very sensitive to weather conditions. This is seen primarily in locations where egg masses are found at a height of about 10 cm above the soil surface. Once females are fertilized, up to 80% will leave their emergence sites and fly or crawl to other trunks. The maximum distance covered by flying females in Moscow Province is about 200 m and flight is slow and heavy. If a female cannot immediately find a place with suitable microclimate, she flies again. In rainy weather, females use any shelter for oviposition. However, if the rain has stopped and oviposition has not yet started, the females leave the shelter and oviposit near it on the southern or southeastern side of a trunk. A female usually deposits 1 and, very rarely, 2 to 4 egg masses.
ECentral; FEMALES, FLIGHT, OVIPOSITION SITE, WEATHER

179 Benkevich, V.I. 1958.
The prediction gypsy moth outbreaks and its control in the USSR. In: 1 Mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 52-61.
-- Protective measures for gypsy moth control consist of finding primary foci and destroying egg masses there. Egg masses are often deposited by females on substrate unsuitable for larval feeding, such as trees with rough bark, stones, etc. Distribution of egg masses depends on hydrothermal conditions in the oviposition period. The higher the temperature, the fewer the egg masses deposited on southern sides; more are deposited on the northern side. The higher the humidity, the higher is deposition of egg masses and pupae on the trunks. The pest prefers light stands, forest edges, and ridges. Males can be killed by light traps when it is dark and by attractant-baited traps.
OVIPOSITION SITE, WEATHER

180 Benkevich, V.I. 1959.
Effect of temperature on embryo development of the gypsy moth, *Ocneria dispar* L., in Moscow region. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 52-61.
-- The gypsy moth usually has a winter diapause in its life cycle, but hatching sometimes occurs in autumn. This can occur when larvae get a total sum of effective temperatures before frosts start; this sum is equal to the sum of effective temperatures before and after diapause. Hatching also is provoked by a fall in temperature to 0° C for a short time in the period both before and after diapause. Under such temperature conditions, larvae that

hatched in autumn die as do eggs that received a sum of effective temperatures before diapause and a partial sum of effective temperatures after diapause. Only eggs that received a sum of effective temperatures before diapause overwinter well.
ECentral; DIAPAUSE, TEMPERATURE

181 Benkevich, V.I. 1959.
The use of ultraviolet radiation in control of the gypsy moth *Porthetria dispar* L. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (3):39-42.
-- Great numbers of gypsy moth males and virgin females are found to fly to ultraviolet light sources. This leads to a sharp increase in the number of unfertilized females depositing sterile eggs. Thus, ultraviolet light traps can be used for continuous monitoring of pest populations and numerical dynamics. Male trapping in primary foci is an effective control measure in a latent phase but, during outbreaks, ultraviolet light sources are not effective.
ECentral; CONTROL, FEMALES, FLIGHT, LIGHT TRAPS, MALES

182 Benkevich, V.I. 1959.
Outlines on the gypsy moth *Ocneria dispar* biology. 1 Report. Biology of the gypsy moth males. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Sbornik rabot po ekologii zhivotnykh. Moscow: 31-51.
-- In Moscow Province, the mean life span of males was 12 hours 56 minutes. The range varied from 6 hours 43 minutes to 30 hours 35 minutes. The highest sensitivity of males to worsening conditions is in the period from emergence to mating. As a result, mating can be delayed, eggs would be of poor quality, and the offspring would be unviable. Searching for females, males use their olfactory analyzer for broad-range searches while vision and touch are used for microfocusing. Female attractants can be used for trapping and killing of males.
ECentral; MALES, MATING, NUMERICAL DATA

183 Benkevich, V.I. 1961.
Gypsy moth outbreaks and their prediction in the lower Volga River Valley. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 30-48.
-- In the lower Volga River Valley, a gypsy moth outbreak is preceded for a period of 4 to 5 years by special meteorological conditions. Three or 4 years before the outbreak, the winter is cold and dry, and no less than two successive winters are severe or close to the norm. Three years before the outbreak, larvae develop in drought conditions (May and June), and for no less than 2 years, May is very dry. Under such hydrothermal conditions, gypsy moth viability and survival increase resulting in drastically higher numbers of the pest.
ECentral; OUTBREAKS, PROGNOSIS, WEATHER

184 Benkevich, V.I. 1961.
Gypsy moth outbreaks and their prediction in the Moscow region. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 22-29.
-- A gypsy moth outbreak was preceded for a period of 2 to 5 years by severe winters and droughts. As a result, insects were more viable and an outbreak occurred.
ECentral; OUTBREAKS, PROGNOSIS, WEATHER

185 Benkevich, V.I. 1961.
Gypsy moth outbreaks and their prediction in the Ulyanovsk region and Bashkirian Autonomous Republic. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 49-59.
-- As in other regions, a gypsy moth outbreak is preceded by special hydrothermal conditions: severe winters and drought in summers. But unlike other regions, in the conditions under study, humidity in May and June is higher or near normal 2 years before the outbreak.
ECentral; OUTBREAKS, PROGNOSIS, WEATHER

186 Benkevich, V.I. 1962.
Gypsy moth outbreaks in East Siberia. Entomologicheskoye obozrenie. 41(1):22-29.
-- In East Siberia, periodicity of gypsy moth outbreaks is 20 to 25 years. Outbreaks occur under certain hydrothermal conditions: droughts in summer and severe, dry winter. Every gypsy moth outbreak is preceded for some years by severe winters and droughts in spring and summer. In the periods between outbreaks, the gypsy moth can be found in survival stations (slopes with southern exposure, in open stands).
WSiberia; OUTBREAKS, PROGNOSIS, SITE CONDITIONS, WEATHER

187 Benkevich, V.I. 1962.
Gypsy moth population dynamics as affected by stand state and weather conditions. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 10-16.
-- Gypsy moth numerical increase usually begins when solar activity is decreasing or are at a minimum, but under conditions of drought, numerical increase also is observed during the period of increased solar activity. Special climatic conditions can be observed: the outbreak is preceded by a severe, dry winter for no less than 2 years, which causes higher mortality of entomophages and lowers their activity. For no less than 2 years, there are droughts in May and June and, just before the outbreak occurs, the winters of two successive years are again severe.
ECentral; OUTBREAKS, PROGNOSIS, SOLAR ACTIVITY, WEATHER

188 Benkevich, V.I. 1963.
Materials on predicting gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae) outbreaks. Report 5. Gypsy moth outbreaks and their prediction in the Voronezh region. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (1):17-22.
-- Outbreaks occur if they are preceded by 2 or 3 successive severe winters (particularly during the first half) and a lower hydrothermal coefficient during May and June 3 years before the outbreak.
ECentral; OUTBREAKS, PROGNOSIS, WEATHER

189 Benkevich, V.I. 1964.
Methods to predict outbreaks of the gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae). Report 7: Gypsy moth outbreaks and their prediction in forests of the Crimea. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 67-82.
-- Gypsy moth outbreaks in the Crimea are preceded by a more severe than normal winter, and by larval development at a low hydrothermal coefficient during May and June 3 years before the outbreak. This reduced the numbers of parasites and lowered their vitality due to the impact of frost and better food quality as a result of weakening during the drought period.
EWest; OUTBREAKS, PARASITES, POPULATION DYNAMICS, WEATHER

190 Benkevich, V.I. 1964.
Methods to predict outbreaks of the gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae). Report 8. Gypsy moth outbreaks and their prediction in the forests of Altai Territory and East Kazakhstan. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 83-95.
-- Studies were made of the hydrothermal regime preceding gypsy moth outbreaks in Altai Krai and eastern Kazakhstan during the period from 1894 to 1960. An outbreak must be preceded by cold, dry winters and droughts in May and June, which leads to numerical reduction of parasites and higher quality of food.
WSiberia; FOLIAGE QUALITY, OUTBREAKS, PARASITES, WEATHER

191 Benkevich, V.I. 1966.
The biology and ecology of larval instars of the gypsy moth, *Ocneria dispar* L. (Lepidoptera. Liparidae). Report 1. Peculiarities in biology of first-instar larvae in the gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae). In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 42-66.
-- Investigations have shown that larvae hatch at different times depending on the latitude, altitude above sea-level, biotope, and meteorological conditions of the given year. Within one biotope, hatching dates fluctuate greatly depending on the localization site of egg masses in the area, on the nature and properties of the substrate on which egg masses are deposited, and on the height and direction of egg mass position on the substrate. All of these factors extend the hatching period. Whether the dates of hatching and major food species foliation would be synchronous or asynchronous is partially determined by the direction and duration of temporal shifts in hatching dates of the majority of larvae. The duration of the first-instar stage depends on hydrothermal conditions, and feeding conditions, among other factors.
ECentral; EGG HATCH, PHENOLOGY

192 Benkevich, V.I. 1966.
Outbreaks of the gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae) in the European part of the USSR relative to solar activity fluctuations, cyclic changes in atmosphere, climate and weather. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 3-41.
-- Large-scale gypsy moth outbreaks occur in the territory of the European part of the USSR during periods of decline and minimum activity within 11-year cycles. These outbreaks occur against the background of the integral curve of centenary fluctuations of Wolf numbers. The fluctuations occur 2, 3, or 4 years after the maximum recurrence index, with maximum development of meridional processes in May and June, from November to March, and particularly in January and February. This macrosynoptic situation brings about a dry May and June, and cold, dry winters, and can be used to determine a favorable period for gypsy moth outbreak, but not its locality. Therefore, changes of weather conditions in specific territories should be analyzed and continuous monitoring of physiological condition and numbers of the pest in all survival stations should be conducted.
ECentral; POPULATION FLUCTUATION, PROGNOSIS, SOLAR ACTIVITY, WEATHER

193 Benkevich, V.I. 1966.
Outlines on the gypsy moth, *Ocneria dispar* L., biology. Report II. The behavioral patterns in unfertilized gypsy moth females. In: Trudy Orekhovo-Zuyevskogo pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 67-80.
-- A gypsy moth female is attractive to males just after emergence. As soon as their wings are dry and spread, females actively select places with optimum hydrothermal and light conditions such as locations with temperatures ranging from 18°C to 25°C, and shady places protected from the wind. In central regions of the European part of the USSR, such conditions are usually observed at southern, eastern, and southeastern edges of forests, and on the mountain slopes of the same exposure with stands of low density. Sterile females fly better than fertilized ones, but females of the middle Russia population can fly actively only for a distance of 800 to 1000 m. Females of the Asian population are strong flyers.
ECentral; FEMALES, FLIGHT, MATING

194 Benkevich, V.I. 1967.
Factors regulating gypsy moth population dynamics in central regions of European part of the USSR. In: Nauchnaya konferentsiya posvyashchennaya itogam nauchno-issledovatel'skoy deyatel'nosti Orekhovo-Zuyevskogo pedagogicheskogo instituta. Tezisy dokladov. Orekhovo-Zuevo: 1O5-1O7.
-- Large-scale gypsy moth outbreaks in the European part of the USSR are related to periods of decline and minimum solar activity during 11-year cycles occurring against the background of the integral curve of centenary fluctuations of Wolf numbers. This occurs 2, 3, or 4 years after the maximum recurrence index and maximum development of meridional processes showing themselves as droughts in May and June, and cold, dry winters. Recognizing these situations, it is possible to determine an outbreak period; actual outbreaks in specific regions are determined by environmental conditions of specific populations.
ECentral; OUTBREAKS, PROGNOSIS, SOLAR

ACTIVITY, WEATHER

195 Benkevich, V.I. 1968.
Gypsy moth outbreaks in the European part of the USSR as related to solar activity fluctuations, atmospheric circulation, climate and weather conditions. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 14-15.
-- Gypsy moth outbreaks sometimes occur on a large scale across vast territories. Outbreaks recorded in various regions of the Soviet Union during the period from 1890 to 1957 were correlated with cycles of solar activity. These outbreaks were found to last 2 to 4 years, each preceded by a year of the maximum index Sm; i.e., they occurred in the years when the number of sunspots is the most constant and when active spot generating of the sun is at its peak. It can be accounted for by the drop of the integral curve of 80-90-year cycles of solar activity (Wolf number) when in the atmosphere western circulatory processes develop that coincide with gypsy moth outbreaks over large areas related to the 11-year cycle of solar activity. A description is made that connects the processes of atmospheric circulation determined by the sun with gypsy moth outbreaks.
ECentral; OUTBREAKS, SOLAR ACTIVITY, WEATHER

196 Benkevich, V.I. 1970.
On the question of correlative links between solar activity fluctuations, atmospheric circulations and number of areas damaged by outbreaks of gypsy moth, *Ocneria dispar* L., in the European part of the USSR. In: Uchenyye zapiski Moskovskogo gosudarstvennogo pedagogicheskogo instituta. Moscow: 16-52.
-- Solar activity and circulatory atmospheric transformations are highly and reliably correlated with the number of regions where gypsy moth outbreaks occur. The correlations established overlap and they are different in different solar and circulatory epochs. A centenary cycle of solar activity shows itself as centenary changes of the number of regions of gypsy moth outbreaks; multi-rhythmic cycle is also a property of solar activity and circulatory atmospheric transformations. A high correlation of solar activity with circulatory atmospheric transformations and with the number of regions of gypsy moth outbreaks mathematically confirms the basic principles of synoptic theory of population dynamics.
ECentral; OUTBREAKS, SOLAR ACTIVITY, WEATHER

197 Benkevich, V.I. 1971.
Food plant choice by gypsy moth larvae relative to ether oil, terpenes, polyterpenes and tannin contents in leaves and needles. In: Nauchnaya konferentsiya Orekhovo-Zuyevskogo pedinstituta. Tezisy dokladov. Moscow: 16-21.
-- The gypsy moth feeds on the plants of the order Coniferae. The essential oil of the conifer needles contains, as a rule, both neopinene and pinene of equal optical activity. More seldom, pinene, or pinene as well as limonene, can be substituted with pinene or tannins. The combination of these substances produces a "bouquet" that is attractive to insects. Needles containing such a combination will be a favored food.
ECentral; FOLIAGE CHEMISTRY

198 Benkevich, V.I. 1974.
Indicators of the physical state of a gypsy moth population relative to its density and performance of abiotic factors during "A + B" circulatory epoch. In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 192-193.
-- Studies were made in the Orekhovo-Zuevo Forest of Moscow Province in 1950-1964. The relationship of abiotic factors with population dynamics phenomena and processes was established. The dynamic sequences compared with averages over a 2-year period.
ECentral; POPULATION DYNAMICS, WEATHER

199 Benkevich, V.I. 1978.
Gypsy moth population structure relative to cyclic fluctuations within some components of a biogeocenosis. In: Doklady MOIP. II polugodiye 1975 goda. Zoologiya i botanika. Moskva: 18-21.
-- The author believes all the elements of a multicomponent relationship - solar activity, circulatory atmospheric transformations, climate and weather - effect the population density, physiological parameters of tree and pest condition, and gypsy moth mortality. A well-balanced genetic pool of the population is formed by innumerable generations under the impact of cyclic changes in pest population density and environmental conditions. During periods of population increases and outbreaks, individuals from different survival stations mate, and lethal combinations of genes are accumulated. The genetic pool is the richest at this time. When foci are reduced, the genetic pool is poorer and the number of homozygotes grows. However, good combinations occur, which allow the population to overcome depression. An outbreak can be induced not only by the pest population (self-regulation), but also by lower plant resistance. During outbreak suppression, entomophages are of great importance. All these factors are interrelated.
ECentral; GENETICS, OUTBREAKS, POPULATION QUALITY, SOLAR ACTIVITY, WEATHER

200 Benkevich, V.I. 1978.
Indicators of the physical state of a gypsy moth population relative to its density and performance by abiotic factors in last circulatory epoche. In: Doklady MOIP. I polugodiye 1975 goda. Zoologiya i botanika. Moskva: 71-75.
-- In some regions of the USSR, gypsy moth outbreaks are preceded by a solar-meteorological situation specific for every region, similar to that recognized by M.L. Khanislamov (1963) for Bashkiria. Reliable at the highest level of significance, the relationship between the outbreaks and the preceding meteorological situation were established by of finding the tetrachoric coefficient. The outbreak had been preceded by a drought and a severe, dry winter 3 years before. Observations were carried out from 1950 to 1964 in the Orekhovo- Zuevo Forest of Moscow Province. Correlation coefficients are given for 50 dynamic sequences that demonstrate the extent to which gypsy moth ecological characteristics depend on a number of meteorological parameters.

ECentral; MODELS, OUTBREAKS, SOLAR ACTIVITY, WEATHER

201 Benkevich, V.I. 1979.
Some mechanisms regulating gypsy moth population dynamics. In: Novyye problemy zoologicheskoy nauki i ikh otrazheniye v vuzovskom prepodavanii. Tezisy dokladov nauchnoy konferentsii zoologov pedinsitutov. Stavropol: 48-49.
-- This survey was made in the Orekhovo-Zuevo Forest from 1950-1964. Significance of various factors limiting the increase of gypsy moth populations was determined and their action at different life stages was clarified. The cycle is considered to begin with a low population level that gradually increases by the fifth to seventh year and reaches its peak by the ninth year. The tenth year marks the beginning of the depression period. With respect to embryogeny during the first years of the cycle, egg parasites perform control functions, and the proportion of undeveloped embryos increases (until the third year) as does the role of vertebrates for control (until the fourth to sixth year). From the sixth to the ninth year, mortality caused by invertebrate predators increases. After the tenth year, as the population reaches the crisis phase, activity of invertebrates increases again, and after the twelfth year, the number of undeveloped eggs becomes greater.
ECentral; POPULATION FLUCTUATION

202 Benkevich, V.I. 1983.
Fluctuations in gypsy moth abundance relative to changes in the physical state of food plants caused by solar activity. In: Doklady MOIP. Zoologiya i botanika 1981. Teoreticheskiye i prikladnyye aspekty rezul'tatov izucheniya rasteniy i zhivotnykh. Moskva: 8-10.
-- Gypsy moth outbreaks in Moscow and Voronezh Provinces were analyzed for a period of about 100 years. The relationship between the physiological condition of trees and their susceptibility to gypsy moth attack to perennial changes of solar activity is shown. Pest outbreaks in Moscow Province were always preceded by very early foliation of oak and birch 1 or 2 years before. For 2 years or 1 year prior to outbreak, or during the year of outbreak, gypsy moth hatching dates coincided with oak foliation dates or were not more than 2 days ahead of them.
ECentral; FOLIAGE QUALITY, OUTBREAKS, PHENOLOGY, SOLAR ACTIVITY

203 Benkevich, V.I. 1984.
Gypsy moth outbreaks in the European part of the USSR. (Massovyye poyavleniya neparnogo shelkopryada v Evropeyskoy chasti SSSR.) Nauka, Moscow. 143 p.
-- The relationship between gypsy moth population dynamics and 11-year, 22-year, centenary, and other solar cycles is shown. It was discovered that there is a relationship between solar activity rhythm, atmospheric processes and weather phenomena, biochemical composition and quantity of food of the gypsy moth, and the physiological condition of parasites and predators attacking the gypsy moth. Possibilities for forecasting gypsy moth population dynamics are shown.
EWest, ECentral, EEast; FOLIAGE QUALITY, OUTBREAKS, PROGNOSIS, REVIEW, SOLAR ACTIVITY, WEATHER

204 Benkevich, V.I. 1984.
Gypsy moth occurrence in the European part of the USSR over the last century in relation to sharp changes in solar activity. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 52.
-- Solar activity can produce a dual effect: cyclic background of Earth processes and distortion of this background. The former effect shows itself in relation to the number of regions where gypsy moth outbreaks occur to the centenary cycle of solar activity. The latter effect can be seen in relation to the number of regions and areas of foci (thousands of hectares) to rare changes and extremes of solar activity. Solar activity is not an ordinary modifying factor. Its regulating function is to put into action other modifying factors and make them cyclic. Cyclic numerical fluctuations are inherent in a population. They would occur even if solar activity were stable, but they would be different.
ECentral; OUTBREAKS, SOLAR ACTIVITY

205 Benkevich, V.I. 1988.
The mortality of gypsy moth larvae due to entomopathogens and disease in connection with sunspots, climate, and weather (in German). [Die Sterblichkeit der Raupen des Schwammspinners, *Lymantria dispar* L. (Lepidoptera, Liparidae) wegen Entomophagen und Krankheiten in Zusammenhang mit der Sonnenfleckenintensitat, dem Klima und dem Wetter.] In: XII Mezhdunarodnyy simpozium po entomofaune Sredney Evropy. Kiev, 25-30 sentyabrya 1988. Tezisy dokladov. Naukova Dumka, Kiev: 23.
-- Mortality of gypsy moth larvae caused by entomophages and diseases was studied from 1950 to 1984 in Moscow Province. The level of mortality was found to be dependent on biotic factors and on solar activity as manifested by climate and weather. Correlation coefficients of different parameters ranged from 0.770 to 0.909.
ECentral; MODELS, SOLAR ACTIVITY, WEATHER

206 Benkevich, V.I. 1990.
The relationship between solar-climatic situations and outbreak of the gypsy moth, *Lymantria dispar* L. (Lepidoptera, Lymantriidae), in the Moscow Region over 120 years. Entomologicheskoye obozrenie. 69(1):3-13.
-- Gypsy moth outbreaks were found to be highly (and reliably) correlated to two solar-climatic situations. If one of these situations is observed before the mid-90s, the eruption phase of an outbreak will occur in the Moscow Province in 1989-1990 or in the mid-90s.
ECentral; OUTBREAKS, PROGNOSIS, SOLAR ACTIVITY

207 Benkevich, V.I., Nazarov, I.A. 1964.
Methods to forecast gypsy moth, *Ocneria dispar* L. (Lepidoptera, Liparidae), outbreaks. Report VI. Gypsy moth (O. dispar L.) outbreaks and their forecast in the Ryazan Region. In: Trudy Orekhovo-Zuyevskogo

pedagogicheskogo instituta. Ekologiya i sistematika zhivotnykh. Moscow: 28-66.
-- Gypsy moth population dynamics and possible causes of outbreaks in the Ryazan Province from 1943 to 1963 are analyzed. The relationship of outbreaks to the coefficient of winter severity as well as to the temperature and humidity of the first half of summer is established. Additionally, the analysis of data on gypsy moth population dynamics since 1856 is made and the relationship of outbreaks to weather conditions is recognized.
ECentral; OUTBREAKS, PROGNOSIS, WEATHER

208 Ben'kovskaya, G.B., Idrisova, N.T. 1985.
The remote effect of juvenoids on gypsy moth ontogenesis. Lesnoye khozyaystvo. (2):63-65.
-- The effect of preparations of aldosar and aldoside on the gypsy moth was studied in two subsequent generations. One application was made of different concentrations of preparations ranging from 0.00001 to 0.1% and applied to III-IV instars. Juvenoids were shown to produce a continuous effect throughout gypsy moth morphogenesis and, in the next generation, embryogeny was particularly affected. Juvenoids are a promising means of pest control.
EEast; GROWTH REGULATORS, PHYSIOLOGY

209 Berdanov, G.B. 1925.
Agricultural pest fauna of the eastern foothills of the Northern Caucasus. In: Izvestiya Inguschskogo NII kraevedeniya. Groznyy: 111-130.
-- One hundred sixteen pest species (insects and rodents) are listed. Of these, 24 species are Lepidoptera, including the gypsy moth. It attacks apple, pear, and other orchard and ornamental plants.
Caucasus; HOST PLANTS, PEST LIST

210 Berdennnikova, S.P., Kutsenogii, K.P., Kirov, Ye.I., Sakharov, V.M., Chankina, O.V. 1977.
Laboratory study of efficacy of highly dispersed insecticide aerosols. Sibirskiy vestnik sel'skokhozyaistvennoy nauki. 7(1):42-48.
WSiberia; CHEMICAL INSECTICIDES

211 Berim, N.G., Druzhelyubova, T.S. 1958.
Anatomical and hystological changes in the gypsy moth, *Porthetria dispar* L., larvae when treated with insecticides. Entomologicheskoye obozrenie. 37(2):252-259.
-- When gypsy moth larvae are treated with DDT, sodium fluoride, calcium arsenite, mixtures of DDT and sodium fluoride, DDT and calcium arsenite, not only is their metabolism upset but morphological changes in the nervous system, intestines, and fat body occur. In the nervous system, nerve cells and ganglia degenerate and the volume of cerebral substance shrinks; intestine epithelium is destroyed, the fat body shrinks, and its cells are deformed and decreased. Changes in the fat body are specific towards specific insecticides.
ECentral; CHEMICAL INSECTICIDES, HISTOLOGY, NEUROLOGY

212 Berim, N.G., Sekun, N.P. 1977.
Pathology of gypsy moth hemolymph when treated with insecticides. In: Nauchnyye trudy Leningradskogo sel'skokhozyaystvennogo instituta. Leningrad: 41-44.
-- When larvae were treated with insecticides, their general hemolymph pattern changed compared to the norm. Later, not only does the ratio of hemocytes change but patho-morphological changes occur both in the cytoplasm and the nucleus. All the insecticides tested - chlorophos, trichlormetaphos-3, DDTVPh and their mixtures - caused similar hematological and histological changes.
ECentral; CHEMICAL INSECTICIDES, HEMOLYMPH

213 Bezhanishvili, T.D. 1974.
Gypsy moth entomophages in Georgia and their sensitivity to insecticides. In: Materialy sed'mogo s"yezda Vsésoyuznogo entomologicheskogo obshchestva. USSR Academy of science, Leningrad: 21-22.
-- The list of parasites includes: *Calasoma sycophanta, Itoplectis alternatus, Pimpla examinator, Meteorus versicolor, Apanteles melanoscelus, Apanteles melitaearum, Monodontomerus aereus*
Caucasus; CHEMICAL INSECTICIDES, PARASITES

214 Blagodatskaya, G.I., Voitenko, N.M. 1968.
Comparative study of morphological and physiological peculiarities of neurosecretory cells of epipharyngeal ganglion in the tent caterpillar, gypsy moth and satin moth. In: Naukovi pratsi USGA. Dostidzhennya z fitopatologii. USGA, Kiev: 72-75.
-- Data are presented on the location of groups of neurosecretory cells of the superesophageal ganglion of the tent caterpillar, gypsy moth, and satin moth. Their morphology and paths of neurosecretory substance transfer also are given. Neurosecretory cells of the species under study respond differently to dyes, which the authors regard as evidence of different properties of the secreta produced by neurosecretory cells.
EWest; ENDOCRINOLOGY

215 Bogach, A.V., Zolotoverkhaya, I.M., Kirichenko, E.I. 1966.
Impact of light and temperature on propagation of some lepidopterous (*Porthetria dispar* L., *Bombyx mori* L.) species. Doklady Akademii nauk Ukrainskoy SSR (Dopovidni Akademii Nauk Ukrains'koy RSR). (6):825-827.
-- Experiments on the effect of light and temperature on mating, fertilization and oviposition of the gypsy moth and the silkworm show that light alone and in combination with temperature affects moth emergence and flight dynamics, fertilization, and oviposition. Photoperiodic effect is observed most clearly at low temperatures. The effect on mating, fertilization, and oviposition by changing light and temperature shows that temperature is more influential when both factors act together.
EWest; MATING, OVIPOSITION BEHAVIOR, PHOTOPERIOD, TEMPERATURE

216 Boiko, G.Ye 1990.
Investigation of modification and utilization of phenolic compounds of oak by gypsy moth and oak roller larvae. In: Uspekhi entomologii v SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 22-23.
EWest; FOLIAGE CHEMISTRY, NUTRITION

217 Boness, M. 1975.
Disparlure: comparison of efficacy in field experiments against *Lymantria dispar* L., *Lymantria monacha* L. In: VIII Mezhdunarodnyy kongress po zashchite rasteniy, doklady i soobshcheniya sektsii V. Biologicheskiye i geneticheskiye metody bor'by. Nauka, Moscow: 35-41.
-- Disparlure was found to possess group specificity (for the Lymantria group). Normally, the gypsy moth is active during the day with maximum flight activity from 11 a.m to 3 p.m. (FRG). In Sardinia, gypsy moth can be active in the evening and also at night, depending on temperature. Gypsy moth females are reluctant to fly and are not vagile before copulation. Vision probably plays an important role in the searching activity of males of this species, especially when the density level is high. Therefore, during an outbreak, males have a weak response to artificial pheromones. By contrast, in sparse populations, male response to the pheromone was strong. Because males emerge earlier than females, their response to disparlure was strongest at the beginning of summer when there were few, if any, females. This allows for rather effective destruction of males with sticky attractant-baited traps at the beginning of a population increase, but during an outbreak they are not effective.
EWest; CONTROL, FEMALES, FLIGHT, PHEROMONE TRAPS

218 Borisoglebskaya, M.S. 1977.
Lepidoptera - the fruit-tree pests. Zashchita rasteniy. (1):59-60.
-- Gypsy moth egg masses are found on the bark at the base of trees, on stumps, and on the lower part of fences and houses near and on the fruit orchards of Rosaceae fruit trees.
ECentral; OVIPOSITION SITE

219 Borisoglebskaya, M.S. 1979.
The necessity of protecting decorative plants. Zashchita rasteniy. (7):61.
ECentral; CONTROL, OVIPOSITION SITE

220 Borisova, O.D., Pugachev, V.G. 1989.
Extraction and cleansing of nuclear polyhedrosis virus of gypsy moth, cabbage looper, and bollworm in production of virus insecticides. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibirsk: 35.
-- In pilot experiments, a crude homogenate of dead larvae is presently used for producing preparations. Large-scale production material used for inoculation requires additional cleansing of foreign microflora. Since polyhedra are similar to microorganisms in some parameters, e.g., buoyant density and size, certain difficulties in selecting the techniques for polyhedra cleansing arise. Polyhedra cleansing in the gradient of glycerol density and pretreatment of crude homogenate of larvae with detergents, lysozyme, or hyaluronidase did not lower the titer of microorganisms. Treatment with sodium dodecyl-sulphate did lower the titer of microorganisms by one order of magnitude. Incubation in TES-buffer (tris - 0.1 M, EDTA -0.004 M, SDS - 1 %) at 30°C for 1.5 hr caused a decrease in the microorganism titer by more than 3 orders of magnitude, preserving the infectivity of baculoviruses.
MICROBIAL PESTICIDES, VIRUS

221 Bryantsev, B. 1928.
Several observations of gypsy moth larval migration from forest to field and gardens in the Kursk Region in 1927. Zashchita rasteniy. (3-4):370-371.
-- Gypsy moth outbreaks were observed in the Kursk Province from 1925 to 1927. In some areas, larvae migrated to gardens and fields and up to 1000 ha of the forest were infested. Oak, linden, aspen, birch, and Weymouth pine were defoliated. Aspen, elm, hazel, and wild pear were not attacked. Pupation often occurred on nonfavored species. Larvae pupated not only in shelters but also on leaves. When migrating to the fields, they attacked wheat and clover, but oats and rye were not injured. Entomophages caused the death of up to 50 % of insects.
ECentral; HOST PLANTS, PUPAE

222 Bublik, I.M. 1959.
Role of insect pests in lowering productivity of orchards in the Lvov Region. In: IV s"yezd Vsesoyuznogo entomologicheskogo obshchestva. Tezisy dokladaov. Nauka, Moscow and Leningrad: 11-12.
-- The gypsy moth is mentioned among 20 of the most serious phyllophagous pests of Lvov Province. Outbreaks of the pest are mostly local and large-scale outbreaks are rare.
EWest; PEST LIST

223 Bublik, I.M. 1970.
Comparative characteristic of entomofauna of garden pest in the western areas of the Ukrainian SSR. In: Materialy 4 nauchnoy konferentsii zoologov pedinstitutov. Gorki: 170-171.
-- In the area west of the Ukraine, more than 200 pests of fruit plants are recorded. The gypsy moth is one of 5 major pests referred to as belonging to polytrophic phyllophagous lepidopterous species.
EWest; PEST LIST

224 Buda, V.G., Karalyus V.A. 1983.
Effect of larval density on imago behavior during pheromone excretion in *Ephestia kuenhniella*, *Lymantria dispar*, *Yponomeuta cagnaellus* (Insecta: Lepidoptera). In: Materialy 3 Vsesoyuznoy konferentsii po povedeniyu zhivotnykh. Nauka, Moscow: 15-16.
EWest; DENSITY, PHEROMONES

225 Budko, L.A., Lyashenko, K.K., Matrosov, V.V.,

Sharonova, S.V. 1982.
Study of effect of some factors on gypsy moth development. In: Ekologiya i okhrana zhivotnykh. Kuybyshev: 63-70.
-- A study was made to determine the effect of daylength and temperature on larval and pupal development, as well as the effect of temperature and duration of cooling on diapausing gypsy moth. The rate of larval and pupal development normally depends on temperature. Photoperiodic conditions of maintenance do not affect the duration of larval development, but they determine the dates of different instars and the increase in pupal weight. The optimum temperature for egg reactivation is 0° to 6° C. Subzero temperatures are unfavorable for reactivation. Cooling, which is required for normal reactivation of gypsy moth eggs, should last about 1.5 months.
ECentral; DIAPAUSE, PHOTOPERIOD, TEMPERATURE

226 Bukovskiy, V. 1940.
Invertebrate populations, mainly oak defoliators, in the Crimean State Preserve. In: Trudy Krymskogo gosudarstvennogo zapovednika. Simferopol: 39-169.
-- The main types of oak forests in the Crimean Preserve, climatic peculiarities, and insects inhabiting oak foliage recorded from surveys made in 12 sites are described. Data on seasonal dynamics of major inhabitants of Crimean oaks (observed in 3 sites) and their mortality and composition of entomophages also are given. One of the major oak pests is the gypsy moth. Distribution of larvae of this species over Crimean oak forests is reported for the period 1932 to 1935. Gypsy moth mortality caused by parasites ranged from 13.4% to 71.5% in different sites, with an average of about 55%. Dominant species were *Phorocera silvestris* R.D. (from 3% to 30%), *Sturmia scutellata* (up to 5% in one site), species of the genus *Apanteles* (from 8% to 36%), and mermethids. The secondary parasites *Mesochorus fasciatus* Bridam and *Habrocytus metallifemus* were extracted from cocoons of *Apanteles*. Biotic factors are the main cause of outbreak collapse.
EWest; NEMATODES, PARASITES, PEST LIST, PHENOLOGY

227 Burdaeva, T.S. 1981.
Pests and diseases in forest shelter belts. Zashchita rasteniy. (7):33.
-- Investigations were made in Oryol Province. Application of entobacterin and dendrobacillin against phyllophagous pests is suggested.
ECentral; BACTERIA, MICROBIAL PESTICIDES

228 Chankina, O.V., Kutsenogiy, K.P. 1981.
Effect of the size of aerosol particles on the efficacy of insecticides in controlling gypsy moth larvae. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 206-207.
-- An experiment was conducted to estimate efficiency of deposition of insecticide aerosol particles ranging from 1 to 6 microns on gypsy moth I-IV instars. The stream velocity ranged from 0.5 to 3 m/sec. An enantiomer of Gexachlorane dissolved in diesel fuel was used. The LD_{50} was found to be independent of the part of the solution from which contamination occurred - the bulk or the surface - and the instar. It was related to the origin of insects and ranged from 2 to 20 mkg/g. An effective cross-section of drop diameter on captured larvae was determined. This value and the value of concentration impulse determined the optimum size of particles. For the gypsy moth this is estimated to be 5 to 15 microns, depending on weather conditions.
WSiberia; CHEMICAL INSECTICIDES

229 Chapek, M. 1985.
Reference list of the braconids (Hymenoptera: Braconidae), parasites of the gypsy moth. Informatsionnyy byulleten' VPS MOBB. 10:32-37.
-- Data are given on 8 braconid species that are active parasites of the gypsy moth. An additional 20 species are listed that are regarded as parasites of this pest in the literature, but have a broader host range.
EWest; PARASITES

230 Chekanov, M.I. 1975.
Gypsy moth in Moldavia. In: Lesomelioratsiya i zashchitnoye lesorazvedeniye v Moldavii. Shtiiintsa, Kishinev: 54-57.
-- Data are given on gypsy moth biology, quantitative and qualitative parameters of the population under study at different gradation phases, and the role of parasites and predators. Twenty entomophagous insect species and one nematode species are mentioned, and data on infestation rate are presented.
EWest; PARASITES, POPULATION FLUCTUATION, PREDATORS

231 Chekanov, M.I. 1976.
The role of entomophages in oak shrinkage in the forest-steppe areas of Moldavia. In: Lesovodstvo i agrolesomelioratsiya v Moldavii. Shtiiintsa, Kishinev: 41-46.
-- Two defoliations of light oak shrubwoods by the gypsy moth together with other factors affecting stands before and after defoliation lead to rapid death of the majority of English oaks. Anthropogenic factors are regarded as the main cause.
EWest; TREE HEALTH

232 Chekanov, M.I., Osetsimskyi, B.I. 1982.
A method to inventory gypsy moth numbers in the oak groves of Moldavia. In: Lesnoye khozyaystvo Moldavii. Shtiiintsa, Kishinev: 74-85.
-- On the basis of gypsy moth distribution in oak groves of Moldavia, two plans of sequential inventories of pest population have been worked out: one for research work and one for practical needs. Application of these methods allows for exact numerical estimates of pest populations in the stands, saving labor and time.
EWest; EGG MASSES, SAMPLING

233 Chelyaev, S.D., Fidosov, N.I. 1989.
The use of bacterial preparations for controlling gypsy moth numbers in its foci. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy.

Novosisbisrk: 69.
-- In the Osh region of Kirgizia, experiments were conducted to improve application technology of the virus of the gypsy moth and the bacterial preparation, crystalline-3. Treatments were made with an aerosol generator (AG-UD-2), and a hand sprayer ("Mini-Ulva"). Pistachio plantations were treated against II and III instar gypsy moth. The expenditure rate of crystalline-3 was reduced to 0.5 kg/ha vs 1.0-1.5 kg/ha (a current standard); biological efficiency was 70% to 90%. Application of virin-ENSh against instar III gypsy moth decreased populations by 60% to 100%. A month later, the population recovered and late instars infested plants; defoliation was 10% to 20% in the crown and 60% to 100% in the control.
MAsia; BACTERIA, MICROBIAL PESTICIDES, VIRUS

234 Chelysheva, L.P., Chelyshev, D.E. 1988.
The role of baculovirus in gypsy moth population dynamics in the Far East region. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 42-43.
-- Epizootiology of virus diseases was studied in gypsy moth gradation foci of Far East populations from 1966 to 1986. Pest outbreaks were recorded in different hardwood and larch stands during 1963 to 1967, 1973 to 1976, and, 1978 to 1984, and occurred in the same stands every 6 to 8 years. Virus disease was the strongest regulating factor, killing 50% to 86% of insects in the foci. In complex foci not only the gypsy moth, but also 9 other lepidopterous species (principally geometrids) died of polyhedrosis. Gypsy moth gradations in all types of foci were terminated by virus epizootics in the second year after a population increase during the later instars. High pest mortality caused by biotic factors such as pathogenic microorganisms and entomophages makes eradication measures unnecessary. Forecasting baculovirus activity must become the basis of integrated pest control.
Far East; OUTBREAKS, VIRUS

235 Chelysheva, L.P., Orlov, J.M. 1986.
Outbreaks of the pink gypsy moth and the gypsy moth in Primorye. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 125-129.
-- Data on biology, distribution, and host plants of Lymantria mathura Moore in the Russian Far East, with some data on diseases of this species and the gypsy moth, are presented.
Far East; GENERAL BIOLOGY, HOST PLANTS

236 Cherbanik, D.D. 1970.
Effect of pseudoallicin-374 on the development of gonads and fecundity in the gypsy moth (*Porthetria dispar* L.). In: Naukovi pratsi USGA. USGA, Kiev: 57-68.
-- Effect of pseudoallicin-374 at a concentration of 1:600 was tested on gypsy moth larvae. It was discovered that pseudoallicin-374 inhibits development of gonads and reduces fecundity.
EWest; GROWTH REGULATORS

237 Cherepanov, A.I. 1949.
The most important insect pests of the forests in Tuva and measures for their control. Izvestiya Zapadno-Sibirskogo filiala Akademii nauk SSSR, seriya biologiya. 3(2):15-35.
WSiberia; CONTROL, PEST LIST

238 Cherepanov, A.I. 1956.
Insects in the Tuva Autonomous Republic. In: Trudy Biologicheskogo instituta Zapadno-Sibirskogo filiala AN SSSR. Izd. AN SSSR, Moscow: 35-78.
-- The gypsy moth is recorded as a pest of forests growing along rivers in the forest-steppe zone. It attacks birch, poplar and willow.
WSiberia; HOST PLANTS, PEST LIST

239 Cherepanov, A.I. 1962.
Pest insects and protection of kolki forests in Western Siberia. In: Trudy Sibirskogo otdeleniya AN SSSR. Novosibirsk: 154-161.
-- The gypsy moth is mentioned among pests of kolki forests. It attacks birch and aspen, which are the main species of kolki forests. But the gypsy moth attacks birch heavily only in the foothills of Altai. In the plain regions, tortricids, sawflies, and scarabids are more important pests, while the most serious pest of aspen is the satin moth.
WSiberia; HOST PLANTS, PEST LIST

240 Cherepenko, Ye.I., Martynenko, Ye.I., Bubenchikova, S.N., Galkin, A.P. 1986.
Gypsy moth, *Porthetria dispar*, cellular and nuclear polyhedrosis virus DNA methylation. Molekulyarnaya genetika, mikrobiologiya i virusologiya. 8:40-43.
EWest; VIRUS

241 Cherepenko, Ye.I., Martynenko, Ye.I., Kok, I.P. 1984.
Physiochemical characteristics of DNA of *Porthetria dispar* nuclear polyhedrosis virus. Ukrainskiy biokhimicheskiy zhurnal. 56:614-619.
EWest; PHYSIOLOGY, VIRUS

242 Chernichuk, L.L. 1987.
Determination of synthetic gypsy moth sex pheromone concentration in the air. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 81-89.
-- Disparlure content in the air of forest plots was estimated during an experiment on sex disorientation of the gypsy moth. To saturate the atmosphere, rubber crumbs (disparlure dissolved in organic solvent), and a new water-based preparation were used. After the plots had been treated with liquid preparations at a dose of 100 g per ha, pheromone concentration in the air did not exceed 3 mkg/cbm during the first 24 hours.
EWest; MATING DISRUPTION

243 Chernichuk, L.L., Bednyy, V.D. 1985.
Characteristics of preparations of disparlure in relation to volatility. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 46-53.
-- Preparations of disparlure used for forecasting gypsy moth and nun moth populations are classified by volatility (concentration of equilibrium vapor). A relationship is established of disparlure volatility to the attractant dose of

the form, type of the base material, and ambient temperature.
EWest; PHEROMONES

244 Chernichuk, L.L., Dron', L.P., Vaintrub, F.P. 1987. **A technique for estimating disparlure in soil.** In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 77-80.
-- A technique for estimating disparlure content in forest soil is described: This technique includes soil extraction with acetone, transfer of disparlure from the extract to a hydrophobic solvent (n-hexane), concentration and purification of the hexane extract by chromotography on an alumina column, concentration of eluate extracted from the column, and quantification of disparlure by gas-liquid chromatography.
EWest; PHEROMONES, SOIL

245 Chernikova, O.I., Tur'yanov, R.A. 1984. **Estimation of efficacy of hormonal preparations of altozar and altozid against the gypsy moth.** In: Nauchno-tekhnicheskoye tvorchestvo molodykh uchyenykh - lesnomu khozyaystvu. Materialy VII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Pushkino: 217-221.
-- Gypsy moth larvae are not sensitive to synthetic analogues of the juvenile hormones altozar and altozid until they reach the last instar, when there are two peaks of sensitivity. The preparations tested remain active for a long time under natural conditions, but they cannot be retained in the organisms of larvae and, therefore, are not harmful to the gypsy moth even in the sensitive period.
ECentral; BIOASSAY, GROWTH REGULATORS

246 Chernikova, O.P., Tur'yanov, R.A. 1983. **Susceptibility of gypsy moth larvae to a synthetic analogue of the juvenile hormone, altozar.** In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 232-236.
-- The action of altozar on gypsy moth instars II and III was studied. Aqueous emulsions of increasing preparation concentrations (0.00001-0.1%) were sprayed on birch leaves that were then fed to larvae. No toxic effect on larvae was observed. A weak morphogenetic effect was seen in two cases: when larvae were reared on altozar-treated food for a long time, and when larvae were treated before molting to the fourth instar.
EEast; BIOASSAY, ENDOCRINOLOGY, GROWTH REGULATORS

247 Chernyavskaya, O.A., Devet'yarova, S.V., Zhimerikin, V.N., Bakhvalov, S.A. 1979. **Introduction of a polyhedrosis in different gypsy moth populations under the influence of suboptimal factors.** In: Entomopatogennyye mikroorganizmy v lesnykh biotsenozakh. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 91-97.
WSiberia; MICROBIAL PESTICIDES, VIRUS

248 Chernyshev, N. 1906. **Protection of gardens against insect pests and diseases.** Plodovodstvo. 4:331-338.
-- The gypsy moth is mentioned among important orchard pests. The following control measures are suggested: spraying trees with Paris green, using kerosene emulsion, and daubing trees with lime milk. Dates of treatments against pests and diseases are suggested.
ECentral; CHEMICAL INSECTICIDES

249 Chervenkov, S. 1984. **Micromechanic determinations of small biological objects.** In: Nauchnyye trudy Vysshego instituta zootekhniki i veterinarnoy meditsiny. Zagora: 103-110.
-- The hardness of gypsy moth chorion was tested using the microhardness gauge PMT-3. Mean egg diameter was determined by 100 measurements. Experiments on testing microhardness of egg chorion in different directions are described. The following metric parameters were measured: mean egg diameter, surface area, and mean volume. Differences found in chorion hardness in different directions towards the spherical chorion surface may be related to differences in chorion structure. Relation of chorion microhardness to the type of contents is studied.
ECentral; EGGS, MORPHOMETRICS

250 Chistyakov, Yu.A. 1984. **Distribution of higher nocturnal lepidopterans from the subfamilies Bombycoidea, Notodontoidea and some Noctuoidea in main forest formations of the southern Primorye.** In: Fauna i ekologiya bespozvonochnykh Dal'nego Vostoka: vrediteli i entomofagi. DNTs AN SSSR, Vladivostok: 80-99.
-- The author presents a list of 173 nocturnal lepidopterous species of the families Bombycidae, Brahmaeidae, Endromidae, Saturniidae, Lasiocampidae, Sphingidae, Notodontidae, and Lymantriidae registered in the southern Primorye. The gypsy moth is a common species in the region. Generalized data are given on distribution by stations, trophic relations and the role of lepidopterous insects in question in basic forest formations. Palearctic lepidopterous insects are shown to prevail in all forest types.
Far East; DISTRIBUTION, FAUNAL LIST

251 Chkhubianishvili, N.A., Kiziryan, N.G. 1990. **Gypsy moth entomophages in Georgia.** Soobshcheniya Akademii nauk Gruzinskoy SSR. 138(1):161-164.
-- In 1988-1989, an epizootic of a nuclear polyhedrosis virus was recorded in gypsy moth population. Also recorded in the pest population were parasitic nematodes of the family Mermithidae of the genus *Isomermis*. Both the virus and nematodes are regarded as promising agents for gypsy moth control.
Caucasus; NEMATODES, VIRUS

252 Chugunin, Ya.V. 1949. **Focal periodicity gypsy moth mass propagations.** Zoologicheskiy zhurnal. 28(5):431-438.
-- Data on gypsy moth outbreaks are given for the period from 1931 to 1948. It is pointed out that during this period no uniform infestation of vast forest areas was recorded and pest distribution is always spotty in foci. The author

believes that, after hatching, all larvae migrate until they molt to the second instar. Origination of foci seems to depend only on weather conditions and peculiarities favoring concentration of migrating first instars in certain areas where secondary foci are formed. It is the author's opinion that larvae remaining in primary foci are doomed to die. The outbreak lasts three years and collapses in the fourth. A complete cycle of population dynamics in the Crimea lasts nine years. Foci of high density always originate in the same places, areas of air-pockets and turbulence. It is suggested that conifers be planted in such plots, thus depriving the pest of food in aggregation sites.
EWest; DISPERSAL, FOCI, OUTBREAKS, SILVICULTURAL TREATMENTS, WEATHER

253 Chugunin, Ya.V. 1951.
Outbreak coincidence of different folivorous larvae. Zoologicheskiy zhurnal. 30(1):63-65.
-- Outbreaks of phyllophagous insects, including gypsy moth, usually occur simultaneously, but foci of each species occupy a separate area and it is only in the process of expansion or redistribution that they can merge and overlap. In the site where outbreak of one phytophage has occurred, there will not be an outbreak of another phyllophage as agents of diseases are the same for all coincident insect species. Polyhedrosis virus is the main factor suppressing outbreaks. In high density foci, pests as well as ants and carabids disappeared. Gypsy moth foci originate only through dispersal of first-instar larvae from hatching sites.
EWest; DISPERSAL, FOCI, POPULATION DYNAMICS, VIRUS

254 Chugunin, Ya.V. 1958.
The gypsy moth. (Neparnyy shelkopryad.) Cel'khozgiz, Moscow. 36 p.
-- Data on gypsy moth outbreaks in the Crimea are given. It is the author's opinion that origination of foci and outbreak collapse are related to the following behavioral traits of gypsy moth larvae: total migration of first-instar larvae and concentration in the points of air turbulence, and the death of insects caused by virus epizootics three years after the onset of outbreak.
EWest; DISPERSAL, POPULATION DYNAMICS

255 Chukhriy, M.G. 1982.
Ultrastructure of viruses of lepidopterous pests. Illustrated handbook. (Ul'trastruktura virusov cheshuekrylykh - vrediteley rastenyy. Illyustrirovannyy opredelitel'.) Shtiintsa, Kishinev. 150 p.
-- Nuclear polyhedrosis and granulosis viruses were studied in 16 lepidopterous species, including the gypsy moth. A lot of unique electromicrograms, which provide an idea of the baculoviruses and nuclear polyhedrosis viruses of insects studied, are presented.
EWest; MORPHOLOGY, VIRUS

256 Chukhriy, M.G. 1987.
Identification of viruses of insect pests and estimation of efficacy of virus preparations. Avtoreferat dissertatsii doktora biologicheskikh nauk. Leningrad. 29 p.
-- The author studied the ultrastructure and the complete morphogenesis cycle of nuclear polyhedrosis viruses of the most serious agricultural pests, including the gypsy moth, from five populations, which served as a basis for new virus preparations. By electron microscopy and mathematical simulation, an express method was developed for estimating the qualities of preparations of virin-ENSh, virin-X and virin ABB.
ECentral; PHYSIOLOGY, VIRUS

257 Chuvakhin, V.S., Mushnikova, K.S., Pastukhov, B.N., Popov, S.D., Gerasimov, B.A., Zaring, P.V. 1945.
The gypsy moth. In: Posobiye po bor'be s vreditelyami i boleznyami sel'skokhozyaystvennykh kul'tur. OGIZ-Sel'khozgiz, Moscow: 436-437.
-- Data are given on gypsy moth area, biology, and phenology. Control measures suggested include treatment with petroleum, scraping off egg masses, and application of insecticides.
ECentral; CONTROL, GENERAL BIOLOGY

258 Chzhou, Khou-An 1960.
Regularities of changes in susceptibility of lepidopterous pests to chloro-organic insecticides and ways they overcome them. Avtoreferat dissertatsii kandidata sel'skokhozyaistvennykh nauk. Leningrad. 17 p.
-- The gypsy moth is one of 10 model lepidopterous species. It was found that when larvae are treated with sublethal doses of organic chloride insecticides, insects develop resistance as early as the first generation. Resistance of larvae and adults is inversely related to the ambient temperature after treatment. Better feeding conditions resulting in better physiological parameters of insects make them more resistant to organic chloride pesticides. A conclusion is made that alternate application of these pesticides does not prevent insect populations from developing resistance to this group of preparations.
ECentral; CHEMICAL INSECTICIDES, GENETICS, NUTRITION

259 Chzhu, Khayi-Tsin 1961.
The effect of a parasite on gypsy moth organs and tissues. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 16 p.
-- The effect of the braconid, *Apanteles solitarius*, on the host organism was studied. The parasite larva causes significant disruption of all systems and organs of host larva by squeezing internal organs. As a result, a host larva consumes less food, and its growth is inhibited. The host is mortally injured when the parasite emerges after completing its development. Death of the host results from the summary action of the parasite. All life stages of the parasite are described.
ECentral; MORPHOLOGY, PARASITES

260 Chzhu, Khayi-Tsin 1962.
Ontogenesis and biology of *Apanteles solitarius* Ratz., a parasite of the gypsy moth (*Porthetria dispar* L.). Vestnik Moskovskogo universiteta, seriya VI, biologiya, pochvovedeneie. 6:26-32.
-- Data are presented on morphology of all preimaginal stages of the parasite (egg, instars I-III, prepupa, pupa). The first instar is described in detail. The process of oviposition, larval competition inside the host, and

fecundity are discussed.
ECentral; DEVELOPMENT, MORPHOLOGY, PARASITES

261 Chzhu, Khayi-Tsin 1965.
The effect of *Apanteles solitarius* larvae on the midgut of the gypsy moth (*Porthetria dispar* L.). Vestnik Moskovskogo universiteta, seriya VI, biologiya, pochvovedeneie. (4):34-37.
-- When early instars of gypsy moth are attacked by parasites of the genus *Apanteles*, the host's internal organs (digestive organs and circulatory system) are squeezed. As the larva grows, this effect becomes more pronounced. Flattening of the crop and mid-intestine results in reduction in the amount of food that passes through the intestine and, consequently, inhibits growth. Disruption of intestine functioning affects the condition of all tissues and organs. When the parasite larva emerges, the host is badly injured and the host dies.
ECentral; PARASITES, PHYSIOLOGY

262 Danil'chenko, A.O. 1925.
Gypsy moth and its control. In: Kiivs'ka stentsiya zakhistu roslin vid shkidnikiv. Kiev: 1-4.
-- The following general data on gypsy moth and control measures are presented: collection of egg masses and treatment with petroleum, treatment with Paris green, and belt traps.
EWest; CONTROL

263 Degtyareva, V.I. 1964.
Gypsy moth. In: Glavneishiye vrednyye cheshuekrylyye drevesno-kustarnikovoy rastitel'nosti tsentral'noy chasti Gissarskogo khrebta i Gissarskoy doliny (Lepidoptera). Izdatelstvo AN Tadzhikskoy SSR, Dushanbe: 41-48.
-- The paper presents general data on gypsy moth ecology, area, parasites, economic significance, and control measures. In Tadjikistan, the gypsy moth flies from late June to late August. Summer in Kondar (an altitude of 1,100 m) is at its peak in July. Males fly around the clock and are attracted by light, but females are very rarely attracted by light. Egg masses could be found on tree trunks, walls, and sometimes as high as under the roof. The size of an egg mass is 280 to 378 eggs. Hatching starts at a temperature no lower than 10°C. In nature, hatching is prolonged, occurring from April to early May. Pupation begins in early June and pupae are found under loose bark, in the tree hollows, in the litter, and under stones. In Turkmenistan, the gypsy moth inhabits broad-leaved forests on northern slopes and at the bottom of canyons at an altitude of 1,000 to 2,100 m. In Middle Asia, as a whole, the gypsy moth is an outbreak species in all the regions with hardwoods and in thickets of willow and elm. *Apanteles tetricus* Beinh. [misidentification?], *Anastatus disparis* Rsch., and a tachinid complex are mentioned as parasites.
MAsia; EGG HATCH, FLIGHT, LIGHT TRAPS, MALES, PARASITES, PUPAE, SITE CONDITIONS

264 Degtyareva, V.I. 1971.
The most promising ichneumonid wasps parasitizing preimaginal-instars of lepidopterans in Tadjikistan. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moskva: 39-40.
-- In central Tadjikistan, dendrophilous lepidopetrans are parasitized by 30 ichneumonid species, 41 braconid species, 22 chalcid species, as well as tachinids and nematodes of the mermithid family. The author believes *Apanteles teticus* Beinh. [misidentified?] to be one of the most promising braconid species, parasitizing early instar gypsy moth on a large scale.
MAsia; PARASITES

265 Dekhtyarev, N.S. 1928.
Insect pests in the Ukraine from 1926-1927. Zakhyst roslin. [1928]:14-25.
-- Two hundred thirty-eight insects, which were important pests in the Ukraine during the given period, are listed; 66 lepidopterous species are included. The gypsy moth was a serious pest of orchards, parks, and forests. Old oak and elm forests were often completely defoliated. Sometimes trunks were densely covered with egg masses, which were often deposited at heights 3 m and above.
EWest; GENERAL BIOLOGY, OVIPOSITION SITE, PEST LIST

266 Dekhtyarev, N.S. 1928.
The gypsy moth (*Porthetria dispar* L.). In: Shkidlivi komakhi sadu. Kharkov: 98-101.
-- Gypsy moth life stages, biology and its harmful effect are described in brief. The following control measures in orchards are suggested: egg mass collection and treatment with petroleum, application of sticky belts, and treatment with insecticides.
EWest; CONTROL, GENERAL BIOLOGY

267 Dem'yanov, L. 1909.
Pest control in the gardens in spring. Sadovodstvo. [1909]:46-50.
-- The gypsy moth is regarded as a major orchard pest. Imago, egg mass and larva are described. Egg mass collection and destruction or treatment with petroleum and application of sticky belts are suggested as control measures. After larvae migrate to the crown, treatment with Paris green or arsenic preparations is suggested.
ECentral; GENERAL BIOLOGY

268 Denisova, S.I., Romenko, T.M. 1988.
Gypsy moth response to the physiological state of a food plant in Belorussia. In: Nepamyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 10.
-- Gypsy moth larvae were fed on apple and birch leaves that were 15% to 20% defoliated by phyllophages. Controls were placed on undamaged trees to feed. Biochemical composition of leaves of damaged and undamaged trees (water, lipids, soluble carbohydrates, protein nitrogen, and carbohydrate-protein ratio) was determined. The effectiveness of food utilization, nitrogen utilization coefficient, and metabolism intensity of the gypsy moth also were determined. Larval metabolism intensity was found to depend both on food plant species and its physiological condition. This factor was higher for gypsy moth that fed on apple than for those that fed on birch. Gypsy moth food plants that were injured 15% to

20% result in a higher leaf content of nitrogenous compounds, soluble carbohydrates, and a better carbohydrate-protein ratio, which is favorable for growth and development of the pest.
ECentral; ENERGETICS, FOLIAGE CHEMISTRY, NUTRITION

269 Derevaynko, N.M., Dey, Ye.A. 1981.
The phenotypic structure of gypsy moth larvae (*Porthetria dispar* L.) in Low Dnieper region. In: Ekologo-morphologicheskiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 97-98.
-- The ratio of "black" and "grey" phenoforms of gypsy moth larvae in the population is established at different gradation phases. The nature of inheritance of larval coloration characteristics is considered in connection with homo- and heterozygosis.
EWEST; COLOR POLYMORPHISM

270 Derevyanko, N.M. 1977.
The study of structural and functional patterns of gypsy moth populations in Low Pridneprovye. In: Ekologo-fiziologicheskiye issledovaniya v prirode i eksperimente. Materialy V Vsesoyuznoy konferentsii. Ilim, Frunze: 109-110.
-- Gypsy moth specimens feeding on different food plants were taken from different micropopulations to study polymorphism of soluble proteins in the gypsy moth hemolymph. Protein polymorphism was found to be related to the food plant favored by larval coloration, as well as to the population gradation phase. The data obtained are discussed in terms of studying intrapopulation variation and population structure.
EWest; BIOCHEMISTRY, COLOR POLYMORPHISM, HOST PLANTS

271 Derevyanko, N.M. 1980.
Development pattern of gypsy moth eggs in the spring as a factor of ecological plasticity of its population in the conditions of Low Pridneprovye. Vestnik zoologii. (4):70-74.
-- In the Lower Dnieper region, three gypsy moth populations were distinguished: those inhabiting oak groves, willow thickets, and bastard acacia stands. Field surveys showed hatching in each population coincided with the foliation of the main forest-forming species favored by the larvae as a food plant. Larvae inhabiting willow stands are the first to hatch; 5-7 days later, hatching occurs in oak groves, and 10-12 days later on bastard acacia. The same rhythm is observed under laboratory conditions when egg masses are kept at an equal temperature. The method of disc-electrophoresis in polyacrylamide gel was used to establish differences in dynamics of soluble protein ratio changes in gypsy moth eggs during their spring postdiapause development. A conclusion is made that genetics plays a role in the insect's adaptation to the conditions of different forest communities and in feeding on different food plants.
EWest; EGG HATCH, GENETICS, HOST PLANTS

272 Derevyanko, N.M. 1980.
Protein polymorphism in the gypsy moth relative to a population phenostructure. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut Lesa i Drevesiny SO AN SSSR, Krasnoyarsk: 42-43.
-- Grey gypsy moth larvae are homozygous while larvae with a black stripe are, as a rule, heterozygous. In the eruption phase of an outbreak, the ratio of grey larvae to those with a black stripe is found to be 92.5:7.5; in the crisis phase it is 98:2.
EWest; COLOR POLYMORPHISM, POPULATION DYNAMICS

273 Derevyanko, N.M. 1988.
Phenotypic variety of gypsy moth populations in various landscape and climatic zones of the USSR. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 11.
-- Phenotypic variety of larval coloration in different populations was studied in the Crimea, the Carpathian region, Voronezh Province, the Lower Dnieper region, and the Krasnoyarsk and Khabarovsk Krais. In the European part of the USSR, three types of gypsy moth larval coloration were detected: grey, black and red. Phenotype ratio is different at different population gradation phases. At all the gradation phases, grey insects prevail, with the portion of black ones ranging from 2 to 7.5%; red larvae usually die at the larval stage. In the Khabarovsk population, red insects comprise 99-99.55% and grey 0.5-1.0%; black ones were not found. A balanced ratio of phenotypes in populations accounts for their phenostructure the function of which, based on the frequency of occurrence of homo- and heterozygotes in mating, amounts to qualitative changes in the population condition. Different proportions of phenotypes in different geographical populations suggests that insects of different phenotypes should be of different selective importance for the population depending on its environmental conditions.
EWest; COLOR POLYMORPHISM, GENETICS

274 Derevyanko, N.M., Kolybin, V.A. 1983.
Some structural and functional patterns of the gypsy moth population in Low Pridneprovye based on the study of polymorphism. In: 5 zoologicheskaya konferentsiya: Biologicheskiye osnovy osvoeniya, rekonstruktsii i okhrany zhivotnogo mira Belorussii. Nauka i tekhnika, Minsk: 46-47.
-- Comparative disc-electrophoretic analysis of gypsy moth hemolymph proteins was made at some stages of ontogeny and in relation to peculiarities of population structure. At different life stages of the gypsy moth and the oak population, the number of protein fractions was found to range from 9 to 19: differences in the number of protein fractions also were detected in the insects of different micropopulations. The identity coefficient of the larvae of oak and willow micropopulations was 0.9, of oak and acacia, 0.29, and of willow and acacia 0.32. A conclusion can be made that in the Lower Dnieper region adaptation of micropopulations to major food plants is accompanied by biochemical changes in the insects.
EWest; BIOCHEMISTRY, HOST PLANTS

275 Derevyanko, N.M., Kolybin, V.A., Shumova, T.Ye.1985.
Ecological and biochemical patterns of gypsy moth

populations from various geographic zones of the USSR. In: Sistema monitoringa v zashchite lesa. Tezisy dokladov Vsesoyuznogo soveshchaniya. Institut lesa i drevesiny SO AS SSSR, Krasnoyarsk: 173-174.
-- Based on ecological and biochemical parameters, differences characterizing each of the gypsy moth populations under study were detected and the degree of adaptability of specific populations to their environment was established.
EWest; GEOGRAPHIC VARIATION

276 Dey, Ye.A. 1980.
Comparative ecological analysis of the emperor moth and gypsy moth. In: Issledovaniya po entomologii i akarologii na Ukraine. Tezisy dokladov 2-go s"yezda UEO, Uzhgorod 1980. Kiev: 91-92.
-- Comparison of ecological characteristics of the saturian, Eudia parvonia L., and the gypsy moth was made using the following parameters: sex ratio, ability of males to fertilize several females, duration of diel activity and imago fecundity, range of food specialization of larvae and frequency of occurrence of their food plants, mobility of larvae, and their ability to live without food. These do not favor *Eudia pavonia.* Thus, a stable, low population level of this species, included in the Red Book of the Ukraine, is due to a complex of its peculiarities that prevent it from winning when competing with other phyllophagous insects.
EWest; GENERAL BIOLOGY

277 Dey, Ye.A., Nikitenko, G.N. 1980.
Predators and symbions of the gypsy moth (*Porthetria dispar* L.) (Lepidoptera) in the Lower Dnieper Region. Vestnik zoologii. (3):91-92.
-- *Bdlella* sp. (Bdellidae, Trombidiformes) are egg parasites, Trombididae and *Protolaepas bickizi* (Aceosjidae, Gamasina) are larval parasites. *Androleapes casalis* (Laelaptidae, Gamasina) parasitizes pupae, while *Metabelta* sp. (Oribatei, Sarcoptiformes), *Trichoribates trimaculatus* (Oribatei Sarcoptiformes) are found in egg masses and pupae, and Liodes sp. and Eporibatula sp. (Oribatei, Sarcopriformes) are found in egg masses. *Platycleis grisea* F. (Tettigoniidae, Orthoptera) eats adults. *Phynocoris iracundus* Poda attacks migrating larvae and *Nabis apterus* F. (Nabidae, Hemiptera) and *Chrysopa* sp. (Chrysopidae, Neuroptera) attack early instars. *Formica pratensis* Retz. (Formicidae, Hymenoptera) attacks adults.
EWest; PREDATORS

278 Dey, Ye.A., Nikitenko, G.N. 1980.
Occasional symbionts and predators of the gypsy moth in Low Pridneprovye. Vestnik zoologii. (3):91-92.
-- Surveys and collections were made in 1976-1978 during a gypsy moth outbreak. Thirteen arthropod species were found to form short-term associations with the pest at different life stages: 8 species of mites (*Bdella* sp., *Protolaelaps bickeji, Androlealeps casalis, Matabella* sp., *Trichoribates trimaculatus, Liodes* sp., *Eporibatula* sp., and the Trombidibae family), and 5 insect species (*Platycleis grisea, Rhynocoris iracundus, Nabis apterus, Chrysopa* sp., and *Formica pratensis*). Associations of saprophytic and carnivorous arthropods with the gypsy moth are most often formed during a period of high gypsy moth numbers, but if the ecological situation in a specific biocenosis changes, some secondary entomophages can easily become primary ones.
EWest; PREDATORS

279 Dey, Ye.A., Nikitenko, G.N. 1980.
Distribution of gypsy moth egg masses in Low Pridneprovye. In: Issledovaniya po entomologii i akarologii na Ukraine. Tezisy dokladov 2-go s"yezda UEO, Uzhgorod 1980. Kiev: 90.
-- To detect fluctuations of gypsy moth populations in time to suggest control measures, annual counts of egg masses in gypsy moth habitats are needed. Surveys were made in Kherson and Nikolaev Provinces. Analysis of the data obtained showed that in the Lower Dnieper Region, at any gradation phase, gypsy moth females prefer to oviposit on the southern sides of food plants. Over 50% of all egg masses usually are deposited on southeastern, southern, and southwestern sides. Most egg masses are deposited on the trunk at heights up to 50 cm, but in humid stations egg masses are found at a height of more than 1 m. At the outbreak phase, distribution of egg masses varies considerably in height, side, and food plants.
EWest; OVIPOSITION SITE

280 Dey, Ye.A., Nikitenko, G.N. 1981.
Deviations from theoretically expected phenogroup ratios in gypsy moth larvae when released into the field. In: Ekologo-morfologicheskiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 95-96.
-- Egg masses resulting from crosses of adults belonging to "grey" and "black" phenogroups were distributed in oak-birch stands of the Black Sea Preserve. At the larval stage, a decrease in the number of "black" larvae was due to their increased mortality and usually occurs during a period of population decrease.
EWest; COLOR POLYMORPHISM, GENETICS

281 Dikusar, N.S. 1979.
Activity of nuclear polyhedrosis virus in the gypsy moth. In: Mikroorganizmy i virusy. Shtiintsa, Kischinev: 71-74.
-- Investigations were made to detect carriers of a latent nuclear polyhedrosis virus in natural populations of the gypsy moth. Instars I to IV were subjected to cooling at a temperature of + 2-3°C. Cooling lasted from 10 to 96 hours and led to nuclear polyhedrosis being induced. To establish cause of death, hemolymph smears were examined with light and electronic microscopes. Cooling of fourth instars for 96 hours proved to be the most effective. Thirty days after cooling, mortality was 57%.
EWest; HISTOLOGY, TEMPERATURE, VIRUS

282 Dmitrienko, V.K., Dryannykh, N.M., Petrenko, Ye.S. 1975.
After effects of ant - insect larvae interactions. In: Materialy 5 Vsesoyuznogo simpoziuma po ispol'zovaniyu murav'yev v bor'be s vreditelyami lesa. Nauka, Moscow: 26-32.

-- The fate of gypsy moth larvae after being bitten by ants is discussed.
WSiberia; PREDATORS

283 Dmitriev, A.P., Fedorov, I.A. 1981.
Gypsy moth control with virin-ENSh preparation. Lesnoye khozyaystvo. (1):56-57.
-- These are practical recommendations on gypsy moth control with the virus preparation virin-ENSh. It is concluded that the preparation should be produced in batches. The gypsy moth is a serious pest in Orenburg Province. The biggest outbreak in this century was observed in 1977, with a focal area of 123,000 ha.
EEast; MICROBIAL PESTICIDES, VIRUS

284 Dmitriev, P.P. 1981.
Gypsy moth management in the forests of the Orenburg Region. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 61-63.
-- In Orenburg Province, forests are represented by flood plain forests and forest "islands" in a forest-steppe, with a total area of 662,000 ha. Because the stands are open, gypsy moth outbreaks are frequent. Since 1967, survey has been made with sex attractants: unfertilized females, their extract, and synthetic disparlure. To capture males, 5 types of glue were applied to the trap surface. It was the glue produced by the "Spodriba" chemical plant (Latvia) that best met the requirements. Traps were checked every second or third day for 30-40 days from early July to early August. No relationship between the number of males captured and stand infestation was found. The author believes that this can be accounted for by males prevailing during periods of outbreak and collapse. Therefore, such a survey can only be useful in foci with increasing numbers. At outbreak and collapse phases, it would be more appropriate to establish the level of infestation using autumn egg mass counts. Thus, surveys using attractants in combination with re-counting and detailed counts of egg masses allow the beginning of an outbreak to be detected more exactly and in proper time for control measures to be outlined.
ECentral; EGG MASSES, PHEROMONE TRAPS, PROGNOSIS, SAMPLING

285 Domnikov, G.V. 1985.
Spatial distribution patterns of outbreaks of folivorous insects in the Central forest-steppe. In: Vos'maya vsesoyuznaya zoogeographicheskaya konferentsiya, Leningrad, 1985. Tezisy dokladov. Moscow: 302-303.
-- In 1971-1983, foci of the green oak leaf roller, the gypsy moth and related species were surveyed in stands of various types - plain and ravine, parkland and closed stands - in the Central Chernozemny Preserve. During this period, phyllophagous insect outbreaks in the Central forest-steppe appeared to be extremely prolonged, which is related to increased anthropogenic impact on forest ecosystems.
ECentral; STAND COMPOSITION

286 Dovnar-Zapolskiy, D.P. 1953.
Oak entomofauna in the European part of the USSR. Avtoreferat dissertatsii kandidata sel'skokhozyaistevennykh nauk. Voronezh. 12 p.
-- The author lists 767 phytophagous species that inhabit oak. Of these, 163 species are of economic significance, and about 10 species are considered the most important, the gypsy moth included. Brief information on ecology, phenology and geographical distribution is given.
ECentral; PEST LIST

287 Dranik, V.A. 1938.
Water impact on gypsy moth egg development. In: Uchenyye zapiski gosudarstvennogo pedagogicheskogo i uchitel'skogo instituta imeni V.V. Kuybysheva. : 47-51.
-- Experiments designed to determine the effect of the duration of flooding on the percentage of gypsy moth hatch and survival showed that a short flooding period (up to 10 days) does not produce a noticeable effect on egg survival and accelerates development of larvae. Therefore, stable pest foci are formed in plavni which must be continuously surveyed by the forest protection service.
ECentral; EGG HATCH, WEATHER

288 Dron, Y.P., Vainrub, F.P. 1980.
Detection of disparlure in biological material. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 11-16.
EWest; PHEROMONES

289 Dubko, L.A., Kozlovskaya, N.S., Sivtsova, L.I. 1989.
Some aspects of rearing gypsy moth as a test object. In: Tezisy dokladov 2 Vsesoyuznoy konferentsii po promyshlennomu razvedeniyu nasekomykh. Nauka, Moscow: 84.
-- Eighteen semisynthetic media for rearing the gypsy moth were tested, and a medium containing wheat germ was suggested. This was adapted to food requirements of the gypsy moth and their changes in different instars. A medium for late instars contained an increased content of dry yeast; filter paper was a phage stimulant, corn flour was partially substituted with soya flour, and the amount of water was decreased. A selection of various insect groups and application of microbiological tests seem advisable.
ECentral; NUTRITION, REARING

290 Dzhemilev, U.M., Fakhretdinov, R.N., Telin, A.G., Tolstikov, G.A., Amirkhanov, D.V., Krivonogov, V.P. 1981.
New approach to the synthesis of optically active disparlures, attractants of *Porthetria dispar*. Khimiya prirodnykh soedineniy. 5:650-657.
-- A new, unique method of synthesis of (+) and (-) enantiomers of 2-methyl-Z-7,8-epoxy and 2-methyl E-7,8 epoxyoctadecans gypsy moth attractants was developed, using available 2-methyl 7 Z and 7E-octadecens and molybdenum peroxides as initial compounds.
EEast; PHEROMONES

291 Ebergardt, G.G. 1930.
List of pests and diseases of the vine in Dagestan SSR in 1927 and 1928. Vestnik vinogradosrstva, vinodeliya i vinotorgovli SSSR. (2):762-770.
-- The gypsy moth is mentioned as a pest of grape.

Larvae often were found in vineyards of Dagestan where they had migrated from hardwood species. The damage is insignificant.
MAsia; HOST PLANTS

292 Edel'man, N.M. 1953.
Effect of feeding regime on development of the gypsy moth, *Lymantria dispar* L., and the leaf beetles *Melasoma populi* L. and *M. tremulae* L.
Entomologicheskoye obozrenie. 33(1):36-46.
-- Feeding on different species, even with the same amount of leaf consumption, was found to cause physiological dissimilarities and different survivorship of gypsy moth larvae. Depending on the food plant, three types of metabolism were distinguished: carbohydrate-protein, fat-protein, and fat. Content of lipase tissues, storage substances, total nitrogen and fat, as well as activity of lipase tissues, were estimated. The conclusion was made that the most favorable feeding conditions are on oak, and the least favorable are on birch and poplar.
ECentral; FOLIAGE QUALITY, HOST PLANTS, PHYSIOLOGY

293 Edel'man, N.M. 1952.
Effect of feeding conditions on the physiological state of the gypsy moth and the winter moth. Doklady Akademii nauk SSSR. 84(4):849-852.
-- Feeding on different species, with the same amount of leaf consumption, was found to cause physiological dissimilarities in gypsy moth larvae. When larvae were feeding on leaves of oak, birch or bird-cherry, those feeding on oak had the best physiological parameters. Metabolism also changes in the course of larval development when insects feed on one species. Total nitrogen content in the organisms of gypsy moth larvae is much higher in the early instars than in the later ones. By contrast, fat content increases. Change of food also produces a considerable effect on insects.
ECentral; DEVELOPMENT, FEEDING, HOST PLANTS, NUTRITION, PHYSIOLOGY

294 Edel'man, N.M. 1954.
Behavior of gypsy moth larvae in mixed stands in the Kurbin region of Azerbaijan SSR. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 91-98.
-- The level of gypsy moth infestation of different plant species in mixed stands was studied with regard to adult behavior in the oviposition period, conditions favorable for transportation of first instars by the wind, and migratory abilities of late instars. It is the author's opinion that behavior of adults and larvae is related to feeding conditions of insects in mixed stands. Under these conditions, the favored food plants of the gypsy moth are oak, hornbeam, apple, and hawthorn. In addition, larvae can feed on maple, beech, hazel, alycha, and aspen. A series of experiments was conducted to find out what food plants the gypsy moth prefers. The experiments showed that the favored food species of the gypsy moth is oak. In later instars, larvae become more polytrophic. By that time, leaf quality of oak has deteriorated, leaves grow tough and lose water, causing changes in physiological condition of larvae. In general, transfer of gypsy moth larvae from favorable to unfavorable food results in a worsening of the insect's the physiological condition and a decrease in fecundity. On the basis of these factors, the author suggests creating mixed forest stands containing species not favored as food by gypsy moth larvae.
MAsia; FOLIAGE QUALITY, HOST PLANTS, SILVICULTURAL TREATMENTS

295 Edel'man, N.M. 1954.
Effect of feeding regime on metabolism in the gypsy moth and the winter moth. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 75-90.
-- The author studied the effect of gypsy moth feeding on species often found in shelter belts (oak, linden, apple) on insect metabolism, as well as the effect of food change on physiological parameters. Larval weight, respiration intensity, respiration rate, content of lipids, and total nitrogen were determined. Different physiological processes occurring in the insect organism are strongly interrelated. For instance, more rapid growth of gypsy moth larvae is always accompanied by more intensive oxygen uptake. This is the case whether larvae feed on one species or on many. There is a correlation between relatively small weight increment of larvae and high mortality. Size of late instars and pupal size determine imago fecundity. A correlation also was observed between respiration rate, fat content, and larval survival. An increase in number is achieved by feeding on species such as oak and apple, which provide the gypsy moth with sufficient protein nutrition. However, the introduction of linden and birch into stands will limit fecundity since these species do not afford accumulation of sufficient nitrogen content.
ECentral; BEHAVIOR, FEEDING, HOST PLANTS, PHYSIOLOGY

296 Edel'man, N.M. 1954.
Fauna of folivorous and trunk pests and changes in its composition and abundance in shelter belts of the Kamennaya Steppe over a 20 year period. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 143-164.
-- Species composition of pests in shelter belts of Kamennaya Steppe (Voronezh Province) is diverse, including more than 120 insect species. In the 1950s, the most widespread species were the green oak leaf roller and the gypsy moth. In general, pest complexes changed with the age of the shelter belts. Weather conditions are extremely important for numerical fluctuations of insects. Gypsy moth development was 58 to 60 days long in favorable years and 68 to 70 days long in unfavorable years. In both different geographical zones and in one geographical zone, the number of molts is not stable, varying depending on weather conditions and food quality. Males can have 5 or 6 instars, females 5 to 7 instars. Weather conditions affect the insects both directly and indirectly, through plants, by changing food biochemical composition. Treatment of egg masses with petroleum and insecticide treatments reduces the number of insects in the current season but contributes to sanitation of the population. There is always the danger of a rapid increase in pest number if these measures are stopped, as is demonstrated by the situation with the gypsy moth and the green oak leaf roller. Decrease in the gypsy moth population was achieved by making shelter belts more

dense and by creating a thick undergrowth.
ECentral; CONTROL, DEVELOPMENT, EGG MASSES, FOLIAGE QUALITY, SILVICULTURAL TREATMENTS, WEATHER

297 Edel'man, N.M. 1957.
Use of gypsy moth food specialization to justify control measures. Zoologicheskiy zhurnal. 36(3):408-420.
-- Feeding preferences of the gypsy moth can be used to prevent pest outbreaks by creating stands that limit populations of this species. It is suggested that species not favored as food by the gypsy moth should be introduced into linden and pea shrub stands.
MAsia; HOST PLANTS, SILVICULTURAL TREATMENTS

298 Edel'man, N.M. 1963.
Age-dependent changes in the physiological state of some dendrophilous insect larvae relative to feeding conditions. Entomologicheskoye obozrenie. 42(1):11-21.
-- Experiments were conducted with *Tortrix viridana, Operopthera brumata, Lymantria dispar, Malacosoma neustria, Diptera alpium, Leucoma salicis,* and *Croesus septentrionalis.* The first four species hatch in the spring, take a long time to develop, and adapt to changes in food biochemical composition. The fifth species is a summer species, and the sixth species feeds primarily on root growth. Larvae of these two species require stable chemical composition of food for normal development. The last species is bivoltine, and adapts to changes in food quality in different generations. Changes in insect physiological condition and adaptability level at the larval stage are the result of the influence of growth factors and insect development, and of environmental impact. Phytophages with a long developmental period adapt to changes in feeding conditions occurring in an orderly sequence, while insects with a short developmental period adapt to strictly specified food with a more stable biochemical composition.
MAsia; DEVELOPMENT, FOLIAGE QUALITY, NUTRITION,

299 Effendi, R.Ye., Abdullaev, S.Y. 1982.
Gypsy moth outbreaks in the South Zakavkazye. Zashchita rasteniy. (1):47.
-- It is the opinion of the authors that the boundary of gypsy moth area goes across the southern Zakavkazye, and is assumed to be the factor causing outbreak periodicity in the Zakavkazye. Outbreaks were recorded in 1970 to 1971 (Yalamin forest) and in 1974 to 1977 (Giran forest) in the Lenkoran Region. In 1971 up to 400 egg masses were found on some trees, and the average number of eggs per mass was 300 to 400. The authors regarded these egg masses as inferior when compared to generally recognized pest fecundity (800 to 1200 eggs). Major food plants in the region are chestnut oak, beech, cork oak, pecan, three-thorned acacia, and silk tree. Nettle tree was attacked in the period of outbreak. In the forests at the foothills of the Bigger and Smaller Caucasus, population increase was insignificant.
Caucasus; DISTRIBUTION, FECUNDITY, HOST PLANTS

300 Epova, V.I., Pleshanov, A.S. 1988.
Areas damaged by gypsy moth in Siberia and the Far East. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 30-31.
-- The gypsy moth is a thermophilous species, therefore, it is found along the southern borders of Siberia and the Far East. In this territory, phyllophage gradations occur in strictly specified regions and are different in character which is determined both by genetically fixed geographical forms of the species (Siberian, East European), and by specific features of habitats. The Siberian form is characterized by adult migrations as well as by migrations of first instars. This behavior makes foci highly mobile at the peak outbreak phase, allowing the pest to avoid the effect of regulating factors and lowering the probability of multiple defoliations of the same stands. Adults of the east Asian form are not so vagile, foci are more stable and, at the sparse population phase, entomophage activity increases. Having significant differences in terms of ecology, both geographical forms still have equal response to the effect of modifying factors of population dynamics. When the weather gets colder the insects start searching for drier habitats. The most important parasites of the east Asian form are *Phobocampe unicincta* Grav., *A. melanoscelus* Panz., and *Blepharipa schineri* Meisn. These parasitize about 80% of the insects in the foci. The most effective species is *Blepharipa schineri* Meisn., which can parasitize about 50% of the pupae. It is concluded that gypsy moth ecological peculiarities should be taken into account in estimating activity of this pest and in conducting forest insect pest monitoring.
ESiberia, Far East; GEOGRAPHIC VARIATION, PARASITES, POPULATION DYNAMICS

301 Eversmann, E. 1837.
Short notes on the behavior of several Russian butterflies (in German). [Kurze Notizen uber einige Schmeterlinge Russlands als Betrege zu Treitschkes supplementen zu Betrachten.] Byulleten' Moskovskogo obshchestva ispytatelei prirody. (1):5-35.
-- The gypsy moth is listed among lepidopterous insects of Kazan Province (Gorky Province) and Orenburg Province. It is widespread in oak and birch forests, causing from severe to total defoliation.
ECentral; PEST LIST

302 Eversmann, E. 1841.
Observations on several butterflies (in German). [Beobachtungen uber einige Schmetterlinge.] Byulleten' Moskovskogo obshchestva ispytatelei prirody. (1):3-14.
-- The paper discusses larvae of nocturnal moths. In 1828, gypsy moth larvae were found in great numbers in Orenburg and Saratov (Volgograd) Provinces. In 1829, a nun moth outbreak was recorded in those parts.
ECentral; LARVAE, OUTBREAKS

303 Farinets, S.I. 1978.
Tachinids - parasites of the gipsy moth. Zashchita rasteniy. 5:32.
EWest; PARASITES

304 Fedorov, S.M. 1930.
Pest insects in forests of the Crimea. Russkoe

entomologicheskoe obozreniye. 24(3-4):225-229.
-- The gypsy moth is mentioned as one of the most important forest pests of the Crimea. Pest outbreaks were recorded in 1898 near Feodosia (data from Mokrzhetskiy), and in 1912 near Sudak within an area of 5,400 acres. By 1913, the outbreak collapsed as a result of entomophage and disease activity. *Apanteles fulvipes* and *A. solitarius* are mentioned as important entomophages. In 1930, a population increase was recorded in the Sevastopol and Baidar forest areas.
EWest; OUTBREAKS, PARASITES

305 Fedoryak, B.Ye. 1982.
Gypsy moth and its control in the forests of the Kustanay region. In: Zhivotnyy mir Kazakhstana i problemy ego okhrany. Alma-Ata: 184-186.
-- General data are given on gypsy moth biology and ecology in local populations. The results of aerial chemical treatments of forests with chlorophos and bacterial preparations in 1977-1978 are discussed.
MAsia; AERIAL SPRAYING, CHEMICAL INSECTICIDES

306 Filip'yev, I.N. 1929.
The gypsy moth. In: Nekotoryye zakonomernosti rasprostraneniya i razmnozheniya massovykh vrediteley. Gosudarstvennyi institut opytnoi agronomii, Leningrad: 9-10.
-- The gypsy moth is regarded as a serious orchard pest in the southern part of the country. During outbreaks, it can defoliate forest and fruit trees. Outbreaks are recorded only in southern and central regions; north of Smolensk and Tver, pest outbreaks have not been recorded. Entomophages play an important part in suppressing gypsy moth outbreaks. The author considers the issue of pest distribution in the United States and the attempt to introduce some European entomophages into the U.S. for suppression of pest populations.
EWest; GENERAL BIOLOGY

307 Fomina, V.I. 1973.
Results of terrestrial treatment of forest shelter belts with bacterial preparations. In: Lesokhozyaystvennaya nauka i praktika. Moskva: 221-222.
-- Four bacterial preparations were applied in high density gypsy moth foci in Chernigov Province in 1971. Dendrobacillin and gomelin proved to be the most effective preparations.
EWest; BACTERIA, MICROBIAL PESTICIDES

308 Galanova, T.F. 1980.
Biochemical aspects of intrapopulation variability in the gypsy moth. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 27-28.
-- Hydrolase enzymes from the middle intestine of late-instar gypsy moth larvae obtained from foci of different densities (population increase, outbreak) were studied using electrophoresis. During outbreak, the number of phosphatase forms was reduced, while the number of esterase and acid phosphatase forms was higher in outbreak populations. This means that the larvae respond to the change in food quality, i.e., refoliation of oak after severe defoliation and a difference in physiological processes at gradation phases.
EWest; BIOCHEMISTRY, ISOENZYMES, FOLIAGE QUALITY

309 Galanova, T.F., Derevyanko, N.M., Shvedova, R.I. 1981.
The study of some hydrolases in gypsy moth eggs. In: Sbornik nauchnykh trudov Moskovskogo pedinstituta im. V.I.Lenina. MGPI, Moskva: 104-113.
-- By electrophoresis in polyacrylamide gel of insects different in larval coloration, activity and dynamics to distinguish among the forms of acid and alkaline phosphatases, esterase and amylase were studied in prediapausing gypsy moth eggs. Activity of esterase and amylase in the eggs of grey phenotype females is much higher than that in the eggs of black phenotype females. However, in the latter, alkaline phosphatase activity is higher; the acid phosphatase activity is same. This could provide evidence for genetic differences among gypsy moth specimens.
EWest; COLOR POLYMORPHISM, EGGS, ISOENZYMES, GENETICS

310 Galanova, T.F., Derevyanko, N.M., Shvedova, R.I. 1981.
The study of hydrolases during gypsy moth metamorphosis. (Izucheniye gidrolaz v protsesse metamorfosa neparnogo shelkopryada.) Institute of Zoology Academy of Sciences of UkSSR, Moscow. 18 p. (Deposited document. VINITI 4001-81)
-- Acid and alkaline phosphatases, esterase, and amylase was studied in gypsy moth eggs when diapause was being established and when embryogeny was completed. The populations examined had larvae that varied phenotypically in color. Changes in hydrolase activity and numerous enzyme forms distinguished by electophoresis in polyacrylamide gel prove that the gypsy moth, in the egg stage, is not structurally uniform.
EWest; COLOR POLYMORPHISM, EGGS, ENZYMES, GENETICS

311 Galanova, T.F., Derevyanko, N.M., Shvedova, R.I. 1982.
The study of hydrolases by the gypsy moth metamorphosis. Vestnik zoologii. (6):80-83.
-- Daily activity and dynamics of hydrolytic enzymes of first and fifth instars feeding on oak leaves were studied. Fifth instars also were subdivided by grey and black phenotypes. First instars showed maximum activity of esterase and amylase on the second day of development and maximum activity of acid and alkaline phosphatases on the third day. For fifth instars activity of these hydrolases was the highest on the second day after molt and then became lower until the next molt. Values of hydrolase activity for grey and black larvae are the same. The only difference is in the number of enzyme forms, which points to non-uniformity in the population.
EWest; COLOR POLYMORPHISM, ENZYMES, GENETICS

312 Galanova, T.F., Kolybin, V.A. 1984.
Study of ferments in gypsy moth from different

geographic zones of the USSR. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 100.
-- Enzyme polymorphism was found in gypsy moth populations in the territory close to the Carpathian Mountains, the central part of the USSR, Krasnoyarsk Krai, and the Lower Dnieper Region. Variation of activity and mobility of acid and alkaline phosphatase forms was established. Differences were found not only in the isoenzyme structure of gypsy moth geographical populations but also in the value of activity of some enzyme forms.
EWest, ECentral, WSiberia; GEOGRAPHIC VARIATION, ENZYMES, GENETICS

313 Galanova, T.F., Kolybin, V.A. 1985.
Estimation of adaptive changes in gypsy moth population on the basis of biochemical polymorphism analysis. In: Sistema monitoringa v zashchite lesa. Tezisy dokladov Vsesoyuznogo soveshchaniya. Institut lesa i drevesiny SO AS SSSR, Krasnoyarsk: 168-170.
-- Amylase, acid, and alkaline phosphatases of gypsy moth larvae from the territory near the Carpathian Mountains south of the Ukraine, and the central part of Russia south of Siberia are regarded as indicators of the level of insect adaptation to environmental conditions.
EWest, ECentral, WSiberia; ENZYMES, GEOGRAPHIC VARIATION

314 Galanova, T.F., Surgova, T.M., Derevyanko, N.M. 1982.
Study of cellulosis in gypsy moth (*Lymantria dispar* L.) eggs. Vestnik zoologii. (1):79-80.
-- Dynamics of Cx-exogluconase during embryogeny activity was studied. Cx-exogluconase is produced when the chitinous eggshell is broken. No Cl cellulase was found in the eggs.
EWest; EGGS, ENZYMES

315 Galasiyeva, T.V., Lebedeva, G.S. 1982.
Patterns of gypsy moth foci in hardwood stands at the Pribelsk department of the Bashkirian Preserve. In: Ekologiya i zashchita lesa. Leningradskaya lesotekhnicheskaya akademiya, Leningrad: 70-74.
-- In stands of the Pribelsk Branch of the Bashkirian Preserve, gypsy moth foci occupied a territory of about 100 ha. The average defoliation rate was about 5% and, in open stands, it ranged from 10% to 30%. By color aberrations, there were 42% typically grey larvae and 34% dark ones. On average, entomophages attacked 5% of the larvae and 8.2% of the pupae. *Pimpla instigator*, and *Lymantrichneumon disparis*, a new species for the gypsy moth in Bashkiria, prevailed. Pathogen infection of larvae was 88%, and 22.9% for pupae. Data on phenology of the species, deposition of eggs, and fecundity are given. There were 7 other species of Lepidoptera besides the gypsy moth in the complex of phyllophages.
EEast; COLOR POLYMORPHISM, NUMERICAL DATA, PARASITES, PATHOGENS

316 Ganiev, M.G. 1986.
Residual amounts of Dimilin in plants and soil of pistachio woodlands southeast of Kirgizia. Lesnoye khozyaystvo. (10):63.
-- Dimilin is a hormonal insecticide that disrupts formation of insect cuticle and is highly specific against phyllophagous pests. At a rate of 0.01 to 0.02 kg of active substance per ha, its efficiency against gypsy moth larvae was 95%. Ten days later, the content of Dimilin in plants and grass was negligible.
MAsia; GROWTH REGULATORS, SOIL

317 Gensitsky, I.P. 1980.
Peculiarities in protein exchange of gypsy moth larvae at different population density levels. In: Issledovaniya po entomologii i akarologii na Ukraine. Tezisy dokladov 2-go s"yezda Ukrainskogo entomologicheskogo obshchestva, Uzhgorod, 1980. Kiev: 226-227.
-- The relationship between protein metabolism of gypsy moth larvae and adult fecundity is found. The minimum content of protein in larval hemolymph that is necessary for the larva to pupate and for the adult to be fecund is 2%. In this case, the adult lays not more than 35 to 50 eggs. During a depression phase, larvae with a low protein content in the hemolymph prevail in the population. When a population increases, the percentage of specimens with high protein content is higher. At the maximum protein level (15%), imago fecundity is 700-800 eggs.
EEast; BIOCHEMISTRY, FECUNDITY

318 Gensitsky, I.P. 1980.
Predicting gypsy moth fecundity by testing protein exchange in the larvae. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 29-30.
-- A reliable correlation between gypsy moth fecundity and the level of protein metabolism (the rate of protein synthesis and its accumulation in hemolymph) in larvae ready for pupation is established. A testing procedure is suggested.
EWest; FECUNDITY, PHYSIOLOGY

319 Gershun, M.S. 1951.
The Liparidae family. The gypsy moth, *Porthetria dispar* L. In: Lesnyye vrediteli Uzbekistana. Tashkent: 3-46.
-- A description of all life stages of the pest is given. In Uzbekistan, hatching occurs in April and pupation in May. Pupal locations are on branches and trunks. Oviposition occurs in June and adults fly in June and July. Gypsy moth foci are found mainly in forest stands and orchards and nearby mountainous regions. The gypsy moth attacks different species of poplar, bastard acacia, oak, ash-leaved maple, linden, and birch. During an outbreak, larvae attack field crops nearest to them. The following control measures are recommended: collection of egg masses and treatment with petroleum, and dusting or spraying of trees with arsenic preparations during the larval development period.
MAsia; CONTROL, GENERAL BIOLOGY, HOST PLANTS

320 Geshkova, A. 1977.
Some results of the application of *Bacillus*

***thuringiensis* Ben. to control the gypsy moth, *Lymantria dispar* L., in Slovakia.** In: Problemy biologicheskoy bor'by s vreditelyami lesa. Zvolen: 65-68.
-- Laboratory experiments showed applications of *B. thuringiensis* against the gypsy moth to be effective and to cause 79-100 % mortality in younger larvae when an aqueous suspension was applied at doses of 0.1-5 kg/ha. Field tests confirmed the results of laboratory experiments; there was a drastic reduction of pest numbers in experimental plots. At the time of complete development, there were only few specimens remaining in the foci. In untreated plots, the level of the pest population was high and trees were completely defoliated. While bacterial treatments are 2-3 times more costly than chemical ones, they are very effective.
EWest; BACTERIA, MICROBIAL PESTICIDES

321 Getsova, A.B. 1958.
Food choice by insect larvae in connection with inherent and acquired responses to food. Izvestiya Akademii pedagogicheskikh nauk SSSR. 85:189-195.
-- Food selection by gypsy moth and processionary moth larvae was studied. Gypsy moth larvae were reared on willow and ash. In the middle of each instar they were offered a choice of oak, bird-cherry, birch, willow or ash. The most favored food plant was usually the one on which larvae had been reared. Food selection by larvae is determined mainly by chemoreception.
ECentral; BEHAVIOR, FEEDING

322 Getsova, A.B., Lozina-Lozinskiy L.K. 1955.
The role of behavior in the adaptation of insects to a herbivorous diet. Zoologicheskiy zhurnal. 34:1066-1070.
-- The part played by sense organs of larvae of gypsy moth (a polyphage) and processionary moth (an oligophage) in food selection was studied. Rearing conditions of the present and previous generations and changes in the food plant chemistry were taken into account in the experiments. Differences in food chemistry affect metabolism and are reflected in the behavior and further development of the insect.
ECentral; BEHAVIOR, FEEDING, FOLIAGE CHEMISTRY, REARING

323 Giglavy, A.V. 1989.
Application of virin-ENSh against gypsy moth. In: Lisove gospodarstvo, lisova, paperova i derevoobrobna promislovist'. Kiev: 9-10.
-- Since 1986, virin-ENSh had been applied annually in gypsy moth foci in the forests around Kharkov. The efficacy of the preparation was rather high (71-85 %) and harmless to useful organisms. It is recommended that it be applied in local pest foci.
EWest; MICROBIAL PESTICIDES, VIRUS

324 Gintsenberg, A. 1909.
Gypsy moth control. Plodovodstvo. (1):27-30.
-- The gypsy moth is regarded as one of the most serious forest and garden pests. A large number of pest egg masses is found in gardens of Kursk Province. Eggs are deposited mainly at the trunk base, but eggs also are found at a height of about 15 m. The most effective recommended control method is the treatment of egg masses, before hatch, with kerosene.
ECentral; CONTROL, OVIPOSITION SITE

325 Girfanova, L.N. 1957.
Dipterous entomophages and their significance in reducing gypsy moth density in Bashkiria. Izvestiya vostochnykh filialov Akademii nauk SSSR. (9):102-109.
-- A complex of dipterous parasites of the gypsy moth was studied in the forest cenoses of Bashkiria (1952-1955). Fourteen species of tachinids and sarcophagids were found. The author considers 7 dipteran species to be effective: *Parasarcophaga pseudoscoparia, P. uliginosa, Kramerea schitzei, Pseudosarcophaga affinis, Sturmia scutellata, Phorocera silvestris*, and *Larvaevora larvarum*. The part played by each species in parasitization of gypsy moth in its foci is determined by a number of factors: yearly variation of populations, population change in relation to the host gradation phase, the state of the focal area, etc. The remaining 7 species are secondary parasites that the author does not believe have a significant effect on the numbers of entomophages. It is considered promising to rear predatory sarcophagids and Muscina stabulans in the laboratory and introduce them into pest foci.
EEast; BIOLOGICAL CONTROL, PARASITES, PREDATORS

326 Girfanova, L.N. 1958.
Fauna of parasitic and predatory dipterans in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 52-56.
-- Data on 88 dipteran species parasitizing lepidopterans are presented. Fourteen dipteran species are listed as entomophages of the gypsy moth. These are the sarcophagids, *Thyrsocnema laciniata, Parasarcophaga harpax, P. scoparia, P. pseudoscoparia, P. similis, P. uliginosa, Kramerea schutzei*, and *Pseudosarcophaga affinis*, and the tachinids, *Tachina grossa, Sturmia bella, S. scutellata, Phorocera silvestris, Larvaevora rustica*, and *L. larvarum*. Data on the place and time of collection or rearing of every species are given.
EEast; PARASITES, REARING

327 Girfanova, L.N. 1962.
Morphological patterns of flesh fly larvae (Sarcophagidae) parasitizing gypsy moth pupae. In: Issledovaniya ochagov vrediteley lesa v Bashkirii. Ufa: 117-122.
-- In Bashkiria, from 1953 to 1960, 9 sarcophagid species were reared from gypsy moth pupae: *Parasarcophaga albiceps, P. tuberosa, P. portschinskyi, P. harpax, P. scoparia, P. pseudoscoparia, P. uliginosa, Kramerea schutzei*, and *Pseudosarcophaga affinis* parasitize healthy pupae whereas: *P. albiceps, P. tuberosa*, and *P. scoparia* are necrophages. Morphology of late instar sarcophagids also is discussed.
EEast; PARASITES

328 Glazenap, S.P. 1920.
Control of garden pests hibernating as eggs. In: Byulleten' 2-go Vserossiyskogo entomo-

fitopatologicheskogo s"yezda v Peterburge 25-30 oktyabrya 1920. Peterburg: 28.
-- Collection of egg masses and treatment with petroleum are suggested as gypsy moth control measures.
CONTROL, EGG MASSES

329 Gninenko, Yu.I. 1981.
Ways of updating inspection of forest pests in Kazakhstan. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 37-38.
-- In some parts of the republic of Kazakhstan (island pine forests in the north and mountain hardwood and coniferous forests of Altai), gypsy moth outbreaks occur regularly. However, conventional forest pathology monitoring of gypsy moth foci is often impossible because egg masses are deposited on bare rocks outside the forest.
MAsia, WSiberia; MONITORING, OVIPOSITION SITE

330 Gninenko, Yu.I. 1983.
Effect of the virus preparation virin-ENSh on gypsy moth population dynamics. Vestnik sel'skokhozyaystvennoy nauki (Kazakhstana). (7):86-88.
MAsia; MICROBIAL PESTICIDES, VIRUS

331 Gninenko, Yu.I. 1986.
Elements of monitoring gypsy moth population in Kazakhstan. Lesovedenie. (4):45-49.
-- Peculiarities of biology and ecology of four gypsy moth geographical forms distinguished by the author in Kazakhstan are discussed. A retrospective analysis of the population dynamics of this species is made. For monitoring of gypsy moth populations, it is suggested that the population be divided into four zones with an independent network of control stations established in each zone.
MAsia; GEOGRAPHIC VARIATION

332 Gninenko, Yu.I., Kovalevskaya, N.I. 1988.
Study of the esterase enzyme complex in gypsy moth populations. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 9-10.
-- The esterase enzyme complex of eggs from different Kazakhstan populations has been analyzed. Four to 8 protein zones with esterase activity were found, and three major activity zones were distinguished. All three zones are polymorphic, i.e. they are represented by forms of different electrophoretic mobility, which allows types of activity zone distribution to be distinguished by inhibitory analysis. In three parts of northern Kazakhstan, specimens with the esterase activity type characteristic of heterozygous organisms tend to accumulate in populations with high density levels. The data obtained suggest a selective nature of polymorphism of esterase activity zones. It is assumed that unfavorable conditions for the population are being made in favor of heterozygotes.
MAsia; EGGS, ENZYMES, GENETICS

333 Golosova, M.A. 1988.
Gypsy moth diseases and prospects for their use in forest protection. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 35-36.
-- The baculovirus, Reprimeus, is the most promising pathogen causing a lethal disease in larvae. A latent pathogen is widespread in gypsy moth populations and it can be activated if external and internal factors combine to create favorable conditions for a nuclear polyhedrosis epizootic. In some host populations, a native virus of cytoplasmic polyhedrosis, *Reovirus disparis*, is extracted, and the virus, *R. pini* (strain MLTI), is adapted to the gypsy moth in the laboratory. This group of viruses causes intestinal polyhedrosis and has a marked protective effect. In the specimens that survived, the virus caused teratogenesis and a decrease in fecundity. It also can activate latent polyhedrosis infection. Therefore, the pathogens can be regarded as promising biocontrol agents. Bacterial flora of the gypsy moth are numerous. Pathological material of larvae and pupae contained toxic bacteria of the group *Bacillus thuringiensis* and some saprophytic bacteria of the genera *Pseudomonus, Serratia, Streptococcus*, and *Bacillus cereus*. There also were some species of microsporidia in the pathological material taken from gypsy moth foci and, in the laboratory, larvae appeared susceptible to some microsporidia extracted from the browntail moth. Two species, *Nosema lymantria* and *Plistophora schubergi*, occurred most frequently in natural foci. *N. muscularia* is a common microsporidium of the browntail moth, which readily infects gypsy moth larvae. All three species often provoke nuclear polyhedrosis and can be considered promising agents for creating complex biological preparations causing mixed infection by synergistic action.
ECentral; BACTERIA, MICROBIAL PESTICIDES, MICROSPORIDIA, VIRUS

334 Golubev, A.V., Semevskiy, F.I. 1969.
Distribution of gypsy moth populations during the depression phase. Zoologicheskiy zhurnal. 48(6):850-859.
-- The regularity of distribution of gypsy moth egg masses was studied during the depression phase of the population cycle. Infestation of forest plots follows the log normal law of probability distribution. Forest quality has only a slight effect on the population density. Age, closing of leaf canopy, and complexity of composition accounted for as little as 14% of the variation in population density. In plots of disturbed forest environments, forest edges, grazings, parks, and shelter belts, population density was 44 times higher than in the forest interior. Distribution of the population at the depression phase is exceptionally stable. From year to year, egg masses can be found in the same plots, in the same forests. The extent to which the forest environment is disturbed and the availability of egg masses should be the basis for population density counts during a depression phase.
ECentral; EGG MASSES, SAMPLING, STAND COMPOSITION

335 Golubeva, T.V., Orekhov, D.A. 1990.
Survival determination of gypsy moth larvae with the help of hemolymph coloration. In: Uspekhi entomologii v

SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 29-31.
ECentral; HEMOLYMPH

336 Golutvin, G.I. 1983.
The effect of industrial pollution on some dendrophilous insects. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (4):127-128.
-- Gypsy moth larvae have lower survival and fecundity on food taken from areas contaminated by metallurgic factories.
ESiberia; AIR POLLUTION, DEVELOPMENT

337 Gorbunov, A.F., Mishnev, A.K. 1983.
Leaf eating forest pests south of the Ukraine. Lesovodstvo i agroleso-melioratsiya. 66:53-58.
-- Studies of the biological peculiarities of the most widespread and important phyllophagous pests of forest stands are presented. Outbreaks of the gypsy moth, the browntail moth, the fall webworm, the satin moth and other phyllophages annually occur in stands of different species composition. Predators, parasites and diseases play an important part in decreasing the numbers of pests at all life stages. Spraying of oak stands with 0.5 % aqueous suspension of dendrobacillin contributes to a 75-90 % decrease of phyllophagous pests.
EWest; ECOLOGY, MICROBIAL PESTICIDES, PEST LIST

338 Gornostaev, G.N. 1962.
Mass flight of the gypsy moth, *Lymantria dispar* L., to mercury lamps in Moscow Province. In: Byulleten' Moskovskogo obshchestva estestvoispytateley. Otdeleniye biologii. MOIP, Moskva: 126.
-- In 1958, for the first time, large-scale flight of gypsy moth adults attracted to ultraviolet lamps was observed in Moscow Province. Flight began on July 24, 1958, reached its peak on July 25, 1958, and was completed on August 30, 1958; 1478 specimens (35.3% females) were observed. It was concluded that ultraviolet lamps can be used for eradication measures.
ECentral; FEMALES, FLIGHT, LIGHT TRAPS, PHENOLOGY

340 Gorokhov, V.A. 1972.
Sanitary condition and management of forests in the Voronezh region. In: Nauchnyye trudy Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk. Zashchita lesa ot vrediteley i bolezney. Moscow: 18-23.
-- The stands of the Voronezh Province lie in an area of continuous outbreaks of phyllophagous insects, the gypsy moth included. An outbreak was recorded here in 1968-1972. By 1972, foci remained only in an area of 334 ha. Oak mortality is mainly the result of anthropogenic impact and not phytophage activity.
ECentral; OUTBREAKS, TREE HEALTH

339 Gorokhov, V.A., Karlenko, V.M. 1980.
A biological method for controlling the gypsy moth, *Lymantria dispar*, a pest of conifers in the Voronezh Region, RSFSR. Lesnoye khozyaystvo. (5):50-52.
-- Light surveys supported the evidence of wide dispersal of gypsy moth males along rivers. In the Teliciman forest, dendrobacillin was applied against the gypsy moth. Its efficiency was 44% to 64%.
ECentral; FLIGHT, LIGHT TRAPS, MALES, MICROBIAL PESTICIDES

341 Grafov, J.A. 1967.
The application of attractants for insect pest control. Lesnoye khozyaystvo. (2):62-64.
-- A conventional pheromone trap to control the gypsy moth is used.
PHEROMONE TRAPS

342 Grechkin, V.P. 1956.
Some of the main representatives of insect pests in the mountain forests of Tadjikistan. Zoologicheskiy zhurnal. 35(10):1476-1492.
-- Mountain forests of Tadjikistan contain more than 120 tree and shrub species. Due to an acute shortage of moisture in summer and the age-long predatory activity of man (cuttings, cattle grazing), stands here are open or represented by individual trees scattered over slopes. Of the 20 species of the main phyllophages, the most serious are the fruit moth (*Hyponomeuta paclellus* L.), the mountain tent caterpillar, (*Malacosoma parallela* Stagr.), and the gypsy moth (*Ocneria dispar* L.). They heavily attack wild fruit species such as alycha, apple, pear, and hawthorn, sometimes completely defoliating them. A gypsy moth outbreak was recorded in 1951-1954 and, as a result of defoliation, there was no wild fruit at all. In the mountains of Tadjikistan, the gypsy moth also attacks *Acer turkestnus* Kom., *A. regelii pax, Populus tadschikistanica* Kom., *P. nivea* Willd., and *Myricaria alopecuroides* Schrenk. English walnut was attacked slightly. Stand differences were observed in pest egg mass deposition. In *P. nivea* stands, females oviposited mainly at a height of 3-4 to 8-10 m, usually on the underside of thick branches. In valleys, masses were deposited mainly at the trunk base.
MAsia; HOST PLANTS, OVIPOSITION SITE

343 Grigoryan, Ye.G., Azaryan, G.K., Davtyan, L.T. 1984.
The use of two inhibitors of chitin synthesis against gypsy moth and the tent caterpillar larvae. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 127-128.
-- In the laboratory, the effect of Dimilin and BAU-8514 at different concentrations was studied. The food of tent caterpillar and gypsy moth larvae was treated with Dimilin and BAU-8514 for 3 days. The food for control larvae was treated with water. Dimilin and BAU-8514 was highly lethal for larvae of both species. A few days after treatment, larvae stop feeding, grew black and died while molting. Preparations have a long-term effect as well because moths die while emerging or are non-viable.
Caucasus; BIOASSAY, GROWTH REGULATORS

344 Grigoryan, Ye.G., Sarkisyan, M.A., Devtyan, L.T. 1988.
Combined application of bacterial preparations and

inhibitors of chitin synthesis against gypsy moth. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 37-38.
-- Studies were made to find the minimum effective doses of the bacterial preparations gomelin, dendrobacillin, and the inhibitors of chitin synthesis, alsitin and Dimilin, applied in combination against gypsy moth larvae. Experiments were made in the laboratory and in the field on larvae of different instars; 20 combinations of the preparations were tested and water was used as the control. Preparation efficacy was estimated by the Abbot formula. Statistical processing was made according to Ashmarina and Vorobyeva (1962). Normality of sampling distribution was made by Shoven criterion. Laboratory experiments showed 100-80% mortality of instars III to V by combinations of bacterial preparations and minimum doses of alsitin (0.00025%) or Dimilin (0.005%).
Caucasus; BACTERIA, BIOASSAY, GROWTH REGULATORS, MICROBIAL PESTICIDES, NUMERICAL DATA

345 Grimalskiy, V.I., Lozinskiy, V.O. 1976.
Effect of hill ants on gypsy moth abandance. Zakhyst roslin. 23:11-16.
-- Surveys of gypsy moth foci showed the aggressive ant, *Formica polyctena* Forst., to be an inefficient entomophage of the gypsy moth. Ants attack injured, diseased, and parasitized larvae and, very rarely under experimental conditions, kill healthy instars II to VI. There were very few egg masses near ant hills; this is not a result of their destruction, but because females disturbed by ants migrate to quieter locations for oviposition. Because larvae are dispersed by wind, population density in pest foci is not affected.
EWest; OVIPOSITION BEHAVIOR, PREDATORS

346 Grimm, O. 1874.
***Liparis dispar* L.** In: Nasekomyye i ikh znacheniye v sel'skom khozyaystve. St. Petersburg: 27-31.
-- In some regions of the European part of Russia, gypsy moth outbreaks occurred in 1847-1848, 1852, 1862-1864, 1866-1869, 1870-1871. These populations were suppressed by entomophages and diseases. Pest adults and larvae are described briefly.
EWest, ECentral; OUTBREAKS

347 Gromova, A.A. 1976.
Effect of density on growth and development of some tussock moth species. In: Sovremennyye problemy zoologii i sovershenstvovaniya metodiki eye prepodavaniya v VUZe i shkole. Perm: 61-62.
-- Gypsy moth larvae that hatched from egg masses collected in nature were placed into glass vessels with a volume of 91 ml, 1 to 5 larvae per vessel, and fed apple leaves. Food was changed daily. The following parameters were measured: diel feeding activity and food utilization, feeding and duration of development, pupal and larval weight, male-female ratio, and fecundity. In the experiments, feeding activity, pupal weight, and fecundity decreased with increase in larval density. Feeding dynamics reflected general regularities in tussock moth feeding. Maximum and minimum amounts of food were, as a rule, consumed on the same days at different density levels. Density effect is thought to be related to the effect of excretory products.
ECentral; BEHAVIOR, DENSITY, ENERGETICS, FEEDING, REARING

348 Grossgeim, N.A. 1931.
The gypsy moth, *Porthetria dispar* L. In: Sadovyye vrediteli. Kharkov: 82-84.
-- All the life stages of the pest are described (illustrations are provided) and principal data on gypsy moth biology and ecology are presented. Pest control measures for gardens such as collection of egg masses and treatment with petroleum, application of sticky belts, digging of grooves to trap migrating late instars, and application of intestinal insecticides are suggested.
ECentral; CONTROL, GENERAL BIOLOGY, LIFE STAGE DESCRIPTIONS

349 Grossgeim, N.A., Pyatakova, V.L. 1928.
Preliminary list of insects damaging fruit crops at the Mleev research station (in 1923-1927). In: Trudy Mleevskoy sadovo-ogorodnoy opytnoy stantsii. Kharkov: 1-63.
-- The gypsy moth is listed among 310 insect species of various orders and families that are pests of fruit species.
EWest; PEST LIST

350 Gukasyan, A.B. 1988.
Microbiological forest protection against gypsy moth. In: Neparnyy shelkoptyad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 36-37.
-- Sporiferous and sporeless pathogen forms, viruses, and fungi were studied as microbiological agents. Fungal preparations are extremely slow to act in mountain forests; sporiferous forms of bacteria cannot be used as pathogens due to their intolerance for the conditions of production technology. Viral preparations are the most promising but their production also is complicated. Integrated protection using highly efficient pathogens (bacterial, fungal, viral, and ectinomyceta), plays a specific part in gypsy moth control. Application of microbiological control methods strengthens natural factors of pest mortality enhancing the effect of other negative factors. Crystaliferous entomopathogenic sporiferous microorganisms introduced into the forest biocenosis for its protection adapt to environmental conditions, and can be active for a long time causing continual interaction of foci.
WSiberia; BACTERIA, FUNGI, MICROBIAL PESTICIDES, VIRUS

351 Gukasyan, V.M. 1967.
Microbiological control of the gypsy moth. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 283-284.
-- More than 10 species of crystal-forming bacteria were tested against various gypsy moth instars. Younger larvae and larvae before pupation were the most sensitive to preparations: up to 58-97% died. Bacteria were found to remain viable in the soil for some years.
WSiberia; BACTERIA, MICROBIAL PESTICIDES, SOIL

352 Gukasyan, V.M. 1968.
Application of entomopathogenic microorganisms for gypsy moth control. In: Izvestiya biologo-geographicheskogo NII pri Irkutskom universitete. Irkutsk: 158-164.
-- Different strains of 10 *Bacillus* species were used as pathogens of gypsy moth diseases. A combination of separate elements of the bacteriological method was found which had maximum biological and economic efficacy. In different variants of the experiment, larval mortality ranged from 58% to 97% vs 1% in the control; pupal mortality was 70% to 80% of the insects that had reached this stage. On the whole, the bacteriological method of gypsy moth control was regarded as effective. The most virulent bacterial cultures were *Bacillus insectus* Guk., *B. dendrolimus* Tal., and *B. thuringiensis* (strain 811).
WSiberia; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

353 Gukasyan, V.M. 1968.
Bacteriological method of gypsy moth control. Avtoreferat dissertatsii kandidata biologichekikh nauk. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk. 24 p.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

354 Gukasyan, V.M., Saaya, B.I., Sarkisyan, M.A., Goginashvili, N.V. 1988.
Microbiological control of gypsy moth in coniferous and broad-leaved forests. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 38-39.
WSiberia; MICROBIAL PESTICIDES

355 Guliy, V.V. 1981.
Microorganisms in crop protection. Zashchita rasteniy. (8):48-49.
-- Bacterial preparations were applied; efficiency was about 90%.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

356 Guliy, V.V., Golosova, M.A. 1975.
Application of viruses for forest protection against insect pests. (Ispol'zovaniye virusov v zashchite lesa ot vrednykh nasekomykh.) Lesnaya promyshlennost', Moscow. 226 p.
-- The role of entomopathogenic viruses for control of some phytophagous insects, including the gypsy moth, is discussed. Peculiarities of pathogenesis and epizootiology of diseases of these pests are shown. Particular emphasis is placed on practical application of pathogens in phytophagous pest control. Some principles on work with various groups of entomopathogenic viruses in connection with their application in forest protection are presented.
MICROBIAL PESTICIDES, REVIEW, VIRUS

357 Guliy, V.V., Teplyakova, T.V., Ivanov, G.M. 1981.
Microorganisms applicable in biological control method. (Mikroorganizmy, poleznyye dlya biometoda.) Nauka, Novosibirsk. 271 p.
-- Data on viruses, rickettsiae, bacteria, and fungi attacking various pests, including the gypsy moth, are presented. The gypsy moth is attacked by *Baculovirus stipnotiae, B. reprimens, Densovirus junonia, Insectoreovirus disparis*, and *I. rotunda*.
REVIEW, VIRUS

358 Gul'ko, A.G. 1979.
Materials on primary toxicological tests of disparlure in trials with warm-blooded species. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 36-39.
-- Disparlure toxicity for mice and rats was examined by single and multiple per os administration and application to the skin. Investigations were carried out according to "Instruction on Hygienic Assessment of New Pesticides" (1969). For single per os administration, the doses ranged from 1 to 10 g/kg of live weight. Pathological response, observed over a 24 hour period, indicated that animals did not die. When the preparation was applied over a longer period of time (4 months) in three groups, 60%, 70%, and 80% of the animals died. Single doses were 0.1, 0.5, and 1 g/kg, and total doses 2.75, 17.386, and 25.284 g/kg of live weight. When the preparation was applied to the skin, no deviations from the norm were observed. The preparation has a low toxicity for warm-blooded animals.
EWest; BIOASSAY, PHEROMONES, TOXICOLOGY

359 Gur'ev, A.N. 1970.
Effect of some phytoncids and their analogues on the silkworm, *Bombyx mori* L., and the gypsy moth, *Porthetria dispar* L. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 26 p.
-- Studies were conducted to find the most active agents possessing both stimulative and insecticidal properties among 115 phytoncide preparations. When treated with analogues of pseudoallicin, insects respond in the same way as when treated with insecticides: the percentage of macronucleocytes decreases and the functioning of the larval neurosecretory system is upset. It should be emphasized that the gypsy moth has an aversion to food treated with pseudoallicins. All this causes slower development, decline in fecundity and, eventually, death. Thus, these preparations should be regarded as promising for plant protection.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

360 Gur'ev, A.N. 1981.
Insecticidal effect of some aquatic and hydrophilous plants on gypsy moth. In: Fitontsydy. Kiev: 310-312.
-- The effect of sap from 10 aquatic and hydrophous plants on the gypsy moth was studied. Mortality, the weight of surviving pupae, and adult fecundity were observed. Water lily and veratrum had marked insecticidal properties. These plants caused 55% to 60% mortality of larvae and reduced weight and fecundity compared to the control.
EWest; NATURAL PLANT PRODUCTS

361 Gur'ev, A.N., Bogdan, N.P. 1968.
Effect of some pseudoallicins on gypsy moth vitality. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 97-99.
-- Apple leaves treated with dilute solutions (1:250) of

pseudoallicins (Nos. 150, 232, 276, and 356) were fed to gypsy moth larvae. The most pernicious effect on larvae was produced by pseudoallicins 150 and 256 (survivorship in the experiment was 15-26 % vs 90-94 % in the control). Adult fecundity also was considerably reduced.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

362 Gur'ev, A.N., Kushvid, F.I. 1976.
A comparative estimation of the effect of a preparation of Haplophyllum obtusifolium and chlorophos on the sorption properties of intestinal walls in gypsy moth. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Teoriya i praktika povysheniya produktivnosti sel'skokhozyaystvennykh zhivotnykh. USKhA, Kiev: 124-125.
-- By the quantitative method of vital staining with neutral red, a stimulative effect of *Haplophyllum obtusifolium* phytoncide was found on the sorption activity of isolated gypsy moth intestines. Activity increased with longer tissue exposure to the preparation (1.3 and 6 hours). Under the action of chlorophos, some increase in intestine sorption activity was observed. As compared to the control, about 130% of the stain remained in the tissue after being in the pesticide solution for an hour; but, 6 hours later intestine sorption activity declined drastically to the value of the control parameter. Similar properties of the preparation under study were found in the experiments on silkworm intestine that had not been isolated.
EWest; CHEMICAL INSECTICIDES, HISTOLOGY, NATURAL PLANT PRODUCTS

363 Gur'ev, A.N., Kushvid, F.I. 1976.
Development of polyhedrosis in gypsy moth through volatile phytoncides of some plants. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 30-31.
-- Instars I to III fed on food treated with virus suspension were infected with polyhedrosis. After molting, infected larvae were kept in special two-story cages with air flow bringing in phytoncides of the following plants: *Mentha arvensis L., Cannabis sativa, Daucus sativus* (Haft.), Roehl., *Raphanus sativus* var. *niger* Rers., *Allum sera* L., *Tagetes patula* (*Artemisia absinthium*), *Thuja occidentalis* L., and *Anethum graveolens*. Against the background of volatile phytoncides of all the species (except *Tagetes patula*), duration of disease development was reduced to 7.83-14.0 days vs 17.67 days in the control for larvae infected in the first instar. Late instars appeared more tolerant but, in most cases, phytoncides served as the factor causing predisposition to diseases. Phytoncides of *Raphanus sativus* and *Thuja occidentalis* had the most suppressive effect on all instars of gypsy moth.
EWest; NATURAL PLANT PRODUCTS, VIRUS

364 Gur'ev, A.N., Kushvid, F.I. 1977.
Development of polyhedrosis in gypsy moth larvae when treated with phytoncidal preparations. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 10-12.
-- Phytoncides of 7 different plants were studied as possible agents contributing to polyhedrosis development. Of all the phytoncides, only the preparation extracted from *Iris songarica* Schrenk. contributed to accelerated development of disease and higher mortality of gypsy moth larvae (99% vs 81% in the control). Mortality was significant from the 5th to the 15th day of the experiment. In this period, 71% of the larvae died vs 41% in the control. Thus, phytoncides should be looked upon as an additional source of insect control.
EWest; NATURAL PLANT PRODUCTS, VIRUS

365 Gur'ev, A.N., Kushvid, F.I. 1978.
Effect of the phytoncide Haplophyllum obtusifolium on gypsy moth infected with polyhedrosis. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 45-46.
-- Two sets of experiments were made. In one, gypsy moth larvae were infected with polyhedrosis in the second instar; in the other, they were infected in the fourth instar. On the second day after infection, larvae were fed apple leaves treated with Haplophyllum obtusifolium phytoncide solution at a concentration of 1:500. Larvae started dying as early as a few hours after the first application of the phytoncide preparation. In the first set of experiments, 100% mortality was recorded on the 17th day; in the control, 84% of the larvae died within 36 days. In the second set of experiments, parameters were 84% within 13 days and 29% within 15 days, respectively. Thus, application of Haplophyllum obtusifolium phytoncide weakened insect organisms considerably and provoked a more acute course of nuclear polyhedrosis.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS, VIRUS

366 Gur'ev, A.N., Morozov, N.S. 1978.
Dynamics of blood-forming activity in the gypsy moth, *Ocneria dispar* L., when treated with European elder sap and chlorophos. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 52-54.
-- A new method for estimating blood-forming activity of larvae is suggested. It consists of heavy blood letting and measuring the number of forming elements in 1 ml of hemolymph at regular intervals with a Goryachev chamber, which is used in medicine. The method is tested on gypsy moth larvae subjected to the action of elder juice and chlorophos. In bled larvae reared under normal conditions, the original number of hemocytes is restored within 9 hours. Larvae treated with elder juice or chlorophos when bled achieved restoration of only 82% of hemocytes after 15 hours; the number of hemocytes begins to decline and, by the end of a 24-hour period, it is 70%.
EWest; CHEMICAL INSECTICIDES, NATURAL PLANT PRODUCTS, PHYSIOLOGY

367 Guseinov, Ye.S. 1973.
Gypsy moth in the forests of Azerbaijan. Zashchita rasteniy. (5):33.
-- In 1971-1972, a gypsy moth outbreak occurred in

Azerbaijan over about 50,000 ha of oak-hornbeam stands. Adult flight was observed in the first half of July. The number of egg masses ranged from 5 to 100 per tree, and egg masses were deposited on trunks and branches along the entire height of trees. Most of the egg masses were deposited at the trunk base, on stones, clods of earth, stumps, houses, fences, leaves, and in the litter. Egg mass sizes ranged from 800 to 1500 eggs. Larvae hatched in late April or early May and were dispersed by wind. The favored food plants were oak and hornbeam; ash, ash-leaved maple, and English walnut were slightly attacked, while Bastard acacia was not attacked by larvae at all. The most active parasites were *Carcelia excisa* and *Parasarcophaga portschinskyi*. The outbreak was suppressed by aerial treatments of chlorophos and hexachloran.
MAsia; CHEMICAL INSECTICIDES, FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PARASITES

368 Guseinov, Ye.S., Mirzoev, J.A. 1976.
Folivorous pests and their control in the forests of Azerbaydzhan. In: Ispol'zovaniye khimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Pushkino: 37-38.
-- In valley and foothill forests of Azerbaijan, great numbers of some lepidopterous pest species are found. The gypsy moth and the geometrids, the winter moth, chevron, and scribber are the main pests. The gypsy moth is recorded annually in an area of more than 200,000 ha but rarely occurs at heights above 500-800 m. Gypsy moth and geometrid foci are formed in mixed stands of hornbeam, oak, and wild fruit trees. In the sites completely defoliated in 2-3 years, oak died or nearly died, especially after droughts. Control measures such as aerial treatments with chlorophos, and ground spraying with phosalon, ftalophos, and sevin were used. Pesticide treatment covers not less than 200,000 ha per year. Since 1975, testing of Virin-ENSh against the gypsy moth has been started. The positive effect is significant.
Caucasus; CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, VIRUS

369 Guzeev, G.F. 1986.
Microbiological preparations for control of defoliating insects in the pistachio forests of Middle Asia. Lesnoye khozyaystvo. (10):63.
-- Dendrobacillin, toxibacillin, and lepidocide are used against the gypsy moth. Gomelin appears to be the most effective preparation.
BACTERIA, MICROBIAL PESTICIDES

370 Ibragimova, K.N. 1969.
Insect pests in Kirgiziya. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 40-41.
-- One hundred sixty-three insect species trophically related to willow have been registered; among polytrophic phyllophages the gypsy moth is of great importance.
MAsia; PEST LIST

371 Idiyatulin, R.M., Amirkhanov, D.V., Tur'yanov, P.A. 1978.
New insecticides used against gypsy moth. Lesnoye khozyaystvo. (11):85-86.
-- Action of organic phosphorous insecticides on the gypsy moth was studied at Bashkir Forest Experimental Station in 1976. Vinylphosphate was found to be the most effective; basudin was highly effective for only a short time.
EEast; CHEMICAL INSECTICIDES, NUTRITION

373 Idrisova, N.T. 1976.
Importance of various biotic factors in reducing the gypsy moth number. In: Biologicheskiye osnovy i ratsional'noye ispol'zovaniye pochv i rastitel'nykh resursov Bashkirii. Ufa: 62-64.
-- A procedure for investigating gypsy moth population density from 1971-1975 is presented. Factors were evaluated using the Bess coefficient. Decrease in population density in three sites was mainly due to diseases (primarily polyhedrosis) and parasites.
EEast; POPULATION DYNAMICS

372 Idrisova, N.T. 1977.
Materials on biology and ecology of the gypsy moth in Bashkirian ASSR. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 38-54.
-- In studies of the gypsy moth from 1971-1975, egg hatch was found to occur when birch and oak come into leaf at a mean daily temperature of 10.6-10.8 C and at a sum of effective temperatures of 168.7 - 210.0. On the average, larval development lasts 59 days and pupal development lasts 14.2 days. Sums of mean daily temperatures were 922.5 and 279.8, respectively. Life tables of gypsy moth generations were made for a period from 1972 to 1975. Using the Bess coefficient, it was found that the key mortality factors were diseases (principally polyhedrosis) and parasites (*Anilasta tricincta* and *Phorocera silvestris*).
EEast; EGG HATCH, PARASITES, PHENOLOGY, TEMPERATURE

374 Idrisova, N.T. 1977.
New gypsy moth outbreaks in Bashkiria. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 26-37.
-- The latest increase in gypsy moth numbers began in Bashkiria in 1971. Foci of gradation are closely related to the major food species--oak and birch. From 1972 to 1975, the area of pest foci increased considerably, spreading to the northern and northwestern regions of the republic. It is suggested that one of the main conditions of rapid gradation in these years is a strong correlation between the time of egg hatch to the time of oak and birch coming into leaf.
EEast; EGG HATCH, NUMERICAL DATA, PHENOLOGY

375 Idrisova, N.T. 1978.
Method of inventory of the gypsy moth egg masses in Bashkiria. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moskva: 48-55.
-- Types of gypsy moth egg mass distribution were studied at permanent experimental plots in some forestries in Bashkiria by counting all the pest egg masses in 1974-1976. Egg masses are highly aggregated and, in most cases, actual distribution patterns cannot be

described with Poisson distribution. Distribution is not random (aggregated) and is described using the exponential curve of the negative binomial. When egg masses are aggregated the best strategy for making counts is to reduce the amount of samples from one tree while increasing the number of sample trees. Thus, it is suggested that egg masses should be counted on one side of the tree.
EEast; EGG MASSES, SAMPLING

376 Idrisova, N.T. 1981.
Role of biotic factors in gypsy moth population dynamics. In: Zashchita lesa v Bashkirii. Ufa: 29-30.
-- Total generational mortality is determined mainly by mortality in the larval stage; in particular, death of instars III to VI has the strongest correlation to total generational mortality. Larval mortality is generally caused by diseases. In some years there was correlation between total pest mortality and mortality at egg and pupal stages. In Bashkiria, death of insects at these stages is mainly caused by diseases, and most commonly by polyhedrosis. In Bashkiria, it is advisable to take measures to increase mortality of early instars by activating the latent form of polyhedrosis using virus preparations.
EEast; POPULATION DYNAMICS, VIRUS

377 Idrisova, N.T. 1981.
Factors of gypsy moth mortality in Bashkiria. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 59-61.
-- Regions west of the Urals and the South Urals were surveyed. Early instars proved to be the most sensitive.
EEast; MICROSPORIDIA

378 Idrisova, N.T. 1983.
Biology, ecology and population dynamics of gypsy moth in Bashkiriya. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 20 p.
-- Data are presented on peculiarities of Bashkirian populations of the gypsy moth such as phenology, population dynamics, the impact of entomophages, diseases, and abiotic factors of Baskirian populations of the gypsy moth. The application of these in pest control is also given.
EEast; CONTROL, PHENOLOGY, POPULATION DYNAMICS

379 Idrisova, N.T., Yafaeva, Z.Sh. 1981.
Phenology of the gypsy moth in Bashkirian ASSR. In: Zashchita lesa v Bashkirii. Ufa: 37-39.
-- In Bashkiria, gypsy moth egg hatch usually coincides with trees coming into leaf (usually early May); weather conditions can prolong hatching to 2 weeks. Leafing generally occurs at the time of hatch but birch sometimes comes into leaf before egg hatch. Birch is the species preferred for oviposition and tree infestation is directly related to trunk diameter. Duration of larval and pupal development and adult flight ranged from 59 to 73 days. Adults usually emerge by mid-June, with flight lasting an average of 32 days. The survey period is from 1953 to 1980.
EEast; DEVELOPMENT, EGG HATCH, PHENOLOGY

380 Ierusalimov, Ye.N. 1979.
Disturbance in physiological processes of the trees infested by defoliating insects. Lesovedenie. (2):62-71.
-- Changes in respiration, transpiration, and bleeding sap transport were studied in some conifers infested by the Siberian moth and in English oak infested by the gypsy moth. Changes were noted in normal respiration of tree trunk and branches, which is specific for each species and tree size. A positive balance of photosynthesis in oaks was observed when 0.3% of foliage biomass was restored, but disappeared as leaves were attacked by true mildew. Decreased respiration intensity of oak trunks was observed for not less than 2 years. When tree trunks were dying, their gas exchange changed sharply. Bleeding sap transport did not cease in oaks attacked by the gypsy moth as contrasted to firs.
ECentral; DEFOLIATION, TREE HEALTH

381 Ierusalimov, Ye.N. 1982.
Changes in the growth of oak, pine-oak and birch stands damaged by gypsy moth. In: Morpho-ekologicheskiye adaptatsii nasekomykh v nazemnykh soobshchestvakh. Nauka, Moscow: 94-99.
-- A single attack of oak crowns by gypsy moth larvae resulted in a decrease of annual increment, which averaged 50% of the increment expected. For two successive years the summary annual increment was lost. In mixed stands, pine was free from gypsy moth attack and had a 1.5-2 time increase in increment on the third and fourth year. In mixed forests, this increase compensated for the loss of increment in oak.
ECentral; STAND COMPOSITION, TREE GROWTH

382 Ierusalimov, Ye.N. 1988.
Storage substances occurring in tissues of an oak tree damaged by phytophages. Lesovedenie. (5):9-14.
-- Dynamics of accumulation of storage nutrients in tissues of oak, the leaves of which were attacked by the green oak leaf roller and the gypsy moth were studied in Krasnodar Krai. It was found that leaf damage caused by phyllophages not only exhausts non-nitrogenous substances in the tree, but also upsets the regulation of their distribution and use.
ECentral; TREE HEALTH

383 Il'ichev, A.L. 1981.
Reaction of gypsy moth males to Disparlure, a synthetic sexual attractant. Zashchita rasteniy. (7):32.
-- The response by males to the odor of the sex attractant, Disparlure, was observed. Four consecutive stages of sexual excitement were distinguished with sequential increase of attractant concentration. Very high concentrations (3-5 mkg/ml) cause high excitement of the male almost immediately, followed by a long period of depression with no response to disparlure. This may explain the drastic decline in the trapping ability of pheromone traps containing excessive attractant.
ECentral; BEHAVIOR, PHEROMONES

384 Il'inskiy, A.I. 1952.
Gypsy moth. In: Nadzor za khvoe-i listogryzushchimi vreditelyami v lesakh i prognoz ikh massovykh razmnozheniy (nastavleniye). Goslesbumizdat, Moscow

and Leningrad: 90-93.
-- Data are presented from regions where gypsy moth outbreaks occur, including an ecological description of locations where primary foci originate and the general duration of outbreaks. Brief descriptions are given of ecological peculiarities of the species and characteristics to identify the pest in its foci and to forecast foci dynamics.
FOCI, OUTBREAKS, PROGNOSIS

385 Il'inskiy, A.I. 1959.
Gypsy moth and its control. (Neparnyy shelkopryad i ego kontrol'.) Goslesbumizdat, Moscow. 63 p.
-- The area of gypsy moth gradation and zones inside the area are studied. Vast evidence on species ecology and its role in biocenoses is presented along with a list of food plants preferred in different parts of the area. Included is a list of gypsy moth entomophages that includes 15 species of predators, 134 species of primary parasites, 27 species of secondary parasites, and 14 species of pathogens. In the last chapter, regularities of changes in gypsy moth population dynamics are outlined.
HOST PLANTS, PARASITES, PATHOGENS, POPULATION DYNAMICS, PREDATORS, REVIEW

386 Il'inskiy, A.I. 1961.
Inventory of folivorous insects in the forests and prediction of their outbreaks. In: Zashchita lesov ot vrediteley i bolezney. Moscow: 57-96.
-- This is a detailed analysis of the occurrence and the dynamics of outbreaks of some important phyllophages, including the gypsy moth. Information on outbreaks of gypsy moth and other pests in the European part of Russia is given for the period from 1890 to 1936. An assessment of effect produced by weather conditions, an analysis of correlation between outbreaks and droughts, and between the number of pests and food plant condition is presented. Theoretical and practical foundations of forecasting and controlling phyllophage populations with regard to activity of biological agents (entomophages and diseases) also is included.
ECentral; POPULATION DYNAMICS, PROGNOSIS, WEATHER

387 Il'inskiy, A.I. 1965.
Gypsy moth. In: Nadzor, uchet i prognoz za massovymi khvoye- i listogryzushchimi nasekomymi. Lesnaya promyshlennost', Moscow: 278-286.
-- A general description of the species, its role in biocenoses, its area, zones of damage, and the role of biotic and abiotic factors in regulating pest numbers are given. A list of food plants is included and gypsy moth population dynamics is discussed.
DEVELOPMENT, GENERAL BIOLOGY, HOST PLANTS, REVIEW

388 Il'inskiy, A.I. 1965.
Abundant folivorous insects: management and prediction. (Nadzor, uchet i prognoz za massovymi khvoye- i listogryzushchimi nasekomymi.) Lesnaya promyshlennost', Moscow. 525 p.
-- Data are presented on regularities of outbreaks, procedures of counts and control, methods for determining insect viability at all life stages, parasitism of entomophages, and infection with diseases. Techniques for pathogen extraction and identification, forecasting techniques, and control measures directed towards some phyllophage complexes, including the gypsy moth also are presented. Also included are morphological descriptions of pest life stages, data on biology, food plants, danger, frequency of outbreaks, places where primary foci originate, etc., for more than 100 species of phyllophagous insects, including the gypsy moth. The supplement contains catalogues of major parasites and diseases of important pest species and meteorological data for some localities. Pages 278-286 are devoted only to gypsy moth (see Il'insky, 1965), but information on gypsy moth also is included in other chapters.
CONTROL, OUTBREAKS, PROGNOSIS, REVIEW

389 Il'inykh, A.V. 1989.
Production of laboratory reared populations of the gypsy moth for virus production. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibirsk: 25.
-- Cultivation of gypsy moth for virus production on a large scale is complicated because it is monovoltine and has a relatively long larval development period. In the laboratory, 4, 3 and 2 gypsy moth generations were produced using eggs from natural populations. Composition of nutrient medium and cultivation procedure are unique. It is suggested that large-scale production of viral material in laboratories should be made on larvae taken from gypsy moth gradation foci, while the laboratory material should be used for bioassays.
WSiberia; REARING, VIRUS

390 Il'inykh, A.V., Mokhovikov, S.M. 1989.
Development of initial gypsy moth colonies. In: Tezisy dokladov 2 Vsesoyuznoy konferentsii po promyshlennomu razvedeniyu nasekomykh. Nauka, Moscow: 87-88.
-- Weight of female pupae and fecundity of adults from certain foci are sufficient criteria for estimating insect populations for use in artificial breeding and for establishing research priorities.
ECentral; POPULATION QUALITY, REARING

391 Imnadze, T.S. 1981.
The use of new microbiological preparations against leaf-gnawing forest pests in Georgia. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 62-64.
-- Bitoxibacillin and gomelin were applied against the green oak leaf roller and other geometrids. Within 3-4 days following treatment, 100% of the insects were dead.
Caucasus; BACTERIA, MICROBIAL PESTICIDES

392 Ingenitskiy, I.V. 1897.
Insect pests of Semirechje. (Nasekomyye-vrediteli Semirech'ya.) St. Petersburg. 132 p.
MAsia; PEST LIST

393 Ipat'eva, G.V., Mukhamedzyanova, F.V. 1976.
Dynamics of gypsy moth infection by mermithids (Mermethidae, Nematoda) in Bashkiria. In: Fiziologicheskaya i populyatsionnaya ekologiya

zhivotnykh. Izdatel'stvo Saratovskogo universiteta, Saratov: 53-63.
-- Analysis of mermithid infection of gypsy moth larvae in Bashkiria from 1964 to 1974 showed that it ranged from 0 to 22%. Sharp numerical fluctuations of mermithids were observed in different years in the same region and in the same year in regions differing in natural and climatic conditions (regarded as important for regulating mermithid population). Effectiveness of mermithids as a regulator of gypsy moth populations also is different.
ECentral; CLIMATE, NEMATODES

394 Issi, I.V. 1968.
Effect of a microsporidium on fecundity of the gypsy moth, *Lymantria dispar* L.(Lepidoptera, Orgyidae) in generations. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 331-339.
-- The effect of infecting gypsy moth instars III and V with the microsporidium *Plistophora schubegi* Zw. extracted from the browntail moth was studied. The following parameters were examined: growth dynamics of infected larvae under heavy and medium infection, pupal weight, and the number of eggs deposited. Also studied were parameters of offspring of healthy and diseased females, the mortality during the developmental period, the number of eggs deposited in the following generation, the average weight of an egg mass, and the total weight of the offspring. At early stages of disease, some stimulation of the host by the parasite was observed, i.e., the growth rate of parasitized insects was higher. After 6-10 days, diseased insects start lagging behind healthy ones in growth. Early infection leads to lower pupal weight and decline in adult fecundity by an average of 70%. If late instars are infected, an insignificant deviation of pupal weight and imago fecundity occurs in the first generation, but in the next generation mortality of infected female offspring is 10% to 15% higher than in the control and fecundity of adults produced by diseased females is 5 times lower than in the control.
ECentral; MICROSPORIDIA

395 Ivashov, A.V., Boyko, G.Ye., Simchuk, A.P. 1992.
Modification and utilization of the phenolic compounds in pubescent oak leaves by caterpillars of the oak leaf roller moth and the gypsy moth. Zhurnal obshchey biologii. 53(3):384-393.
-- Biochemical analysis of leaves of *Quercus pubescens* Willd. revealed 18 secondary metabolites, most of which were phenolic compounds. The percentage decrease of these compounds in the intestines and excrement of caterpillars of the monophagous leaf roller moth (*Tortrix viridana* L., Tortricidae) and the polyphagous *Lymantria dispar* L. was traced. The vast majority of the secondary metabolites of oak leaves were modified in the intestine of the leaf roller moth larvae. These modifications are reversible, and the same compounds as in the food were identified in caterpillar excrement. These modifications also are revealed in the case of the gypsy moth. Results indicate that multiple forms of the leaf roller's non-specific esterases act on a compound extracted from the oak leaves tentatively identified as kempferol-3-glucoside. Possible mechanisms of detoxication of the phenolic compounds in mono- and polyphages are discussed.
EWest; BIOCHEMISTRY, FOLIAGE CHEMISTRY, TOXICOLOGY

396 Ivashov, V.I., Ivlev, V.I. 1983.
Some peculiarities of gypsy moth interaction with nuclear polyhedrosis. In: Ekosistemy gornogo Kryma, ikh optimatizatsiya i okhrana. SGU, Simferopol: 111-115.
-- The effect of a nuclear polyhedrosis virus on gypsy moth larvae from a Moldavian population was studied in the laboratory. Mortality dynamics was studied by treating insects with doses of 1000 to 10,000,000 polyhedra per larvae. The data obtained were contradictory.
EWest; BIOASSAY, VIRUS

397 Izhevskiy, S.S. 1971.
Role of carbohydrases in carbon nutrition of the gypsy moth. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskow: 131-138.
-- Composition of gypsy moth carbohydrases and their role in digestion were studied. Four carbohydrases were found in different parts of gypsy moth larval intestines: glucosidase, galactosidase, fructofuranosidase, and amylase. The fact that these highly active digestive carbohydrases, which can readily hydrolyze oligosugars and starch, are found in the intestine means that these polysaccharides can be converted to monosaccharides and hence are a food resource. A conclusion can be made that this species is capable of utilizing a variety of plant carbohydrates and is not so dependent on the amount of monosaccharides in food as previously reported.
ECentral; BIOCHEMISTRY, ENZYMES

398 Izhevskiy, S.S. 1973.
Comparative analysis of alpha-amylase of the gypsy moth and the tent caterpillar. In: Biochemicheskaya evolyutsiya. Izd. AN SSSR, Leningrad: 33-38.
-- Considerable differences were found in the parameters of alpha-amylase extracted from the intestinal tissue of gypsy moth and tent caterpillar larvae reared under similar conditions and fed the same food. The maximum amylase activity of the tent caterpillar is observed at pH = 7.0 and a temperature of 62°C; for the gypsy moth it is pH =9.2 and 45 C. Values of Michaelis constant are equal for both species and constitute 0.031% to 0.034%. The rate of starch enzymolysis is higher for the tent caterpillar than for the gypsy moth - 2.13 mg and 1.63 mg of maltose, respectively, within 30 minutes in 1.5 ml of incubation mixture. A possible relationship between the values of parameters obtained and ecological factors is discussed.
ECentral; BIOCHEMISTRY, ENZYMES

399 Izhevskiy, S.S. 1974.
Adaptive patterns of digestive systems of the gypsy moth and the tent caterpillar. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moscow: 171-180.
-- Adaptive capabilities of the digestive system of phytophagous insects are studied using the tent caterpillar and the gypsy moth. Lipases, amylases, alfa-glucosidase, beta-galoctosidase, beta-fructofuranosidase trehalase, pepsin- and trypsin-like peptidases have been found in the

intestinal tissues of these species. Shifts in enzyme activity in the course of ontogeny observed are ways that adjustments are made by different species and within a species to new feeding conditions to changes in environmental conditions. Labile chemical composition of food plants does not cause dysfunction of the organism as the intestine medium serves as a buffer providing uniformity of monomers involved in metabolic processes.
ECentral; BIOCHEMISTRY, ENZYMES

400 Kalinnikova, T.N. 1932.
Quantitative inventory of the fauna of decidous trees in the Crimea mountains. In: Trudy Leningradskogo obshchestva estestvoispytateley. Leningrad: 15-19.
EWest; FAUNAL LIST, HOST PLANTS

401 Kal'vish, T.K., Sekpit-Ool, T.M. 1974.
Interactions of muscardine fungi with gypsy moth microflora and epiphytic fungi of its food plants. In: Trudy Biologicheskogo instituta SO AN SSSR. Nauka, Novosibirsk: 8-17.
-- The interaction of muscardine fungi with microflora of healthy gypsy moth larvae and epiphytic microflora of pest food plants was recorded. Antagonistic activity of agents of mycoses in insect habitats is discussed.
WSiberia; FOLIAGE QUALITY, FUNGI

402 Kamber, A. 1914.
Control of the garden pest with gypsin. Sadovodstvo. (9):715-717.
-- Directions for producing and applying the insecticide gypsin are given. Application experiments on phyllophagous orchard pests, including gypsy moth in Kursk Province are described.
ECentral; CHEMICAL INSECTICIDES

403 Kamenek, L.K., Kharina, N.I. 1982.
Cytologic effect of delta-endotoxin *Bacillus thuringiensis* var. *galleriae* on the cell culture of *Lymantria dispar* L. In: Ispol'zovaniye mikroorganizmov v sel'skom khozyaystve i promyshlennosti. Nauka, Novosibirsk: 72-79.
-- Gypsy moth cells that were in contact with delta-endotoxin solution were studied in vitro by light scanning and transmission microscopy. Cell ultrastructure and appearance were found to undergo considerable changes compared to the control.
BACTERIA, CELL CULTURE, HISTOLOGY

404 Kamenek, L.K., Shternshis, M.V. 1984.
Effect of *Bacillus thuringiensis* delta-endotoxin on active ion transport in insects. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (3):17-113.
WSiberia; BACTERIA, BIOCHEMISTRY

405 Kamyshny, N.S. 1925.
Forest pests and their control in Kharkov Province in 1924. Zakhyst roslin. (1-2):14-15.
-- The gypsy moth was not widespread, but was observed in nearly all the forests surveyed. Population increase is mentioned and the possibility of an outbreak is suggested.
EWest; GENERAL BIOLOGY, PEST LIST

406 Karasev, V.S. 1969.
Important pests of willow trees and their control in the floodplain forests of the Ukraine. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 37 p.
-- The gypsy moth is one of the most important phyllophagous pests of willow stands in the floodplain. Pest foci are found in plots that have been flooded for a long time or have been weakened by excessive cattle grazing. Data on gypsy moth biology are given. In willow stands the gypsy moth often starves due to the presence of another serious pest, the willow moth. Pupation of gypsy moth larvae occurs often in willow moth nests, which provide protection for them. The levels of infestation of willow by the willow moth and the gypsy moth are inversely related.
EWest; ECOLOGY, HOST PLANTS, PEST LIST, STAND CONDITION

407 Karasev, V.S. 1971.
Impact of summer high-floods on the abundance of willow moth and gypsy moth in the Dniester River floodplains. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moscow: 51-54.
-- Outbreaks of the gypsy moth and willow moth often occur in forest floodplains of the Dniester River. Gypsy moth reservations are black poplar stands, but in willow stands the two species compete. When willow moth populations are high there are no gypsy moth present. This is determined by different ecological requirements for the species: the willow moth cannot tolerate long periods of flooding while the gypsy moth is more tolerant of it.
EWest; HOST PLANTS, STAND CONDITION

408 Karasev, V.S., Satarova, T.I. 1973.
Impact of tannins from willow, poplar, and oak trees on gypsy moth development. Zakhyst roslin. 17:44-46.
-- Gypsy moth larvae taken from apple trees were fed oak, poplar, and willow. Larvae were fed leaves on branches. Each day the amount of food consumed was estimated and larvae were weighed. Tannin content was estimated in the food. With an increase in tannin content, the coefficient of food utilization became smaller and viability of the larvae declined. Tannins are regarded as impairing larval food utilization and causing mortality, particularly in early instars.
EWest; ENERGETICS, FOLIAGE CHEMISTRY, HOST PLANTS, NUTRITION

409 Karavaeva, R.P., Romanenko, K.Ye 1958.
Folivorous forest pests of the Northern Kirgizia. In: Trudy Kirgizskogoy lesnoy opytnoy stantsii. Frunze: 117-132.
-- A complex of forest pests was studied in Chuya Valley, Issyk-Kul Kettle, and Tyan-Shan Province from 1953-1957. One hundred and fifty six forest pest species were found; 50 of them are lepidopterans. The gypsy moth is regarded as a serious pest and is widespread in southern Kirgizia where it attacks mainly fruit and forest species. Egg masses are sometimes heavily attacked by

dermestids.
MAsia; PEST LIST

410 Kardidina, M.V., Fedoryak, V.Ye., Kharlamova, N.V., Simonova, T.I. 1982.
Gypsy moth and its control in northern Kazakhstan. In: Sbornik nauchnykh trudov Kazakhskogo NII lesnogo khozyaystva i agrolesomelioratsii. Shchuchinsk: 121-130.
-- A conclusion is made that collapse of gypsy moth foci in Kokchetav Province was due to the effect of biopreparations (bacterial and viral), insecticides that were used for treatment of foci, and entomophages, which killed the gypsy moth at every life stage. Biopreparations are particularly effective under favorable weather conditions and against early instars.
MAsia; BACTERIA, MICROBIAL PESTICIDES, VIRUS

411 Karpov, A.Ye 1987.
Reproduction of foreign baculovirus in the tissues of *Leptinotarsa decemlineata* Say (Coleoptera: Chrysomellidae). Mikrobiologicheskiy zhurnal. (2):78-81.
EWest; PHYSIOLOGY, VIRUS

412 Karpov, A.Ye., Karabash, Yu.A., Zolotarenko, A.I. 1977.
Detection of nuclear polyhedrosis latent virus carriers in natural populations of the gypsy moth *Lymantria dispar* L. (Lepidoptera, Lymantriidae).
Mikrobiologicheskiy zhurnal. 39(1):61-64.
-- By heating instars III-IV of a Kiev population up to 45 C for 60-120 minutes and delaying hibernation of eggs of an Azerbaijan population by 30 days, nuclear polyhedrosis virus was induced in the majority of insects, or the insects were identified as virus carriers. The results obtained suggest that there are a great many virus carriers among larvae of some gypsy moth populations. Effective chemical inducers of low toxicity should be found, which activate a latent nuclear polyhedrosis virus to protect plants from the pest without using toxic insecticides.
EWest, MAsia; TEMPERATURE, VIRUS

413 Kashkarova, L.F. 1981.
Nosematosis of the silkwork. Zashchita rasteniy. 9:28-29.
MAsia; MICROSPORIDIA

414 Kataev, O.A. 1981.
Some aspects of the impact of human activity on forest pests. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 69-73.
-- Gypsy moth larvae were reared on larch needles collected in zones intensely polluted by aluminum and cellulose plants. The effect on ecological and physiological parameters of the gypsy moth was negative. In the vicinity of the aluminum plant, the content of magnesium in larch needles decreased to 69%, the content of manganese did not change, the content of copper increased to 143%, the content of iron, silicum, calcium, and aluminum increased to 167, 175, 224 and 368%, respectively.
ECentral; AIR POLLUTION, FOLIAGE CHEMISTRY

415 Katerinich, A.A. 1930.
Materials on lepidopterous fauna in the Ukraine. In: Trudy Kharkivskogo tovaristva doslidnikiv prirody. Kharkov: 65-74.
-- A list of 233 lepidopterous species is given. The gypsy moth is mentioned as a species limited in number.
EWest; FAUNAL LIST

416 Kellus, O.G. 1939.
The role of food plants in gypsy moth development. Zoologicheskiy zhurnal. 18(6):1010-1020.
-- Data are given on larval and pupal survival, dates and duration of life stages, larval and pupal weight, sex ratio, and imago fecundity, in connection with the food plants of the larvae. The gypsy moth can feed on more than 275 plant species, but it develops normally and produces offspring only on a limited variety of plants.
ECentral; HOST PLANTS, NUMERICAL DATA

417 Kellus, O.G. 1941.
Geographic occurrence of the gypsy moth and its outbreak areas in the USSR. Vestnik zashchity rasteniy. (1):45-50.
DISTRIBUTION

418 Keppen, F.P. 1883.
***Ocneria (Liparis) dispar* L.** In: Vrednyye nasekomyye. Spetsial'naya chast' 2. Babochki, dvukrylye i poluzhetskokrylyye. St. Petersburg: 49-59.
-- Gypsy moth appearance and location are described. Nearly all hardwood and conifer species of trees and shrubs as well as herbs are food plants. Aspects of ecology, and outbreak control by pathogens and entomophages are discussed. Chronology of outbreaks in the European part of Russia is traced from 1842.
ECentral; DISTRIBUTION, ECOLOGY, HOST PLANTS, OUTBREAKS

419 Keremedchiev, M.T. 1968.
Gradation dynamics of the gypsy moth (*Lymantria dispar* L.) in the People's Republik of Bulgaria. In: XIII Mezhdunarodnyy entomologicheskiy kongress. Tom 3. Moscow: 51-54.
-- The author presents data on gypsy moth outbreaks in Bulgaria during the period 1891 to 1965. From 1891 to 1932 every gradation lasted 3 years, with depression periods of 5 to 11 years. The length of the gradations increased to 4 to 5 years, with 2 to 3 year depressions during the period from 1932 to 1946. A 12-year gradation broke out in 1946. During the period from 1949 to 1965 two widespread gradations broke out. The first gradation collapsed by 1952, the second broke out in 1962 and lasted until 1968. Fluctuations of gypsy moth populations resulted from a number of factors: climatic conditions, stand condition, quality and quantity of food, and presence of entomophages and diseases. In the period between outbreaks, both fecundity and survival declined. The highest survival and fecundity was observed in the prodromic period.
EWest; FOLIAGE QUALITY, POPULATION FLUCTUATION, WEATHER

420 Khakimov, A. 1972.

The tachinid fauna (Diptera, Tachinidae) of the Tashkent region. Entomologicheskoye obozrenie. 51(2):296-303.
-- The parasites *Exorista rossica* Mesnil and *Ceromasia rubrifrons* Macquart were reared from gypsy moth larvae. This is the first time the latter species was recorded as a parasite of the gypsy moth. It was also reared from larvae of the large cabbage butterfly. Geographic range and habitat is given for 105 species of tachinids. [English translation of this article is in Entomological Review 51:180-184.]
MAsia; PARASITES

421 Khalilov, Sh. Kh 1976.
Phosphororganic preparations against the gypsy moth. Zashchita rasteniy. (5):43.
-- Phtalaphos, phosalon, and BI-58 were used against the gypsy moth in pistachio stands of southern Kirgizia during the pest outbreaks in 1972-1973. Their efficiency was recorded.
CAsia; CHEMICAL INSECTICIDES

422 Khamdam-Zade, T.K. 1968.
The gypsy moth (*Porthetria dispar* L.) in the foothills of Fergana Valley. In: Materialy 3 nauchnoy konferentsii po sel'skomu khozyaystvu. Fan, Tashkent: 165-168.
-- General data on pest ecology are given. Gypsy moth heavily attacks apricot orchards. Only pesticide treatments are suggested as control measures. Some effective pesticides caused 100% larval mortality. Treatments were made twice: during egg hatch and in instars III and IV.
CAsia; CONTROL, HOST PLANTS

423 Khamdam-Zade, T.K. 1972.
Gypsy moth and its control in peach gardens in the northeast of Central Asia. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Tashkent. 24 p.
-- The author studied gypsy moth geographical distribution in the Fergana Valley and Chirk-Angeren oasis. Species biology, ecology, and damage in Central Asia, and the development of control measures also were studied. It was discovered that the population in question is morphologically different from other forms of the gypsy moth. The author distinguished it as *Ocneria dispar* (forma) ferganica. The gypsy moth is found at the foothills and in mountainous regions at elevations no less than 1,000 m above sea level. Oviposition usually occurs on apricot and rarely on apple, and if these species are unavailable, oviposition occurs on other trees, primarily in the butt zone, but seldom higher. The maximum height of oviposition is 8 to 10 m. The most favored food plant is apricot followed by apple. Gypsy moth control measures in the orchards are suggested, including agrotechnical, chemical-mechanical, and chemical methods. Very good results were achieved by applying bacterial preparations.
MAsia; GEOGRAPHIC VARIATION, HOST PLANTS, OVIPOSITION SITE

424 Khanislamov, M.G. 1958.
Gypsy moth population dynamics relative to feeding conditions and weather. In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 108-110.
-- In the 1950's gypsy moth outbreaks were recorded in central and southern regions of the European part of the USSR, West Siberia, USA, and Western Europe. It is believed that the onset of pest outbreaks correlates to the years of declining or minimum solar activity, which cause changes in the meteorological conditions in pest habitats (i.e., the low hydrothermal coefficients of May and June and severe winters). The longer the phase of pest population depression, the smaller the change of meteorological conditions, which are favorable for pest outbreak development. Repeated combinations of favorable conditions are not necessary for a continuous increase in number, but they can cause outbreak prolongation. Effect of favorable conditions on gypsy moth population is seen only in fecundity variation and insect survival. Embryonal mortality plays an important part in general population dynamics. To estimate egg viability and to establish possible causes of egg and embryonal mortality, a method of luminescing egg contents with UV-rays is suggested; unfertilized eggs, live and killed embryos, and parasitized eggs differ in luminosity.
EWest, EEast, WSiberia; EGGS, FECUNDITY, POPULATION DYNAMICS, SOLAR ACTIVITY, WEATHER

425 Khanislamov, M.G. 1963.
Driving conditions of an outbreak initiated by folivorous insects. In: Voprosy lesozashchity. Moskva: 34-35.
-- Outbreaks of phytophage complex, including the gypsy moth, correlate to the years of solar activity decline, because the meteorological situation becomes favorable for pests. Low hydrothermal coefficients in May and June and severe winters contribute to higher survival of phytophages and improvement of food quality.
EEast; OUTBREAKS, SOLAR ACTIVITY, WEATHER

426 Khanislamov, M.G., Girfanova, L.N., Yafaeva, Z.Sh., Stepanova, R.K. 1958.
Gypsy moth outbreaks in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 5-45.
-- Gypsy moth outbreaks are recorded in Bashkiria every 8 to 14 years. Primary foci originate in light hardwood stands of the forest-steppe zone of the republic. They serve as a source of secondary and tertiary pest foci. Outbreak, as a rule, starts in two years after drought in May and June and a severe winter. In primary foci, an outbreak lasts 6 to 7 years, with 2 years of population increase, 2 to 3 years of the eruption phase, and 2 years of population decrease. In secondary and tertiary foci gradation is displaced in phase by 3 to 4 years. Outbreak collapse is caused primarily by biotic factors. In the foci, entomophages kill more than 80% and sometimes 96%, of the pest population. Forty-nine primary and secondary entomophages of the gypsy moth are recorded in Bashkiria. In Bashkiria survival stations are aspen, birch, and oak-birch light forests. For oviposition females prefer birch. The maximum larval weight is recorded on poplar.
EEast; OVIPOSITION SITE, PARASITES, POPULATION DYNAMICS, STAND COMPOSITION, WEATHER

427 Khanislamov, M.G., Girfanova, L.N., Yafaeva, Z.Sh., Stepanova, R.K. 1962.
Conditions for establishing foci and gypsy moth population increase in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 32-66.
-- At the depression phase, the gypsy moth population usually occupies foci with unstable boundaries. Origination and migration of foci are related to selective feeding of larvae and selective oviposition of adults. Population increase from the depression phase is not associated with higher fecundity, but is determined by higher total survival caused by a certain combination of weather conditions: drought in May and June and a very severe winter of the preceding or following year. Gypsy moth gradation develops more rapidly in the stands where pest population density at the prodromic phase is higher due to availability of reservations or collapsing foci. Intensity of outbreak development also depends on availability of entomophages, which vary in their composition and effectiveness in different areas and gradation phases. Continuous gypsy moth control is achieved only by diseases and special entomophages. Pest potential is higher when the gypsy moth feeds on weakened trees and its sensitivity to changing feeding conditions depends on the gradation phase. In pest foci, 55 entomophagous species are found: 33 Hymenoptera, 14 Diptera, 6 Coleoptera, 1 Hemiptera and 1 nematode. *Angitia chrysisticta* Gmel., *Gelis pulicaria* Rorst., *Microgaster tibialis* Nees, *Anilasta tricincta* Holmgr., *Meteorus pulchricornis* Wesm., and *M. versicolor* Wesm. are recorded for the first time in Bashkiria.
EEast; FECUNDITY, NEMATODES, PARASITES, POPULATION DYNAMICS, PREDATORS, WEATHER

428 Khanislamov, M.G., Vekshina, R.S. 1962.
Correlation between gypsy moth outbreak collapse and physiological state of a tree. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 97-102.
-- Factors causing numerical decrease of gypsy moth populations in the foci were studied. It is believed that the main factor causing population decrease is changes in leaf quality after one or two defoliations. The conclusion is based on the results of experiments rearing gypsy moth larvae on oak and subjecting them to artificial defoliation.
EEast; DEFOLIATION, FOLIAGE QUALITY, REARING

429 Khanislamov, M.G., Yafaeva, Z.Sh. 1964.
Biological regulation of pest abundance at various phases of its gradation cycle. In: Issledovaniye po biologicheskomu metodu bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Novosibirsk: 204-206.
-- From 1952 to 1963 stationary surveys of the level of gypsy moth micro- and macroparasitism were conducted in two foci in Bashkiria. In 1952, both foci were at the eruption phase. In 1962, an increase in number started in one of them; in the other, the second cycle of numerical fluctuations had ended. The level of parasitism was estimated by the population-analytical method. Larvae were sampled from both foci twice within a generation (during the period of development of instars II and III, and during pupation), egg masses were collected after parasites emerged. The role of entomophages in pest control was determined by focus condition and the host gradation phase. Species composition and efficiency index of entomophages (percentage of parasitism) changed every year. At the beginning of a depression, 97% to 98% of the insects died of diseases; as a result, the population was sanitized and survival increased greatly. In that period, the contribution of special entomophages was higher. Polyhedrosis viruses and the entomophages *Apanteles disparis* and *Phorocera silvestris* were always found in the foci. The role of polyphagous parasites increased during the period of host population increase and during the eruption phase (65-90%) of parasitized insects.
EEast; PARASITES, POPULATION DYNAMICS, VIRUS

430 Kharitonchenko, R.P. 1976.
Patterns of gypsy moth feeding and development on introduced woody species. In: Issledovaniye komponentov lesnykh biogeotsenozov Sibiri. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 25-29.
-- Gypsy moth larvae were reared in the laboratory on 11 species of aboriginal and introduced plants. Common birch, goat willow, and aspen proved to be the most favorable species; average fecundity was 112, 163 and 152, respectively on these species. The multiplication index (37.7 to 53.6), and mean weight of females (727 to 1044 mg) also were recorded. Females prevailed in the population. On some introduced tree species the mean weight of females was very high, yet males prevailed in the population, and the general level of reproduction was lower. The most evident sign is larval survivorship. Introduced food plants did not, as a rule, provide normal development of the gypsy moth. It is concluded that unfavorable tree species such as white poplar, mountain elm, and others could be introduced into stands.
WSiberia; FECUNDITY, HOST PLANTS, REARING, SILVICULTURAL TREATMENTS

431 Kharitonov, L.I. 1941.
Gypsy moth and measures for its control. (Nepamyy shelkopryad i mery bor'by s nim.) OGIZ, Gorki. 42 p.
CONTROL

432 Khar'kov, V.I. 1980.
Distribution pattern of gypsy moth egg masses in connection with ecological factors within the Saratov-Astrakhan shelter belt in the arid steppe of Saratov Zavolzhye. In: Zashchita rasteniy ot vrediteley i bolezney na Yugo-Vostoke i v Zapadnom Kazakhstane. Saratov: 51-55.
-- The effect of species composition in shelter belts on gypsy moth oviposition was studied. It is suggested that shelter belts should be of a certain species composition in order to diminish defoliation by the gypsy moth. Species composition in pest foci is as follows: 40% English oak, 40% elm, 20% green ash, and undergrowth-golden currant. The favored food plant of the pest is oak. For oviposition, females prefer elm and ash.
ECentral; OVIPOSITION SITE, STAND COMPOSITION

433 Khitsova, L.N., Isaeva, G.A. 1986.
Entomophages of forest pests in Central

Chernozemye. (Entomofagi vrediteley lesa Tsentral'nogo Chernozem'ya.) Izd. Voronezhskogo gosudarstvennogo universiteta, Voronezh. 120 p.
-- The gypsy moth is mentioned among the most important forest pests of Voronezh Province. The species biology, ecology, and population dynamics is briefly described. The list of entomophages of forest pests includes 57 tachinid species, 61 ichneumonid species, and 56 braconid species. One hundred and fifty-four lepidopterous species, 17 sawflies, and 5 beetle species are listed as hosts of these entomophages. Trophic relations and ecology of tachinids as well as morphological peculiarities of their puparia are discussed. General data are given on hymenopterous parasites extracted from phyllophagous pests. The role of the parasite complex in pest control in the Voronezh Province is estimated.
ECentral; FAUNAL LIST, PARASITES

434 Kim, N.G. 1976.
Application of insecticides against folivorous pests in the walnut forests of Central Asia. In: Ispol'zovaniye chimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Moscow: 64.
-- The most important pests of nut forests are the gypsy moth, and fruit and apple moths. Benzophosphate, gardon, phosalon, antio and phthalophos were successfully used in gypsy moth control. Their technical efficacy was 89.9% to 98.4%.
CAsia; CHEMICAL INSECTICIDES

435 Kim, N.G., Khalilov, Sh. Kh, Dvozhon, V.A., Kim, Z.I. 1976.
Aerial chemical control of the gypsy moth in pistache-woodland. Lesnoye khozyaystvo. (10):76-77.
-- In Central Asia over 300,000 ha of pistachio woodlands are heavily attacked by many pests, most importantly the gypsy moth. The largest foci are found in south Kirgizia. From 1973-1975 these areas were treated with aerial applications of chemicals such as phosalon phthalophos and antio; mortality was 90%. On the tenth day after spraying, the residual level of pesticides was lower than the maximum permissible concentration. These preparations are effective when used for gypsy moth control in pistachio woodlands.
CAsia; AERIAL SPRAYING, CHEMICAL INSECTICIDES

436 Kipiani, A.A., Machavariani, E.A. 1977.
Genetic control of the gypsy moth. In: Sbornik nauchnykh rabot po izucheniyu bol'shogo elovogo luboeda v Gruzii. Institut gornogo lesovodstva, Tbilisi: 161-171.
Caucasus; GENETICS

438 Kipiani, A.A., Machavariani, E.A. 1979.
Prospects for the combined use of chemical sterilants and insect pheromones under field conditions in the Georgian USSR. In: Biologicheskiye veshchestva v zashchite rasteniy. Kolos, Moscow: 6-84.
Caucasus; CHEMICAL INSECTICIDES, MORPHOLOGY, PHEROMONES

437 Kipiani, A.A., Machavariani, E.A., Chapidze, N.F. 1980.
Preliminary results of studying the combined use of sterilization traps and pheromones in the East Georgian forests. In: Zashchita lesov ot vrediteley i bolezney. Moscow: 143-150.
Caucasus; CONTROL, MORPHOLOGY, PHEROMONES

439 Kireeva, I.M. 1976.
Estimating the state of the gypsy moth population using morphological and physiological features of larvae. In: Ob okhrane nasekomykh. Erevan: 62-64.
-- Numerical fluctuations in the gypsy moth population in the Lower Dnieper region resulted from a strong correlation between species condition and environmental conditions. Not only does the population size fluctuate, but the morphological and physiological condition of the insects changes. Morphological and physiological polymorphism has an adaptive nature; it increases species plasticity and is a necessary condition for the regulation of population dynamics.
EWest; MORPHOLOGY, PHYSIOLOGY, POPULATION FLUCTUATION

440 Kireeva, I.M. 1978.
The role of population density to the dynamics of gypsy moth number in the Lower Dnieper region of the USSR. Vestnik zoologii. (2):31-34.
-- Major food species in the region are oak and bastard acacia. Changes in gypsy moth population density are reflected in morphological peculiarities of larvae. When reared singly, larvae are, for the most part, light in color. Survival of a single larva is higher than those found at high densities. Population density affects growth rate of larvae. As a response to overpopulation, larval weight decreases. Sex index is also related to population density.
EWest; DENSITY, COLOR POLYMORPHISM

441 Kireeva, I.M. 1978.
Prediction of gypsy moth outbreaks. Lesnoye khozyaystvo. (4):86-87.
-- Morphological differences among gypsy moth larvae from the foci at different gradation stages are studied.
EWest; MORPHOLOGY, POPULATION DYNAMICS

442 Kireeva, I.M. 1979.
Morphological and physiological structure of the gypsy moth population in the Lower Dnieper region. Lesovedenie. (6):12-19.
-- Investigations of the gypsy moth carried out from 1971-1975 showed that the physiological and biochemical changes that occur in the process of insect development are of great importance for population dynamics.
EWest; DEVELOPMENT, PHYSIOLOGY, POPULATION DYNAMICS

443 Kireeva, I.M. 1980.
Ecological and physiological characteristic of the gypsy moth population in the Zakarapatje region. In: Issledovaniya po entomologii i akarologii na Ukraine. Tezisy dokladov 2-go s"yezda UEO, Uzhgorod 1980. Kiev: 100-101.
-- From 1977-1978 the gypsy moth was studied in two foci; one with a population increase and one in collapse.

In the outbreak focus, 81% of the larvae were grey and 18% were red, in the depression focus they comprised 63% and 37%, respectively. Sex index in the focus with an increase in population was 0.46%, and 0.29% in the collapsing focus. In the collapsing focus, larval development lasted longer, survival, pupal weight, and lipid content were lower, and there were fewer and smaller egg masses.
EWest; COLOR POLYMORPHISM, POPULATION DYNAMICS

444 Kireeva, I.M. 1981.
Intrapopulation aspects of gypsy moth population dynamics. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 83-84.
-- During the course of gypsy moth gradation, its population is continuously restructured through changes in larval morphotypes and physiological parameters. High intensity of metabolic processes determined by increase in oxygen uptake is accompanied by decrease in larval and pupal weights.
EWest; MORPHOLOGY, PHYSIOLOGY, POPULATION DYNAMICS

445 Kireeva, I.M. 1983.
Ecology and physiology of the gypsy moth. (Ecologiya i fisiologiya neparnogo shelkopryada.) Naukova Dumka, Kiev. 128 p.
-- This is a major work that discusses the ecology and physiology of the gypsy moth in various landscape and geographical conditions. Five larval morphotypes are distinguished and physiological peculiarities of each morphotype are studied. Recommendations are given for forecasting gypsy moth population dynamics and for monitoring the pest in its foci. A long list of reviewed literature is included.
EWest, Caucasus; COLOR POLYMORPHISM, MONITORING, PHYSIOLOGY, POPULATION DYNAMICS, PROGNOSIS, REVIEW

446 Kireeva, I.M. 1985.
Phenetic approach to studying the intraspecific variability in the gypsy moth. In: *Sistema monitoringa v* zashchite lesa. Tezisy dokladov Vsesoyuznogo soveshchaniya. Institut lesa i drevesiny SO AS SSSR, Krasnoyarsk: 46-47.
-- Frequency of occurrence and some physiological parameters of larvae of various coloration morphotypes were studied in gypsy moth populations from the Lower Dnieper region, the Carpathian region, and Armenia. The following larval morphotypes were taken: grey and red chitin coloration, three dorsal stripes, velvety black dorsal stripe, bright spots on the back, and a marble-like pattern of hypodermis. A conclusion is made for a correlation between gypsy moth population fluctuations and frequency of different morphotypes.
EWest, Caucasus; COLOR POLYMORPHISM, PHYSIOLOGY, POPULATION FLUCTUATION

447 Kireeva, I.M. 1986.
Phenetic methods of investigating *Lymantria dispar* L. Lesnoye khozyaystvo. (11):50-52.
-- Larval morphotypes were studied in the Lower Dnieper region. The following phenes were distinguished: grey, red, and one type with a velvety-black stripe. Phenetic diversity is determined by natural conditions. The author suggests that biochemical and physiological peculiarities of food plants should determine larval morphotypes. There are no red larvae in the willow micropopulation, they are abundant on oak, and a few can be found on acacia. The proportion of different morphotypes changes with changing food plants. Larvae of different morphotypes store energy differently. A red phene has the highest survival during the larval stage, and adult fecundity is also higher. A grey phene indicates a longer life and higher survival at the egg stage. Insects belonging to the grey phene, which are abundant in nature, are not resistant to chlorophos. Mortality amounts to 100%, yet mortality of red phene insects is 80% to 85%. When an outbreak is at its peak, grey larvae prevail. It is advisable to carry out control measures when red phene insects comprise the population.
EWest; COLOR POLYMORPHISM, HOST PLANTS, POPULATION QUALITY

448 Kireeva, I.M. 1987.
Phenetic approach to studying intraspecific variability in gypsy moth. (Feneticheskiy podkhod k izucheniyu vnutrividovoy izmenchivosti neparnogo shelkopryada.) Vestnik zoologii, Kiev. 12 p. (Deposited Document. VINITI 8742-V87)
-- Different phenes of the gypsy moth are distinguished on the basis of chitin and hypodermis coloration. Differences in the frequency of occurrence of certain phenes in pest populations from the lower Dnieper region, the Carpathian region, and Armenia are shown. Changes in the phene pool structure are different at different developmental stages of each of the populations under study. Phenes were found with frequencies that are persistently at high or low levels, have considerable fluctuations, and occur only at certain stages of population dynamics. This probably relates to their different functions in gypsy moth population.
EWest, Caucasus; COLOR POLYMORPHISM, POPULATION DYNAMICS

449 Kireeva, I.M. 1988.
Role of population density and structure in the gypsy moth density dynamics. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 12.
-- The effect of density was studied on gypsy moth larvae from different populations from the Lower Dnieper region, the Carpathian region, and Armenia that were reared on oak. With a density increase, the main color of the body was observed to change from light yellow to dark grey. Density dependent change in larval coloration also caused changes in survival, growth rate, larval and pupal weight, and sex index. Thus, morphological and physiological changes of the gypsy moth are related to the functioning of regulatory mechanisms causing numerical changes in certain gypsy moth populations.
EWest, Caucasus; COLOR POLYMORPHISM, DENSITY, PHYSIOLOGY, REARING

450 Kireeva, I.M., Kolybin, V.A. 1974.

Morphological and physiological polymorphism in the gypsy moth larval population from the Lower Dnieper region. In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 218-219.
-- Intrapopulation variation of ecological and physiological parameters of gypsy moth populations from the lower Dnieper region was studied. In addition to ecological and physiological differences among trophic micropopulations distinguished in the Lower Dnieper population, larval polymorphism was observed within every micropopulation. Five larval types are differentiated by the color of hairs, dorsal warts, shade of hypodermis, head marks, and the extent at which dorsal stripes are seen. Morphological and physiological polymorphism of larvae in the gypsy moth population provides wide adaptability and increases general survival, which makes it an important factor in regulating the pest population.
EWest; COLOR POLYMORPHISM, PHYSIOLOGY

451 Kobakhidze, D.N. 1957.
Gypsy moth. In: Vrednaya entomofauna sel'skokhozyaystvennykh kul'tur Gruzinskoy SSR. Izd.An Gruz. SSR, Tbilisi: 228-229.
-- Data on the damage caused by the gypsy moth in Georgia, including pest phenology and ecology, are presented.
Caucasus; GENERAL BIOLOGY

452 Koblova, F.V. 1921.
Report on activity of the Orlov plant protection station in 1920-1921. In: Byulleten' III Vsesoyuznogo entomo-fitopatologicheskogo s"yezda v Petrograde 18-25 dekabrya 1921 goda. Petrograd: 17-24.
-- The gypsy moth is mentioned among forest pests, but at that time its numbers were limited.
ECentral; PEST LIST

453 Kobzar', V.F. 1987.
Technology and effectiveness of aerial spraying with bacterial suspensions against phytophages in the forest shelterbelts. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 42-46.
-- A technique of aerial spraying shelterbelts in the southeastern USSR with bacterial suspensions against major oak pests, such as the green oakleaf roller and the gypsy moth, are described.
EEast; AERIAL SPRAYING, BACTERIA, MICROBIAL PESTICIDES

454 Kobzar', V.F., Volkogonov, S.D., Timchenko, G.N., Dorogoichenko, N.I., Levina, V.V. 1981.
Application of biological preparations against gypsy moth. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 96-97.
-- In 1979 and 1980, gypsy moth foci in oak groves of the Odessa Province were sprayed from the air with dendrobacillin containing an adherent and bitoxibacillin (their titers were 30 billion) at the rate of 2 kg/ha and with virin-ENSh (containing 1 billion polyhedra per 1 ml). Technical chlorophos (80%) at a rate of 1.0 kg/ha was used as the reference. Treatments were made when trees were completely leafed, defoliation was 20% to 30%, and the majority of larvae were in the third instar. Technical efficacy of biopreparations was 95.7% to 99.8%, compared to 93.9% efficacy of chlorophos.
EWest; AERIAL SPRAYING, BACTERIA, MICROBIAL PESTICIDES, PHENOLOGY, VIRUS

455 Kokhmanyuk, F.S. 1964.
Egg laying by *Ocneria dispar* L. Zoologicheskiy zhurnal. 43(2):290-291.
-- Females start ovipositing within an hour after copulation. The highest oviposition activity is during the first day, from 2 p.m. to 6 p.m., and on the third or fourth day after oviposition. The duration of oviposition is determined by potential fecundity, which correlates to female size. Large females oviposit for 6 to 10 days, and small ones for 2 to 3 days; the full stock of eggs range from 130 to 1000. Medium-sized females with an egg stock of 400 to 600 eggs prevail in the Polesye population. Larger females comprise about 5% of the population, and smaller ones comprise 10%. In Byelorussian Polesye, location of egg masses along the tree trunk seems to correlate to their sizes; i.e., large egg masses are on the lower part of the trunk, and smaller ones are on the upper part.
EWest; FECUNDITY, OVIPOSITION BEHAVIOR, OVIPOSITION SITE

456 Kokhmanyuk, F.S. 1964.
Location of gypsy moth *Ocneria dispar* L. egg masses depending on the environment. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (1):24-26.
-- In Brest Province every female deposits 2 to 3 eggs masses. This conclusion is based on the fact that the average number of eggs in egg masses collected in nature is 200 to 300, and the average number of eggs deposited by a female in the laboratory is 400 to 600. In this population, oviposition occurs primarily in the butt zone, and fluctuations in height are determined by weather conditions in the oviposition period and by the conditions of a specific biotope. In rainy years, egg masses tend to be deposited higher than in dry years, and in orchards they are deposited higher than in forests. In the forest, egg masses are found primarily at forest edges in dry years, and they are more or less evenly distributed over the forest in rainy years. For oviposition females prefer old trees with rough bark, and there are 5 to 60 times more egg masses on old trees than on young ones. Females (over 80%) appear to prefer southeastern aspects of trees for oviposition.
EWest; FECUNDITY, OVIPOSITION SITE

457 Kokhmanyuk, F.S. 1967.
Outbreak cyclicity and dynamics in the gypsy moth (*Ocneria dispar* L.) in Brest region. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (12):35-38.
-- The leading factors determining the cyclic character of gypsy moth gradation and regularities of its population dynamics are solar activity, accumulation of pathogens in the focus, and heterosis. Solar activity, ultraviolet, X-ray

and corpuscular radiation affect the pest's survival directly or indirectly, through natural enemies and diseases. Some groups of insects showed increased survival under unfavorable environmental conditions due to inheritance. Infectious diseases that spread in the focus are accumulated and later control and suppress pest development in the given area for 5 to 6 years after an outbreak.
EWest; GENETICS, POPULATION DYNAMICS, SOLAR ACTIVITY

458 Kokhmanyuk, F.S. 1969.
The role of chemoreception in the gypsy moth. In: I-ya Vsesoyuznaya konferentsiya po strukture i funktsii obonyatel'nogo analizatora zhivotnykh i cheloveka i ikh modelirovaniyu. Tezisy i referaty dokladov. MGU, Moscow: 57-58.
-- Chemoreception is the main factor in mating behavior and fertilization of the gypsy moth.
EWest; MATING, PHEROMONES

459 Kokhmanyuk, F.S. 1972.
Population dynamics of the gypsy moth (*Ocneria dispar* L.) and its determining factors in Belorussian Polesye. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Minsk. 27 p.
-- Gypsy moth ecology in Belorussian Polesye was studied, in addition to the role of abiotic, biotic and genetic factors in gypsy moth population dynamics. The effectiveness of the application of light traps and attractants for studying pest ecology and for preventive control of this species was tested.
EWest; ECOLOGY, GENETICS, LIGHT TRAPS, PHEROMONES, POPULATION DYNAMICS

460 Kokhmanyuk, F.S. 1975.
Migrations of the gypsy moth larvae and adults (*Ocneria dispar* L.). In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Naukova Dumka, Kiev: 73-75.
-- Newly hatched larvae migrate passively by wind and actively when there is inadequate food or overcrowding. Migrating first instars leave a trail of silk along which other larvae follow. The width of the silk trail is a sign of the density of the larvae. Usually, the instinct of migration is retained for 1-3 days and larvae can starve for 5-10 days. If the weather is hot, the larvae can creep a distance of 1-3 km maintaining a straight line. The distance at which larvae can be dispersed by wind is proportional to the product of the square of the wind force and the waftability coefficient. Adults migrate when males search for mates and females fly to light. In experiments with marked male moths, females were discovered 1.8 km away after 1.5 hr. Male flight speed is given as 6 km/hr.
EWest; DISPERSAL, FEMALES, FLIGHT, LARVAE, MALES

461 Kokhmanyuk, F.S. 1976.
Factors of gypsy moth population dynamics in the Polesye region. In: Sovremennyye problemy zoologii i sovershenstvovaniya metodiki eye prepodavaniya v VUZe i shkole. Perm: 83-85.
-- Analysis of gypsy moth dynamics in Belorussian Polesye from 1919 to 1974 shows that the given species supports the concept of random environmental effect. This effect causes fluctuation, which is stabilized by biotic and genetic factors functionally correlated to density. Based on the evidence of a correlation made between cycles of gypsy moth gradation and an 11-year cycle of solar activity, positive effect of UV-radiation on pest larvae is recorded. The trophic factor can have a different effect on population dynamics, manifesting itself through food quantity and quality. The strongest correlation is between biotic and genetic factors, and population density. Outbreeding resulting in heterosis leads to a 1.5-3.0-fold decrease in mortality and a 15% to 35% increase in fecundity. As a rule, outbreaks occur in the foci where insects of different populations cross. By analyzing gypsy moth population density, one can see mass effect and group effect, manifested as an the increase in fecundity, development rate, and survival. But when the optimum density has been reached all parameters worsen. Density effect also depends on the gradation phase. For instance, if density is artificially increased 3x during the depression phase mortality was 54%, during the outbreak phase it was 29%. The author believes that metabolites released by larvae serve as a signal for the mechanisms regulating density to start functioning.
EWest; DENSITY, GENETICS, POPULATION FLUCTUATION, SOLAR ACTIVITY

462 Kokhmanyuk, F.S. 1978.
Role of polymorphism in gypsy moth (*Ocneria dispar* L.) population dynamics. In: Fiziologicheskaya i populyatsionnaya ekologiya zhivotnykh. Izdatel'stvo Saratovskogo universiteta, Saratov: 51-54.
-- Polymorphism in the coloration of gypsy moth larvae of the Polesye population is accounted for monoallelic inheritance with the superdomination phenomena in the heterozygous state. Dynamics of larvae belonging to different color types during the course of gradation is indicative of a balanced polymorphism and a different adaptive value of different genotypes and phenotypes. Of highest viability are heterozygotes with a dark hypodermis, followed by grey larvae, homozygous for a dominant gene, which usually prevail in the population. Light larvae (yellow), which are homozygous for a recessive gene, are the least viable.
EWest; COLOR POLYMORPHISM, GENETICS, POPULATION QUALITY

463 Kokhmanyuk, F.S. 1979.
Population dynamics and microevolution of gypsy moth. In: Novyye problemy zoologicheskoy nauki i ikh otrazheniye v vuzovskom prepodavanii. Tezisy dokladov nauchnoy konferentsii zoologov pedagogicheskikh institutov. Stavropol: 88-90.
-- A conclusion is made that during the period of depression there is no genetic drift in the foci. During the depression period, heterosis comes into play, contributing to random preservation of some genes in new conditions. Due to a cyclic nature of pest population dynamics, a new polygenic system, which gives rise to various new forms of isolation, emerges at the boundary of the population.
EWest; GENETICS, POPULATION DYNAMICS

464 Kokhmanyuk, F.S. 1980.
Gypsy moth attractants. Khimiya v sel'skom khozyaistve. 18(12):21-24.
-- Domestic and foreign literature are reviewed that discuss application of gypsy moth attractants for determining flight dynamics, population numbers, and male disorientation as a control measure.
PHEROMONES, REVIEW

465 Kokhmanyuk, F.S. 1981.
Role of behavior in the population dynamics of gypsy moth (*Ocneria dispar* L.) in Polesye area. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Minsk: 129-133.
-- Egg hatch usually coincides in time with leafing of food species. Larvae feeding on willow are the first to hatch, followed by larvae feeding on Rosaceae, with larvae feeding on oak the last to hatch. After staying on the "areolet," further larval behavior is determined by their density. At a high density, a high number of the larvae migrate actively and migration foci originate. In this period, larvae are divided into active and passive ones, according to their behavior. Certain behavioral differences are observed between groups of larvae that feed on different species or on one species, larvae that have developed at varying temperature conditions, and larvae that have hatched out of eggs differing in weight, etc. A conclusion is made that gypsy moth behavior in foci is one of the factors determining population dynamics; thus, its role and importance should be considered when predicting pest outbreaks.
EWest; BEHAVIOR, DISPERSAL, EGG MASSES, LARVAE, PHENOLOGY, POPULATION QUALITY,

466 Kolomiets, N.G. 1955.
Forest pests of Khakassia. In: Trudy Tomskogo gosudarstvennogo universiteta. Seriya biologii. : 34-39.
WSiberia; PEST LIST

467 Kolomiets, N.G. 1955.
Important forest pests of West Siberia and their control. In: Trudy Zapadno-sibirskogo filiala AN SSSR i Zapadno-sibirskogo otdeleniya VNITOLES. Novosibirsk: 1-35.
WSiberia; CONTROL, PEST LIST

468 Kolomiets, N.G. 1958.
Parasites of insect forest pests in Siberia. Entomologicheskoye obozrenie. 37(3):603-615.
WSiberia, ESiberia, Far East; PARASITES

469 Kolomiets, N.G. 1975.
Materials on fauna and biology of parasitic dipterans of Tachinidae subfamily (Diptera, Tachinidae). In: Trudy Biologo-pochvennogo instituta DNTs AN SSSR. DNTs AN SSSR, Vladivostok: 21-46.
WSiberia, ESiberia, Far East; PARASITES

470 Kolomiets, N.G. 1977.
Fauna and biology of parasitic dipterans of the subfamily Exoristinae (Diptera, Tachinidae) in Siberia and the Far East. In: Trudy Biologo-pochvennogo instituta DNTs AN SSSR. Fauna i biologiya nasekomykh Dal'nego Vostoka. DNTs AN SSSR, Vladivostok: 35-80.
WSiberia, Far East; PARASITES

471 Kolomiets, N.G. 1987.
Insects - predators and parasites of the gypsy moth (*Lymantria dispar* L., Lepidoptera) in Asian part of the USSR. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (1):83-89.
-- Synonyms, distribution, host-parasite relations and efficiency of 105 insect species, recorded as natural enemies of gypsy moth in the territory of Soviet Asia, are discussed. The list is compiled from 29 referenced papers. The most important natural enemies are: *Anastatus japonicus, Apanteles melanoscelus, Parasetigena silvestris, Calosoma sycophanta, Dermestes erichsonii*, and *Megatoma conspersa*. The gypsy moth has no egg parasites in the territory of Siberia and the Far East.
WSiberia, ESiberia, Far East; DISTRIBUTION, PARASITES, PREDATORS

472 Kolomiets, N.G. 1990.
Tachinid parasites of *Dendrolimus* and *Lymantria* (Lepidoptera) in the USSR. In: II International Congress on Dipterology. Bratislava, 1990. Bratislava: 116.
-- In different regions of the USSR, 41 tachinid species are related to the gypsy moth, 21 to the nun moth, 22 to the pine moth, and 12 to the Siberian moth. The most widespread are *Exorista fasciata, E. larvarum, Pales palida, Blepharipa pratensis, B. schineri, Masicera sphingivora*, and *Tachina grossa*.
FAUNAL LIST, PARASITES

473 Kolomiets, N.G., Kossinskaya, I.S., Meyer, E.I. 1971.
Forest pests. The most important insects and virus diseases in the forests of Priobye region. (Vragi lesa. Samyye opasnyye nasekomyye i gribnyye bolezni v lesakh Priob'ya.) Zapadno-Sibirskoe knizhnoe izdatel'stvo, Tomsk. 71 p.
WSiberia; PEST LIST, VIRUS

474 Kolosov Yu.M. 1915.
List of field and forest pests of the Urals. In: Zapiski Ural'skogo obshchestva lyubiteley estestvoznaniya. Ekaterinburg: 133-164.
-- Gypsy moth is recorded from different places to the south of Ekaterinburg (Middle Urals).
EEast; PEST LIST

475 Kolosov Yu.M. 1916.
Outline on field pests of the Urals. In: Zapiski Ural'skogo obshchestva lyubiteley estestvoznaniya. Ekaterinburg: 45-58.
-- In Section V the gypsy moth is mentioned as a pest of some regions. It attacked hardwood species, primarily birch. Damage was local (15 to 25 ha of the forest).
EEast; HOST PLANTS, PEST LIST

476 Koltunov, Ye.V. 1982.

Comparative analysis of structural proteins of virons of three nuclear polyhedrosis viruses. Voprosy virusologii. (6):743-747.
WSiberia; BIOCHEMISTRY, VIRUS

477 Koltunov, Ye.V. 1992.
Peculiarities of selectional defoliation of forest stands by gypsy moth under global anthropogenic impact. In: Tekhnogennyye vozdeystviya na lesnyye soobshchestva i problemy ikh vosstanovleniya i sokhraneniya. Institut lesa UrO RAN, Ekaterinburg: 107-123.
-- At the West Siberian plain, gypsy moth outbreaks take place in birch forests growing in the richest soils. The mean radial growth of these forests was much higher than on poor soils, but before outbreak an abrupt decrease of growth was observed.
EEast; PROGNOSIS, STAND CONDITION

478 Koltunov, Ye.V., Ponomarev, V.I., Fedorenko, S.I. 1991.
Effect of gypsy moth outbreaks on structural and functional patterns of forest biocoenosis destroyed by anthropogenic factors in the Urals. In: Dinamika lesnykh fitotsenozov i ekologiya nasekomykh vrediteley v usloviyakh antropogennogo vozdeystviya. AN SSSR, Moskva: 11-27.
EEast; OUTBREAKS, STAND CONDITION, TREE HEALTH

479 Koltunov, Ye.V., Ponomarev, V.I., Fedorenko, S.I. 1991.
Population ecology of the gypsy moth in forest ecosystems destroyed by anthropogenic factors in the Urals. In: Dinamika lesnykh fitotsenozov i ekologiya nasekomykh vrediteley v usloviyakh antropogennogo vozdeystviya. AN SSSR, Moskva: 28-35.
EEast; POPULATION DYNAMICS, STAND CONDITION

480 Kolybin, V.A. 1976.
The role of population structure and intrapopulational heterosis in gypsy moth population dynamics (*Porthetria dispar* L.). Zoologicheskiy zhurnal. 55:844-855.
-- In field and laboratory conditions, the structure, ecological, and physiological peculiarities of numerical dynamics of gypsy moth populations of the Lower Dnieper region were studied. Survival, size, larval coloration, and adult fecundity are shown to be determined by insect origin. Insects produced by crossing specimens belonging to different micropopulations or different morphological groups can have a much higher survival and fecundity, which increases the population fecundity rate. A diagram of intrapopulation heterosis is given and its role in gypsy moth population dynamics is discussed.
EWest; COLOR POLYMORPHISM, GENETICS, GEOGRAPHIC VARIATION, POPULATION DYNAMICS

481 Kolybin, V.A., Kireeva, I.M., Zelinskaya, L.M. 1974.
Biological distinctions of population dynamics of the gypsy moth, *Porthetria dispar* L. Report I. Fecundity. Vestnik zoologii. (2):61-65.
-- A correlation between gypsy moth survival and reproductive ability under different conditions to physiological properties of insects was found. Multiplication and fecundity of insects were determined by the joint action of internal and external factors, the importance of each group being different for different populations, and for different gradation phases.
EWest; PHYSIOLOGY, POPULATION DYNAMICS

482 Kolybin, V.A., Shumov, S.N. 1984.
Dynamics of lysozyme activity in gypsy moth ontogenesis. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 234.
-- Lysozyme activity, one of the factors of insect humoral immunity, was studied in the hemolymph, gut wall, and peritrophic membrane of gypsy moth populations of the Lower Dnieper region feeding on oak and birch. Inhibition of lysozyme activity was found in the peritrophic membrane of feeding larvae. This lysozyme inhibitor does not manifest itself during molts, and its nature is not clear. Increase in bacterial resistance in gypsy moth ontogeny and essential difference in lysozyme activity of insects feeding on different food plants is estimated in terms of the role the lysozyme complex plays in the insect's population dynamics.
EWest; BACTERIA, ENZYMES, HISTOLOGY

483 Kolybin, V.A., Zelinskaya, L.M. 1969.
Ecological and physiological patterns of the gypsy moth population in the Dnieper river region. I.Population structure. Vestnik zoologii. (3):37-42.
-- The normal life cycle of the gypsy moth is found to correspond to the seasonal cycle of development of food plants on which it develops (willow, oak, alder, bastard acacia). In some cases, the difference in egg hatch time related to food species is 10 to 15 days. In the lower Dnieper region, gradation phases in different micropopulations (oak, willow, acacia, alder) begin at different times. Survival of gypsy moth larvae and pupae under natural conditions is different on different food plants. Such a separation of the gypsy moth population into micropopulations contributes to maintaining pest numbers and formation of foci with a seasonal shift, which complicates pest control.
EWest; EGG HATCH, HOST PLANTS, POPULATION DYNAMICS

484 Kolybin, V.A., Zelinskaya, L.M. 1971.
Eco-physiological patterns of the gypsy moth population in the Lower Dnieper region. II. Parasites and diseases. Vestnik zoologii. (1):26-31.
-- Nineteen insect species are reported as parasites and predators of the gypsy moth in the Lower Dnieper region. These consist of 7 species of Hymenoptera: *Hoplectis viduata* Gram., *Phobocampe pulchella* Thoms., *Apanteles vitripennis* Hal., *A. solitarius* Ratz., *Anastatus disparis* Rusch., *Meteorus dubius* Ruthe., and *Brachymeria intermedia*; 6 species of Diptera: *Exorista larvarum* L., *Drino inconspicua* Mg., *Larvivora larvarum* L., *Parasarcophaga harpax* Pand., *P. portschinskyi* Rold., and *Pseudosarcophaga affinis* Fall.; and 6 species of Coleoptera: *Calosoma sycophanta* L., *Dermestes*

erichsonii G., *D. undulatus* Barhm., *D. lardarius* L., *Anthrenus verbasci* L., and *Malachius aeneus* L. The relative importance of the entomophages in gypsy moth dynamics varies in the different stands in the region and is related to the gradation phase. Latent polyhedrosis and microsporidiosis are present in every micropopulation. Epizootics are provoked by deterioration of development conditions caused by factors such as density, food quality, cold, etc. On the whole, entomophages and pathogens are important factors regulating gypsy moth population dynamics.
EWest; PARASITES, POPULATION DYNAMICS, PREDATORS

485 Kolybin, V.A., Zelinskaya, L.M. 1971.
Ecological and physiological patterns of the gypsy moth population in the Lower Dnieper region. III. Effect of diet on the qualitative composition of pupae. Vestnik zoologii. (3):45-49.
-- In the Lower Dnieper region major food plants of the gypsy moth are oak, willow, birch, bastard acacia, and alder, and vary greatly in the leaf qualitative composition according to vegetation time and environmental conditions. In this region bastard acacia is quite suitable for normal growth and development of the pest. Gypsy moth pupae of different micropopulations differ in the content of glycogen carbohydrates, lipids, and proteins. Their content is related not only to food quality but also to living conditions of larvae, which determines future viability and fecundity of adults.
EWest; FOLIAGE QUALITY, HOST PLANTS, PHYSIOLOGY

486 Kolybin, V.A., Zelinskaya, L.M. 1972.
The morphological structure of gypsy moth populations in the Lower Dnieper region. Doklady Akademii nauk Ukrainskoy SSR (Dopovidni Akademii Nauk Ukrains'koy RSR). (3):278-281.
-- Four types of larvae are distinguished according to coloration of hairs, warts, hypodermis, and head capsule. The first type are light-colored larvae with light hairs and bright yellow lateral stripes; the second type, light-colored larvae with light and dark hairs and grey-yellow lateral stripes; the third type, grey larvae with grey and black hairs with a largely distinguishable lateral stripe; and the fourth type grey larvae with a black dorsal stripe. The most viable are larvae of the third type. A conclusion is made that in different groups of larvae genotypes are different and that ratio of genotypes is related to the physiological condition of the population.
EWest; COLOR POLYMORPHISM, GENETICS

487 Kolybin, V.A., Zelinskaya, L.M. 1974.
The outlook of biological control methods for the gypsy moth in the Lower Dnieper. In: Patologiya chlenistonogikh i biologicheskiye sredstva bor'by s vrednymi organizmami. Tezisy dokladov 1 gorodskoy konferentsii. Kiev: 97-99.
-- In the Lower Dnieper region, a gypsy moth population can be subdivided into a number of micropopulations inhabiting certain stations and feeding on certain plants. The part played by entomophages and diseases in regulating a pest population in these micropopulations is different and also depends on the gradation phase, where it is highest at the eruption phase and lowest at the prodromic and outbreak phases. Experiments were carried out to test tolerance of gypsy moth larvae to entobacterin with sublethal doses of chlorophos. The results showed that treatments with such mixtures can stimulate epizootics in gypsy moth foci if the percentage of insects carrying a latent virus is high.
EWest; BACTERIA, CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, VIRUS

488 Kolybin, V.A., Zelinskaya, L.M. 1975.
The role of behavior in gypsy moth population dynamics in the Lower Dnieper region. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Naukova Dumka, Kiev: 75-82.
-- Due to gypsy moth behavioral characteristics that developed during the course of evolution, the species is widespread in certain environmental conditions, and the population remains heterogenous owing to formation of micropopulations and the exchange of migrants. Different species can be used as food plants, thus creating favorable conditions for the maximum bioproductivity of a population. Tabular data are shown on eggs per mass, egg masses per tree, and mean egg weight in different phases of the population cycle and the effect of different host plants on these same variables.
EWest; FECUNDITY, HOST PLANTS

489 Kolybin, V.A., Zelinskaya, L.M. 1975.
Distinctions of gypsy moth control relative to structural and functional features of a population. In: VIII Mezhdunarodnyy kongress po zashchite rasteniy. Tezisy dokladov sovetskikh uchastnikov kongressa. Moscow: 230-231.
EWest; CONTROL, PROGNOSIS

490 Kolybin, V.A., Zelinskaya, L.M. 1976.
Biological backgrounds of gypsy moth population dynamics. II. Role of sex ratio. Vestnik zoologii. (4):25-37.
-- Due to different developmental periods for males and females, adult males emerge much earlier than females from the same egg mass. In addition, there are differences in pest phenology in the foci of different densities and species composition of food plants. Adults emerge earlier in the foci where density is high. As to different food plants, hatching first occurs in willow populations, then in oak, and finally in acacia, thus maintaining population heterogeneity. Ecological hybrids of high adaptability and ecological valence appear, allowing the species to prosper under various conditions. These factors are significant for biological mechanisms that regulate pest populations.
EWest; EGG HATCH, HOST PLANTS, PHENOLOGY

491 Kolybin, V.A., Zelinskaya, L.M., Barabanova, V.V. 1968.
Ecophysiological characteristics of a gradation population of gypsy moth, *Porthetria dispar* L., in the Lower Dneiper Region (in French). [Les caracteres ecophysiologiques de la population et la gradation de

Porthetria dispar L. dans la Region le Bas-Dniepre.] In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 400-401.
-- Data are given on ecological and physiological differentiation of the gypsy moth and the importance of these factors for species population dynamics. In the Lower Dnieper region, gypsy moth populations exist as separate micropopulations related to different food plants. Major food plants of the gypsy moth in the given region are oak, white willow, Dnieper birch, and alder. Micropopulations differ in phenological parameters of insects (different hatching time), fecundity and survival, and the manner in which biochemical processes occur according to peculiarities of the host plant. Investigations made in the Lower Dnieper population during 10 years revealed differences in population dynamics of separate micropopulations; the adaptive role of these differences was suggested.
EWest; HOST PLANTS, POPULATION DYNAMICS

492 Komissarenko, S.V., Gerasimova, T.B. 1982.
Patterns of primary extraction and passage of a nuclear polyhedrosis virus of the gypsy moth in homologous cell culture. Molekulyarnaya biologiya. 31:55-59.
-- This reference contains a description of the primary extraction of a nuclear polyhedrosis virus of the gypsy moth from a homologous inoculation culture of IPLB-65 cells, using Greis medium containing hemohydrolysate and chick embryo extract as substitutes for cattle embryo serum. A test has been made to compare sensitivity of the cells of this strain and of the strain SCLD-135 for passage of a homologous virus (strain K-1). This strain causes generation of polyhedra in nuclei of the cells of the inoculation strains used.
CELL CULTURE, VIRUS

493 Komissarenko, S.V., Skuratovskaya, I.N. 1980.
The use of a cooling procedure to synchronize the infectious process in gypsy moth inoculating cell culture affected by nuclear polyhedrosis virus. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Riga: 48-51.
-- Synchronization of gypsy moth inoculated cells by cooling is suggested. A strain of gypsy moth cells, SCLD-135, received from France was used in the experiments. Cooling contributed to synchronization of the process of infection in the inoculation culture of gypsy moth cells when inoculation was made with virus material of low multiplicity of infection (1-7 BOE per cell).
EWest; CELL CULTURE, TEMPERATURE, VIRUS

494 Komissarenko, S.V., Sutugina, L.P., Zherebtsova, Ye.N. 1979.
Formulation of plaque: a method for studying properties of a nuclear polyhedrosis virus. In: Metody molekulyarnoy biologii. Naukova Dumka, Kiev: 22-216.
EWest; HISTOLOGY, VIRUS

495 Kondakov, Yu.P. 1958.
Gypsy moth as an abundant forest pest in the South of Krasnoyarsk Territory. In: Nauchno-proizvodstvennaya konferentsiya. Osnovy vedeniya khozyaystva v lesakh Sibiri. Tezisy dokladov. Izd. Sibirskogo lesotekhnicheskogo instituta, Krasnoyarsk: 15-17.
WSiberia; GENERAL BIOLOGY

496 Kondakov, Yu.P. 1959.
Coincident outbreaks of *Dendrolimus sibirikus* Tshtv., *Ocneria dispar* L., and *Semiothisa pumila* Kusn. in the deciduous forests of the Krasnoyarsk Territory. In: Uchenyye zapiski Krasnoyarskogo gosudarstvennogo pedagogicheskogo instituta. Krasnoyarsk: 183-194.
-- Outbreaks of some forest pests in southern Khakassia (southern part of Krasnoyarsky Krai) occur simultaneously. These pest species are: the gypsy moth, the Siberian moth, the larch looper, pine sawflies, the larch leaf roller, the pine looper, the vaporer moth, the haw moth, etc. Simultaneous emergence of various pest species in great numbers must be related primarily to cenosis variability and the resulting qualitative changes in food species and their pests.
WSiberia; FOLIAGE QUALITY, OUTBREAKS, PEST LIST

497 Kondakov, Yu.P. 1961.
Distribution of the gypsy moth egg clusters in the forests of the Krasnoyarsk Territory. In: Uchenyye zapiski Krasnoyarskogo gosudarstvennogo pedagogicheskogo instituta. Krasnoyarsk: 17-32.
-- The author considers the following aspects: distribution of gypsy moth masses and behavior of first instars and adults in migrations in the plain and mountain taiga forests of the Krasnoyarsk Krai. In the plain forests, egg masses are deposited on thick pines (unfavored food species), and larvae migrate to birch underwoods (favorable food species). In the mountains, egg masses usually are deposited on rocks, which provide optimum conditions for settlement of first instars. Females migrate there from emergence sites, which are sometimes as far as 7 km away. Adults of the Krasnoyarsk population fly rather well and female migrations are fixed by evolution.
WSiberia; FEMALES, FLIGHT, HOST PLANTS, OVIPOSITION SITE

498 Kondakov, Yu.P. 1963.
The gypsy moth, *Ocneria dispar*, in the forests of the Krasnoyarsk Territory. In: Zashchita lesov Sibiri ot nasekomykh-vrediteley. Izd. AN SSSR, Moscow: 30-77.
-- The work describes the location under study, procedure of investigation, data on gypsy moth distribution in the forests of Krasnoyarsk Krai, morphological and bio-ecological peculiarities of gypsy moth population, dispersal of gypsy moth adults and larvae, pest phenology, and food plants in Krasnoyarsk Krai. Population dynamics in the 20th century is traced. Data are presented on pest economic importance, biocenotic relations to dendrophilous pests, and pest control measures in Krasnoyarsk Krai.
WSiberia; CONTROL, HOST PLANTS, PHENOLOGY, POPULATION DYNAMICS

499 Kondakov, Yu.P. 1979.
Gypsy moth and its entomophages in the forests of the West Zabaikalye. In: Zapiski Zabaykal'skogo filiala Geograficheskogo obshchestva SSSR. Chita: 88-89.

-- In 1972-1975, the total area infested by the gypsy moth in the Selenga River Basin was about 350,000 ha. Hardwood and larch forests were the most damaged species, as determined by peculiarities of regional oligophagy of larvae. Gypsy moth populations in the West Baikal region had a number of specific properties. In this region, migrations of adults are of great importance for gypsy moth population dynamics, and parasites were more important than diseases for regulating gypsy moth populations.
ESiberia; DISPERSAL, FLIGHT, PARASITES

500 Kondakov, Yu.P. 1979.
Needle- and foliage chewing insect pests in the forests of the Lake Baikal basin. In: Fauna lesov basseyna ozera Baykal. Nauka, Novosibirsk: 5-42.
-- Pages 37-41 are devoted to the main biological peculiarities of the gypsy moth populations in Southern Transbaikalia.
ESiberia; GENERAL BIOLOGY

501 Kondakov, Yu.P. 1987.
Phytocenotic characteristics of leaf and needle eating insects outbreaks in Siberian forests. In: Ecologicheskaya otsenka mestoobitaniy lesnykh zhivotnykh. Nauka, Novosibirsk: 29-40.
-- Brief data are provided on fecundity of different gypsy moth populations in Siberia.
WSiberia; FECUNDITY

502 Kondakov, Yu.P., Kondakov, S.Yu. 1982.
Age structure of gypsy moth populations in South Siberia. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 58-67.
-- The specific demographic structure of gypsy moth populations in the mountain forests of South Siberia is discussed. Regulations of variations of morphological parameters of larvae were studied in the laboratory and in the field.
WSiberia; MORPHOLOGY, POPULATION DYNAMICS

503 Kondakov, Yu.P., Tarasova, O.V. 1981.
Landscape-ecological characteristics of folivorous insects in the shelterbelt pine-forests of Minusinsk Kettle. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 149-151.
-- Specific environmental conditions of Minusinsk forest belts account for landscape-ecological peculiarities of aboriginal populations of phyllophagous insects such as the pine sawfly, the pine moth, the pine noctuid, the gypsy moth and other pests. Primary foci of the gypsy moth are found in the peripheral part of forest belts, primarily in shrub-herb birch stands and aspen stands. High concentrations of pest egg masses are observed in pine forests with dense undergrowth of Siberian pea shrub growing in elevated places.
WSiberia; PEST LIST, STAND COMPOSITION

504 Kondakov, Yu.P., Zemkova, P.I., Nakrokhina, O.I. 1967.
A study of the effect of food species and population density on gypsy moth development and fecundity. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 247-250.
-- Experiments were conducted in the laboratory and in the field on 10 tree and shrub species with different pest densities. Feeding conditions of larvae determine the rate of their development, survival and fecundity. The favored food plants of the gypsy moth in South Siberia are larch and birch.
WSiberia; DENSITY, HOST PLANTS, REARING

505 Kondorskiy, B.M. 1982.
Comparative estimation of efficacy of a visual method for determining vitality of gypsy moth eggs. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 49-54.
-- Data on potential and actual viability of egg masses were analyzed. A correlation was established between egg viability and microclimatic peculiarities of foci, egg mass sizes, and position of eggs in the egg mass.
ECentral; EGGS

506 Kondorskiy, B.M. 1982.
Methodical aspects of planning control measures against the gypsy moth. In: Zashchita rasteniy i okhrana okruzhayushchey sredy v Tatarskoy ASSR. Kazan': 93-95.
CONTROL

507 Kondorskiy, B.M. 1983.
Preference index of food species by ovipositing gypsy moth females and its alteration pattern in time and space. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moscow: 213-218.
-- Natural populations of the gypsy moth were studied in forestries of Tatarstan and, as a result, an index of the food species preferred by females during oviposition was suggested.
EEast; HOST PLANTS, OVIPOSITION SITE

508 Kondorskiy, B.M. 1984.
Patterns of outbreak realization by the gypsy moth in the Tataria region. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 237.
-- The main parameters of gypsy moth outbreaks are related primarily to entomoresistance of stands. In the Tatarstan "island" pure oak groves of a grass-sedge type are regarded as having low entomoresistance, mixed oak groves have medium entomoresistance, and birch, linden and aspen stands are highly resistant. In Tatarstan, gypsy moth outbreaks tend to spread.
EEast; STAND COMPOSITION

509 Kondorskiy, B.M. 1988.
Alteration pattern of gypsy moth fecundity during an outbreak. In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institute lesa i drevesiny SO AN SSSR, Krasnoyarsk: 12-13.
-- In Tatarstan in 1978-1983, gypsy moth foci were studied with regard to some regularities of fecundity variations in space (within separate foci) and in time (in the course of outbreak). Fecundity is higher during the period of population increase, and lower at the eruption

phase. At the crisis phase it remains at a low level. Higher fecundity at the beginning of a depression stabilizes at a level related to the level of stand entomoresistance. Five phases of fecundity variation can be distinguished in the course of gypsy moth outbreak and depression: increase, decrease, depression, recovery, and stabilization.
EEast; FECUNDITY, POPULATION DYNAMICS

510 Kondorskiy, B.M. 1989.
Ecology of gypsy moth population dynamics in the forest steppe of Moldavia. In: Ekologicheskiye osnovy okhrany i vosproizvodstva lesnykh resursov Moldavii. Respublikanskaya nauchno-prakticheskaya konferentsiya. Tezisy dokladov. Kishinev: 201-203.
EWest; ECOLOGY

511 Kondrya, V.A., Tret'yakova, M.F., Lipilchuk, M.D., Smelyy, V.L. 1980.
Testing of biopreparations against leaf-gnawing lepidopetrous larvae in orchards. Biologicheskiy zhurnal Armenii. (4):439-441.
Caucasus; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, PEST LIST

512 Konicheva, A.P., Kuznetsova, L.V., Orlovskaya, Ye.V., Zinov'eva, L.A., Tsvetaeva, I.A. 1979.
Amino acid composition of artificial diet used for rearing the gypsy moth, *Lymantria dispar* L. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 132-138.
-- Amino acid composition of natural food of the gypsy moth (oak leaves of different vegetation periods) was compared with artificial nutrient media (ANM:BM-2, BM-12, No 14, No 14-a, No 144 us, No 144-IV). ANM examined were found to have all the amino acids necessary for normal development but their amount and ratio did not meet requirements for the gypsy moth, especially for the earlier instars. It is suggested that amino acids should be added to ANM, the proportion calculated by comparing amino acid composition of ANM and oak leaves.
ECentral; ARTIFICIAL DIET, FOLIAGE CHEMISTRY, NUTRITION, REARING

513 Konicheva, A.P., Orlovskaya, Ye.V., Shershukova, L.S. 1984.
Evaluation of the level of metabolic processes in prolonged storage of silkworm eggs according to enzyme activity of their homogenates. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 25-28.
ECentral; EGGS, ENZYMES

514 Konicheva, A.P., Orlovskaya, Ye.V., Tsvetaeva, I.A. 1984.
Use of enzymic tests to improve the nutrient medium for insects by addition of certain amino acids. In: Biokhimiya nasekomykh. MGPI, Moscow: 38-125.
ECentral; NUTRITION, PHYSIOLOGY

515 Konicheva, A.P., Orlovskaya, Ye.V., Zinov'eva, L.A. 1981.
Comparative characteristic of soluble proteins in the tissues of gypsy moth larvae affected by nuclear polyhedrosis virus and reared on natural and artificial diet. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 143-150.
ECentral; ARTIFICIAL DIET, BIOCHEMISTRY, REARING, VIRUS

516 Konicheva, A.P., Orlovskaya, Ye.V., Zinov'eva, L.A., Tsvetaeva, I.A. 1979.
Carbohydrate composition of artificial diet and natural food of the gypsy moth. In: Trudy Moskovskogo gosudarstvennogo pedagogicheskogo instituta im. V.I.Lenina. Moscow: 139-144.
-- A comparison was made of carbohydrate composition and natural food of the gypsy moth (oak leaves) and artificial nutrient media (ANM:14, 14-a, BM-16, MP-8, BAC). In the quantitative composition of soluble carbohydrates, the ANM examined are similar to those in oak leaves but quantitatively they are markedly different in the content of all the carbohydrates. A conclusion is made that to provide normal development of gypsy moth it is necessary to lower the content of carbohydrates in the ANM examined.
ECentral; ARTIFICIAL DIET, FOLIAGE CHEMISTRY, NUTRITION, REARING

517 Konikov, A.S. 1974.
Role of physiological factors in the population structure of the Siberian moth and the gypsy moth. In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 222-223.
-- Larval polymorphism was observed in a number of parameters in both species. Early instars living in groups have much higher levels of energy processes and lower mortality than insects living singly. In later instars, digestive enzymes of small larvae are blocked and larvae die. Polymorphism, group effect and hierarchy regulate populations of these species, while physiological regulators operate at the population level.
WSiberia; PHYSIOLOGY, POPULATION QUALITY

518 Konikov, A.S. 1978.
Regulators of forest insect population density. (Regulyatory chislennosti lesnykh nasekomykh.) Nauka, Novosibirsk. 96 p.
-- The monograph presents information on population dynamics of some forest insects with regard to exogenic and endogenic regulating factors. The gypsy moth is used as an example to show regulating mechanisms.
WSiberia; POPULATION DYNAMICS

519 Konikov, A.S. 1980.
Population structure of a species and the role of system interrelationships in taiga forest ecosystems. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 69-70.
-- The Siberian moth and the gypsy moth are used as examples for considering the role of some exogenic and

endogenic factors in numerical dynamics of forest insects at population levels.
WSiberia; POPULATION DYNAMICS

520 Konikov, A.S., Aleksandrova, S.P., Aleksandrina, I.G. 1977.
Regulatory mechanisms of the abundance of forest insects. In: Problemy lesovedeniya Sibiri. Nauka, Moscow: 215-225.
WSiberia; DENSITY, FEEDING, PHYSIOLOGY

521 Konikov, A.S., Chernyshova, L.V. 1981.
Heritable mechanisms regulating gypsy moth population density and behavior. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 57-60.
-- Egg mass peculiarities (whether singly or in aggregation), the synchronous or asynchronous character of egg hatch, the ability of larvae to aggregate, and the resulting group effect are population level responses, that affect the regulation of insect numbers. Adaptation mechanisms of ecologically flexible species are related to "imprinting" of trace responses of earlier conditions. For instance, trace aftereffects can cause a 5-fold reduction of gypsy moth protease activity. All the behavioral responses of gypsy moth larvae are genetically fixed, and their manifestation is corrected by trace responses (the "memory" of developmental conditions of the previous generation). On the basis of the analysis of species population structure, the term "population" can be defined as a group of individuals of one species occupying a certain area for a long time, freely crossing and united by genetic intrapopulation relations of an ecological nature.
WSiberia; BEHAVIOR, EGGS, GENETICS, PHYSIOLOGY

522 Konikov, A.S., Chernyshova, L.V., Alexandrina, I.G., Shakhmatova, I.G. 1982.
Some regulators of trophic connections and behavior in gypsy moth. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 42-51.
-- Selection of food plant by gypsy moth larvae is determined by imprinting at different life stages. Data on variations in larval growth when feeding on different food plants are given.
WSiberia; BEHAVIOR, FEEDING, HOST PLANTS, NUTRITION

523 Kononova, N.Ye. 1964.
The role of plant condition in the survival of folivorous insects. Zoologicheskiy zhurnal. 43(1):37-42.
-- Effect of feeding on the biological parameters of the tent caterpillar and the gypsy moth, under natural conditions and on branches in the laboratory, was studied. Larvae reared on branches had a higher survival and a more steady and rapid development than larvae reared on trees. Mechanical injury of plants, which causes deterioration of their physiological condition, has a favorable effect on pest survival and fecundity, leading to a sharp increase in their number. Of great importance is that trees come into leaf at the time of egg hatch. If hatched larvae of the species under study feed on old leaves, the majority of insects die. First instars can die from feeding on healthy plants, with clear signs of poisoning, which means that the sap of healthy plants is toxic for at least a portion of the pest population. Thus, the physiological condition of food plants proved to produce an essential effect on tent caterpillar and gypsy moth populations.
ECentral; FEEDING, FOLIAGE QUALITY, REARING

524 Korchagin, V.N. 1980.
The gypsy moth. Zashchita rasteniy. (11):64-65.
ECentral; GENERAL BIOLOGY

525 Korduba, P.T. 1958.
Important folivorous entomophages in the oak stands of the Carpathian region. In: 1 Mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moskva: 49-51.
-- Oak stands in the Carpathian region were most often attacked by the gypsy moth and the tent caterpillar; less important pests were the green oak leaf roller, the browntail moth, and the processionary moth. In 1953, gypsy moth populations increased, and browntail moth, green oak leaf roller, and tent caterpillar populations also increased to some extent. In 1954, the area of foci was about 14,000 ha, and the foci were found mainly in very light stands with a density of 0.3-0.5 poor young growth and poor or no undergrowth. Egg masses were primarily deposited on a well heated part of the trunk from top to bottom, and in locations with high humidity; they also were deposited in the crown and on thin branches, which the author associated with the hydrothermal optimum. Females oviposited not only on oak, but on hornbeam and other hardwood species. During the outbreak period, there were 15 to 30 egg masses per tree, with 200 to 300 eggs per mass. The highest egg mass concentration was observed near settlements. The greatest outbreaks were recorded in 1949, 1952, and 1956. The author believes that frequent occurrence of outbreaks is the result of entomophage destruction by large-scale application of pesticides.
EWest; FECUNDITY, OUTBREAKS, OVIPOSITION SITE, STAND COMPOSITION

526 Korenev, A.A., Kondorskiy, B.M. 1987.
The role of oligophagous tachinid flies in reducing gypsy moth population density during pest depression. In: Entomophagi i mikroorganizmy v zashchite rasteniy. Kishinev: 54-59.
-- A correlation is established between decrease in gypsy moth density and parasitism of larvae by oligophagous tachinids. A descriptive table of adult tachinid parasites of the gypsy moth in Moldavia is given.
EWest; PARASITES, POPULATION DYNAMICS

527 Korotun, N.N. 1931.
The gypsy moth. In: Shkidlivi komakhi v sadakh na Polissi ta borot'ba z nimi. Vid.VUAN, Kiev: 13-32.
-- The gypsy moth was the most destructive pest in the Volyn Province in 1825-1827, in the Kazan Province in 1852, in the Ryazan and Tambov Provinces in 1857, and in Voronezh, Moscow, Kostroma, Yaroslavl, Kazan, Niznby Novgorod and Perm Provinces in 1893-1895. Life cycle, biology, phenology, and favored food plants are briefly described. Hairs of caterpillars are observed to cause skin irritation. Data are given on destructive effect

and control measures, such as egg mass collection and treatment with petroleum, and application of sticky belts.
ECentral, EEast; CONTROL, GENERAL BIOLOGY

528 Kosminskiy, P.A. 1921.
Experiments on extraction of gynandromorphs in *Lymantria dispar* L. (preliminary report). Russkiy zoologicheskiy zhurnal. 4(2):197-206.
-- Data are given on changes observed in morphological parameters of gypsy moth adults emerging from pupae that had been exposed to high temperatures (39ºC) for 12-36 hours. The action of high and low temperatures was found to bring about the occurrence of intersexes. The data obtained are discussed along with R. Goldschmidt's data.
ECentral; GENETICS, MORPHOLOGY, TEMPERATURE

529 Kosminskiy, P.A. 1924.
Some data on the development of gypsy moth antennae in terms of intersexuality phenomena. Russkiy zoologicheskiy zhurnal. 4(3-4):134-140.
-- The development of gypsy moth antennae of males and females under normal conditions and with regard to phenomena of intersexuality were studied. Data are discussed invoking R. Goldschmidt's materials and conclusions.
ECentral; GENETICS, MORPHOLOGY

530 Kosminskiy, P.A. 1925.
Gynandromorphism in the gypsy moth. Russkiy zoologicheskiy zhurnal. 5(1-2):3-24.
-- Gynandromorphs are produced by abnormal food, which causes partial starvation and general weakening. Most females remain sterile. Such conditions are supposed to affect the process of nucleus division and result in production of insects with a triple set of chromosomes (3n), causing a mixture of male and female characteristics in one individual. This supposition, however, was not confirmed by further studies. Offspring of the first generation after crossing were normal, while gynandromorphs were produced in the second generation. Thus, it is supposed that females are responsible for gynadromorphism. In addition to unfavorable food, gametes are also affected by high temperatures.
ECentral; GENETICS, MORPHOLOGY

531 Kosminskiy, P.A. 1929.
Inheritance of hypodermis and color patterns by larvae of the gypsy moth, *Lymantria dispar* L. Russkiy zoologicheskiy zhurnal. 9(1):3-61.
-- This is a detailed analysis of gypsy moth color races in different regions of the USSR. The author differentiates among races based on chitin coloration and hypodermis pattern. According to chitin coloration, two races are differentiated: dark, with a dark shade of chitin, and light, with light chitin. According to hypodermis coloration, yellow, grey and black races are differentiated. The work presents materials on crossing of individuals of different races, genetic analysis of crossing results, data on the effect of temperature on manifestation of some characters, and comparison of the data with materials and conclusions of R. Goldschmidt.
ECentral; COLOR POLYMORPHISM, GENETICS, TEMPERATURE

532 Kosminskiy, P.A. 1930.
An investigation of intersexuality in the gypsy moth. (Part I.). Russkiy zoologicheskiy zhurnal. 10(2):1-50.
-- Occurrence of gypsy moth intersexuality within one race was studied. It is pointed out that intersexuality is transmitted by females and must be caused by mutation of F-factor determining development towards females. The author discusses his data and compares them to those of R. Goldschmidt.
ECentral; GENETICS

533 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part II. Morphological study of intersexual males. Zoologicheskiy zhurnal. 14(1):113-158.
-- Crossings made to study inheritance of intersexuality by different interracial hybrids of the gypsy moth are analyzed and the results obtained are compared to those of R. Goldschmidt. Morphological investigation of intersexes obtained is described in detail and compared with normal insects obtained in R. Goldschmidt's experiments. In the Section "Gypsy Moth Sex Differences," a comparison is made of the normal construction of wings, antennae, sex organs, and the dynamics of their development, as well as time of morphological differentiation in ontogeny. Data on changes in various systems of organs in intersexes and dynamics of their development also are included, as well as data on homology of male and female organs and their changes in intersexes.
EWest; GENETICS, MORPHOLOGY

534 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part IV. General conclusion. Zoologicheskiy zhurnal. 14(4):621-636.
-- This is a study of gypsy moth intersexuality on the basis of genetic analysis. R. Goldschmidt's theory of gene quantitative changes is criticized.
EWest; GENETICS, MORPHOLOGY

535 Kosminskiy, P.A. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part II. Morphological study of intersexual males. Zoologicheskiy zhurnal. 14(2):271-310.
-- The author discusses the interrelationships existing when various systems of organs in intersexes change, the and occurrence of intersexuality in some variants of crossing. A long summary follows in which the author argues with R. Goldschmidt on the basis of the data obtained regarding conclusions made by Goldschmidt as a result of his studies on intersexuality. In conclusions this debate continues; in each of the 10 parts a comparison is made of the data obtained by the author and R. Goldschmidt.
EWest; GENETICS, MORPHOLOGY

536 Kosminskiy, P.A., Vershaver, N.B. 1935.
Investigations of intersexuality in the gypsy moth, *Lymantria dispar* L. Part III. Intersexual changes induced by temperature. Zoologicheskiy zhurnal. 14(3):439-464.
-- Changes towards intersexuality occurring in males and females under the influence of temperature are considered and a possible explanation of the reasons for such changes is suggested. The data obtained are discussed together with R. Goldschmidt's data.
EWest; GENETICS, MORPHOLOGY, TEMPERATURE

537 Kost, A.N., Kovalev, B.G., Matveeva, Ye.D., Stan, V.V., Yudin, L.G., Elizarov, Yu.A., Barybkina, M.N. 1977.
Synthesis and biological activity of disparlure and its analogues. Bioorganicheskaya khimiya. (7):934-942.
-- Stereodirected synthesis of the attractant cis-7, 8-epoxy-2-methyloctadecan (disparlure) is made. To estimate the role of the substance structure in interaction with the gypsy moth chemoreceptor, a number of disparlure analogues were synthesized. The synthesis was based on alkylation of acetylene hydrocarbons in hexametafield, allowing dialkylacetylenes with outputs of 35-45% to be obtained. To produce cis-olefins, hydration was made over Lindlar catalyst. By epoxidating olefins, disparlure, its homologues and isologues, differing in the length of carbohydrate chain and position of epoxy bridge, were produced. This analogue and trans-isomer of disparlure were synthesized. The attractive power of compounds produced was analyzed.
ECentral; BIOASSAY, PHEROMONES, PHYSIOLOGY

538 Kostin, I.A. 1958.
Comparative characteristic of outbreak fading dynamics of the Siberian moth and the gypsy moth in East Kazakhstan. In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 56-58.
-- Outbreaks of the Siberian moth and the gypsy moth are provoked by similar weather conditions. In 1951-1956, considerable defoliation of both hardwood and coniferous species was first recorded. Foci collapsed due to the action of self-regulating mechanisms but the process was different in Siberian moth and gypsy moth. An outbreak of the former species stopped abruptly; decrease in numbers of the latter was gradual. This can be accounted for by nearly all foci eggs of the Siberian moth being parasitized by *Telenomus grandis* Mayr., while this parasite attacked very few eggs of the gypsy moth. Siberian moth larvae migrate little if at all, unlike gypsy moth larvae, thus disease development is more rapid for the Siberian moth.
CAsia; EGGS, OUTBREAKS, PARASITES, WEATHER

539 Kostin, I.A. 1958.
Gypsy moth outbreak in East Kazakstan in 1953-1955. In: Trudy instituta zoologii AN Kazakhskoy SSR. Alma-Ata: 118-121.
-- Pest gradation foci originated in areas well heated by the sun and protected from northerly winds. Unlike the Siberian moth, the gypsy moth is dispersed by winds from its primary foci. Its food plants are birch, aspen, and fir and, in flood plains, willow. In the undergrowth it attacked bird cherry, Siberian pea shrub, mountain ash, May rose, sweetbrier, honeysuckle, raspberry, spiraea, etc. Foci, however, were formed only on bird cherry and birch. Feeding on fir can be accounted for by high population and lack of food.
MAsia; HOST PLANTS, SITE CONDITIONS

540 Kostin, I.A. 1967.
An integrated method of gypsy moth control. Vestnik Akademii nauk Kazakhskoy SSR. (10):75-76.
-- In the forests of the Altai Mountains a great many gypsy moth females oviposit on the rocks in the upper parts of mountain ridge slopes. Good results on aggregated egg masses were achieved by aerial treatments of DDT. It is suggested that females should be attracted to places suitable for oviposition by light sources so that egg masses are concentrated, facilitating their destruction.
WSiberia; AERIAL SPRAYING, CHEMICAL INSECTICIDES, CONTROL, LIGHT TRAPS, OVIPOSITION SITE

541 Kostin, I.A. 1968.
Innovations in gypsy moth control in Kazakhstan. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 58-59.
-- Gypsy moth outbreaks occur in Altai every decade. During the last 30 years, the maximum numbers were recorded in 1946, 1955, and 1966. For pest control, it was suggested that aerial treatments of oviposition sites should be made during the period of egg hatch. Females that are active in twilight fly to well heated areas during the day, and to rocks that are clearly seen in the evening, on the upper, primarily southwestern, mountain slopes; about 90% of the egg masses are deposited in these conditions. The author believes that these places are chosen for oviposition by gypsy moth populations in Altai because, on the one hand, eggs are well heated in spring, and on the other hand, unfavorable factors, abiotic ones included, can be avoided. Hatched larvae readily find suitable food due to their aerophorous nature. Detection of the sites where egg masses are concentrated would make it possible to reduce treatment of vast areas with pesticides and reduce the damage caused by the gypsy moth to economically acceptable levels.
WSiberia; CONTROL, FEMALES, FLIGHT, OVIPOSITION SITE

542 Kostin, I.A., Garynin, A.V. 1968.
Gypsy moth control in the Altai Territory. Lesnoye khozyaystvo. (9):65.
-- In the Altai Territory, gypsy moth females oviposit on bare rocks of southwestern slopes and on mountain crests. The authors suggest that treatment of aggregations of hatched larvae in the sites where egg masses are aggregated should be made before active migrations start. Such a control method proved to be quite satisfactory in all respects: the pest number in the stands sharply decreased and major entomophages were preserved in the forests. This method was 10 times less costly than treatment of all damaged stands after migration of larvae to the trees. Knowing what sites the gypsy moth prefer makes monitoring the condition of pest populations in periods between outbreaks more effective.

WSiberia; CONTROL, OVIPOSITION SITE

543 Kotenko, A.G. 1974.
The ecology of dermestid beetles (Coleoptera, Dermestidae) - entomophages of the gypsy moth *Lymantria dispar* L. (Lepidoptera, Lymantriidae). In: Materialy VII s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 224-225.
-- Species composition of dermestids and their role in the entomophage complex of the gypsy moth were studied from 1968-1972 in the Lower Dnieper region. In this region, 5 dermestid species ecologically related to the gypsy moth are recorded: *Dermestes lardarius* L., *D. undulatus* Brahm., *D. erichsoni* Gangld., *D. bicolor* F., and *Anthrenus verbasci* L. The most common are *D. undulatus* and *D. bicolor* which, together with *D. lardarius*, are conventionally regarded as belonging to the group of dermestids living on nesting birds. In the Black Sea Preserve, where most surveys were made, there were a lot of nest boxes for starlings in which gypsy moth females often oviposited and, as a result, egg predation by dermestid larvae in these artificial nests reached 100%. Egg masses deposited on tree trunks are attacked to a lesser extent (up to 70% on the average). On the average, 66% and 29% of eggs, respectively, were destroyed. Damage inflicted on the pest by dermestids declines markedly as the distance to sites with artificial nests increases.
EWest; BIRDS, EGGS, PREDATORS

544 Kotenko, A.G. 1975.
Studies of the biology of the tachinid fly, *Parasetigena agilis* R-D. (Diptera, Tachinidae), an effective parasite of the gypsy moth (Lepidoptera, *Ocneria dispar* L.) in southern Ukraine. In: Nekotoryye voprosy ekologii i morphologii zhivotnykh. Naukova dumka, Kiev: 29-31.
-- In southern Ukraine, *Parasetigena agilis* adults emerge from puparia in late April or early May and begin to parasitize their hosts by mid-May. They prefer late instars, beginning with the third instar; first instars are not parasitized at all, and second instars are rarely parasitized. Larger prey provide parasites with a larger store of food and allows the parasite to avoid, to some extent, competition by hymenopterous parasites of early instars. Flies cannot differentiate between infected, diseased, molting, and healthy larvae, so they can parasitize hosts on which they are not able to develop. As a result, a portion of the offspring dies, lowering parasite effectiveness.
EWest; BEHAVIOR, PARASITES

545 Kotenko, A.G. 1975.
The effect of *Meteorus pulchricornis* Wesm. (Hymenoptera, Braconidae) on changes in weight and mobility of parasitized gypsy moth larvae, *Ocneria dispar* L. (Lepidoptera). In: II Vsesoyuznaya konferentsiya molodykh uchenykh po voprosam sravnitel'noy morphologii i ekologii zhivotnykh. Tezisy dokladov. AN SSSR, Moscow: 20-21.
-- The development of larvae was studied from the moment they were parasitized until their death. Development of *Meteorus* from larviposition to pupation lasts 13 to 18 days. Parasitized larvae grow and molt but they gain weight slower than healthy ones. Percentage of weight loss to maximum weight on the day of parasite emergence averages 33.8%. Larvae become immobile 2 to 4 days before parasite emergence. After parasite emergence larval motor function is disrupted and death occurs on the first to third day.
EWest; DEVELOPMENT, PARASITES

546 Kotenko, A.G. 1976.
Secondary parasites of the gypsy moth, *Ocneria dispar* L., in outbreak areas in the Lower Pridneprovye. Vestnik zoologii. (1):80-82.
-- Sixteen species of secondary parasites of the gypsy moth belonging to 7 families of Hymenoptera are listed. Thirteen of them are mentioned, for the first time, in relation to the region under study. The most active were: *Eurytoma verticillata* (Fabr.), *E. goidanichi* (Bck.), *Dibrachys cavus* (Walk.), and *Pediobius* sp. on *Apanteles* sp., and *E. vericillata* (Fabr.), *Hemiteles areator* (Grav.), and *Brachymeria secundaria* (Rusch.) on *Meteorus* sp.
EWest; PARASITES

547 Kotenko, A.G. 1976.
The braconid wasps (Hymenoptera, Braconidae)-- entomophages of the gypsy moth, *Ocneria dispar* L., in the southern Ukraine. Entomologicheskoye obozrenie. 55(1):151-158.
-- Braconids of 7 species were reared from the gypsy moth. Four species not earlier recorded as parasites of the gypsy moth in the southern Ukraine are *Apanteles ocneria, A. liparidis, Meteorus gyrator*, and *M. versicolor. A. porthetriae* and *A. solitarius* are the most widespread due to windblown dispersal of parasitized first instars. A descriptive table of these parasites is given, and some data on their biology are presented. The significant effect of hyperparasites on parasite numbers is discussed.
EWest; PARASITES

548 Kotenko, A.G. 1977.
Entomophages of the gypsy moth, *Ocneria dispar* L., in Southern Ukraine and their role in regulating pest density. Avtoreferat dissertatsii kandidata biologicheskykh nauk. Kiev. 24 p.
-- A significant supplement is made to the list of entomophages of the gypsy moth in the southern Ukraine (56 species vs 30 previously known), with data on areas of many species increased. Parasite species that belong to the family Braconidae, which have been mentioned in earlier literature but diagnosed incorrectly, are now exactly established. New data on ecology of parasites and predators of the gypsy moth are given. Trophic relations in the entomophage complex are presented schematically, and factors influencing the number and effectiveness of some species are detected. The relative role of parasites and predators in the destruction of gypsy moth is estimated and the most important entomophages regulating pest populations are identified. On the basis of these investigations, measures to maintain and increase the effect of entomophages are suggested.
EWest; BIOLOGICAL CONTROL, PARASITES, POPULATION DYNAMICS, PREDATORS

549 Kotenko, A.G. 1978.
Tachinid flies (Diptera, Tachinidae) - entomophages of gypsy moth at the Black Sea State Preserve. In: 50 let Chernomorskomu zapovedniku. Materialy respublikanskogo seminara-soveshchaniya. Kiev: 70-72.
-- Ten tachinid species are mentioned. *Parasetigena agilis* R.-D., *Drino inconspicua* Mg., and *Exorista larvarum* L. were recorded previously, while *Zenilla libatrix* Panz., *Exorista fasciata* Fll., *Blepharipoda scutellata* Mg., *Blondelia nigripes* Fll., and *Compsilura concinnata* Mg. are recorded in the Black Sea Preserve for the first time. *Exorista rossica* Mesn,. and *Microphthalma europaea* Egg. are recorded in the Ukraine for the first time. The most effective tachinids are *E. rossica, P. agilis, E. larvarum, B. scutellata*, and *E. fasciata*. Parasitic flies are most effective at the outbreak and collapse phases.
EWest; PARASITES

550 Kotenko, A.G. 1981.
Vertical migrations of gypsy moth larvae, *Ocneria dispar* L., and their impact on phytophage activity in Southern Ukraine. In: Ekologo-morphologichekiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 102-104.
-- Daily vertical migrations of larvae result in increased proportion of parasitized gypsy moth larvae in the crown during the day; parasitized insects are less mobile. This phenomenon makes parasite competition more acute. As insectivorous birds are also active during the day, their activity can lead to some sanitation of the pest population. Because the percentage of molting larvae in the crowns in the daytime is higher, the effectiveness of tachinids declines as they oviposit on host covering. Parasite eggs are shed together with the larval covering before hatch. As a result of the vertical migrations of larvae, some part of ichneumonid cocoons and tachinid puparia get into tree hollows and artificial bird nests where cocoons are destroyed by dermestids and puparia go dry. This also effects the parasite population.
EWest; BEHAVIOR, DISTRIBUTION, LARVAE, PARASITES

551 Kotenko, A.G. 1981.
Vertical migrations of larvae of the gypsy moth (*Ocneria dispar* L.) and their effect on activity of natural enemies in southern Ukraine. In: Ekologo-morfologicheskiye osobennosti zhivotnykh i sreda ikh obitaniya. Naukova Dumka, Kiev: 102-114.
-- In the daytime, gypsy moth larvae migrate vertically to shelters. Parasites of the gypsy moth also were studied.
EWest; BEHAVIOR, DISPERSAL, LARVAE, PARASITES

552 Kotenko, A.G. 1981.
The effect of some behavioral responses of the gypsy moth, *Ocneria dispar* L. larvae on entomophages. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor`by s vreditelyami sel`skogo i lesnogo khozyaystva. Minsk: 125-128.
-- The effect of some behavioral traits of gypsy moth larvae on the activity of primary parasites and predators was studied. These include wind dispersal, vertical daily migrations, selection of pupation sites by the larvae, and response of larvae to parasite attack. In southern Ukraine, 58 entomophage species of the gypsy moth are registered; of them, 21 species are primary parasites and predators of larvae. Investigation of numbers, species composition and behavioral traits of entomophages and the host shows that behavioral traits of gypsy moth larvae affect both the character of the pest (natural enemy relations) and peculiarities of relations within the entomophage complex.
EWest; BEHAVIOR, LARVAE, PARASITES, PREDATORS

553 Kotenko, A.G. 1982.
Dermestid beetles (Coleoptera, Dermestidae) - gypsy moth entomophages in Southern Ukraine. Report I. Species composition and ecology. Vestnik zoologii. (1):41-45.
-- Six species of dermestids, entomophages of the gypsy moth, are recorded in southern Ukraine. These were *Dermestes lardarius* L., *D. undulatus* Brahm., *D. erichsoni* Gang., *D. bicolor* F., *Anthrenus verbasci* (L.), and *Trododerma* sp. Of greatest importance are species of the genus *Dermestes*, which destroy gypsy moth egg masses. Ecology of some dermestid species is presented.
EWest; BIRDS, EGGS, PREDATORS

554 Kotenko, A.G. 1983.
Competition among primary insect parasites of gypsy moth larvae. In: II Vsesoyuzny s"yezd parasitotsenologov. Tezisy dokladov. Kiev: 169-170.
-- Investigations of competition among entomophages, primary parasites of the gypsy moth in southern Ukraine, show that the ichneumonid complex dominating in the early and middle instars tends to give way to the tachinid complex in the second half of larval development. Among parasites of early instars, braconids of the genus *Apanteles* prevailed. Ichneumonids dominated in destruction of middle instars, when the host population was low; tachinids dominated when it was high. Competition among parasites grows more acute due to larval migrations (with wind and daily vertical migration), and some economic measures, such as egg mass treatment with petroleum and mowing of grass cover. Differences in parasite ecology contribute to the decrease in competition, composition of additional hosts and enemies, adjustment to different instars of the host, etc.
EWest; PARASITES, POPULATION DYNAMICS

555 Kovalev, B.G., Bednyy, V.G., Carde, R. 1980.
Attraction of disparlure enantiomers for the gypsy moth and the nun moth. In: Khemoretseptsiya nasekomykh. Vilnius: 106-112.
-- Field tests of optically active enantiomers of disparlure showed / + /-cis-disparlure to be much more attractive to gypsy moth males than cis-disparlure and the racemic mixture of these isomers. / - /-disparlure does not produce an inhibitory effect on nun moth males. The possible role of optical isomerism of disparlure in genetic isolation of these species is suggested. Literature on this question is reviewed.
EWest, EEast; PHEROMONES

556 Kovalevskaya, N.I., Gninenko, Yu.I. 1984.
Polymorphism of hydrolytic ferments in gypsy moth populations in terms of the problems of density dynamics and biological control. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 226-227.
-- Electrophoresis in polyacrylamide gel was used to detect polymorphism of leucinaminopeptidase and esterases in gypsy moth eggs from natural populations in North Kazakstan. Three types of carboxylesterase and 47 types of leucinaminopeptidase were distinguished. The data are evidence for the adaptive nature of polymorphism of hydrolases in gypsy moth populations. The results obtained suggest that polymorphism of pest egg hydrolases can be used to forecast pest numbers and to estimate the effect of different means of control.
WSiberia, MAsia; EGGS, ENZYMES, GENETICS, PROGNOSIS

557 Kovalskiy, A.A., Ketsenogy, K.P., Sakharov, V.M., Makarov, V.I. 1982.
Optimatization of insecticide application. In: Aerozoli v zashchite rasteniy. Moscow: 96-105.
-- The correlation between insecticidal aerosol size and the amount of insecticide received by gnats and first instars of gypsy moth is discussed. If the size is 10 to 20 mm the amount of insecticide received by the insect is the highest and the preparation expenditure is the lowest.
WSiberia; CHEMICAL INSECTICIDES

558 Kovalskiy, A.A., Kutsenogiy, K.P. 1977.
Determination of the principles of insecticidal aerosol action on insects. In: Fundamental'nyye issledovaniya: khimicheskiye nauki. Nauka, Novosibirsk: 56-61.
WSiberia; CHEMICAL INSECTICIDES

559 Kovalskiy, A.A., Kutsenogy, K.P., Chankina, O.V., Zagulyaev, G.N., Kirov, Ye.I., Makarov, V.I., Sakharov, V.M. 1979.
Kinetics of pesticide accumulation in insects when treated with aerosol insecticide. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya khimicheskikh nauk. (5):82-176.
WSiberia; CHEMICAL INSECTICIDES, PHYSIOLOGY

560 Kovalsky, A.A., Kutsenogiy, K.P., Chankina, O.V., Zagulyaev, G.N., Makarov, V.I., Sakharov, V.M., Kirov, Ye.I. 1978.
Effect of particle size on efficacy of insecticidal aerosols. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya khimicheskikh nauk. (7):131-137.
-- The relationship between particle size and efficiency of application of aerosol insecticide was studied. A procedure for the application of highly concentrated preparations containing more than 20% of pesticide is described. The most effective is the cloud with particles of 5 to 10 mm in diameter.
WSiberia; CHEMICAL INSECTICIDES

561 Kozhanchikov, I.V. 1940.
The importance of environmental conditions on gypsy moth egg development. Vestnik zashchity rasteniy. (3):3-16.
ECentral; EGGS

562 Kozhanchikov, I.V. 1949.
The importance of seasonal changes in food plant leaves for the gypsy moth, *Ocneria dispar* L., development. Doklady Akademii nauk SSSR. 66(4):1203-1206.
-- In three sets of experiments (spring, summer, autumn) gypsy moth larvae were fed on willow, oak and mountain ash from hatch to pupation. The following parameters were estimated: survival, length of development of every stage, larval weight in every instar, pupal weight, and imago fecundity. Feeding on spring leaves by all the species proved to be the most favorable. Feeding on summer and autumn leaves of willow and oak increases mortality or leads to 100% mortality at the beginning of development. The fact that normal growth of the species of spring phenology is impossible when feeding on summer leaves is one of the most important reasons for their specialization and, therefore, a cause for obligatory diapause.
ECentral; HOST PLANTS, PHENOLOGY, REARING

563 Kozhanchikov, I.V. 1950.
Gypsy moth. In: Fauna SSSR. Nasekomye cheshuekrylyye. Volnyanki Orgyidae. Izd.AN SSSR, Moscow and Leningrad: 582.
-- A global review of the taxonomy and biology of Palearctic Lymantriidae. At pages 365-374 author gives synonyms of the species and a list of principal works published before 1950. There is a description of imago morphology including male and female genitals, larvae with their chetotaxis, eggs and pupae. Color variations and their possible causes are briefly described. The author defines the species area in Eurasia, gives a list of food plants containing 155 plant species of 29 families, periods of development, fecundity, habitats and damage zones. A list of parasites and predators is also included (by Shedl, 1936).
COLOR POLYMORPHISM, HOST PLANTS, MORPHOLOGY, PARASITES, PREDATORS, REVIEW, TAXONOMY

564 Kozhanchikov, I.V. 1950.
Patterns of hibernation and diapause in the gypsy moth, *Ocneria dispar* L. Doklady Akademii nauk SSSR. 73(3):605-607.
-- The gypsy moth always overwinters at the egg stage in diapause. Larvae sometimes hatch in the same year, but they die because of the absence of suitable food (spring leaves). In general, the gypsy moth has egg diapause of one hibernation. Egg hatch can occur at temperatures ranging from + 13° C to 35-40° C. It is concluded that only tropical conditions are unfavorable for the diapause of this species. The maximum life span of gypsy moth embryos is about 14 months.
ECentral; DIAPAUSE, EGG HATCH, TEMPERATURE

565 Kozhanchikov, I.V. 1952.
Optimum temperature for development. IX. Temperature amplitude as a factor for development of

the gypsy moth and other silkworms.
Entomologicheskoye obozrenie. 32:27-42.
-- Comparative adaptability of the gypsy moth and the processionary moth to different temperatures was studied. Adaptability of these species to temperature variations is different: the processionary moth can develop at a temperature range of 10° C-20° C; the gypsy moth can develop at a temperature range of 18° C-20° C. With increase in daily amplitude, the length of development and larval mortality increase while larval weight decreases; pupal viability and adult fecundity also fall. A conclusion is made that the different response to temperature conditions is related to different ecological plasticity of the species under study.
ECentral; TEMPERATURE

566 Kozhanchikov, I.V. 1955.
***Ocneria dispar* L. (*Lymantria dispar* L.) - the gypsy moth.** In: Vrediteli lesa. Spravochnik. Izd. AN SSSR, Moscow: 243.
-- A short ecological description of the species, major and minor food plants and the area of occurrence are given in a one page description.
EWest, EEast, ECentral, Caucasus, MAsia, ESiberia, Far East; GENERAL BIOLOGY

567 Kozlov, E.A., Levitina, T.L., Gusak, N.M., Larionov, G.V., Veremeichenko, S.N., Serebryanyy, S.B. 1978.
Comparative biochemical studies of polyhedral proteins of nuclear polyhedrosis viruses. Biokhimiya. 43(12):2189-2195.
-- *The method of disc-electrophoresis in polyacrylamid* gel showed polyhedral proteins of nuclear polyhedrosis viruses (NPV) of *Bombyx mori*, *Galleria mellonella* and *Porthetria dispar* to have a molecular weight of 28.000 + - 300. Polyhedra of the silkworm and the gypsy moth contain protease which, at some points specifically disintegrated the polypeptide chain of polyhedral protein which in solution has pH = 10.5. Amino acid composition of polyhedral proteins of NPV is similar for the silkworm and the gypsy moth, suggesting structural homology of proteins.
ECentral; BIOCHEMISTRY, VIRUS

568 Kozlov, E.A., Levitina, T.L., Gusak, N.M., Ovander, M.N., Serebryanyy, S.B. 1981.
Comparison of the amino-acid sequences of inclusion body proteins from the nuclear polyhedrosis viruses of *Bombyx mori*, *Porthetria dispar*, and *Galleria mellonella*. Bioorganicheskaya khimiya. (7):1008-1015.
ECentral; BIOCHEMISTRY, VIRUS

569 Kozlov, M.A. 1971.
Proctotrupoid parasites (Hymenoptera, Proctotrupoidea) of fauna of the USSR. In: Trudy Vsesoyuznogo entomologicheskogo obshchestva, vypusk 54. Parasiticheskiye nasekomyye - entomophagi. USSR Academy of Science, Leningrad: 3-67.
-- *Eremioscelio lymantriae* Masner and *E. dichropterus* Kozlov are among the parasites of gypsy moth listed.
MAsia; PARASITES, REVIEW, TAXONOMY

570 Kozlov, M.A., Kononova, S.V. 1983.
Telenomids of fauna of the USSR. (Telenomidy fauny SSSR.) Nauka, Leningrad. 336 p.
-- *Telenomus lymantriae* Kozlov is listed as a gypsy moth parasite.
MAsia; PARASITES, REVIEW

571 Kravtsov, B.G., Baranchikov, Yu.N., Kondrina, G.S., Voloshchenko, I.D., Antonova, N.N. 1980.
Ecological cause of morphological patterns of gypsy moth wings. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoysuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 124.
-- Gypsy moth adults From natural populations in the region near the Urals, South Urals, Tuva, and the east Baikal region, were reared under laboratory conditions. The length of veins of the right forewing and values of the angle produced by distal veins were examined. Adults of both sexes in all populations under study were morphologically similar. This similarity can be accounted for by equality of ecological conditions under which the pest preimaginal stages developed. It is shown that ecological factors should be taken into account when intraspecies groups are identified in the area according to their morphological parameters.
EEast, WSiberia, EWest; GEOGRAPHIC VARIATION, MORPHOMETRICS

572 Kriventsov, Yu.I. 1968.
Ecological and physiological peculiarties in development rhythm and behavior of insects. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 404-405.
-- The periodic activity of the processionary moth, the gypsy moth and the walking stick, *Carausius morosus,* were studied. Life cycles of each insect species are regulated by daily and seasonal variations in temperature and lighting, but in some cases effect of unfavorable conditions can change the rhythm. For instance, when eggs of lepidopterans were kept at different photoperiods, illuminated with the light of different spectra, and gypsy moth egg were kept in water for a period of up to 300 days, behavior and rhythm changed.
ECentral; EGGS, PHENOLOGY, PHOTOPERIOD

573 Kriventsov, Yu.I. 1970.
Vitality of gypsy moth eggs (*Porthetria dispar* L.) and the silkworm (*Bombyx mori* L.) under anaerobic conditions. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USKhA, Kiev: 31-35.
-- Experiments in which gypsy moth eggs were kept in water for a period of up to 300 days, and silkworm eggs for up to 350 days, demonstrated the great ability of eggs of lepidopterans to tolerate anaerobic conditions. If kept in water for a long time gypsy moth eggs had higher viability (70%). Sensitivity of silkworm eggs to anaerobic conditions was determined by the time which passed from the day of oviposition to the day when eggs were placed into water. The maximum survival was recorded when 5-day-old eggs were put into water.
EWest; EGGS, PHYSIOLOGY

574 Kriventsov, Yu.I. 1970.
Age-dependent resistance of gypsy moth larvae (*Porthetria dispar* L.) to white muscardine fungus (*Beauveria bassiana* (Bals.) Vuill.). In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USKhA, Kiev: 22-26.
-- Gypsy moth larval resistance to beauverin increases with their growth. Survival of first instars infected with 1% beauverin is 18.2%; 5% beauverin causes 100% mortality and sensitivity of second instars is lower. If larvae are infected in the third instar and do not die, the results of the application manifest themselves in the following ontogeny stages: pupa, adult, eggs. Fecundity decline was highest when instars I, II and IV were infected with beauverin. These data should be taken into account when considering integrated pest control.
EWest; BIOASSAY, FUNGI

575 Kriventsov, Yu.I. 1972.
Ecological and physiological patterns of individual development of lepidopterans. In: Naukovi pratsi USGA. Zakhist roslin vid shkidnikiv ta khvorob sel'skogospodarskikh kul'tur. USGA, Kiev: 94-96.
-- Ecological and physiological peculiarities of lepidopterous insect development were studied to establish the effect of light, temperature, and food on manifestation of biological rhythm of development and behavior of insects belonging to 7 model species, including the gypsy moth. Temperature, lighting conditions, food qualitative composition, and environmental conditions changed within 24 hours and within a season. At the onset of ontogeny and at the pupal stage, the temperature appeared to be the most important factor, determining intensity of development of lepidopterous insects. For late instars at the optimum temperature, feeding conditions and food quality are the dominant factors.
EWest; DEVELOPMENT, FOLIAGE QUALITY, TEMPERATURE

576 Kriventsov, Yu.I., Opanasjuk, T.I. 1971.
The effect of entobacterin and beauverin mixtures on some lepidopterous pests of fruit trees. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 163-164.
-- Microbiological preparations of entobacterin-3 and beauverin were tested for use in control of some lepidopterous orchard pests (the apple moth, the gypsy moth, the tent caterpillar). It was discovered that the application of mixed entomopathogens or entomopathogens together with substances that increase the effect of microbiopreparations, e.g., with small doses of pesticides or substances, makes the medium favorable for increasing biopreparation pathogenicity. Application of these preparations in combination with other protective measures would contribute to successful development of integrated plant protection.
EWest; BACTERIA, FUNGI, MICROBIAL PESTICIDES, PEST LIST

577 Kriventsov, Yu.I., Pokhiton, S.V., Kaduk, M.A. 1968.
The effect of infections on the hemolymph of gypsy moth and the tent caterpillar. Visnyk sil'skohospodarskoy nauki. (9):79-82.
-- Changes in the hemolymph of the gypsy moth and the tent caterpillar infected with polyhedrosis of the processionary moth, beauverin and a mixture of beauverin and viruses showed that mixed infections affected the insects more than separate preparations. Under the impact of a polyhedrosis virus, beauverin and their mixture, the ratio of hemolymph forming elements changed. The authors established that enocytes and eosinophyls underwent morphological changes under the impact of infection. A conclusion can be made that these forming elements take part in the control of infection. It is suggested that these changes should be taken into consideration when diagnosing the condition of the infected organism.
EWest; FUNGI, HEMOLYMPH, VIRUS

578 Krulikovskiy, L.K. 1906.
Data on lepidopterous species in the Bessarabia region. Russkoe entomologicheskoe obozreniye. 6:184-187.
-- A list of 59 lepidopterous species is given, including the gypsy moth.
EWest; FLIGHT, PEST LIST

579 Krulikovskiy, L.K. 1906.
Notes on the collection of lepidopterous insects in the Urzhum area of the Vyatsk region in the Summer of 1905. Russkoe entomologicheskoe obozreniye. 6:60-63.
-- In collections of lepidopterous insects of the Vyatka Province, the gypsy moth is registered as a non-outbreak species.
ECentral; OUTBREAKS, PEST LIST

580 Krulikovskiy, L.K. 1909.
Notes on the collection of lepidopterans in the Vyatka region in Summer of 1908. Russkoe entomologicheskoe obozreniye. 8-9:240-244.
-- In collections of lepidopterous insects the gypsy moth is registered as a common species for the region.
ECentral; PEST LIST

581 Krykova, Ye.A. 1976.
Insect pests and vascular mycosis of oak trees. Zashchita rasteniy. (5):42-43.
-- Insect pests of oak play an active part in the transfer of pathogens of vascular mycosis of oak. Both dendrophages and phyllophages, including the gypsy moth, can be carriers. Flight and feeding of pests occur in the period of high susceptibility of oak to the disease (May - June), when the pathogenic fungus is at the most aggressive stage. Hence, effective control of phytophagous carriers is important for effective disease control. Bacterial preparations are suggested for phyllophage control.
EWest; FUNGI, PEST LIST, TREE HEALTH

582 Kryshtal', A.F. 1959.
Insects - agricultural pests of the Forest Steppe and Polesye of the Ukraine. (Komahi-shkidniki cil'ckogo spodarskikch roslin v umovakh Lisostepu ta Polissia Ukraini.) KGU, Kiev. 369 p.

-- The gypsy moth is regarded as a widespread primary polyphagous pest of orchards. It is listed among pests of bean species, Rosaceae, mulberry tree, English walnut, nut tree, currant, gooseberry, and barberry.
EWest; HOST PLANTS, PEST LIST

583 Kucherov, S.Ye. 1990.
The effect of gypsy moth on the radial increment of the English oak. Lesovedenie. (2):20-29.
-- Effect of late autumn frosts, summer droughts and gypsy moth outbreaks on the radial growth of the English oak in the southern Urals were studied. A procedure for reconstructing the stress of these factors is suggested.
WSiberia; TREE GROWTH

584 Kulagin, N.M. 1896.
Gypsy moth: an outline of life pattern and important control measures. (Neparnyy shelkopryad. Kratkoye opisaniye obraza zhizni i glavneyshikh mer bor'by s etim nasekomym.) Izdanie Moskovskogo muzeya prikladnykh znanii, Moscow. 41 p.
-- Data on pest ecology are given and every life stage is described. Damage is estimated and control measures are discussed, primarily destruction of egg masses.
CONTROL, ECOLOGY, LIFE STAGE DESCRIPTIONS

585 Kulagin, N.M. 1909.
The gypsy moth (*Lymantria dispar* L.). In: Nasekomyye, vrednye dlya sada i ogoroda v sredney i severnoy Rossii. St. Petersburg: 75-80.
-- Gypsy moth life stages and ecology are described. The area is described briefly, damage is estimated and control measures such as treatment of egg masses with petroleum, and sticky belts on tree trunks are discussed.
ECentral; CONTROL, GENERAL BIOLOGY

586 Kulagin, N.M. 1913.
The gypsy moth, *Lymantria* (*Ocneria*) *dispar* L. In: Vrednyye nasekomyye i mery bor'by s nimi. Moscow: 517-538.
-- Gypsy moth adults and larvae are described and data on distribution and outbreaks, primarily in the territory of the European part of Russia from 1880 to 1913, are given. Also discussed are data on gypsy moth phenology in some parts of the region, some peculiarities of species biology, damage, and control measures.
EWest, ECentral; DISTRIBUTION, GENERAL BIOLOGY, OUTBREAKS

587 Kulagin, N.M. 1930.
The gypsy moth. In: Vrednyye nasekomyye i mery bor'by s nimi. Gosizdat, Moscow and Leningrad: 118-126.
-- Data on the gypsy moth are given: life stages and ecology are described, the area is characterized briefly, and principal control measures are discussed.
ECentral; CONTROL, GENERAL BIOLOGY

588 Kupriyanova, V.A. 1968.
Prospects of attractant application against forest insect pests. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 131-139.
-- Domestic and foreign literature on sex attractants of the gypsy moth, the pine moth, the nun moth, and the pine noctuid are reviewed. As attractants, the researcher uses extracts of the female genital glands, hydrogenated extracts, synthetic sex attractants, and their analogues and isomers. Application of attractants seems promising, allowing early detection of pests and their foci so that control measures could be taken. Joint application of attractants and insecticides reduces the expenditure of the latter and prevents treating the entire stand.
ECentral; PEST LIST, PHEROMONES, REVIEW

589 Kupriyanova, V.A. 1969.
Prospects of attractant applications against the gypsy moth and other forest pests. Zashchita rasteniy. (11):39-41.
-- Data on application of attractants include catching males with unfertilized females of different lepidopterous species, and a history of introducing disparlure into the practice of gypsy moth control all over the world are reviewed. Experiments were made on attractants produced by benzine extraction of genital glands of unfertilized females.
ECentral; PHEROMONES, REVIEW

590 Kupriyanova, V.A. 1973.
The effect of insecticides on changes in insect infection by pathogenic microorganisms. In: Zashchita lesa ot vrediteley i bolezney. Sbornik trudov. Moscow: 28-39.
-- The effect of large-scale treatments of stands with insecticides on the rate of gypsy moth and green oak leaf roller infection with entomopathogenic organisms was studied. Treatments did not affect gypsy moth total mortality caused by diseases. Application of organic chlorine preparations produced a negative effect in both species on the rate of infection with entomopathogenic organisms, resulting in population sanitation. Chlorophos had no effect on the rate of larval infection with entomopathogens. It is concluded that chlorophos should be used for pest control in the foci.
ECentral; CHEMICAL INSECTICIDES, PATHOGENS

591 Kupriyanova, V.A. 1981.
The joint effect of diseases and parasites on gypsy moth survival. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 107-109.
-- The joint effect of diseases and parasites on gypsy moth survival was studied in oak groves in the Saratov Province in 1976, 1979, and 1980, in different periods of the yearly cycle, with changing density of pest population. By studying species composition, different infectious and invasion diseases were identified; their pathogens were a nuclear polyhedrosis virus, microsporidia, and the fungi, *Penicillum brevicaulis* and *Beauveria bassiana*. A portion of the insects usually died of non-specific diseases without contribution by microorganisms. Survival of first and second instars was found to correlate with egg sizes. The majority of larvae and pupae died of parasitism (up to 90%); 1.5-15% of larvae and some pupae died of diseases. The lower the percentage of parasitism, the higher the mortality caused by diseases.
ECentral; EGGS, FUNGI, MICROSPORIDIA, PARASITES, VIRUS

592 Kupyanskaya, A.I. 1967.
Insect pests in the "green zones" in the cities of Vladivostok and Artyom. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 259-262.
-- The gypsy moth is mentioned as one of important pests of Rosaceae and oak in the forests near Vladivostok and Artyom. It is an outbreak species. Pesticides are suggested as a means of control.
Far East; CHEMICAL INSECTICIDES, HOST PLANTS, PEST LIST

593 Kurentsov, A.I. 1939.
Macrolepidoptera - pests of trees and shrubs in Ussuriisk Territory. In: Trudy Dal'nevostochnoy gornotayezhnoy stantsii AN SSSR. Moscow: 107-210.
Far East; HOST PLANTS, PEST LIST

594 Kurentsov, A.I. 1941.
Problems of agricultural development of territories covered with mountainous taiga in Primorye regions and insect pests. In: Trudy Dal'nevostochnoy gornotayezhnoy stantsii AN SSSR. Moskva: 1-108.
-- Gypsy moth outbreaks are recorded in Primorye. In natural conditions the pest seems to prefer Rosaceae and oak. Conditions of species migrations, the gypsy moth included, from natural biocenoses to artificial stands are considered.
Far East; DISTRIBUTION, HOST PLANTS, PEST LIST

595 Kuteev, F.S. 1958.
The effect of insect pests on shrinking oak groves in the North Caucasus. In: Sbornik rabot po lesnomy khozyaystvu Severnogo Kavkaza. Maikop: 152-170.
Caucasus; PEST LIST, STAND CONDITION

596 Kuteev, F.S., Lyashenko, L.I., Zurabova, E.R., Chekanov, M.I. 1983.
Lepidocide concentrate application against forest pests. Lesnoye khozyaystvo. (8):52-53.
-- Entobacterin has low efficacy in gypsy moth control. In Moldavia, in 1982, lepidocide was applied against the gypsy moth and its efficiency was 99.92%.
EWest; BACTERIA, MICROBIAL PESTICIDES

597 Kuteev, F.S., Zubkova, T.I., Pribylova, M.V. 1980.
The condition of oak groves and measures of their protection against insect pests. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 3-11.
ECentral; CONTROL, TREE HEALTH

598 Kuteev, F.S., Zubov, P.A., Dashevsky, V.I. 1980.
Efficiency of ultra-low volume spraying. Zashchita rasteniy. (6):31-32.
-- Tests were made in different age stands in Vologda, Saratov, Rostov, and Voronezh Provinces, and Krasnodar Krai. Ricefan, carbophos, dursban, zolon, volaton, actellic, sumition, and decis were applied. Ultra-low volume aerial spraying is more effective than treatment with emulsifying concentrations, and technical and moistened powders.
ECentral; AERIAL SPRAYING, CHEMICAL INSECTICIDES, STAND COMPOSITION

599 Kutsenogiy, K.P., Ankilov, A.N. 1981.
Theoretical backgrounds for optimizing use of insecticidal aerosols against gypsy moth larvae. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 111-112.
-- A mathematical model for quantitative estimation of the effect of insecticide aerosol application in pest control is suggested. Experiments show that the main way gypsy moth larvae receive lethal doses is by the deposition of drops containing pesticide from airborne preparations. For any distance, there is a drop diameter at which the pesticide will be the lowest, all other factors being equal. Dependence of the size of the drops of the optimum capture on the width of capture, weather conditions, and larval instar is calculated.
WSiberia; AERIAL APPLICATION, CHEMICAL INSECTICIDES, MODELS

600 Kutsenogiy, K.P., Chankin, O.V., Kirov, E.I., Makarov, V.I., Sakharov, V.M. 1984.
The effectiveness of the accumulation rate of the gamma-isomer of HCH on the III-IV instar gypsy moth larvae during application of aerosol insecticides. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (6):62-68.
WSiberia; CHEMICAL INSECTICIDES

601 Kutsenogy, K.P., Chankin, O.V., Zagulyaev, G.N., Makarov, V.I., Sakharov, V.M., Kirov, E.I. 1982.
The effect of size, concentration, and speed of aerosol particles, and fallout density on preparation amounts affecting gypsy moth larvae. In: Aerozoli v zashchite rasteniy. Moscow: 88-96.
-- Deposition of monodispersed insecticide aerosols of a diameter of 8.28 and 57 mm at a stream velocity ranging from 0.5 to 3 m/sec. and concentrations of 2×10^2 to 3 mkgl on gypsy moth larvae was investigated. The rate of pesticide accumulation on insects and effectiveness of capture cross-section were estimated. Effectiveness of deposition was shown to depend on the size and velocity of particles. A comparison is made of the accumulation rate of pesticides depositing from the volume with the collection rate on contact with deposits of different density created by the particles of equal size. This comparison showed that the bulk of the preparation was deposited on the insect from aerosol clouds.
WSiberia; AERIAL APPLICATION, CHEMICAL INSECTICIDES

602 Kuznetsov, N.Ya. 1904.
A gynandromorph specimen of *Porthetria dispar* L. (Lepidoptera, Lymantriidae). Russkoe entomologicheskoe obozreniye. 6(1):203-206.
-- In June 1903, in the vicinity of Alushta, a gynandromorphic gypsy moth "male" was found. It had the regularly distributed secondary sexual characters of a female, female-type pigmentation and scales on some parts of each of the four wings, and abdominal hairs typical of females.
EWest; GENETICS, MORPHOLOGY

603 Kuznetsov, N.Ya. 1936.
Lepidopterans. In: Zhivotnyy mir SSSR. Izd. AN SSSR, Moscow and Leningrad: 416-429.
-- This is an outline of lepidopterous fauna. The gypsy moth is mentioned among important pests of orchards and forests.
PEST LIST

604 Kuznetsov, V.I. 1960.
Materials on fauna and ecology of lepidopterans (Lepidioptera) of the western Kopet-Dag. In: Trudy zoologicheskogo instituta AN SSS. Fauna i ekologiya nasekomykh Turkmenskoy SSR. Leningrad: 11-93.
-- The gypsy moth is not found in irrigated and mountain-desert zones. In the lower forest subzone larvae are common on forest species and English walnut, although there are no outbreaks and do not cause significant damage. In the upper forest subzone, pest outbreaks occur and the gypsy moth defoliates hardwood species. An outbreak is recorded in 1952; in 1953 the population decreased due to entomophage activity. Gypsy moth phenology in Turkmenistan is also presented.
MAsia; DISTRIBUTION, HOST PLANTS, PHENOLOGY

605 Kuznetsov, V.I., Martynova, Ye.F. 1954.
A list of lepidopterans for the middle region of the Ural River Basin. In: Trudy zoologicheskogo instituta AN SSSR. Leningrad: 322-350.
-- The gypsy moth is found in the floodplain and ravine forests of the Ural River. In 1950, in some flood plain regions pest outbreak were recorded. Larvae and egg masses were found on all tree shrub species, but oak-linden forests were the most heavily attacked. Species phenology in the region under survey is also presented.
EEast; PHENOLOGY, STAND COMPOSITION

606 Kuznetsova, L.V., Kaloshin, B.K. 1984.
Populational analysis of esterase and acid phosphatase of the gypsy moth. In: Biokhimiya nasekomykh. MGPI, Moscow: 75-81.
ECentral; BIOCHEMISTRY, ENZYMES

607 Kuznetsova, Ye.I., Neupokoeva, N.K. 1980.
Protection of tree and shrub species. Zashchita rasteniy. (1):36.
-- In Rostov Province, seedlings of linden and sweetbrier are injured. Dendrobacillin with chlorophos is applied against phyllophagous pests.
ECentral; BACTERIA, CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, PEST LIST

608 Kvartskhelia, T. 1914.
Development of fruit trees and pest invasions. Plodovodstvo. (3):186-188.
-- In Moldavia, the spring of 1913 came early and was rapid and steady, but throughout the season populations of various pests were high. The gypsy moth is mentioned among lepidopterans that attacked orchards.
EWest; PEST LIST, WEATHER

609 Lappa, N.V. 1971.
Effect of Beauverin and Entobacterin on pH-value in the hemolymph and the intestine in the gypsy moth and the cabbage moth. In: Patologiya chlenostonogikh i biologicheskiye sredstva bor'by s vrednymi organizmami. Tezisy dokladov 1 gorodskoy konferentsii. Kiev: 100-103.
-- The effect of *Bacillus thuringiensis* var. *galleriae* and *Beauveria bassiana* on the gypsy moth and cabbage moth was studied. Analysis of pH of gypsy moth hemolymph (instars V and VI) after 8 days did not reveal significant changes, which can be accounted for by the slow action of these preparations on the pest under the given experimental conditions. The intestinal pH of these insects gradually decreased in comparison with the control. A conclusion is made that pH values of the hemolymph and the intestine of the test insects can be used together with other criteria to establish the degree of decrease in viability of these species affected by diseases.
EWest; BACTERIA, FUNGI, HEMOLYMPH, MICROBIAL PESTICIDES

610 Larionov, G.V. 1974.
Serological interrelationship of the strains of a nuclear polyhedrosis virus of *Ocneria dispar* L. from different geographic zones. In: Trudy Biologicheskogo instituta. Virusy nasekomykh. Nauka, Novosibirsk: 53-57.
-- Four strains of a nuclear polyhedrosis virus of the gypsy moth extracted from different regions of the USSR and Yugoslavia were studied. The serological interrelationship was determined by gel precipitation; sera were produced by immunization of rabbits. The antigenic structure of a nuclear polyhedrosis virus of the "amur" strain was somewhat more complex than other strains studied.
EWest, ECentral; GENETICS, HEMOLYMPH, VIRUS

611 Larionov, G.V. 1974.
Morphological characteristic of the nuclear polyhedrosis virus of *Ocneria dispar* L. In: Trudy Biologicheskogo instituta. Virusy nasekomykh. Nauka, Novosibirsk: 12-19.
-- Results of examining body-inclusions of viral bundles and viral rods with an electronic microscope are presented. Particle sizes and some details of their structure are given.
WSiberia; HISTOLOGY, VIRUS

612 Larionov, G.V., Baranovskiy, V.I. 1979.
Effect of virus infection on lytic activity of hemolymph in *Ocneria dispar* L. and *Dendrolimus sibiricus* Tschetv. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (2):131-135.
-- In the late 1960s, it was found that immunity of insects to most gram-positive bacteria resulted from the presence of a lyzozyme. The authors studied bacteriolytic activity of hemolymph of gypsy moth and Siberian moth larvae during a period of virus disease. Analysis of the data obtained showed that response to the organisms by the larvae infected with a nuclear polyhedrosis virus was analogous to the response to inoculation of bacterial cultures. As a result, bacteriolytic properties of hemolymph were enhanced. Based on different lytic

activity of hemolymph of larvae from different populations, it is suggested that there must be a correlation between the level of bacteriological activity of hemolymph and organism resistance to infection.
WSiberia; BACTERIA, HEMOLYMPH, VIRUS, MICROBIAL PESTICIDES

613 Lazareva, A.I., Ogorodnikova, V.I., Pareva, V.V., Dvortsova, R.A. 1980.
Microbiopreparations in town plantings. Zashchita rasteniy. 8:35-36.
-- Pure bacterial preparations of Bacterin, Dendrobacillin, and Gomelin were mixed with small doses of insecticide and tested against phyllophagous pests. When applied together, doses of bacterial preparations were 3 to 5 times lower and doses of insecticide were 4 to 5 times lower. For better adhesion, aqueous-oil suspension was used. Efficiency of the preparation was calculated by the Abbot formula. Tests were conducted in Bashkiria where Gomelin (2%) proved to be the most effective bacterial preparation for gypsy moth control. Only chlorophos and phosphoamid can be applied; Carbophos inhibits activity of bacterial preparations, even when used in small doses.
EEast; CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, NUMERICAL DATA

614 Lebedev, A.G. 1935.
Materials on the study of biocenosis in a deciduous forest. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Kiev: 19-56.
-- The gypsy moth is mentioned as a common species among lepidopterous insects of the forests of Kiev Province. Adults fly from late June to early August.
EWest; PEST LIST

615 Leskova, A.Y. 1968.
Histopathology of some larvae when infected with *Bacillus thuringiensis* var. *galleriae*. In: Biologicheskiye metody bor'by s vreditelyami rasteniy. Riga: 87-92.
-- Pathological changes in the mid-intestine of three insect species, the cabbage white moth, the winter moth, and the gypsy moth were studied. These changes resulted from insects infected with the entomopathogen *B. thuringiensis* var. *galleriae*. Larvae were infected through food sprayed with a suspension of spores the quantity of which ranged from 3 billion to 300,000 per 1 ml. The intestine of gypsy moth larvae continues to function until the death of the insect. Epithelial cells are injured slightly, exfoliating from each other and from the basal membrane. The entomopathogenic bacillus multiplies in the mid-intestine of live larvae and in most cases larvae die of septicemia.
BACTERIA, BIOASSAY, HISTOLOGY, MICROBIAL PESTICIDES

616 Levitina, T.L., Kozlov, E.A., Ovander, M.N., Serebryanyy, S.V. 1981.
Tryptic peptides of the body inclusion proteins of a nuclear polyhedrosis virus of the gypsy moth, *Porthetria dispar*. Bioorganicheskaya khimiya. 7(7):95-985.
BIOCHEMISTRY, VIRUS

617 Levitt, N.N. 1934.
Pupal variability and imago fecundity in the gypsy moth *Porthetria dispar* L. In: Trudy Institutu zoologii ta biologii VUAN. Zbornik prats' viddilu nazemnykh tverin. Tom 2, vyp. 2. Institut zoologii VUAN, Kiev: 135-170.
-- Correlation between gypsy moth imago fecundity and pupal weight and size was studied on insects from two populations: Kiev (eruption phase of gradation) and Crimean (crisis). Pupal weight variation coefficient in the crisis period is larger than at the eruption phase. Practical applicability of these coefficients is discussed.
EWest; FECUNDITY, MODELS, MORPHOMETRICS

618 Likhovidov, V.Ye., Mironik, I.N. 1982.
Organization of forest-pathologic surveillance in the forests of Soviet Moldavia. Lesnoye khozyaystvo. (6):55-57.
-- Surveys were conducted using universally accepted procedures of forest pest inventory.
EWest; MONITORING

619 Likhovidov, V.Ye., Mironik, I.N., Kobelkov, M.Ye., Gubin, A.S. 1981.
Virin-ENSh effectiveness for gypsy moth control in the forests of Moldavia. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 118-120.
-- The preparations tested were dispersed from the ground and from the air. Stands of low density (0.25 egg masses per tree), and of medium density (2.4 egg masses per tree) were sprayed with the preparation from the ground. In low and medium foci populations no decrease in pest number resulted; contrarily, an increase in gypsy moth population was observed both in the control and in the experiment. In the high density foci, pest populations sharply decreased by 94% in the sites treated with Virin-ENSh.
EWest; DENSITY, EGG MASSES, MICROBIAL PESTICIDES, VIRUS

620 Likventov, A.V. 1954.
Effect of food regimen on gypsy moth growth and development. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 64-74.
-- Gypsy moth larvae were fed oak, apple and linden and differences were reflected in larval condition and sex ratio. Feeding on young oak leaves resulted in domination of females, which comprised about 75% of the adults. Linden appeared to be an unfavorable food species as mortality increased significantly. There also were differences in physiological properties of larvae feeding on different species. Higher survival of larvae and 100% survival of pupae was recorded under laboratory conditions in contrast to the natural population.
ECentral; HOST PLANTS, REARING

621 Likventov, A.V. 1955.
Fecundity, egg weight, and progeny survival in the gypsy moth. Zoologicheskiy zhurnal. 34(5):1061-1065.
-- An increase in female fecundity is correlated with lower egg weight. There is a decrease in hatching rate and

survival of insects from lower weight eggs. An inverse relation between the number of deposited eggs and their weight is not always true, as deviations are typical of small females. Counts made for predicting pest outbreaks should be based both on the number of eggs per mass and on egg weight. An outbreak is rare if the weight of an egg ranges from 0.45 to 0.65 mg. A numerical increase of a population occurs when the egg weight is more than 0.8 mg.
ECentral; EGGS, FECUNDITY, NUMERICAL DATA, PROGNOSIS

622 Likventov, A.V. 1957.
Effect of diet change on gypsy moth generations. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 88-98.
-- Gypsy moth population condition is highly affected by larval feeding conditions, a change of food plant with generation in particular. A positive effect is produced if larvae of the first generation feed on unfavored food (linden) and larvae of the second generation feed on favored food (oak). In such situations, survival increases, percentage of females in the entire offspring increases, and the weight of eggs is relatively high. Feeding on unfavored species (linden) in the course of two generations causes further weakening of the population, resulting in a much lower offspring number than in cases when other variants of food change were chosen. Higher egg weight, however, is a sign of high viability of future offspring sufficient to maintain or increase populations.
ECentral; EGGS, HOST PLANTS, REARING

623 Likventov, A.V. 1958.
Experience on gypsy moth control. Vestnik sel'skokhozyaystvennoy nauki. (4):109-110.
-- A gypsy moth outbreak started in Belgorod Province in 1953. During the first stage, egg masses were treated with petroleum; in 1955-1956 this treatment was combined with DDT treatments. It is believed that these measures contributed to the reduction of the pest population while preserving major entomophages. The outbreak was suppressed and by 1957 was eliminated.
ECentral; CHEMICAL INSECTICIDES

624 Likventov, A.V. 1960.
The retarding effect of oak-linden forests on gypsy moth outbreaks. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 33-40.
-- The condition of gypsy moth foci in some forestries of Voronezh, Tula, and Belgorod Provinces was studied. Results of surveys suggest that in mixed stands with a high percentage of linden, the gypsy moth population is in a suppressed state. Therefore, stands where linden comprises not less than 20% can be recommended as shelterbelts as they can control gypsy moth populations. Gypsy moth population suppression in oak-linden stands may result not only from unfavorable feeding conditions but from changes in microclimate; i.e., higher humidity and lower lighting under the tree canopy.
ECentral; HOST PLANTS, STAND COMPOSITION

625 Lindeman, K.E. 1869.
Critique of measures of insect pest control. Russkoe sel'skoe khozyaystvo. (1):304-337.
-- A gypsy moth outbreak was recorded in Saratov Province in 1868; forests and orchards were heavily attacked. Treatment of orchards with arsenic preparations had little effect, and destruction of egg masses by collecting or treating with petroleum is suggested as an effective control measure. The number of entomophages in the foci should be considered before pest control measures are undertaken.
ECentral; CHEMICAL INSECTICIDES, CONTROL, EGG MASSES

626 Lindeman, K.E. 1894.
Gypsy moth from the city of Moscow. Sel'skiy khozyain. 40:832-833.
-- Gypsy moth adults flying in great numbers were observed in Moscow. In many provinces of central Russia, pest outbreaks were recorded from 1890 to 1894. Gypsy moth egg masses are described in detail, and it is suggested that they be destroyed in city parks and gardens by scraping them off or treating them with petroleum. After egg hatch, it is recommended that larvae be collected.
ECentral; CONTROL, EGG MASSES, FLIGHT

627 Lindeman, K.E. 1894.
Control measures against the gypsy moth in the Novolil area of the Tula region. Sel'skiy khozyain. 44:906-907.
-- A high density of pest egg masses (up to 90 egg masses per tree) was observed in gardens and forests of the Province. It was suggested that they be collected and destroyed at least in the orchards. To compare expenditures and effect, treatment with petroleum was performed also.
ECentral; CONTROL, EGG MASSES

628 Lindeman, K.E. 1895.
The gypsy moth. In: O nasekomykh vredyashchikh lesam i merakh ikh istrebleniya. Moscow: 133-157.
-- Data are given on gypsy moth outbreaks in central and east Russia since the late 1860s. A single defoliation of forest species did not result in death of healthy trees, and caused only some loss of increment during the outbreak year. The damage to orchards was more pronounced and there was no crop in the year of defoliation. Pest polyphagy is discussed and a list of food plants is given. The reference includes data on pest phenology and biology, entomophages, and diseases. Control measures such as egg mass destruction and sticky belts are suggested.
ECentral, EEast; CONTROL, DEFOLIATION, PARASITES, PREDATORS, TREE HEALTH

629 Lipskiy, V.G. 1983.
The gypsy moth. Zashchita rasteniy. (10):64.
-- Species ecology and principal control measures are outlined.
EWest; CONTROL, GENERAL BIOLOGY

630 Litvinchuk, L.N. 1988.
Patterns of establishment of the gypsy moth population during the stage of depression in Priobsk

forest-steppe. In: Nepamyy shelkopryad: itogi i perspektivy issledovanniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 32-33.
-- Gypsy moth population structure was studied in the floodplain forests of the upper reaches of the Ob River from 1983 to 1985. The objective was to determine what food plants of Ob forests were preferred by the pest during a population depression. Larvae were reared on 4 major species: birch, willow, bird cherry, and hawthorn, with the density of insects ranging from 5 to 50 in the variant. Principal biological parameters (survival, weight, fecundity) were estimated. The different pupal weights were determined by food species and density of insects, decreasing in the following order: willow, bird cherry, hawthorn, birch; there was an increase in the number of insects in the variant. In the collapsing focus, the mean value of pupal weight at the depression phase becomes relatively independent of the food plant on which larvae develop. Generally, average fecundity of females is equal on each species tested, but groups of heavier insects can appear on willow. It is a micropopulation of high productivity that can drastically increase density. A conclusion is made that the character of insect-plant trophic relations is different at different stages of gypsy moth population gradation, the most stable trophic relations being with willow and bird cherry.
WSiberia; DENSITY, DEVELOPMENT, HOST PLANTS, REARING

631 Litvinchuk, L.N. 1988.
Patterns of trophic relations between the gypsy moth, *Lymantria dispar* L. (Lepidoptera, Orgyidae) and pine trees in the forests of the Ob River Basin. In: Voprosy ekologii bespozvonochnykh. Tomsk University, Tomsk: 7-13.
-- In the forests along the Ob River, gypsy moth egg hatch occurs when needles are viable on pine shoots of the current year. Trophic relations between pest larvae and pine are established in the year when phenophases of the gypsy moth and pine coincide.
WSiberia; HOST PLANTS, PHENOLOGY

632 Logoida, S.S. 1978.
Gypsy moth outbreak in oak forests of the Carpathian region and its population dynamics during the period 1970-1976. Nauchnyye doklady vysshey shkoly, biologicheskiye nauki. (2):59-65.
-- Data are given on gypsy moth outbreaks in oak groves of the Carpathian region for the last 50 years. During some years, qualitative and quantitative parameters of the pest population were studied. On the basis of these studies, pest distribution and population dynamics are described, taking into account the effect of biotic and abiotic factors as well as the impact of eradication measures.
EWest; POPULATION DYNAMICS

633 Logoida, S.S. 1982.
Recommendations on updating the inventory of gypsy moth pupal and larval density. In: Rekomendatsii po okhrane prirody Karpat v svete resheniy 24-go s"yezda KPSS. Uzhgorod: 131-135.
-- To make a scientific forecast of gypsy moth population dynamics, accurate data on population density during the period in question are needed. A mathematical method for calculating the number of model branches needed in relation to egg mass density in different cenoses is suggested so that detailed, reliable, labor-saving monitoring of the pest at larval and pupal stages can be conducted.
EWest; DENSITY, LARVAE, MODELS, SAMPLING

634 Logoida, S.S. 1988.
An interval estimation of the degree of gypsy moth infestation. Lesnoye khozyaystvo. (12):42-43.
-- Sequential estimation of the rate of oak stand infestation by the gypsy moth in the Carpathian region is presented, including interval estimation of the ecological density of the population.
EWest; DENSITY, MODELS, SAMPLING

635 Logoida, S.S. 1988.
Some results of a forecast-aimed study of gypsy moth in oak groves of the Carpathian region. In: Nepamyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 23-34.
-- The gypsy moth is a serious pest of plain oak forests of the Carpathian region. Outbreaks have been recorded since 1916; nine gradation phases are recognized. The author studied the outbreaks of 1964-1967, 1970-1979, and 1986. Primary pest outbreaks originate mainly in light stands without undergrowth. An outbreak starts during the second or third year of a dry period, during larval and pupal stages, and the flight season of adults. Hibernation conditions do not affect population development. Major diseases are polyhedrosis and microsporidiosis. Parasites and predators are the most effective biotic factor causing pest population reduction. The author extracted 35 entomophagous species from larvae and pupae: 10 ichneumonid species, 6 braconid species, 2 chalcid species, 11 tachinid species, 4 sarcophagid species, 1 muscid species, and 1 parasitic nematode species. Four larval morphotypes are distinguished in the population: dark grey, light grey, larvae with a black dorsal stripe, and yellow. The morphotype ratio reflects the condition of the population. Suggestions for forecasting pest populations are given.
EWest; COLOR POLYMORPHISM, MICROSPORIDIA, PARASITES, PREDATORS, PROGNOSIS, STAND COMPOSITION, VIRUS, WEATHER

636 Logoida, S.S. 1990.
The effect of pyrethroids on destructive and beneficial entomofauna of oak groves. Lesnoye khozyaystvo. (6):52-53.
-- In 1987, an investigation in the Carpathian forests was conducted to study the efficacy of six pyrethroids to control an oak pest phyllophage complex. Their effect on beneficial entomocomplexes of oak phytocenosis also was studied. Being highly effective against phytophages, these preparations all have a negative effect on beneficial entomofauna. Pyrethroids should be applied only in early spring to ensure effectiveness.
EWest; CHEMICAL INSECTICIDES

637 Lopatina, N.V. 1971.

A comparison of the effect of phytoncide and toxic chemicals on the gypsy moth and the tent caterpillar. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Shtiintsa, Kishinev: 213.
-- Phytoncides of iris and desert-candle possessing insecticide properties were tested. Phytoncide and insecticide doses equal to LD 50 for the early fourth instar were fed to insects. As a result of phytoncide action, death of insects or disruption of their physiological processes were observed throughout the experiment. Comparative data suggest a similar inhibitory effect of phytoncides and insecticides on insect organisms.
NATURAL PLANT PRODUCTS

638 Lopatina, N.V. 1974.
The effect of phytoncides on the midgut structure and on some metabolic prosesses in the silkworms. In: Patologiya chlenistonogikh i biologicheskiye sredstva bor'by s vrednymi organizmami. Tezisy dokladov I gorodskoy konferentsii. Kiev: 106-108.
-- Fourth instars of the silkworm, the gypsy moth, and the tent caterpillar were used in the experiments. Diluted phytoncides of Tien Shan iris and desert-candle 1:30 and 1:600, and the synthetic analogue of garlic phytoncide, pseudoallicin-323 (1:300) were orally administered to the insects. For reference, the insecticides Sevin (0.025) and methation (0.05) were fed to the larvae. Phytoncides clearly exhibited insecticidal properties, causing changes in the alimentary canal, a reduction of storage substances (total lipids), and a decrease in insect respiration intensity. Additionally, phytoncides have a long-term effect on insect physiology while application of insecticides does not lead to irreversible physiological changes.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS, PHYSIOLOGY

639 Lozinskiy, V.A. 1960.
Effect of flood waters on the occurrence of lepidopterous pest foci. Zoologicheskiy zhurnal. 39(10):1515-1520.
-- Infestation of willows with gypsy egg masses was studied in the floodplains of rivers in the Zacarpatye and Odessa Provinces. Absolute and relative infestation by the gypsy moth is much higher in the flooded area of stands than in the unflooded area. Surveys show that in the unflooded area a large number of entomophages congregate in the litter, while in the flooded area the litter is removed by flood in spring. In unflooded plots, the physiological condition of trees is better; there are more tannins in the leaves, which inhibit larval development. In addition, foci usually occur in the sites where soil is compacted as a result of floods or other factors, such as cattle grazing.
EWest; FOLIAGE CHEMISTRY, SITE CONDITIONS

640 Lozinskiy, V.A., Romanova, Yu.A. 1965.
Effect of favorable components in gypsy moth foci in flood-plain forests of the Dniester River Basin. In: Issledovaniya po biologicheskomu metodu bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Novosibirsk: 92-94.
-- In 1958-1959, entomological investigations and inventories were made in gypsy moth foci in natural willow stands of the Dniester Delta. Outbreaks were recorded from 1947-1952, and from 1954-1959. In 1959, epizootics reduced pest numbers. In the foci located in the unflooded area there were 7.6 larvae of *Calosoma calidum* per 1 sq. m, 2.3 braconid adults, and 0.2 tachinid adults in the litter. Dermestids and birds attacked 9.7% of the egg masses in the flooded area of the focus, and 51.3% in the unflooded area; egg parasitism comprised 69-40.3% and 8.2%, respectively. No chemical treatments were applied, which contributed to the preservation of entomophages.
EWest; BIRDS, NUMERICAL DATA, PARASITES, PREDATORS

641 Lozovoy, D.I. 1941.
Destructive entomofauna in the forests of Georgia. In: Trudy zoologicheskogo sektora Gruzinskogo filiala AN SSSR. Tbilisi: 191-207.
-- The gypsy moth is mentioned among 25 lepidopterous insects that are important forest pests in Georgia. A great number of egg masses were found on sea buckthorn (*Hippophae rhamnoides* L.) in Batumi in the autumn of 1938.
Caucasus; OVIPOSITION SITE, PEST LIST

642 Lozovoy, D.I. 1948.
Insect pests of parklands in the city of Tbilisi. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 3-14.
Caucasus; PEST LIST

643 Lozovoy, D.I. 1953.
The gypsy moth in park and forest stands of Georgia. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 12-24.
Caucasus; GENERAL BIOLOGY

644 Lozovoy, D.I. 1954.
Ecological and geographical features of the most important forest insect pests and criteria for their control in Georgian SSR. In: III ekologicheskaya konferentsiya. Tezisy dokladov. Kievskyi gosudarstvennyi universitet, Kiev: 142-147.
-- Data are given on pest complexes inhabiting different forest plants in Georgia. The gypsy moth is found in lowland paludal alder-poplar forests, in broad-leaved lowland forests, flood plain forests, and in mountain forests of the lower belt in which various oak species dominated. The gypsy moth is regarded as a pest of alder, poplar, oak, and willow.
Caucasus; HOST PLANTS, PEST LIST, STAND COMPOSITION

645 Lozovoy, D.I. 1956.
Ecological, geographical and distributional patterns of the most important insect pests and principal control measures in Georgian SSR. Zoologicheskiy zhurnal. 35:365-372.
-- The gypsy moth is recorded as an important pest of various hardwood species in forest biocenoses of Georgia. In lowland forests of western Georgia, it attacks alder and poplar, has outbreaks in broad-leaved lowland forests and mountain forests of the lower belt where various oak species prevail. Species composition of

important pests in the forests of West Georgia is quite different from that found in East Georgia.
Caucasus; HOST PLANTS, STAND COMPOSITION

646 Lozovoy, D.I. 1956.
Insect pests in the park and forest-park stands of the city of Rustavi. In: Vestnik Tbilisskogo botanicheskogo sada. Tbilisi: 179-192.
-- The gypsy moth is an important outbreak species of the stands near Rustavi. Protective measures must be based on correct selection of species composition of parklands.
Caucasus; HOST PLANTS, PEST LIST, STAND COMPOSITION

647 Luchnik, V. 1925.
A list of insects damaging plants in the Stavropol area in 1924. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 9-15.
-- The list of pests includes 49 insect species, with the gypsy moth mentioned among 12 important lepidopterous pests. Its numbers are usually limited, but in 1923-1925 an outbreak (40 to 60 egg masses per tree) was recorded. During the outbreak, larvae defoliated all trees and shrubs except ash and pear.
Caucasus; DENSITY, EGG MASSES, PEST LIST

648 Luchnik, V. 1926.
A list of insects damaging plants in the Stavropol area in 1925. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 12-24.
-- The gypsy moth is listed among 96 pests of plants. In 1925, the outbreak collapsed but new foci originated in some locations. The most active entomophages in the foci were larvae and adults of *Calosoma*. Also mentioned are *Xylodrepa quadripunctata* L. and *Thrombidium* species, which destroy eggs.
Caucasus; PEST LIST, PREDATORS

649 Luchnik, V. 1927.
A list of insects damaging plants in the Stavropol area in 1926. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 33-38.
-- Forty-three pest species are mentioned, including the gypsy moth. It is believed that further decrease in pest number was mainly due to entomophages. *Calosoma* was the most active entomophage destroying gypsy moth larvae and pupae.
EWest; PEST LIST, PREDATORS

650 Luchnik, V. 1928.
Insect pests in the Stavropol area in 1927. In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 22-31.
-- The gypsy moth is mentioned among 95 species. In the period reported, the species is in depression and few individuals are recorded.
Caucasus; NUMERICAL DATA, PEST LIST

651 Luky'anov, M. 1893.
***Ocneria dispar* L. in Tula region.** Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. 23(4):34-38.
ECentral; GENERAL BIOLOGY

652 Lyamtsev, N.I. 1981.
Biometric dependence of gypsy moth fecundity on the body size of its pupae and larvae. In: Rol' nauki v sozdanii lesov budushchego. Tezisy dokladov Vsesoyuznoy konferentsii, Pushkino. Leningrad: 165-166.
-- In 1978, in oak shrubwoods of Saratov Province, a strong correlation of fecundity to weight and length of gypsy moth female pupae, to wing length of adult and to the product of pupal length by width was established. Correlations obtained provide a means for estimating fecundity even at low density levels.
ECentral; FECUNDITY, MODELS, STAND COMPOSITION

653 Lyamtsev, N.I. 1981.
The effect of stand composition on some indicators of gypsy moth population dynamics. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Pushkino: 122-124.
-- Surveys were made in Saratov Province from 1977 to 1980. It was found that the most important stand characteristic was the proportion of favored food species positively correlating to gypsy moth population density. During the outbreak period, the correlation coefficient is lower, the pest ecological valence is higher, and it occupies a greater variety of stations. The species most favorable to the gypsy moth are oak shrubwoods of the third or fourth age class, third or fourth quality class, 0.4-0.8 density, and with few non-oak species. Much less favorable are mixed stands in which oak comprises less than 70%. Pest aggregation increases as its density decreases, while during an outbreak infestation of different forest plots it becomes uniform. Stand structure also is important for population quality, and egg weight is considerably higher in the stands favorable for gypsy moth development.
ECentral; STAND COMPOSITION

654 Lyamtsev, N.I. 1981.
Forecasting the quality of a gypsy moth population by egg weight. Lesnoye khozyaystvo. (4):60-61.
-- Correlations between egg weight, survival, the number of eggs per mass, and gypsy moth multiplication coefficient can be used for forecasting pest populations.
ECentral; EGGS, MODELS, POPULATION QUALITY, PROGNOSIS

655 Lyamtsev, N.I. 1981.
Distributional pattern of the gypsy moth egg masses in connection with changes in its abundance. (Kharakter raspredeleniya plodovitosti neparnogo shelkopryada v svyazi s izmeneniyem ego chislennosti.) VNII lesovodstva i mekhanizatsii lesnogo khozyaistva, Pushkino. 7 p. (Deposited Document. TsBNTI Leskhos N.77-LD)
-- Peculiarities of gypsy moth egg mass distribution by egg size and number in 1977 to 1980 are shown. Distribution is not normal and exhibits positive asymmetry. The highest value of the asymmetry coefficient characterizes the transfer from the outbreak culmination to the crisis phase. In a low gypsy moth population,

density distribution is close to normal. The asymmetry coefficient changes regularly with pest variability, fecundity, population density, population quality, and gradation phase; hence, it can be used in forecasting a pest population.
ECentral; EGGS, EGG MASSES, PROGNOSIS, SAMPLING

656 Lyamtsev, N.I. 1982.
Estimation of gypsy moth fecundity by egg mass size. In: Molodyye uchenyye v sovershenstvovanii teorii i praktiki vedeniya lesnogo khozyaystva. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva, Pushkino, 1982. Pushkino: 150-153.
-- The least labor-consuming method of estimating actual fecundity of the gypsy moth is by a regression equation describing the correlation between egg mass size and the number of eggs it contains. Investigations carried out in the Saratov Province from 1977 to 1980 prove that variation in length and width of egg masses can account for about 70% of the difference in the number of eggs in the mass. Parameters of the coupling equations described in detail in this publication differ at different gradation phases as egg weight and egg mass dimensions change. So, the model obtained is more fit for the crisis phase and the depression period of the gypsy moth population.
ECentral; EGG MASSES, MODELS, MORPHOMETRICS, SAMPLING

657 Lyamtsev, N.I. 1983.
Impact of weather on changes in gypsy moth density. In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstba i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 188-194.
-- Data obtained from 1978 to 1982 show that warm, dry weather is favorable for gypsy moth development in the Saratov Province, particularly for development of early instars. Hard frosts during this period and during egg hatch produce a negative effect on the population, causing immediate death of larvae, lower viability due to the freezing of leaves, and the disruption of synchronous development of the gypsy moth and its food plant. A positive correlation is established between the lowest temperature in the developmental period of instars I and II, and the multiplication coefficient. Winter frosts with the lowest temperature at 40° C do not cause the death of embryos if egg masses are below the level of snow cover. Gypsy moth fecundity increases as the average temperature rises to a certain limit, about 21° C, in July and August, when later instars develop, adults fly and oviposit. The period of larval and pupal development was the longest in 1978 (80 days) and the shortest (65 days) in 1981. The mean air temperature was 14.7° C and 18.5° C, respectively.
ECentral; DEVELOPMENT, TEMPERATURE, WEATHER

658 Lyamtsev, N.I. 1984.
Color index of gypsy moth larvae and a prediction of its density. In: Nauchno-tekhnicheskoye tvorchestvo molodykh uchenykh - lesnomu khozyaystvu. Materialy VII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Pushkino: 198-202.
-- As a result of surveys of gypsy moth populations made in the Saratov Province from 1978 to 1983, instars IV to VI were subdivided into 3 morphotypes: grey, red, and black. At the crisis phase, the proportion of red larvae declined from 36-40% in the fourth instar to 1-4% in the sixth instar, while the proportion of grey larvae increased from 58-63% to 96-98%. The proportion of black larvae declined insignificantly over this period. Parasitism of red larvae by Apanteles was two times higher and their sex index (0.13-10.18) three times lower when compared to grey larvae. Larval morphotype ratio regularly varied in the course of gradation, which makes it useful for forecasting gypsy moth populations. At the crisis phase and in the period of depression, the occurrence of grey, red, and black instar V was 82.0, 17.5, and 0.5%, respectively. The onset of an outbreak is characterized by a decrease in the proportion of red larvae and the predominance of grey larvae (95% and higher), which are more viable.
ECentral; COLOR POLYMORPHISM, POPULATION FLUCTUATION, PROGNOSIS

659 Lyamtsev, N.I. 1986.
Fecundity as an indicator of gypsy moth population dynamics. In: Materialy VIII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Moscow: 126-129.
-- As a result of surveys in oak shrubwoods of the Saratov Province, a strong correlation is established between the number of eggs in a mass and the initial density of a gypsy moth population (r = 0.938), temperature in July (r = 0.642), multiplication coefficient for the generation to come (r =0.780), and food quality and quantity. Variation in fecundity is an important intrapopulation regulatory mechanism. To estimate fecundity, the number of eggs per mass should be taken into account as well as mean egg weight. The value of these parameters is the lowest in the period of outbreak culmination (172 +- 5.1 eggs, 0.674 +- 0.005 mg). The crisis phase and the period of depression are characterized by maximum egg weight (0.816-0.846 mg), while fecundity is somewhat lower than average (230-286 eggs). When the depression period is over, the number of eggs per mass drastically increases (up to 370-427 eggs) and the egg weight is average (0.740-0.790 mg).
ECentral; DENSITY, FECUNDITY, PROGNOSIS

660 Lyamtsev, N.I. 1986.
A study of ecological-populational indicators of gypsy moth density prognosis in oak groves of the forest steppe. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 20 p.
-- Data on gypsy moth ecology in the Saratov Province were obtained at a low population level. The role of intrapopulational mechanisms and other biotic regulatory mechanisms is shown. It is established that population condition and structure change in the flex points of a gradation curve, and they change gradually at all phases of population decrease and increase. A full quantitative description of population parameters is given for the first

time, including their interrelations and variations with gradation phases. Asymmetry of fecundity value distribution and the rate of population aggregation in space are suggested as criteria for gradation phases. Relation of population parameters (birth rate, mortality, fecundity, multiplication coefficient) to the number and condition of gypsy moth populations in the previous gradation, weather conditions, and stand structure is analytically expressed. These data can be used to forecast species population in the forest-steppe.
ECentral; MODELS, PROGNOSIS

661 Lyapchenko, L.V. 1969.
The gypsy moth and the browntail moth in forests of Tatarian SSR and Ulyanovsk area and their control. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (4):152-153.
ECentral; CONTROL, GENERAL BIOLOGY

662 Lyashenko, L.I. 1981.
The use of pyrethroid insecticides and Dimilin against folivorous insects. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 124-126.
-- In Rostov and Lipetsk Provinces, forests damaged by the gypsy moth were treated with a pyrethroid (25% Ambush) and Dimilin. The 25% Ambush caused 98.2% mortality of instars II and III, and the expenditure rate was 12.5 g/ha. Autumn counts of egg masses of the next generation showed a decrease or more than 98% in the pest population. Dimilin caused 99.0-99.3-89.1% mortality of gypsy moth larvae, the expenditure rate being 62.5, 31.25, and 10.0 g/ha, respectively. A general decrease in the number in the third variant was 99.3%, counted by egg masses. In the next generation, 45.3% of the eggs were unfertilized as a result of the tetratogenous effect of Dimilin. The bulk of gypsy moth larvae die 10 to 18 days after treatment.
ECentral; CHEMICAL INSECTICIDES, GROWTH REGULATORS

663 Lyashenko, P.I., Andreeva, G.I. 1979.
The use of Dimilin for control of forest pests. Zashchita rasteniy. (6):3-21.
EWest; GROWTH REGULATORS

664 Lysenko, M.A., Abdulaev, A.A. 1968.
Dynamics of larval mortality in some lepidopterans when treated with allicin analogues. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. Kiev: 124-127.
-- Survival of different instars of the gypsy moth and the tent caterpillar, when treated with pseudoallicins, was studied. Pseudoallicins revealed a more pronounced insecticidal effect than allicin. Insect survival depended on species and instar in which they were treated and on the preparation concentration.
EWest; BIOASSAY, NATURAL PLANT PRODUCTS

665 Lysenko, M.A., Cherbanik, D.D., Zhuk, Ye.Ye. 1970.
Changes in survival and hemolymph cell composition in gypsy moth after treatment with phytoncides. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 62-66.
-- Gypsy moth survival and hemolymph cell composition of larvae subjected to the action of nine phytoncides in the second instar were studied. Preparations were found to possess different insecticide properties and to cause 6% to 50% mortality of insects. In the hemolymph of the larvae treated with phytoncides, the content of proleucocytes and macronucleocytes decreases while the content of phagocytes, enocytes, pathological and dead cells increases. The preparation produced from Haplophyllum obtusifolium Lebed. appeared to produce the most toxic effect on gypsy moth larvae.
EWest; BIOASSAY, HEMOLYMPH, NATURAL PLANT PRODUCTS

666 Lysenko, M.A., Zemkova, R.I., Shvachko, N.V. 1976.
Patterns of food specialization in first-instar gypsy moth larvae. In: Nauchnyye trudy Ukrainskoy sel'skokhozyaystvennoy akademii. Zashchita rasteniy ot vrediteley i bolezney. USKhA, Kiev: 12-13.
-- Food specialization of first instars of the gypsy moth was studied. Twenty-five plant species were tested. Selection of food by first instars is determined by the degree of leaf coarseness. Some tree species, late oak, for example, are not attacked by the gypsy moth as tree foliation and pest egg hatch occur at different times. As leaves grow coarse, favored food species (early oak, quince) become unsuitable for feeding by first instar gypsy moth. Life cycle and food specialization of the gypsy moth prove to be strongly correlated to food species.
EWest; FOLIAGE QUALITY, HOST PLANTS, PHENOLOGY, REARING

667 Lyubarskiy, L.V., Nakonechny, V.I. 1970.
Entomophages of the gypsy moth population, *Ocneria (Lymantria) dispar praeterea* Kand. (Lepidopetera, Orgyidae), in Priamurye. In: Sbornik trudov Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 221-230.
-- Ecological peculiarities of the local form of gypsy moth in Amur Province are considered. The species of the primary entomophages of the pest include 40 species of 25 genera (3 braconid species, 3 ichneumon species, 24 tachinid species, 8 sarcophagid species, 2 muscid species). Peculiarities of parasite complex are discussed and the effect of entomophages on gradation of the gypsy moth population in the Amur Province is described.
Far East; PARASITES, POPULATION DYNAMICS

668 Makaryan, M.Ya., Avetyan, A.S. 1931.
***Porthetria (Lymantria, Ocneria) dispar* L.** In: Obzor vrediteley sel'skokhozyaystvennykh i lesnykh rasteniy Armenii. Erevan: 29-30.
-- The gypsy moth is a common species in the Araks River valley. Major food plants it infests in the agricultural region of Armenia are apple, pear, quince, apricot, plum, and willow. In 1929 an insignificant pest focus was registered. Species ecology and behavior include nocturnal migrations and sheltering in the daytime (at the butt, under hedge stones, in cracks in the bark).
Caucasus; BEHAVIOR, HOST PLANTS, LARVAE

669 Makhnovskiy, I.K. 1955.
The gypsy moth, *Ocneria dispar* L. In: Vrediteli zashchitnykh lesnykh nasazhdeniy Sredney Azii i mery bor'by s nimi. Gosizdat Uzb.SSR, Tashkent: 166-169.
-- The gypsy moth, one of the most serious pests of plantations and hardwood forests in Central Asia, is an outbreak species whose main enemies are cuckoos and *Calosoma*. The author describes life stages, major food plants, phenology, and some ethological peculiarities. Collection of egg masses and treatment with petroleum as well as DDT and calcium arsenite are suggested as control measures.
MAsia; CHEMICAL INSECTICIDES, CONTROL, PREDATORS

670 Makhnovskiy, I.K. 1966.
The gypsy moth. In: Vrediteli gornykh lesov i bor'ba s nimi. Lesnaya promyshlennost', Moscow: 70-71.
-- A serious pest of mountain nut forests in Central Asia, the gypsy moth's primary foci originate in light stands. In closed stands of a mountain forest belt, the pest does not produce stable foci and, as a rule, damage is insignificant. Outbreaks are recorded on pistachio in southern Kirgizia, in mountain forests and apricot orchards of Turkmenistan, in Uzbekistan, and in southeastern Kazakhstan. Data on general species ecology in the region suggest that pest fecundity is 100 to 650 eggs, sometimes as high as 1,500; egg masses are usually deposited at the tree base, but sometimes can be found at a height of 4 to 5 m.
MAsia; FECUNDITY, OVIPOSITION SITE, STAND COMPOSITION

671 Makhnovskiy, I.K. 1972.
Insect pests, their biology and control in the mountainous forests of Middle Asia. Avtoreferat dissertatsii doktora biologicheskikh nauk. Tashkent. 50 p.
-- Polytrophic phyllophages such as the gypsy moth are, as a rule, pests of secondary importance in nut forests in Central Asia. Major entomophages consuming these pests are dipterans and *Calosoma*.
MAsia; GENERAL BIOLOGY

672 Makhnovskiy, I.K., Romanchenko, K.Ye., Chebotarev, I.N. 1963.
Nut woodlands and their protection in Kirgizia. In: Orekhoplodnyye lesa Kirgizii i okhrana ikh ot vrediteley. Kirgizgosizdat, Frunze: 154.
MAsia; CONTROL

673 Malokvasova, T.S. 1973.
Susceptibility of the gypsy moth to infection with *Bacillus entomocidus* var. *entomocidus* in test experiments. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Ispol'zovaniye i vosproizvedeniye lesnykh resursov Dal'nego Vostoka. Dal'NIILKh, Khabarovsk: 333-337.
-- Gypsy moth larvae were infected with different doses of *B. entomocidus* var. *entomocidus* in a laboratory experiment. Pathogenicity of the bacillus tested for gypsy moth larvae was established, and the relation of disease generalization to infection rate was noted.
Far East; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

674 Malokvasova, T.S. 1983.
Efficacy of preparation made on the basis of *Bacillus thuringiensis* Berl. for gypsy moth control in Primorye region. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 140-146.
-- In laboratory and field experiments in southern Primorye from 1972 to 1981, resistance of gypsy moth larvae to inoculation with crystal-forming bacteria was found to be relatively high in the period of population increase. Therefore, extermination by application of bacterial preparations seems unreasonable during this period. The results of biological control can be improved by application of highly virulent natural isolates. Early and middle instars collected at the eruption phase of a gypsy moth outbreak are highly sensitive to bacterial preparations, while later instars are more resistant to crystallophorous bacteria. Middle instars are more sensitive at the crisis phase than at the prodromic and eruption phases of an outbreak. Higher sensitivity is the result of the accumulation of latent infections and the associated deterioration in physiological condition. Environmental conditions, primarily temperature and humidity, are not important factors affecting the entomocidal activity of preparations. The optimum dose for killing early and middle instars is a bacterial suspension of a titer of 1 billion spores per 1 ml of liquid.
Far East; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES

675 Malokvasova, T.S. 1988.
Crystal-forming bacilli in gypsy moth population in the Far East and their biological activity. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 39.
-- Collection of healthy gypsy moth specimens for microscopic examination and microbiological assay beginning in 1969 covered different gradation phases. Data were obtained on inoculation of the gypsy moth with crystal-forming bacilli under different ecological conditions. Biological activity of bacterial isolates was estimated. In low pest populations, no inoculation of larvae with crystal-forming bacilli was observed; at high population levels, during the crisis phase, when entomopathogenic viruses prevailed, crystal-forming bacilli played an insignificant part. Their contribution ranged from 0 to 20% in different foci. Bacilli found in killed gypsy moth larvae were isolated into pure culture, and their biological activity against the tent caterpillar, the Siberian moth, the gypsy moth, the apple moth, the satin moth, and the fall webworm was tested. None of the isolates was highly effective against the gypsy moth, but some isolates were active against other entomophages. One of the reasons for the unstable efficacy of bacterial preparations against the gypsy moth in the Far East is the microbial background of insect intestines, which affects pathogenic bacteria.
Far East; BACTERIA, MICROBIAL PESTICIDES, POPULATION DYNAMICS

676 Maltsev, I.V. 1954.

The gypsy moth *Porthetria dispar* L. In: Vrednyye nasekomyye lesonasazhdeniy stepnogo Kryma i mery bor'by s nimi. Krymizdat, Simferopol: 23-25.
-- The life stages of the gypsy moth are traced. Pupation starts in late May, with pupae found between leaves or under bark flaps. Adults are active from the second half of June to the end of July, depositing egg masses low on tree trunks or occasionally at the trunk base, on dead leaves, stones, or on the ground. Fecundity is 150 to 600 eggs. In the Crimea, the gypsy moth feeds on more than 270 species of trees, shrubs, and herbs; it does not attack ash, elaeagnus, or tamarisk. It occurs rarely in the steppes, except in parklands along the Salgir and Karasevka Rivers. Suggested control measures are collection of egg masses and treatment with petroleum, DDT, and calcium arsenite.
EWest; CHEMICAL INSECTICIDES, FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PHENOLOGY

677 Malyy, L.P., Krushchev, L.T., Likhovidov, V.Ye., Kuksenkov, V.M., Sinchuk, I.V. 1978.
The use of bacterial preparations against oak defoliators. Lesnoye khozyaystvo. (11):84-85.
-- Rock oak, English oak, hornbeam, ash, Norway maple, common maple, linden, and cherry grow in the Kodry Preserve (Moldova). Gomelin, in powder and paste forms, was applied against the winter moth, the green oak leaf roller, and the scribbler. The efficiency rate was 87%.
EWest; BACTERIA, MICROBIAL PESTICIDES

678 Mamedov, Z.M. 1988.
Parasites of the brown-tail moth (*Euproctis chrysorrhoea* L.) and the gypsy moth (*Lymantria dispar* L.) in the gardens of Azerbaijan. Izvestiya Akademii nauk Azerbaidzhanskoi SSR, seriya biologicheskie nauki. 4:75-77.
-- Sixteen species of parasites play an important part in regulating numbers of browntail moth larvae and pupae, five of which are the most effective. There are 18 species affecting the gypsy moth, with seven being the most effective and reducing pest populations by 15% to 24%. *Phanerotoma atra* is mentioned for the first time as a parasite of the gypsy moth in the former USSR.
MAsia; PARASITES

679 Mamontova, V.A., Derevyanko, N.M., Nikitenko, G.N., Galanova, T.F. 1983.
Structural and functional features of gypsy moth populations connected with different food plants. In: Rol' vzaimootnosheniy rasteniye-nasekomoye v dinamike chislennosti populyatsiy lesnykh vrediteley. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 112-125.
-- The distribution and population dynamics of the gypsy moth were studied in the lower Dnieper region. Distribution is determined by food specialization in different foci. Feeding on willow (plavni of the Dnieper River), oak (forest "islands" of the Black Sea Preserve), or acacia (plantations) resulted in the formation of food races, or micropopulations, differing in phenological development and gradation phases. In the course of the investigation, peculiarities of behavior at different life stages and gradation phases were discovered, the distribution of egg masses on different species of trees and at different heights on the trunk was studied, and migration activity of larvae in different instars as well as daily activity of males and females was investigated. The phenotypic structure of the population was determined by larval coloration. Biochemical analysis of the dynamics of soluble protein fraction composition, as well as the forms and activity of hydrolytic enzymes of hemolymph and tissues in the ontogeny of insects belonging to different phenotypes, was made. Peculiarities of protein composition, enzyme forms, and activity were used to distinguish among phenotypes of homo- and heterozygotes and insects feeding on different food plants. At a certain gradation phase, the ratio of larvae with high and low protein content in hemolymph changes, determining the level of adult fecundity.
EWest; BIOCHEMISTRY, COLOR POLYMORPHISM, POPULATION DYNAMICS

680 Markov, V.A. 1983.
Use of attractant traps. Lesnoye khozyaystvo. (6):57-58.
-- Disparlure-baited traps are used to estimate gypsy moth populations.
ECentral; PHEROMONE TRAPS

681 Markov, V.A. 1988.
Prolonged embryonal diapause in the gypsy moth. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 13-14.
-- Although it is generally believed that egg masses of previous seasons are unviable, the author found mature embryos of gypsy moth larvae in unhatched eggs. Surveys in Ryazan Province from 1978 to 1987 showed that some of the eggs that hibernated for a second time remained viable and produced offspring. During an outbreak, the majority of healthy eggs does not hatch the following spring. The fact that there are egg masses of the previous year in addition to egg masses of the new generation is a sign of partial long diapause. On the basis of an analysis of factors determining gypsy moth population dynamics, the author concludes that long embryonic diapause plays an important part in the period of gypsy moth outbreak. Taking into account this peculiarity of pest development, forecasting of populations can be improved and frequent and ineffective pesticide treatments polluting the environment can be avoided.
ECentral; DIAPAUSE, EGG HATCH

682 Marovich, P. 1975.
Efficacy of synthetic and natural sex attractants of the gypsy moth *Lymantria dispar* L. in field tests. In: VIII Mezhdunarodnyy kongress po zashchite rasteniy. Doklady i soobshcheniya sektsii 5. Biologicheskiye i geneticheskiye metody bor'by. Moscow: 113-121.
-- Cylindrical metal traps were hung at a height of 1.5 to 2.0 m. Disparlure based on trinoctanoin used for baiting was very stable and was active for at least 4 years after being placed in a trap. An increase in concentration from 20 to 600 mkg per trap did not result in an increase in the number of males captured. The maximum number of males in the traps during 3 years of surveys correlated with 3,000 mkg of the attractant. In the traps baited with natural attractant extracted from 12, 24, and 60 females,

the maximum numbers of males was at the lowest preparation concentration. The natural attractant was active in the traps during one season, while in ampules it remained active for 18 years.
EWest; PHEROMONE TRAPS, PHEROMONES

683 Martynova, Ye.F. 1952.
Peculiarities of lepidopterous fauna in the south Urals region and its significance for the steppe afforestation. In: Trudy zoologicheskogo instituta AN SSSR. Leningrad: 66-91.
-- In the region to the west of the South Urals, the gypsy moth inhabits floodplain and ravine forests. In 1949-1950, an increase in the pest population was observed in floodplain forests. The highest density of egg masses (2-3 per tree) was recorded in light, well-heated oak and oak-linden floodplain plots. Egg masses were found at tree bases, mainly on thin oaks, lindens, and aspens. In ravine forests there was a decrease in numbers of pests, caused by high concentrations of entomophages in adjacent foci of the tent caterpillar and the browntail moth, and by spring frosts.
EEast; DENSITY, EGG MASSES, OVIPOSITION SITE, SITE CONDITIONS

684 Marushina, N.G. 1981.
Comparison of sampling methods of the gypsy moth egg masses. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 126-130.
-- A method of estimating gypsy moth population is suggested: in sample plots of 50 trees in a typical place in the focus, egg masses are counted along a strip 3 to 5 m wide, depending on the character of the stand, on the sides of the trees facing the course of survey; the number of egg masses found in the strip is doubled. Advantages of this method are discussed.
ECentral; EGG MASSES, SAMPLING

685 Marushina, N.G., Ashimov, K.S. 1984.
Gypsy moth in nut forests of the southern Kirgizia. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Kiev: 12-16.
-- Gypsy moth biological parameters were studied in nut forests of southern Kirgizia. Adult flight dynamics were correlated with the altitude above sea level at which stands are located. Flight is prolonged during nearly 3 months. Three well-defined flight peaks are determined by the altitude of stands. Other parameters studied were peculiarities of egg mass deposition on tree trunks and the distribution of larvae and pupae in tree crowns.
MAsia; FLIGHT, PHENOLOGY

686 Mashanov, A.I. 1988.
Plant protection against biological damage with a bacterial preparation insectin. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 40.
-- In mixed mountain forests of Tuva, the favored species of gypsy moth larvae are larch, birch, aspen, willow, and sweetbrier. Phyllophage foci are usually combined, for instance, joint foci of the Siberian moth and the gypsy moth. After aerial application of bacterial preparations, high mortality of gypsy moth larvae was registered in the foci. On food plants treated with the bacterial preparation insectin, lower feeding intensity and more rapid molting were recorded.
WSiberia; BACTERIA, HOST PLANTS, MICROBIAL PESTICIDES

687 Mashanov, A.I., Baranovskiy, V.I., Pakhtuev, A.I. 1980.
New bacterial preparations and their use in forest protection. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. 10(2):63-68.
-- The bacterial preparations tuverin-2 and insectin-2 were tested in the field against the Siberian moth and the pine looper moth. Tuverin-2 had an efficacy of 80.7%.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

688 Mashanov, A.I., Gukasyan, A.B., Chulikov, A.I. 1981.
Microorganisms in forest protection. (Mikroorganizmy v zashchite lesa.) Nauka, Novosibirsk. 130 p.
-- The book describes the methods and results of applications of Bt-based pesticides in different zones of Siberia. *Lymantria dispar*, *Leucoma salicis* and *Dendrolimus superans* were the main target pests.
WSiberia; BACTERIA, MICROBIAL PESTICIDES

689 Mashnina, G.I., Fomina, V.I. 1974.
Susceptibility of gypsy moth and pine moth to bacterial preparations relative to larval instar and temperature. In: Lesokhozyaystvennaya nauka i praktika. Moskva: 154-157.
-- While gypsy moth and pine moth larvae in early instars are very susceptible to bacterial infections, late instar gypsy moth are more resistant. The efficacy of bacterial preparations is determined by temperature, with high efficacy recorded at temperatures above 23º C.
ECentral; BACTERIA, MICROBIAL PESTICIDES, TEMPERATURE

690 Masyuk, Yu. A., Orlovkaya, Ye.V., Bayukova, A.Yu. 1978.
Accumulation of virus biomass by gypsy moth larvae relative to their age and body weight. In: Microbiologicheskiye sredstva zashchity rasteniy i bakterial'nyye preparaty. Moscow: 58-62.
ECentral; VIRUS

691 Matskevich, M.N. 1978.
Parasites of the gypsy moth. Zashchita rasteniy. (9):24.
-- In Gorky Province, 23 parasite species were extracted from gypsy moth eggs, larvae, and pupae. The tachinid is a specialized parasite of the gypsy moth. Of the total pest number, 27% are parasitized.
ECentral; OVIPOSITION SITE, PARASITES

692 Matvievskiy, A.S. 1954.
Evaluation of accuracy of the methods of sampling gypsy moth *Ocneria dispar* L. egg masses and their improvement. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Leningrad. 13 p.
ECentral; EGG MASSES, SAMPLING

693 Matvievskiy, A.S. 1984.

Control of pests and diseases in the orchards. Zashchita rasteniy. (2):58.
-- Trichlor 5 or Trichlorol 5m was applied against scales, tortoise scales, early instars of the apple moth and gypsy moth, fruit mite eggs, plant lice, and psyllas. Efficacy was 76%.
ECentral; CHEMICAL INSECTICIDES, PEST LIST

694 Mazokhin-Porshnyakov, G.A., Kazyakina, V.I. 1984. **Structure of visual organs in the gypsy moth larvae (Lepidoptera, Lymantriidae).** Entomologicheskoye obozrenie. 63(1):29-34.
-- The appearance and inner structure of six stemmas of last instar gypsy moth are described. There are three mantle, three crystal, and seven retinula (three distal and four proximal) cells in each stemma. Retinula cells, which make a fused rhabdom with digital appendages, are packed with granules of screening pigment. In triple stemmas (stemmas 1 and 6 [Dethier 1942]), the top of the rhabdom is bifurcated. The gypsy moth stemma combines features of *Operophtera brumata* L. and *Macrothylacia rubi* L. stemmas. Phylogenesis and stemma functions are discussed.
ECentral; HISTOLOGY, MORPHOLOGY

695 Meshkova, L.V. 1988. **Results on study of the gypsy moth in the Ukraine.** In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 24-25.
-- An analysis of data on population dynamics in the Ukraine during many years showed that the largest area of gypsy moth foci occurred in 1948-1952. After that the pest either produced local foci or occurred in conjunction with other phyllophages, mostly the green oakleaf roller. Forests belonging to collective farms, ravine forests, and shelter belts served as gypsy moth reservations. The pest population recovered 2 to 3 years after being treated with pesticides and bacterial preparations, but the entomophage population was suppressed either by pesticides or loss of food objects that had been destroyed with bacterial preparations. Application of the preparation virin-ENSh causes a gradual decrease of the pest population while preserving natural enemies. The distribution of egg masses, larvae, and pupae in the population was expressed by the coupling equation of depression, which served as a basis for inventories at different density levels.
EWest; CHEMICAL PESTICIDES, MICROBIAL PESTICIDES, POPULATION DYNAMICS, VIRUS

696 Meshkova, V.L. 1979. **Virus epizooty in gypsy moth population after terrestrial treatment with virus preparation virin-ENSh.** In: Trudy Khar'kovskogo SKhI imeni V.V.Dokuchaeva. Zashchita sel'skokhozyaystvennykh kul'tur ot vrediteley, bolezney i sornyakov. Khar'kov: 29-33.
-- When a virus preparation is introduced into a gypsy moth focus, disease and death occur not only in the treated plot but in plots as far away as 800 m. At a distance of more than 1,300 m, the development of virosis is epizootic and mortality caused by nuclear polyhedrosis is low. As the distance from the treated plot becomes greater, larval mortality decreases considerably. Thus, foci of virus infection should be created at intervals of not more than 800 m.
EWest; FOCI, MICROBIAL PESTICIDES, VIRUS

697 Meshkova, V.L. 1980. **Effect of virus preparation virin-ENSh on a population in lower Dnieper region.** Avtorefereat dissertatsii kandidata biologicheskikh nauk. Leningrad. 16 p.
-- After treatment with Virin-ENSh, an epizootic developed throughout the season in some stages, and the second wave of the epizootic was generated by secondary infection of larvae. To create stable foci, it is necessary to treat 1,500 to 3,000 egg masses in plots not more than 600 to 800 m apart. Leaves should be sprayed against feeding larvae after the majority of eggs have hatched, when instars I and II prevail. Entomophages play an important part in spreading virus infection.
EWest; MICROBIAL PESTICIDES, PARASITES, VIRUS

698 Meshkova, V.L. 1984. **Mathematical modeling of optimum conditions for virus and bacterial preparations when used jointly against gypsy moth larvae.** In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 45.
-- Simultaneous application of the virus preparation virin-ENSh and the bacterial preparation Gomelin produces a synergistic effect. The relation between LT_{50} and gypsy moth larval mortality and the time interval between treatments of larvae with these preparations is given. Dispersion analysis of the data shows simultaneous application to be more effective than consecutive application. The models can be used to forecast the end effect of application and to determine combinations of doses causing high mortality within a short time, given the availability of preparations.
EWest; BIOASSAY, MODELS, VIRUS

699 Meshkova, V.L. 1985. **Effect of virus preparation virin-ENSh on gypsy moth population at low pest density.** Lesovodstvo i agrolesomelioratsiya. 70:54-56.
-- Population dynamics were studied and factors of larval and pupal mortality analyzed in experimental and control plots for two years after application of the preparation virin-ENSh. In the year following application, the pest population kept decreasing from both diseases and higher parasitic activity.
EWest; MICROBIAL PESTICIDES, POPULATION DYNAMICS, VIRUS

700 Meshkova, V.L. 1988. **Improvement of a joint use of virin-ENSh and gomelin against gypsy moth.** Lesovodstvo i agrolesomelioratsiya. 76:44-48.
-- Nomograms were used to chart the relation between mean lethal time and mortality of gypsy moth larvae caused by the joint application of the virus preparation virin-ENSh and the bacterial preparation Gomelin. These charts can be used for forecasting the end effect of particular doses and for determining combinations of doses that cause high pest mortality within a short time

with minimum preparation and expenditure of money.
EWest; MICROBIAL PESTICIDES, MODELS, VIRUS

701 Meshkova, V.L., Gamayunova, S.G. 1981.
Effect of a virus preparation virin-ENSh on parasites of *Lymantria dispar* in the lower Dnieper river basin.
Lesovodstvo i agroleso-melioratsiya. 61:26-30.
EWest; PARASITES, MICROBIAL PESTICIDES, VIRUS

702 Meyer, N.F. 1937.
Biological control of the gypsy moth and browntail moth. In: Biologicheskiy metod bor'by s vrednymi nasekomymi. OGIZ, Leningrad: 48-65.
-- A history of the use of parasites and predators of the gypsy moth in the USA and Europe from 1905 to the mid-1930s. Of 56 species of ichneumons and tachinids registered by that time in Europe as entomophages of the gypsy moth, 31 species were imported to the USA; of 42 parasite species of the browntail, 25 species were imported. As a result of studying their ecology and effectiveness, the following natural enemies were acclimatized in the USA: egg parasites - *Anastatus disparis, Schedius kuwanae*; tachinids - *Compsilura concinnata, Sturmia scutellata*; the chalcid parasite of pupae *Monodontomerus aereus*; and the predator *Calosoma sycophanta.* Effective biological control of the gypsy moth is possible in the former USSR. The procedure of laboratory rearing of some parasites is given.
ECentral; BIOLOGICAL CONTROL, PARASITES, REARING, REVIEW

703 Meyngard, A.A. 1909.
On lepidopterous fauna of Siberia. Russkoe entomologicheskoe obozreniye. (1-2):150-165.
-- During an outbreak in 1903, gypsy moth adults were much larger than European counterparts (females were up to 68 mm in length, with brownish wings having almost no pattern). Females were observed flying across the Yenisey River in warm, calm weather and, unlike the European insects, they oviposited in the foothills and on mountain slopes, on rocks and under stones.
WSiberia; FEMALES, FLIGHT, MORPHOLOGY, OVIPOSITION SITE

704 Meyngard, A.A. 1912.
Review of entomological collections sampled in Western Sayany and in Yenisei river basin on August 6 - September 8 in 1903. In: Izvestiya Tomskogo obshchestva estestvoispytateley i vrachey. Tomsk: 12.
WSiberia; FAUNAL LIST, STAND COMPOSITION

705 Michalache, G. 1989.
Test of preparations for control of folivorous forest pests of Romania. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma, Borzhomi, 1989. Moscow: 127-133.
-- Bacterial preparations based on *Bacillus thuringiensis*, Thuringin (three preparations produced in Romania), and Dipel (two preparations produced in the USA) were applied against larvae of the gypsy moth, oak leaf roller, and tent caterpillar by aerial spraying of oak stands with ultra-small volumes. Natural and technological factors influencing the efficacy of bacterial preparations are discussed. Instars I to III possess the highest susceptibility to the preparations.
EWest; AERIAL SPRAYING, BACTERIA, GROWTH REGULATORS, MICROBIAL PESTICIDES

706 Milyanovskiy, Ye.S. 1956.
The lepidopterous fauna in Abkhazia. In: Trudy instituta zoologii AN Gruzinskoy SSR. Tbilisi: 51-110.
-- Data on 605 lepidopterous species of 27 families, the gypsy moth included, are given. In Abkhazia gypsy moth adults fly from July to October; their emergence is prolonged due to the prolonged period of larval development. Intersexes occur frequently. Larvae can feed on different species, but mostly they attack young apple trees. In some years many adults were observed in oak groves, but larvae did not attack oaks.
Caucasus; GENETICS, HOST PLANTS, PEST LIST, PHENOLOGY

707 Minyaeva, T.L., Galetov, V.A. 1979.
Tests of biological activity of a disparlure against the gypsy moth. In: Itogi i perspectivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. Tezisy dokladov Vsesoyuznogo nauchno-tekhnicheskogo soveshchaniya. Pushkino: 78-81.
-- In Moscow Province, three types of disparlure produced at the Shchyolkov Branch of VNIIASZR were tested, each at four concentrations: 0.05, 0.5, 5.0, and 50.0 mkg per trap. Also tested was a polymer attractant containing 0.5 and 5.0 mkg of disparlure. The dose of 50.0 mkg per trap proved to be the most effective, although it is somewhat higher than doses needed for attracting the gypsy moth. In mixed stands where visual inspection did not reveal the insects, traps for nun moth control captured from two to 36 adults. The experiments proved high biological activity of disparlure for the nun moth and suggested its practical application in forest management.
ECentral; PHEROMONE TRAPS

708 Minyailo, B.A., Kovalev, B.G., Bednyy, V.D. 1978.
On specificity of the gypsy moth and the nun moth attractants. In: Khemoretseptsiya nasekomykh. Vilnius: 97-101.
-- A synthetic analogue of disparlure, 2-methyl- cis-6.7-epixyheptadecan, was as attractive for the nun moth as disparlure (Altai Krai, July-August 1973), while for the gypsy moth its attractiveness was low (Moldavia, late July-early August 1974). In nature this substance at levels up to 10 mkg did not attract gypsy moth males, and in a laboratory test it was 5 orders of magnitude less effective than disparlure; it was necessary to take 10 times less of this substance than of disparlure to obtain the same amplitude of electroantennograms. It is suggested that 2-methyl-cis-6.7-epixyheptadecan be used together with disparlure in the nun moth sex attractant, making it specific.
EWest, WSiberia; BIOASSAY, PHEROMONES

709 Minyailo, V.A., Kovalev, B.G., Kirov, E.I., Minyailo, A.K. 1977.
On attractivity of disparlure, sex pheromone of the

gypsy moth females *Porthetria dispar* L. for the males of *Zanclognatha lunaris* (Lepidoptera). Zoologicheskiy zhurnal. 56(2):309-310.
-- Disparlure, the gypsy moth attractant, had been known to attract nun moth males, but the authors found that Disparlure also is attractive to the noctuid *Zanclognatha lunaris* Scop. Disparlure was placed inside traps made of two veneer sheets joined with studs and covered inside with glue. The traps were hung at a height of about 1.5 m not less than 10 m from each other in a pine forest (Altai Krai). Within 3 days, 38 noctuid males were captured. Their distribution was not random, but depended on disparlure concentration. Species population in the stand was not estimated.
WSiberia; PHEROMONES

710 Mirzoev, J.A., Guseinov, Ye.S. 1973.
Gypsy moth and its control measures at the Yamskaya forest bungalow in Azerbaijan. In: Trudy Azerbaydzhanskogo NII lesnogo khozyaystva i agromelioratsii. Baku: 63-68.
Caucasus; CONTROL

711 Mirzoyan, S.A. 1977.
Dendrophilous insects in the parklands and forests of Armenia. (Dendrofil'nyye nasekomyye lesov i parkov Armenii.) Aistan, Erevan. 453 p.
Caucasus; PEST LIST

712 Mirzoyan, S.A. 1988.
Morphometric parameters of the gypsy moth population in Armenia. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 26-27.
-- In the mountain forests of Armenia, parameters were different not only in different topographical zones but also in different vertical zones. At a height over 2,000 m above sea level, males had 4 instars and females 5 instars; below 1,550 m they had 5 and 6 instars, respectively. Egg hatch occurs 20 to 25 days earlier in the foothills than in the upper zone. But the difference in pupation time and time of imago flight is 5 to 10 days, occurring in late July-early August. Insects of the upper zone are, on the average, smaller than those of the lower zone, though with a wide range of variability values for each sex overlap. Establishing correlations between specific morphometric parameters of insects allows for the exact estimation and forecasting of populations.
Caucasus; GEOGRAPHIC VARIATION, MORPHOMETRICS, PHENOLOGY

713 Mirzoyan, S.A., Akopyan, S.G. 1981.
The gypsy moth survey with pheromone traps in mountain forests of Armenia. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Pushkino: 140-142.
-- Gypsy moth outbreaks have been recorded in Armenia at intervals of 8 to 12 years, lasting 2 to 5 years depending on variations in weather conditions. Pheromone-baited traps are suggested as a simpler monitoring method than counts of egg masses. For long action of the pheromone, a dose of 50 mkg per trap is the best. On slopes more than 10 grades steep, more adults are captured by the traps on the lower parts of the slopes as a result of air convergence, while on gentler slopes and in plain forests the number of captures per trap is proportional to the rate of forest infestation. Results of captures can be used for forecasting and determining focus boundaries, and rates of infestation. In contrast to the Crimea, where 50% defoliation is recorded after 350 or more males were captured by traps in the preceding year, in Armenia heavy defoliation of forests is recorded after capturing 50 males per trap.
Caucasus; MONITORING, NUMERICAL DATA, PHEROMONE TRAPS

714 Mirzoyan, S.A., Kireeva, I.M., Esayan, A.G. 1982.
Ecological and physiological features of the gypsy moth population in Armenia. Biologicheskiy zhurnal Armenii. 35(3):169-178.
-- A summary of results of field and laboratory investigations aimed at establishing ecological and physiological peculiarities of the gypsy moth in the forests of central Armenia. When larvae are reared singly, their morphological and biochemical parameters are similar to those of larvae in low-density foci; when they are reared in groups, their parameters are similar to those of larvae in high-density foci. During an outbreak, larvae of dark color prevail; during a collapse, light ones prevail.
Caucasus; BIOCHEMISTRY, COLOR POLYMORPHISM, DENSITY

715 Mirzoyan, S.A., Kobzar', V.F., Akopyan, S.G., Svatkovskaya, T.V., Esayan, A.G. 1980.
The use of dendrobacillin against gypsy moth in the oak groves of Armenian SSR. Lesnoye khozyaystvo. (10):60-62.
-- Oak groves comprise 34.4% of Armenian forests, mainly in the southern, central, and northeastern parts of the republic. As they are located in the recreation zone biological pest control seems to be the only available option. Efficacy of dendrobacillin and BIP with and without chlorophos was determined and compared with treatment with pure chlorophos in laboratory and field experiments. Gypsy moth foci were also treated from the air with dendrobacillin against instars II and III. The experiments showed high efficacy of biopreparations. To achieve thorough treatment of mountain oak groves, spraying should be done in the spring, with the plane flying at not more than 40 m above the forest canopy.
Caucasus; AERIAL APPLICATION, BACTERIA, MICROBIAL PESTICIDES

716 Mirzoyan, S.S. 1954.
On the question about reproduction of the winter moth, scribler, gypsy moth, and browntail moth in forests of Armenia. Izvestiya Akademii nauk Armyanskoy SSR, biologichekie i sel'skokhozyaistvennyye nauki. 7(1):81-90.
-- The species being studied are common forest and orchard pests in Armenia. The gypsy moth is an outbreak species in the forests of southern Armenia. Foci, usually located in the zone below 1,500 m above sea level, are characterized by small area, dispersal, short duration, and mobility, qualities that can be accounted for by sharp

temperature variations throughout the season (including frequent spring frosts) and diverse ecological conditions.
Caucasus; OUTBREAKS, TEMPERATURE

717 Mirzoyan, V.S., Adzhemyan, L.A. 1988.
Dynamics of main biochemical components in the gypsy moth during post-embryonal development. In: Neparnyy shelkopryad: itogi i perspektivy isselodovaniy. Institut lesa i drevesiny SO AN SSSR. Krasnoyarsk: 14-15.
-- The following biochemical parameters of gypsy moth larvae, pupae, adults, and eggs from mountain forests of Armenia were studied: changes in the content of water, lipids (qualitative and fatty acid composition), glucose, glycogen, and proteins of different fractions (water soluble, salt soluble, alcohol soluble, and alkali soluble). Total lipids of the gypsy moth contain fractions of phospholipids, sterols, diglycerides, free fatty acids, triglycerides, and sterol ethers. As larvae develop, lipids, carbohydrates, and proteins used in metamorphosis are accumulated. Their quantity and quality can be a criterion for determining population condition.
Caucasus; BIOCHEMISTRY

718 Mochul'skiy, V. 1866.
Catalogue of common insects from Japan (in French). [Catalogue des Insectes recus du Japan.] Byulleten' Moskovskogo obshchestva ispytatelei prirody. 39(1):162-200.
-- *Ocneria dispar* L. and *Liparis japonica* Motsch. are mentioned among species common in Japan.
Far East; PEST LIST

719 Modestov, V.V. 1926.
The gypsy moth, *Ocneria dispar* L.(Lymantria). In: Vrediteli lesa i bor'ba s nimi. Moscow: 63-64.
-- The species is briefly described as a polyphagous outbreak pest. Destruction of egg masses is suggested as a control measure.
ECentral; GENERAL BIOLOGY

720 Modestov, V.V. 1941.
Bioecology of the gypsy moth and problems of its silvicultural control in forests of the Crimea. In: Nauchno-metodichekiye zapiski. Glavnoye upravlenie po zapovednikam, zooparkam i zoosadam. Moskva: 143-161.
-- Data on gypsy moth ecology in the Crimea are presented. Pupation and oviposition usually occur at the tree base and in shelters, and sometimes in the crown. Fecundity is from 200 to 1,000 eggs, 300 to 400 eggs on the average. Major food plants are oak and oriental hornbeam. Analogous data are available for other regions; for instance, the same manner of oviposition was recorded in Spain by American scientists.
EWest; FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PUPAE

721 Mokhovikov, S.M. 1989.
Study of genomes for DNA-sequences, homologous genomes corresponding to nuclear polyhedrosis virus in the cabbage moth and the gypsy moth by the method of nucleic acid hybridization. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibisrk: 36.
-- There are many virus carriers in insect populations. To identify latent virus infections, different methods are used, such as X-ray structural examination of chitin, microscopy, and immunology. To examine the starter culture of the cabbage looper and the gypsy moth, the author chose a method of nucleic acid hybridization that can detect DNA virus in the insect body irrespective of the condition of the virus genome. This method was used to examine total DNA extracted from the larvae of the starter culture. The whole DNA of nuclear polyhedrosis virus that can infect the respective insect species was used as a probe. In all cases the hybridization effect is greater than the nonspecific binding effect, and thus the insect has DNA sequences homologous to DNA viruses attacking it.
WSiberia; CELL CULTURE, GENETICS, VIRUS

722 Mokrezhetsky, S.A., Shchegolev, N.M. 1913.
Destructive insects and plant diseases recorded in Tavricheskyaya district in 1912. (Otchet o deyatel'nosti Gubernskogo entomologa Tavricheskogo zemstva i ego pomoshnika za 1912 god. God XX.) Simferopol. 56 p.
-- During a gypsy moth outbreak in the mountains of Crimea, pest control measures were not needed, as foci collapsed in a year due to the activity of entomophages and diseases. The most active parasites were: Habronotus howardi Mokr, which destroyed up to 75-80% of eggs; the early instar parasites *Apanteles solitarius* Rtzb., *A. fulvipes* Hal., and *Pristomertus vulnerator* Panz.; and the parasites of late instars *Sarcophaga affinis* Fall., *Roeselia antiqua* Merg., and *Scotia saturniae* R.-D. Pest control measures are obligatory in gardens and parks. Egg masses should be scratched off and treated with petroleum, sticky belts should be applied to tree trunks during the period of larval migration, and protective zones should be created around gardens.
EWest; CONTROL, PARASITES

723 Mokrzhetskiy, S.A. 1914.
Report on activities of an entomologist in Tavricheskaya district in 1913, the 21st year of his work. (Otchet o deyatel'nosti Gubernskogo entomologa Tavricheskogo zemstva za 1913 god. God 21.) Simferopol. 13 p.
-- During the 1912 gypsy moth outbreak in the mountain forests of the Crimea, gypsy moth infested up to 5,400 acres in the Sudak Forest. In 1913, the outbreak collapsed naturally, due to activity of entomophages and diseases. The most important entomophages were *Apanteles solitarius* Ratz. and *A. fulvipes* Hal.
EWest; PARASITES

724 Mokrzhetskiy, S.A. 1914.
Destructive insects and fungous diseases recorded in gardens of the Crimea in 1913. Sadovodstvo. (6):458-464.
-- During a gypsy moth outbreak in the Crimea in 1912-1913, large foci were recorded in the Simferopol, Feodosia, and Yalta regions. The following control measures are suggested: treatment of egg masses with

petroleum, cutting of surrounding vegetation to protect orchards and nurseries, and application of sticky belts to tree trunks during the period of egg hatch in March. High activity of parasites and a great number of diseased insects were recorded in the foci. By the end of the generation, the pest population was insignificant, and egg masses deposited by females were small. The forecast for 1914 was favorable.
EWest; CONTROL, PARASITES, PATHOGENS

725 Mokrzhetskiy, S.A. 1914.
Destructive insects and diseases of the plants recorded in Tavricheskaya Province in 1913. (Vrednyye nasokomyye i bolezni rasteniy, nablyudavshiyesya v Tavricheskoy gubernii v techenii 1913 g.) Simferopol. 14 p.
-- The gypsy moth is mentioned as an orchard pest. Pear orchards in the Crimea are rarely attacked by this pest. In mixed apple-pear orchards, pear is more heavily attacked and apple less heavily attacked than in pure stands. A similar phenomenon is observed for beech and oak, beech mixed with oak is more heavily attacked than in pure stands, while oak is less heavily attacked.
EWest; HOST PLANTS, STAND COMPOSITION

726 Mokrzhetskiy, S.A., Bragina, A.P. 1917.
Disappearance of *Lymantria dispar* L. in the Crimea. Zhurnal prikladnoy entomologii. (1):21-22.
EWest; POPULATION FLUCTUATION

727 Molchanov, M.I., Kuteev, F.S., Molchanova, V.A., Kotovskaya, A.P. 1987.
Effect of insecticides from group of synthetic pyrethroids on hemolymph proteins in the gypsy moth larvae. Prikladnaya biokhimiya i microbiologiya. 23(2):253-259.
-- The authors studied the effect of insecticides belonging to the group of synthetic pyrethroids on hemolymph proteins of third instars that survived treatment. Quantitative changes in protein content and qualitative changes in protein components were found. Fractionation of hemolymph proteins in polyacrylamide gel revealed changes in the composition of hemolymph proteins of larvae treated with insecticides at concentrations ranging from 0.000075 to 0.05%. Depending on chemical composition and concentration of insecticides, the protein component of a molecular weight of 229 kDa dropped out of the protein fraction spectrum, the components of molecular weights of 43.17 and 14 kDa sharply decreased, and the component of a molecular weight of 50 kDa increased. A decrease was recorded in the protein content of hemolymph of larvae that survived treatment with cymbush in the gypsy moth gradation focus.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES, HEMOLYMPH

728 Molchanov, M.I., Kuteev, F.S., Molchanova, V.A., Nikiforov, V.V. 1980.
Effect of phosphorous organic insecticides on hemolymph proteins in gypsy moth larvae. Prikladnaya biokhimiya i microbiologiya. 16(5):741-746.
-- The authors studied the effect of organic phosphorous insecticides on hemolymph proteins of gypsy moth larvae that survived after being treated with pesticides in instars III and IV. Fractionation of hemolymph proteins in polyacrylamide gel revealed changes in the composition of hemolymph proteins of larvae treated with insecticides at concentrations ranging from 0.01 to 0.5%. Pupal weight decreased under the impact of metation and diasinon; the number of eggs per mass was not reduced by the action of metation. The component structure of hemolymph proteins of larvae that survive is regarded as an objective criterion for estimating the efficiency of chemical control.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES

729 Molchanova, V.A. 1980.
Effect of phosporous organic insecticides on protein component composition in hemolymph of the gypsy moth larvae. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 70-82.
ECentral; CHEMICAL INSECTICIDES, HEMOLYMPH

730 Molchanova, V.A. 1982.
Effect of new insecticides on protein content in hemolymph of gypsy moth larvae. In: Molodyye uchenyye v sovershenstvovanii teorii i praktiki vedeniya lesnogo khozyaystva. Trudy nauchnoy konfemtsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva, Pushkino, 1982. VNIILM, Pushkino: 158-162.
-- The author studied the effects of pyrethroid (decis, ambush, cymbush) and organic phosphorous (actelic) insecticides on protein content in the hemolymph of gypsy moth larvae. Depending on the toxicity and concentration of the insecticides, the content of total proteins in the hemolymph of third instars decreased from 89.4% to 44.4%. Total content of protein in hemolymph of larvae treated with insecticides correlated to pupal weight.
ECentral; BIOCHEMISTRY, CHEMICAL INSECTICIDES, HEMOLYMPH

731 Molchanova, V.A., Kuteev, F.S. 1983.
The study of conditions in gypsy moth foci after treatment with insecticides. In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 202-205.
-- In Lipetsk Province about 245 ha of oak stands were treated against gypsy moth larvae by low-volume spraying. Application of preparations of ambush, cymbush, and dimilin reduced the pest population by 67 and 98-99%. Two years later, the gypsy moth population remained at a low level (0.07-0.26 egg masses per tree); however, female fecundity increased, and average weight of eggs in a mass was higher than in preceding years. An increase in the oak leaf roller population was observed in treated forest plots. In spring, oak defoliation was 100%.
ECentral; CHEMICAL INSECTICIDES, GROWTH REGULATORS

732 Moravskaya, A.S. 1958.
The gypsy moth - abundant pest of forests and plantations. Priroda. 3:90-93.
-- The gypsy moth is a polyphagous pest that feeds on more than 100 plant species. It prefers oak, beech,

hornbeam, mountain ash, and apple. During an outbreak, the gypsy moth inflicts serious damage on orchards and forests, leading to complete defoliation of trees, weakening and killing them; in orchards it also causes loss of crops for at least two years, the year of defoliation and the following year, as fruit buds are not generated immediately after defoliation. Life stages of the pest and some peculiarities of ecology are described. Fecundity is from a few dozen to 1,500 eggs. Gypsy moth phenology is presented and pest control measures are suggested. Mentioned as entomophages are birds, beetles of the genus *Calosoma*, *Xylodrepa quadripunctata* L., *Malachius viridis* L., dermestid larvae, as well as some hymenopterous and dipterous species.
ECentral; BIRDS, HOST PLANTS, PARASITES, PREDATORS, TREE HEALTH

733 Moravskaya, A.S. 1971.
On biology of *Anastatus disparis* Rusch., an egg parasite of the gypsy moth. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moscow: 87-89.
-- In the Tellerman Forest Enterprise, Voronezh Province, the egg parasites *Anastatus* and *Telenomus* were found. As the latter species is very rare, *Anastatus* was studied as a promising entomophage. An additional host of this species in the Tellerman Forest is the insect *Palomena parasina* L. Data are given on phenology, life duration, fecundity, parasitic behavior, and preferred biotopes. The maximum parasitism of gypsy moth eggs in the conditions under study amounted to 50%; the annual mean was 3.6%.
ECentral; EGGS, NUMERICAL DATA, PARASITES

734 Moravskaya, A.S. 1973.
A new additional host, *Anastatus disparis* (Hymenoptera, Eupelmidae), egg parasite of the gypsy moth. Zoologicheskiy zhurnal. 52(1):147-150.
-- *Anastatus disparis* was reared from the eggs of *Palomena prasina* L. in nature and in the laboratory. *A. disparis* has a second, additional generation in *P. prasina* during the year. Both male and female wasps are produced from *P. prasina*.
ECentral; EGGS, PARASITES

735 Moravskaya, A.S. 1973.
Influence of imaginal feeding on fecundity and life duration of adults in *Anastatus disparsis* (Hymenoptera: Eupelmidae), egg parasite of the gypsy moth. Zoologicheskiy zhurnal. 52(12):1809-1814.
-- Adult males and females without access to food lived a maximum of 5 and 7 days, respectively. When fed sugar water the maximum life span was increased to 16 and 32 days, respectively. Females given sugar water and host egg contents lived a maximum of 33 days and the number of mature eggs was 16; if feed only sugar water, the maximum number of mature eggs was 9. In nature, a female can kill up to 24 eggs by pricking them with her ovipositor in order to feed on the egg contents.
ECentral; PARASITES, REARING

736 Moravskaya, A.S. 1975.
***Anastatus* - an egg parasite of the gypsy moth.** Zashchita rasteniy. (12):22.
-- *Anastatus disparis* is of high economic significance among egg parasites of the gypsy moth. Surveys in Tellerman Forests in Voronezh Province show that it can parasitize up to 50% of pest eggs. Life stages of *Anastatus* are described. Adults start emerging 20 to 30 days before gypsy moth adults emerge. *Palomena grasina* is mentioned as an additional host. Parasitized eggs of *Palomena* produce both males and females.
ECentral; EGGS, PARASITES

737 Mukhamedzyanova, F.V. 1976.
On materials about study of nematodes for biological controlling parasitic organisms in plant and animals. In: Bor'ba s invaziynymi boleznyami sel'skokhozyaystvennykh zhivotnykh. Ufa: 46-48.
-- An invasion of the gypsy moth by mermithids was studied in pest foci in the forest-steppe zone of Bashkir PRE- Urals in 1973-1975. Helminths were not found in eggs and first instars. In instars II, III and IV, the extent of invasion was 0.4, 2.4, and 1.8%, respectively. In all cases, invasion intensity did not exceed one specimen. The parasitic stage coincides with the period of active feeding of the host. Postparasitic mermithid larvae emerged from gypsy moth larvae in June, when host larvae were in instars IV to VI. All larvae from which helminths emerged died.
EEast; NEMATODES

738 Mukhamedzyanova, F.V. 1981.
Ecology of soil mermithides relative to forest growth conditions and problems of forest protection against gypsy moth. In: Vozobnovitel'nyye protsessy v gornykh shirokolistvenno-khvoynykh lesakh. Ufa: 79-82.
-- Mermithids cause 25% mortality of the gypsy moth in Bashkir region. In some foci, invasion exceeds 30%. Peculiarities of the distribution of these helminths in the hilly forest area of Ufa Plateau were studied. Investigations were conducted in excavations, since a large part of mermithid ontogeny (both preparasitic and postparasitic stages) occurs in the ground. The distribution of mermithids was studied in different forest types, and correlation was established between humidity of the area and mermithid invasion.
EEast; CLIMATE, NEMATODES

739 Mukhin, V.A. 1972.
On study of predators and parasites of the gypsy moth in Volga-Akhtuba floodplain. In: Voprosy parazitologii zhivotnykh Yugo-Vostoka SSSR. Volgograd: 79-84.
-- Literature on factors causing gypsy moth outbreaks is reviewed. An outbreak was recorded from 1968 to 1971 in the Volga-Akthuba floodplain. The gypsy moth population was largely regulated by dipterans: the tachinid *Blepharipoda scutellata* R.-D., and the sarcophagid *Pseudosarcophaga affinis* F. The dominant species were *Exorista larvarum* L. and *Carcelia bombicivora* R.-D. Larval parasitism ranged from 5.8 to 51%; pupal parasitism amounted to greater than 80%. Other active entomophages were the dermestids *Dermestes erichsoni*

Gylb., *Megatoma undata* L., and *Globicornis marginata* Rk., which killed up to 50% of eggs. Data on ecology of dermestid *Globicornis marginata* Pk. are given based on laboratory and field investigations.
EEast; NUMERICAL DATA, PARASITES, PREDATORS

740 Mukhin, Y.P. 1987.
Entomophages of oak pests and improvement of their efficacy in few-row forest belts. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Moscow: 65-72.
-- Pests and their entomophages were studied in oak groves in Volgograd Province from 1974 to 1979. The most important pests were the green oak leaf roller, the gypsy moth, and the tent caterpillar. Eighteen entomophagous species of different families parasitized the gypsy moth. Parasites caused 5 to 8% of the mortality in the pest population. Accumulation of parasites occurs when mixed forest stands are created, for instance, when poplar is introduced into oak-birch stands. Abundant species of predators (lady beetles, carabids) also were of some importance in decreasing the pest population. Under favorable conditions, the percentage of parasitism by entomophages becomes higher.
ECentral; FAUNAL LIST, PARASITES, PREDATORS, STAND COMPOSITION

741 Nakonechniy, V.I. 1967.
Principles of beneficial usage of biological features of Tachina flies and predacous flesh flies in the control of forest pests. In: Itogi izucheniya lesov Dal'nego Vostoka. Vladivostok: 279-281.
Far East; BIOLOGICAL CONTROL, PARASITES

742 Nakonechniy, V.I. 1971.
Trophic connections of entomophagous Tachina flies with nectar-bearing plants. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Doklady Vsesoyuznoy konferentsii. Moscow: 136-138.
Far East; ECOLOGY, PARASITES

743 Nakonechniy, V.I. 1973.
Importance of dipterous entomophages at various gradation stages of dendrophilous lepidopterans. In: Entomologicheskiye issledovaniya na Dal'nem Vostoke. Dal'NIILKh, Khabarovsk: 117-125.
-- Dipterous entomophages were studied in the forests of the Far East in 1957-1959 and 1966-1968 under different conditions and in different states of lepidopteran populations. Complexes of parasitic and predatory flies, primarily tachinids and sarcophagids, were distinguished: 34 parasites and predators of the gypsy moth, 22 of the buff tip moth, 20 of the tussock moth, and 15 of the vaporer moth. The rate of parasitism of the gypsy moth by tachinids ranged from 21.3 to 25.4%; sarcophagids destroyed up to 70-85% of the pupae. The dominant species were the oligo- and polyphages: *Carcelia tibialis* R.-D., *Exorista fasciata* Fall., *E. larvarum* L., *Blepharipoda (Sturmia) scutellata* R.-D., Masicera zimini Kol., *Lynnaemyia retroflexa* Pand., *Peletieria* sp., *Kramerea schutzei* Kram., *Parasarcophaga pseudoscoparia* Kram., *P. uliginosa* Kram., and *P. albiceps* Mg. In some cases, joint activity of dipterous parasites can suppress pest outbreaks and sustain their populations at a low level over a long period.
Far East; PARASITES

744 Nakrokhina, O.I. 1978.
Effect of arboricides containing 2,4-D on grazing of leaves by forest insects. In: Ekologiya pitaniya lesnykh zhivotnykh. Nauka, Novosibirsk: 96-107.
-- Feeding of gypsy moth larvae is intensified just after contact. Higher poison doses (2.0, 3.0, and 4.0 kg/ha) cause higher activity in food consumption. Treating foliage with 8 kg/ha has an inhibitory effect on larvae.
WSiberia; CHEMICAL INSECTICIDES, FEEDING

745 Naumenko, A.T. 1975.
Stationary depression of the gypsy moth in oak groves of Moldavia. In: Lesa Moldavii i khozyaystvo v nikh. Kishinev: 66-67.
EWest; POPULATION QUALITY, TREE GROWTH

746 Naumenko, A.T., Kovalev, B.G. 1974.
Use of the gypsy moth sex attractant. In: Entomofagi i microorganizmy v zashchite rasteniy. Byulleten' nauchno-tekhnichekoy informatsii. Kishinev: 58-59.
-- A disparlure preparation tested in the field proved to be highly active at doses of 0.005 - 5.0 mkg per trap. Mating periodicity studies in Moldavia established two peaks of male activity: from 9:30 a.m to 1 p.m., and from 5 p.m. to 7 p.m. Experiments were carried out in plots with low density (0.017 egg masses per tree), medium density (0.3 egg masses per tree), and high density (3.9 egg masses per tree). At high population density, flight lasted 20 to 25 days; at low density it lasted 13 to 17 days.
EWest; DENSITY, EGG MASSES, MATING, PHEROMONE TRAPS

747 Naumenko, A.T., Kovalev, B.G. 1974.
Investigation of possibility to attract the gypsy moth males (*Porthetria dispar* L.) by pheromone traps with disparlure. Zoologicheskiy zhurnal. 53(2):1643-1654.
-- In forest stands with pest populations at different gradation phases, gypsy moth males were attracted to disparlure-baited traps of various types. Disparlure concentrations from 0.005 to 5 mkg of benzene appear to be effective and can be used not only for detection of the pest and numerical counts, but also for behavior control.
ECentral; MATING DISRUPTION, PHEROMONE TRAPS

748 Naumov, P.V. 1958.
Impact of climatic factors on outbreak realization by folivorous forest pests in Ulyanovsk region. In: Uchenyye zapiski Ul'yanovskogo gosudarstvennogo pedagogicheskogo instituta. Ulyanovsk: 108-123.
-- The author studied the role of light, wind, hibernation conditions, and precipitation in the origination and distribution of gypsy moth foci. In Ulyanovsk region, wind is of no importance for the origination of foci, but it transports larvae. Light oak groves are heavily attacked, as the pest is a light-requiring insect. Hibernation conditions and amount of precipitation are thought to

affect species population, but no regularities were found.
ECentral; FOCI, STAND COMPOSITION, WEATHER

749 Nazarenko, I.D. 1968.
Nuclear polyhedrosis virus against the gypsy moth. Lesnoye khozyaystvo. (2):55-56.
-- In the northern Caucasus near Groznyi, gypsy moth egg masses in foci were treated with a suspension of nuclear polyhedrosis virus, which caused collapse of the foci. The best results were achieved when application was made while it was raining.
Caucasus; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

750 Nevskiy, V.P. 1937.
Garden pests of Middle Asia. (Nasekomyye, vredyashchiye plodovym sadam Sredney Asii.) Tashkent. 211 p.
MAsia; PEST LIST

751 Nikiforuk, K.Ye 1940.
Moisture resistance of the gypsy moth egg masses. Lesnoye khozyaystvo. (1):72.
-- The effect of flooding on hatching of gypsy moth eggs and viability was studied. If the length of flooding changes from 2 to 20 days, the percentage of hatching falls from 88.6 to 43.1%. The sum of effective temperatures required for hatching after diapause is not affected by the length of flooding.
DIAPAUSE, EGG HATCH, WEATHER

752 Nikitenko, G.N. 1985.
On the method of vital staining of the gypsy moth when reared on natural diet. Vestnik zoologii. (2):78-82.
-- The effect of histological dyes (rodamin, pyronin, eosin, fuchsin, methylene blue, and amidoschwarz) was studied when testing the method of vital staining. Larvae were reared on apple tree branches under seminatural conditions and subjected to all meteorological effects. Of six dyes, a 4% alcoholic solution of methylene blue appeared to be best for vital staining of gypsy moth larvae. In all replicates of the experiment, larvae ate quite a lot of stained food, their biological parameters did not differ from those of controls, and they could be well differentiated in natural conditions.
EWest; HISTOLOGY, MONITORING

753 Nikitenko, G.N. 1985.
Effect of the ecological situation on the dispersal activity of first instar gypsy moth larvae. In: Sistema monitoringa v zashchite lesa. Tezisy dokladov Vsesoyuznogo soveshchaniya. Institut lesa i drevesiny SO AS SSSR, Krasnoyrask: 202-203.
-- The behavior of nonfeeding first instars of gypsy moth, the stage which plays the most important part in pest dispersal over a large area, is the function of the gradation phase, insect physiological peculiarities, weather conditions, etc. In experiments, from 0 to 9% of insects remained on the food plant, depending on variations in these parameters.
EWest; DISPERSAL, LARVAE

754 Nikitenko, N.G. 1984.
Dispersion of the gypsy moth larvae, *Lymantria dispar* L. (Lepidoptera, Lymantriidae) within tree crown. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 68.
-- An analysis was done on the distribution of migrating larvae in tree crowns in relation to population density, food plant species, and phenological phase. In contrast to data presented by F.N. Semevskiy (1971), the author does not believe that in the lower Dnieper region migratory activity of gypsy moth larvae can create the optimum density. This is especially true for foci with high density.
EWest; DISPERSAL, LARVAE

755 Nikolaevskaya, N.G., Ashimov, K.S. 1987.
Economic importance of the gypsy moth in pistachio-woodlands of Kirgizia. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 139-141.
-- The gypsy moth is a common species in Kirgizia. In the zone of light pistachio forests, pest foci are local and small. The pest has a considerable effect on pistachio crops.
MAsia; HOST PLANTS, TREE HEALTH

756 Novikova, L.K., Shagov, Ye.M., Sinitsyna, L.P., Zakharchenko, I.S., Sharueva, A.A., Solonkina, L.M. 1986.
Biological principles of two-stage rearing of the gypsy moth larvae *Lymantria dispar* L. Zoologicheskiy zhurnal. 65(12):1881-1885.
-- Instars I and II were reared in petri dishes, 100 to 200 larvae per dish. From the third instar they were reared in 250-cm^3 incubator cages at a density of 50-25-105 larvae per cage, with an 18-hour photoperiod and at a temperature of 23° to 25° C. Medium composition for two-stage rearing of larvae is described.
ECentral; REARING

757 Novikova, L.K., Zakharchenko, I.S., Solonkina, L.M. 1984.
Effect of repeated copulations on general fecundity of the gypsy moth under artificial conditions. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 73.
-- When gypsy moths are reared under laboratory conditions, females are often more numerous than males. The sex index can be 2, more often 1.5. Normal deposition of fertilized eggs by all females does not occur and the proportion of ovipositing females falls to 35%. Old males mating with fresh females increased the proportion of females that deposited fertilized eggs to 100%. Egg masses did not differ from controls produced by fresh males and females either in weight or in the number of eggs in a mass. In the control, average fecundity per female was 416 eggs, with the mean egg weight 0.79 mg; in the experiments with previously used males, the average fecundity was 413 eggs, and the mean egg weight was 0.78 mg.
Central; FECUNDITY, MATING, REARING

758 Novopol'skaye, Ye.V., Tertyshnik, N.M. 1952.
Experimental test of DDT and hexachloran against the *browntail moth* and the gypsy moth. In: Organicheskiye sinteticheskiye insektitsidy. Sel'khozgiz, Moscow: 152.
-- On the basis of laboratory and field experiments, DDT is highly effective against the browntail and the gypsy moth, causing 100% mortality of instars I to III and 88-95% mortality of late instars. Hexachloran is less effective particularly against late instars.
CHEMICAL INSECTICIDES

759 Novotny, J. 1989.
Biological control of the gypsy moth *Lymantria dispar* L. in forests of the CSSR. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma. VPS MOBB, Moscow: 114-120.
-- Under unstable climatic conditions, either enhanced doses of the bacterial preparation bathurin-82 or joint application of the preparation and sublethal doses of biotechnical insecticide (nomolt, dimilin) can be effective against gypsy moth larvae.
EWest; BACTERIA, GROWTH REGULATORS, MICROBIAL PESTICIDES

760 Novotny, J. 1989.
Microsporidia and viruses in bioregulation of the gypsy moth *Lymantria dispar* L. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma. VPS MOBB, Borzhomi: 110-114.
-- In field experiments, the pathogens Microsporidium *Nosema lymantriae* and the virus *Borretina reprimens* were both highly effective. Their application is considered to hold much promise for forest protection.
EWest; MICROSPORIDIA, VIRUS

761 Novozhenov, J.I. 1961.
Pest insects damaging larch needles and young growth at Ilmen State Preserve. In: Trudy Il'menskogo gosudarstvennogo zapovednika. Sverdlovsk: 183-193.
-- In Ilmen State Preserve (Urals), 28 species of the most common phyllophages were found, 16 of them lepidopterans. The gypsy moth and the nun moth are the most important pests of larch forests because they are outbreak species. Multiple defoliations lead to lower resistance and the death of trees.
EEast; PEST LIST, TREE HEALTH

762 Obraztsov, N.S. 1930.
Lepidopterous fauna of Pobuzhsk-Dniester steppe. In: Zapiski Mikolaivs'kogo Institutu narodnoy osviti. Nikolaev: 81-98.
-- In a list of lepidopterous species, belonging to 31 families, the gypsy moth is mentioned as a species frequently occurring in collections.
EWest; FAUNAL LIST

763 Okhotnikov, V.I. 1975.
Bitoxibacillin against folivorous insects. Zashchita rasteniy. (9):45.
-- An experimental application of bitoxibacillin against the gypsy moth, the green oak leaf roller, and the winter moth in the forests of Ivanovo-Frankovsk and Chernovtsy provinces gave better results than application of entomobacterin and carbophos. Most of the diseased larvae were parasitized, primarily by tachinids.
EWest; BACTERIA, MICROBIAL PESTICIDES, PARASITES

764 Okhotnikov, V.I. 1975.
Preparation virin-ENSh against the gypsy moth. Lesnoye khozyaystvo. (8):87-88.
-- The preparation virin-ENSh was tested against the gypsy moth in Chernovtsy Province from 1972 to 1975. Foci were at the phase of population increase; in 1973 defoliation was insignificant and few old egg masses were found. Treatment efficiency ranged from 60 to 87.9%, depending on specific conditions in a focus. Entomophages actively destroying pests in the foci (up to 40% of pupae) were preserved. Because of the high efficacy of the preparation, its application is recommended.
EWest; MICROBIAL PESTICIDES, VIRUS

765 Okhotnikov, V.I. 1978.
Efficacy of bitoxyibacillin against forest defoliators. Lesnoye khozyaystvo. (1):84-86.
-- Efficiency of application of bitoxibacillin against the gypsy moth is 100% on the 28th day.
EWest; BACTERIA, MICROBIAL PESTICIDES

766 Orlov, L.M. 1982.
Studies on preimaginal variability in the gypsy moth. In: Genetika populyatsiy. Materialy III Vsesoyuznogo soveshchaniya. Nauka, Moscow: 150-153.
-- Structural variation in segments of larvae from the South Urals was studied in 1976-1977. Structures of the prothorax change very slightly with growth of a larva as compared to changes in size and merging of warts in the mesothorax and metathorax. Changes in abdominal segments can serve as phenotypic characters. The structure of hairs changes after the first larval molt and later remains stable, while changes in coloration have a polygenic origin. Variations in position of pigmental dorsal warts and longitudinal stripes below these warts can be regarded as phenotypic characters. The number of molts of individual insects depends on feeding conditions, environment, sex, etc., suggesting a way of distinguishing phenes.
WSiberia; COLOR POLYMORPHISM

767 Orlov, L.M. 1985.
Color variations in gypsy moth larvae. In: Genetika populyatsiy. Materialy III Vsesoyuznogo soveshchaniya. Moscow: 141-142.
-- Color variations and sculptural formations of gypsy moth larvae in the South Urals and central Chernozyom zone of Russia were analyzed from 1975 to 1978. There were 45 phenetic parameters distinguished and the larvae were classified into 7 groups. In first instars, color variations are indistinct. Second instar have 25 phenes, third instars have 32, fourth instars have 19, and fifth instars have 12. Larvae collected from different habitats appeared to be more phenetically uniform in the third

instar than "reserve" ones in the same instar. Later, larvae became phenetically diverse again from mixing of populations.
WSiberia; COLOR POLYMORPHISM, MORPHOMETRICS

768 Orlovskaya, Ye.V. 1962.
The use of test-strain of a nuclearpolyhedrosis virus to provoke epizootics in gypsy moth populations. In: Voprosy ekologii. Po materialam IV ekologichekoy konferentsii. Izd. KGU, Kiev: 87-88.
-- When gypsy moth larvae were infected with viruses extracted from 11 insect species, the only larvae that died had received polyhedra extracted from the gypsy moth and the satin moth. Larvae were more susceptible to their own virus, but higher virulence of the satin moth virus could be achieved by passing it through gypsy moth larvae. Field experiments suggested the possibility of initiating epizootics of the gypsy moth by applying small amounts of a highly virulent virus in the foci.
ECentral; MICROBIAL PESTICIDES, VIRUS

769 Orlovskaya, Ye.V. 1968.
Susceptibility of some dendrophilous lepidopterans to various viruses. In: Nauchnyye trudy Leningradskoy lesotehknicheskoy akademii. Zashchita lesa. Leningradskaya lesotehknicheskaya akademiya, Leningrad: 162-170.
-- Experiments were conducted to estimate susceptibility to different viruses of seven dendrophilous lepidopterous species often occurring in the same biotope (gypsy moth, tent caterpillar, haw moth, browntail, apple moth, fruit moth, and fall webworm). The results showed that polyhedral epizootics cannot be expected to involve all species in the focus by application of viruses isolated from one of them.
ECentral; MICROBIAL PESTICIDES, VIRUS

770 Orlovskaya, Ye.V. 1968.
Mechanism of influence of nuclear polyhedrosis on Lepidoptera populations. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 87-88.
-- Investigations of populations of the gypsy moth, the tent caterpillar, the Siberian moth, the haw moth, the cabbage moth, and other lepidopterous insects showed that each species had its own polyhedrosis form. The mechanism of infection was studied under natural and experimental conditions. Population condition and density, food quality, concomitant diseases, and abiotic factors (influence of temperature, and humidity) were taken into consideration. The effect of a virus on an insect population can best be accounted for by the pathogen's virulence and the biological peculiarities of the host insect.
ECentral; POPULATION QUALITY, VIRUS

771 Orlovskaya, Ye.V. 1988.
Prospects of production of virus preparation virin-ENSh for the gypsy moth control. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 40-41.
-- When insects are used for reproduction of viruses, more than 70% of the work is connected with culturing. The main factor retarding large-scale production of virus preparations in the USSR is the lack of well-equipped insectaries. The author has developed techniques to rear gypsy moth larvae and other phytophages in groups and to culture viruses in them. Cheap, agar-free media are produced, and insectaries for producing not only virin-ENSh but also other virus preparations have been designed in cooperation with NPO Agropromlaboratoria.
ECentral; REARING, VIRUS

772 Orlovskaya, Ye.V., Kovaleva, V.Y., Dorovskaya, M.M. 1968.
Effect of diet on susceptibility to a nuclear polyhedrosis virus in *Porthetria dispar* L. and *Barathra brassica* L. and on accumulation of polyhedral masses in the insect body. In: Biologicheskiy metod bor'by s vreditelyami rasteniy. Zinatne, Riga: 63-68.
-- After artificial inoculation of *P. dispar* and *B. brassica* larvae with experimental strains of nuclear polyhedrosis virus, both larval mortality and the number of polyhedra that developed in larvae varied depending on food quality. The number of polyhedra increases as the quality of food decreases.
ECentral; NUTRITION, REARING, VIRUS

773 Orlovskaya, Ye.V., Meshkova, V.L. 1981.
Development of infection processes in gypsy moth population after treatment with the virus preparation virin-ENSh. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 113-116.
-- A ground focal method is the most effective way of developing infections, providing 70% infection of first-instar larvae. In some plots, efficiency amounted to 90%.
ECentral; FOCI, MICROBIAL PESTICIDES, VIRUS

774 Orlovskaya, Ye.V., Sefikhanov, S.S. 1974.
Economic estimation of the use of preparation virin-ENSh. Lesnoye khozyaystvo. (6):91-93.
-- To increase virulence for a certain species, foreign viruses are passed through individuals of the species. Such strains are experimental, in contrast to natural native strains. Spraying or wetting of gypsy moth egg masses a laboratory preparation of virin-ENSh is suggested as a gypsy moth control measure. An outbreak in Dagestan with a density of more than 4 egg masses per tree, was suppressed by application of virin-ENSh, a measure that proved to be less costly than aerial chemical treatment.
Caucasus; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

775 Orlovskaya, Ye.V., Sherdyukova, L.S., Efimova, V.A., Kravchenko, T.V. 1979.
Ways of increasing gypsy moth larval vitality when reared artificially. In: Microbiologichekiye sredstva zashchity rasteniy i bakterial'nyye preparaty. Moscow: 31-37.
ECentral; REARING

776 Orlovskaya, Ye.V., Vasil'eva, V.L., Gural, A.L., Trusov, V.I., Lappa, N.V., Goral, V.M., Spektor, M.P., Murza, V.I., Platunov, B.I. 1981.

Experience in the use of virin-ENSh for gypsy moth control in the South of the Ukraine. Zakhyst roslin. 28:25-27.
-- Technical efficacy in the pest focus at the initial phase of collapse in 1975 did not exceed 60%. Larval mortality in the experimental plots was caused mainly by the action of the introduced virus and by natural diseases such as polyhedrosis and nosematosis, while in the control plot insect mortality was caused by natural viruses and protozoan diseases. The effect of virin-ENSh on the following generation was not very pronounced, but the number of adults, their fecundity and egg mass weight were lower than in the control or in the variant of chlorophos application. Thus, application of the virus preparation in forest biocenoses offers some advantages over application of chemical insecticides.
EWest; MICROBIAL PESTICIDES, VIRUS

777 Orlovskaya, Ye.V., Zakrevskaya, M.V. 1990.
The influence of egg cluster storage conditions on the vitality of gypsy moth larvae. In: Uspekhi entomologii v SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 97-99.
ECentral; EGG MASSES, REARING

778 Osipov, N. 1914.
A section from the annual report made by an instructor-entomologist. Sadovodstvo. (3):250-254.
-- The moth is recorded as a secondary pest in orchards of Bukovina and Moldavia.
EWest; PEST LIST

779 Ovander, M.N. 1983.
Protein primary structure of inclusion bodies of a nuclear polyhedrosis virus in the gypsy moth, *Porthetria dispar* L. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 23 p.
-- By polyacrylamide gel electrophoresis with n-end analyzer, it is shown that the polyhedral protein of inclusion bodies of gypsy moth nuclear polyhedrosis virus makes up one peptide chain of a molecular weight of 28,000 daltons. The amino acid of the protein is characterized by a high hydrophobic content. The primary structure of the protein is reconstructed on the basis of amino acid sequences of 36 peptides established by the author and compared with homologous parts of the polyhedral protein of a nuclear polyhedrosis virus of the silkworm. A number of specific features of amino acid residue disposition in the polypeptide chain of the protein are distinguished. The secondary structure of the protein is worked out by Chu and Farsman's method.
EWest; BIOCHEMISTRY, VIRUS

780 Padiy, N.N. 1953.
Application of a biological method of controlling the gypsy moth. Lesnoye khozyaystvo. (10):44-47.
-- A method to colonize parasites by introducing them into new foci from old ones was tested in Kiev Province. *Apanteles porthetriae* Mues. was colonized. The species is bivoltine; the number of larvae emerging from one host larva is 72 to 109. Removal of *Apanteles* from collapsing foci into new ones gave positive results: experimental foci collapsed a year after parasite colonization.
EWest; BIOLOGICAL CONTROL, PARASITES

781 Panina, N.B. 1979.
The gypsy moth effective entomophages. In: Itogi i perspektivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. Tezisy dokladov Vsesoyuznogo nauchno-tekhnichekogo soveshchaniya. Moscow: 82-85.
-- Entomophages of the gypsy moth and their role in pest population dynamics were studied in oak shrubwood of Saratov Province during the culmination of an outbreak. The main contributors to mortality were dipterous parasites: the tachinids *Parasetigena* and *Blepharipa*, and some sarcophagids. The effectiveness of these entomophages was found to be determined by bioecological peculiarities of local parts of the stand. The percentage of parasitism by entomophagous species was correlated to the gypsy moth population.
ECentral; NUMERICAL DATA, PARASITES, SITE CONDITIONS

782 Panina, N.B. 1979.
Performance estimation of tachinids and flesh flies - the gypsy moth entomophages. Lesnoye khozyaystvo. (12):57-60.
-- Investigations carried out in Saratov Province in 1977-1978 showed that of the highest importance for gypsy moth control were the tachinids *Parasetigena silvestris* and *Blepharipoda scutellata* and the sarcophagids *Pseudosarcophaga affinis*, *Parasarcophaga harpax*, and *P. uliginosa*, which parasitized up to 90% of gypsy moth larvae and pupae. Ecological characteristics of each of the 5 dipterous species are given. Analysis of distribution peculiarities of fly larvae in host populations shows that there is a strong positive correlation between distribution parameters (dispersal and the mean) at different parasitism rates. On the whole, actual distribution appeared to be close to a Poisson distribution, which is confirmed by the chi-square criterion analysis. Variations in the rate of parasitism in different crown parts were insignificant. Larvae circulated within the crown (migrations for molting). The sample size for estimating parasitism levels ranges from 420-185 to 75-35 insects, depending on the percentage of crown defoliation.
ECentral; NUMERICAL DATA, PARASITES, SAMPLING

783 Panina, N.B. 1980.
Analysis-aimed sampling of gypsy moth eggs. Lesnoye khozyaystvo. (9):66-67.
-- Five hundred egg masses were analyzed in Saratov province from 1977 to 1979. The aim was to determine the dynamics of egg hatch in groups of different sizes (from 10 to 150 eggs in a group) and in egg masses as a whole. Dispersion between egg masses is considerably higher than dispersion of parameters between samples taken from the same egg mass (13.748 and 2.736, respectively). In general, the optimum sample size is proportional to dispersion between separate samples and inversely proportional to dispersion between separate egg masses. The author suggests a formula for determining the optimum size of a sample taken from separate egg masses and the sample size for estimating population

viability. Fifty eggs per mass from 14-15 egg masses are sufficient.
ECentral; EGGS, EGG HATCH, EGG MASSES, SAMPLING

784 Panina, N.B. 1980.
Evaluation of abundance of gypsy moth dipterous entomophages. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 48-57.
-- Distribution peculiarities of tachinids and sarcophagids in different periods of their life cycle are considered. Puparia are aggregated in soil, and adults are aggregated in the stand space. Mathematical models of these distributions are given. The optimum size of the ground plot for puparia counts is calculated. The author suggests simple equations and tables for estimating the appropriate volume of inventory work at different stages of entomophage development.
EEast; MODELS, PARASITES, SAMPLING

785 Panina, N.B. 1984.
Factors affecting gypsy moth entomophage abundance in oak groves in the southeast-European part of the USSR. In: Lesnyye ekosistemy i voprosy modelirovaniya. Moscow: 49-53.
-- Life tables for entomophagous parasites of the gypsy moth are given. Critical stages of ontogeny and factors producing the greatest effect on entomophage population in the course of gradation are established. Practical recommendations for increasing entomophage effectiveness are made.
EWest; BIOLOGICAL CONTROL, NUMERICAL DATA, PARASITES

786 Panina, N.B. 1984.
Methods of determining the efficacy of *Lymantria dispar* L. predators. Lesnoye khozyaystvo. (12):49-50.
-- The best method of estimating the proportion of eggs in gypsy moth egg masses eaten by predators is the one related to egg mass size.
ECentral; EGGS, MODELS, PREDATORS

787 Pantyukhov, G.A. 1962.
Impact of positive temperatures on different populations of the browntail moth and the gypsy moth. Entomologicheskoye obozrenie. 41(2):274-284.
-- In a study of the effect of above-zero temperatures on principal physiological characters of the gypsy moth and the browntail taken from different populations and reared under laboratory conditions, there was no significant difference in the content of water, lipids, total nitrogen, glycogen, reducing substances, the value of iodine number, and dynamics and respiration energy. This must be the reason for a similar response of the species under study to variations in temperature conditions.
ECentral; BIOCHEMISTRY, PHYSIOLOGY, TEMPERATURE

788 Paramonov, A.Ya. 1934.
On the question about the effect of gypsy moth injuries on oak increment in the Crimea. In: Zb. prats' zool. muzeyu. Kiev: 97-110.
-- Sections of oak, beech, and ash were examined, and rings for 24 years (1909 to 1932) were measured. Within this period, three gypsy moth outbreaks were recorded (1909-1913, 1918-1922, 1928-1932). A comparison of increment curves, with allowance made for climatic factors and environmental conditions, showed the growth of the three species to have a strong correlation to the amount of precipitation; the oak growth also correlated to years of defoliation. In these years, oak lost 30 to 50% of volume increment, the absolute value of losses increasing with stand productivity. Under these conditions, however, more complete increment recovery occurred in the years following the outbreak. On the whole, the increment of many years compensated for the losses in the period of outbreaks.
EWest; DEFOLIATION, TREE GROWTH

789 Parfent'yev, V.Ya. 1953.
Forest pests in Urdinsk area. In: Trudy respublikanskoy stantsii zashchity rasteniy Kazakhskogo filiala VASKhNIL. Alma-Ata: 59-61.
-- In 1951 the gypsy moth rarely occurred in Urda region of West Kazakhstan Province, but in the stands surveyed a lot of old eggs masses were found, suggesting past outbreaks and the possibility of infestations in newly created stands. The gypsy moth attacks black poplar, willow, oak, elaeagnus, and elm. Climatic conditions in the summer of 1951 were unfavorable for development (low humidity and dry winds), so the larvae were found mostly in dense and shadowed parts of trees, close to the trunk and soil surface.
MAsia; DISTRIBUTION, HOST PLANTS, WEATHER

790 Parkhomenko, V.Yu. 1936.
The gypsy moth (*Porthetria dispar* L.) in forests of the Crimea. (Neparnyy shelkopryad (*Porthetria dispar* L.) v lesakh Kryma.) Izd. VUAN, Kiev. 4 p.
-- In forests and orchards of the Crimea, first instar gypsy moths migrate in May and early June. The maximum migration intensity occurs in the mountains, with directed air streams, and in foci with a high pest density. Migrations usually occur during the day when there are upward air streams. Peculiarities of egg mass distribution are pointed out. The preferred biotopes in the Crimea are dry, digressing oak groves; in other places they are light digressing parts of stands. The most favored food species are hornbeam, pubescent oak, aspen, apple, and bird cherry (in descending order).
EWest; DISPERSAL, HOST PLANTS, LARVAE, SITE CONDITIONS

791 Pavlyuk, R.S. 1979.
What investigations have shown. Zashchita rasteniy. (12):33.
-- In Lvov Province, English oak and rock oak were heavily attacked by the gypsy moth, but hybrid species were not. No pests were found on the introduced species: thuya, katsura, lime, and maidenhair trees.
EWest; HOST PLANTS

792 Peridskaya, L.T., Kulakova, N.M. 1967.
Cultural and morphological patterns of infectious agents of the gypsy moth and the browntail moth. In:

Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 17-21.
-- To isolate disease agents to pure cultures, the authors studied biochemical and morphological parameters of bacterial strains extracted from gypsy moth and browntail moth larvae that died under natural conditions. Twenty-five strains were extracted from gypsy moth larvae and 40 strains were extracted from the browntail moth. A highly toxic bacterium, *Bacillus cereus*, was taken as the reference.
EEast; BACTERIA

793 Persidskaya, L.T. 1975.
Development of microbiological method of controlling the green oak tortrix *Tortrix viridana* L. and the gypsy moth, *Ocneria dispar* L. in meliorated plantings in Rostov region. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 24 p.
-- Bioecological peculiarities of the green oak leaf roller and the gypsy moth in Rostov Province were studied to detect diseases of these pests and factors contributing to epizootics. Seven crystalloid strains of entomopathogenic bacteria and a polyhedrosis virus of the gypsy moth were isolated from diseased and dead insects. Laboratory investigations revealed high susceptibility of green oak leaf roller larvae to isolated bacterial strains and entobacterin, and gypsy moth larvae proved to be susceptible to a polyhedrosis virus. In joint foci, pesticides should be applied to buds coming into leaf, and entobacterin should be applied to leaf blades. In this way, pests can be destroyed and entomophages preserved.
EWest; BACTERIA, MICROBIAL PESTICIDES, VIRUS

794 Persidskaya, L.T. 1981.
Results of plant protection measures in agricultural-forest improvement plantations in Volgograd region. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 120-122.
ECentral; CONTROL, PEST LIST

795 Persidskaya, L.T. 1986.
State of floodplain oak groves and their protection against folivorous pests. In: Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 43-48.
-- Floodplain forests in Volgograd Province, which are of great importance for water and soil protection, have been weakened by heavy anthropogenic pressure and, in recent years, have been frequently defoliated by pests. The most serious pests of oak groves are the green oak leaf roller, the browntail moth, the gypsy moth, the tent caterpillar, and the winter moth. Aerial treatments of pest foci with bacterial preparations and some other biological agents (compounds of the dimilin group) are suggested as control measures.
ECentral; CONTROL, PEST LIST

796 Persidskaya, L.T. 1987.
Protection of meliorated stands and steppe forests against pests in the southeast of the USSR. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 28-36.
-- The most important pests of shelter belts and floodplain forests of the southeastern USSR flourish in spring: the green oakleaf roller, the gypsy moth, the tent caterpillar, and the winter moth. Less important are summer pests: the buff-tip moth and the satin moth. To control pest populations, it is necessary to introduce resistant tree and shrub species, to apply bacterial and virus preparations. Stimulation of beneficial fauna by cultivating sugar plants, creating survival stations for entomophages, setting up artificial bird nests, and limiting cattle grazing also are necessary.
EEast; CONTROL, PEST LIST, STAND COMPOSITION

797 Persidskaya, L.T., Belitskaya, M.N. 1983.
Distinctions in protection of flood-plain oak groves against folivorous pests. Lesnoye khozyaystvo. (7):48-49.
-- The protection of weakened oak groves in the Volga-Akhtuba floodplain against phyllophagous insects is discussed, and ways of increasing biological resistance are suggested. The most serious pests are the green oak leaf roller, the browntail moth, the gypsy moth, the tent caterpillar, and the winter moth. Application of bacterial preparations such as dimilin, and other biologically active preparations is advisable. Moreover, recreational pressures should be relieved, and living conditions of parasites and invertebrate predators should be optimized.
ECentral; PEST LIST, STAND CONDITION

798 Petrov, A.I. 1953.
Pests of woody species at the Aksu-Djebagly Reserve in the South Kazakhstan region. In: Trudy Kazakhskogo sel'skokhozyaystvennogo instituta. Alma-Ata: 36-47.
-- The gypsy moth is mentioned as a pest of poplar and apple. It occurs rather frequently, attacking numerous tree and shrub species. In the mountains it often oviposits on rocks. It heavily attacks some hardwood species when larvae are transported by air from hatching sites to valleys.
MAsia; GENERAL BIOLOGY, OVIPOSITION SITE

799 Petrova, I.D., Kozhushko, Ye.A. 1989.
Characteristics of biological activity of baculoviruses with reference to a nuclear polyhedrosis virus in the gypsy moth. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Materialy otraslevogo soveshchaniya. Novosibirsk: 37.
-- Six geographical isolates of gypsy moth nuclear polyhedrosis were studied. LD_{50} and LT_{50} were used as parameters of biological activity. All viruses were studied concurrently in two gypsy moth populations from Pavlovsk and Krasnoyarsk.
ECentral, WSiberia; GEOGRAPHIC VARIATION, MICROBIAL PESTICIDES, VIRUS

800 Platunov, B.I. 1985.
Introduction of pheromone traps for monitoring *Lymantria dispar* L. Lesnoye khozyaystvo. (11):65-66.
PHEROMONE TRAPS

801 Pleshanov, A.S. 1982.

Insects - defoliators of the larch forests in Eastern Siberia. (Nasekomyye - defoliatory listvennichnykh lesov Vostochnoy Sibiri.) Nauka, Novosibirsk. 209 p.
-- The history of Siberian insect fauna on larch (*Larix sibirica, L. dahurica,* etc.), species distribution, and localization of the outbreak areas are discussed. Methods to evaluate larch resistance to damage are proposed and tree physiology following different types of defoliation is described. The biology of gypsy moth is briefly described on pages 160-163.
ESiberia; PEST LIST, TREE HEALTH

802 Pleshanov, A.S., Berezhnykh, Ye.D., Gamerova, O.G., Tokmakov, A.V., Epova, B.I. 1988.
Groups of insects, important for ecological management in the forest of BAM zone. Lesovedenie. (3):21-26.
-- Along the Baikal-Amur railway (BAM) gypsy moth outbreaks take place in larch stands. High density lasts not longer then 2 years and larch trees usually recover fully after defoliation.
ESiberia, Far East; DISTRIBUTION, HOST PLANTS, TREE HEALTH

803 Plokhikh, V.S. 1967.
On complex pattern of folivore foci in meliorated oak stands in the southeast of the European part of the USSR. In: Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 5-7.
-- Pest foci in oak stands usually exist as a complex, even if one species prevails; therefore ecological peculiarities should be taken into consideration. Three complexes of phyllophagous pests are distinguished from early spring through summer. The gypsy moth is one of the most important species of the spring complex in the Azov-Pre-Caucasus zone, in the Lower Volga region, and in the Caspian-desert zone.
Caucasus, EEast; GENERAL BIOLOGY

804 Plokhikh, V.S. 1967.
Occurrence of bacterial diseases in oak defoliators under natural conditions. In: Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 9-12.
-- Oak stands in Volgograd, Kuibyshev, and Rostov provinces were investigated from 1963 to 1965 to find agents of bacterial diseases of important oak pests such as the browntail moth, the green oak leaf roller, and the gypsy moth. No epizootics involved all pests. At different gradation phases of the gypsy moth population, 12 to 63% of insects were parasitized by entomophages, and 3 to 12% were infected with bacterioses. A high pest population is favorable for bacteriosis development; temperature variations in the period of hibernation are favorable for protozoan diseases.
EEast; BACTERIA, MICROSPORIDIA, PARASITES, TEMPERATURE

805 Plotnikov, V.I. 1911.
Review on pest insects in Turkestan and methods to control them. Turkestanskoe sel'skoe khozyaystvo. (2):812-831.
MAsia; CONTROL, PEST LIST

806 Plotnikov, V.I. 1914.
Garden pests in Semirechye. Turkestanskoe sel'skoe khozyaystvo. (8):740-742.
-- Orchard pests and diseases were studied in the vicinity of Alma-Ata. The gypsy moth occurred rarely during the period of survey (May and June).
MAsia; PEST LIST

807 Plotnikov, V.I. 1926.
Gypsy moth. In: Nasekomyye, vredyashchiye sel'skokhozyaystvennym rasteniyam v Sredney Azii. Tashkent: 98-99.
-- The gypsy moth is an important pest in the mountain valleys of Uzbekistan. During an outbreak it defoliates orchards and forests. A single defoliation of forests leads to the loss of annual increment, while orchards fail to bear fruit not only in the year of defoliation but also in the following year. Egg masses are deposited as early as June, usually on the lower part of tree trunks. Larvae pupate on trunks, in branch forks, between leaves, and in bark crevices. Adult females are observed to fly at night, covering short distances; males fly both at night and in the daytime. Egg mass size varies from 100 to 500 eggs. Egg masses are destroyed by dermestids and larvae and pupae are destroyed by tachinids and ichneumons. The cuckoo is a predator of the gypsy moth. The best control measure is destruction of egg masses.
MAsia; BIRDS, GENERAL BIOLOGY

808 Pokhiton, S.V. 1970.
Effect of some microbiological preparations on neurohumoral activity in the gypsy moth, the tent caterpillar, and satin moth. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 24 p.
-- Changes in neurohumoral activity of some lepidopterous pests, including gypsy moth, were studied. Insects were infected with entomopathogenic bacteria, fungi, and viruses (pure cultures, mixed infections, and bioagents with insecticide admixtures). Mixed infections appeared to be more effective than pure cultures, producing a more profound effect on the neurohumoral system, which leads quickly to death.
EWest; ENDOCRINOLOGY, PATHOGENS

809 Pokoziy, I.T. 1965.
The most important folivorous and soil-dwelling pests of oak trees in Pridonetsk area of the Ukraine and their control. Avtoreferat dissertatsii doktora biologicheskikh nauk. Kharkov. 40 p.
-- The gypsy moth is mentioned among important phyllophagous pests of oak. Data are given on phenology, ecology, population dynamics, and factors regulating population dynamics. The author considers diseases to be the main factor in pest control; parasites are less important. The role of climatic factors (droughts, frosts) also is mentioned.
EWest; GENERAL BIOLOGY

810 Polozhentsev, P.A. 1949.
Gypsy moth. In: Zhivotnyy mir Bashkirii. Bashgosizdat,

Ufa: 202-289.
-- Pest outbreaks were recorded in Bashkiria in 1924, 1934, 1936-1938, 1941-1943, and 1948. Orchards, hardwood species, pine, and larch are attacked. Life stages, damage, and focal areas are described. The pest is parasitized by *Phorocera agilis* R.-D.
EEast; OUTBREAKS, PARASITES

811 Polozhentsev, P.A. 1977.
Gypsy moth. In: Zhivotnyy mir Bashkirii. Ufa: 170-171.
-- Pest outbreaks were recorded in Bashkiria in 1934-1941, 1942-1944, 1950-1956, and 1957-1962. Data on the area of foci are given and the pest and the damage it inflicts are described briefly.
EEast; OUTBREAKS

812 Polozhentsev, P.A. 1978.
Invertebrates and their application for forest pest control. Lesnoye khozyaystvo. (1):80-90.
-- The effect of protozoan diseases and nematodes on gypsy moth population dynamics is discussed. High larval mortality (up to 100%) caused by *Nosema disparis* was recorded in Bashkiria. In the vicinity of Kherson, nosematosis was used for effective control of the gypsy moth in natural foci. Good results had been achieved by Veiser and Veber by treating pest larvae in the foci with spores of *Nosema serbica*, *Plistophora scubergi*, and *Thelohania hyphntriae*. In some foci, mortality caused by nematodes reached 100%.
EEast, EWest; BIOLOGICAL CONTROL, MICROSPORIDIA, NEMATODES

813 Polozhentsev, P.A., Khanislamov, M.G. 1962.
Insect pests of oak trees in Bashkiria. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 105-112.
-- Oak can be attacked by more than 1,400 insect species. English oak does not grow east of Bashkiria, and the condition of oak groves has been weakened for many years. There are 65 oak pests in Bashkiria: 46 primary pests and 19 secondary ones. The most serious primary pests are the gypsy moth, the tent caterpillar, and the browntail moth. The most serious secondary pests are the capricorn beetles *Mesosa myops*, *Plagienotus arcuatus*, and *P. detritus*, buprestids of the genus *Agrilus*, and the cambium beetle *Scolytus intricatus*.
EEast; PEST LIST, TREE HEALTH

814 Polozhentsev, P.A., Khanislamov, M.G. 1962.
Theory and trends in correlations of insect gradations to the physiological state of a tree. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 57-60.
-- Data on the relation between the physiological condition of food plants and insect gradation phases include the gypsy moth as a model object. Climatic changes affect the phyllophage population through changes in the biochemical composition of plants.
EEast; CLIMATE, FOLIAGE CHEMISTRY, WEATHER

815 Polyakov, V.A., Mednikov, A.A., Rozhkov, V.M. 1989.
Gypsy moth in Krasnodar Region. Lesnoye khozyaystvo. (9):54-55.
-- An analysis of the relation between cyclic gypsy moth outbreaks and meteorological factors shows that in Krasnodar Krai, like in other regions, outbreaks are preceded by two severe winters and droughts in May and June. These conditions lead to an increase in entomophage mortality and cause changes in the biochemical composition of leaves that are favorable for feeding of phyllophages. An objective and exact long-term prediction under the conditions of a specific biocenosis is difficult to make because of fluctuations in solar activity cycles and anthropogenic impacts.
EWest; FOLIAGE CHEMISTRY, PARASITES, SOLAR ACTIVITY, WEATHER

816 Polyakova, V.P., Simchuk, P.A. 1978.
Yield of microspores of *Pleistophora schubergi* relative to infection rate and to gypsy moth larval instar. In: Biologicheskiye osnovy ratsional'nogo ispol'zovaniya zhivotnogo i rastitel'nogo mira. Tezisy dokladov konferentsii molodykh uchenykh-biologov. Riga: 281-282.
-- In all instars of gypsy moth larvae, the yield of spores per body weight increases with infection rate. The yield of spores is highest when early instars are infected. The highest yield of spore stock of microspordia is produced when larvae are infected with suspensions containing 105-106 spores per 1 ml of solution.
EWest; MICROSPORIDIA, REARING

817 Ponomareva, P.Ye., Romanenko, K.Ye., Gabrid, N.V. 1984.
Some factors limiting the gypsy moth population number in nut woodlands of Kirgizia. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 105.
-- The focus that originated in floodplain valley forests in the 1960s increased in size and by the time of surveys it had reached the upper boundary. Chemical treatments of foci produced only a short-term effect. Forests of the upper and middle zones (1,400 to 2,200 m above sea level) are less affected by anthropogenic impacts and the pest population is controlled naturally. Application of pesticides upsets the ratio of harmful and beneficial species. To preserve nut forests as model biocenoses and prevent them from being polluted with pesticides, chemical treatments should be stopped.
MAsia; CHEMICAL INSECTICIDES

818 Porchinskiy, I.A. 1904.
Gypsy moth. Plodovodstvo. (7):521.
-- The species is described, its activity in orchards is discussed, and control measures including destruction of egg masses, application of sticky belts, and treatment with Paris green in the period of larval feeding are suggested.
EWest; CONTROL, GENERAL BIOLOGY

819 Porchinskiy, I.A. 1913.
List of occurrence of important destructive animals in Russia in 1912. In: Ezhegodnik deputatskogo sel'skokhozyaystvennogo tsentral'nogo soveta zemel'noy administratsii i sel'skogo khozyaystva. St. Petersburg:

351-361.
PEST LIST

820 Poryvaev, V.D., Kandrushin, Ye.V., Karavaev, V.S., Vavilin, V.I., Sviridenko, A.V. 1989.
The use of sublimation drying technique in production of entomopathogenous viral preparations. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Materialy otraslevogo soveshchaniya. Novosibirsk: 61.
-- The authors discuss advantages of freeze-drying in producing entomopathogenic preparations based on nuclear polyhedrosis viruses of the cabbage moth, the bollworm, and the gypsy moth. Lyophilization of a virus preparation in the presence of a protective medium containing peptone, carbohydrates, proteins, and amino acid additives provides increased stability in storage. Preparations are also completely soluble, allowing restrictions on dispersion techniques to be removed. Virus material must be purified to intensify the process of freeze-drying. The application of various additives and antioxidants in producing standard samples of material and virus preparations seems promising.
WSiberia; MICROBIAL PESTICIDES, VIRUS

821 Poskryakov, A.V. 1983.
Pheromone traps for gypsy moth monitoring. In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNIILM lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 210-217.
-- Pheromone traps of different shapes and methods of preventing escapes were tested in the field for the monitoring of the gypsy moth. The tests showed that closed cylindrical and prismatic traps were highly effective. The use of insecticide traps was considered pointless because of the instability of results. Practical aspects of application and efficiency of different glue types are discussed.
ECentral; PHEROMONE TRAPS

822 Pribylova, M.V. 1981.
Gypsy moth entomophages and the ways to increase their number in the forests of the northern Caucasus. In: Tezisy dokladov nauchnoy konferentsii "Biologicheskiye metody bor'by s vreditelyami sel'khozkul'tur i lesa". Zashchita rasteniy i okhrana nasekomykh. Ministerstvo sel'skogo khozyaystva Armyanskoy SSR, Erevan: 24-25.
-- A list of gypsy moth parasites and predators includes: *Pimpla turionellae, Pimpla instigator, Apanteles liparidis, Apanteles melanoscelus, Apanteles porthetriae, Brachymeria intermedia, Anastatus japonicus, Exorista larvarum, Parasetigena silvestris, Blondelia nigripes, Compsilura concinnata, Zenillia libathrix, Tachina fera, Parasarcophaga harpax, Parasarcophaga uliginosa, Calosoma inquisitor, Calosoma sycophanta, Xylodrepa quadripunctata, Dermestes bicolor, Dermestes erichsoni, Mantis religiosa.*
EWest; BIOLOGICAL CONTROL, PARASITES, PREDATORS

823 Pribylova, M.V. 1986.
Efficiency of disparlure traps for monitoring and forecasting *Lymantria dispar* L. population. Lesnoye khozyaystvo. (7):68-69.
Caucasus; PHEROMONE TRAPS, PROGNOSIS

824 Pribylova, M.V. 1988.
Gypsy moth in the North Caucasus. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 27-28.
-- The gypsy moth was the most important phyllophagous pest in the forests of the North Caucasus during the period from 1947 to 1987. It was responsible for more than 33% of infested area, followed by the green oak leaf roller (about 30%), geometrids (mainly the winter moth and the scribbler) (about 29%), the browntail moth (about 40%), and other pests. There were two pandemic gypsy moth outbreaks (1949 to 1951 and 1981 to 1983) and two local outbreaks (1964 to 1966 and 1972 to 1974). The insect caused 5 to 30% loss of increment and acorn yield during 4 to 6 years following every population increase. Imago fecundity varies from 30 to 70 eggs at the crisis phase to 400 to 700 eggs in the period of population increase. The absolute density is 0.1-0.2 eggs per tree in the period of depression, to 5,000-7,500 or more in the culmination of an outbreak. The main control factor in population dynamics is moisture supply: the higher the water stress, the more intensive the pest outbreak. If deficiency of moisture amounts to 100% of the norm over 2-3 days, gypsy moth gradation will cause death of the majority of trees. On the basis of these data, the author worked out three long-term forecasts of population dynamics of the most important phyllophages. Parasites and predators play an important part in population control. In the forests of the North Caucasus, more than 30 species of effective entomophages have been recorded.
Caucasus; DENSITY, FECUNDITY, NUMERICAL DATA, PEST LIST, PROGNOSIS, TREE GROWTH, WEATHER

825 Prokof'ev, M.A. 1966.
Pests and diseases of Siberian gardens. (Vrediteli i bolezni sadov Sibiri.) Altaiskoe knizhnoe izdatel'stvo, Barnaul. 112 p.
-- Parasites of gypsy moth listed were: *Casinaria tenuiventris, Apanteles liparidis, Exorista fasciata, Exorista larvarum.*
WSiberia; PARASITES, PEST LIST

826 Prutenskiy, D.I. 1960.
Pest insects in Kirgizia. (Vrednyye nasekomyye Kirgizii.) Kirgizgosizdat, Frunze. 123 p.
MAsia; GENERAL BIOLOGY, PEST LIST

827 Prutenskiy, D.I., Karavaeva, R.P., Romanenko, K.Ye. 1954.
The gypsy moth (*Ocneria dispar* L.). In: Vrednyye nasekomyye i mery bor'by s nimi v dolinnykh nasazhdeniyakh Kirgizii. Frunze: 17-18.
-- The gypsy moth is a common species in the valleys of Kirgizia. Its life stages are described. Larvae begin to pupate in late May, between leaves and in bark crevices. Adults fly in late June-early July, and egg hatch occurs in April-May. Fecundity is 400 to 850 eggs in one or several

clusters. Major food plants are elm, various poplar species, and apple. The type of damage is discussed. The following control measures are suggested: collection of egg masses and treatment with petroleum, and treatment of stands with DDT, hexachloran, and calcium arsenite during larval feeding.
MAsia; CHEMICAL INSECTICIDES, CONTROL, FECUNDITY, HOST PLANTS, PHENOLOGY

828 Prutenskiy, D.I., Ryk-Bogdaniko, M.G. 1940.
Pests of the nutlands in southern Kirgizii. In: Gretskiy orekh Yuzhnoy Kirgizii. Frunze: 12-36.
MAsia; PEST LIST

829 Pukhov, B.A. 1917.
Measures of controlling field pests in Orenburg district in 1916 and schedule for 1917. In: Orenburgskoye zemstvo. Orenburg: 2-9.
EEast; CONTROL, PEST LIST

830 Pyatnitskiy, G.K. 1935.
Factors promoting and limiting gypsy moth outbreaks in the Crimea. In: Voprosy ekologii i biotsenologii. Kiev: 110-119.
-- Pest outbreaks were recorded in the Crimea in 1842, 1861 to 1863, 1869 to 1871, 1884 to 1885, 1911 to 1913, and 1929 to 1932. The principal factors causing outbreaks are the region's dry climate, degradation of forests under anthropogenic impact, and prevalence of food species preferred by the pest (oriental hornbeam and pubescent oak). The main dispersal stage is the first instar; females do not fly. Average fecundity is 350 eggs, with a maximum fecundity of 1,200. Preferred oviposition sites are tree bases, bark crevices, hollows, and litter; eggs are often deposited on and under stones. A male can fertilize 10 females; the length of copulation is 30 to 40 minutes. All eggs are deposited in one cluster, primarily by the end of the first day following fertilization. The following factors control population: station differences (southern slopes are preferred), self-regulation of density in foci owing to dispersal of larvae, entomophages, and diseases. The following biological factors of pest control are established: nosematosis, and parasite and predator complexes. The most important parasites and predators are *Sturmia scutellata, Calosoma sycophanta, Picromerus conformis, Dermestes* sp. Entomophages attack from 1 to 95% of insects, depending on focus density; up to 30% of insects contract diseases.
EWest; CLIMATE, FECUNDITY, MATING, NEMATODES, OUTBREAKS, OVIPOSITION SITE, PARASITES, PREDATORS, SITE CONDITIONS

831 Radkevich, V.A., Romenko, T.M. 1979.
Duration of development and gypsy moth larvae growth dynamics on food plants of different physiological conditions. In: Fauna i ekologiya nasekomykh Belorussii. Minsk: 173-183.
-- Peculiarities of gypsy moth growth and development depending on the physiological condition of food plants were studied. On weakened plants, the length of larval development was shorter, and larvae grew more intensively.

FOLIAGE QUALITY, REARING

832 Raevskiy, V.G. 1924.
Investigations of field pests within Orenburg-Kirgizia region in 1923. In: Byulleten' Sibirskogo entomologicheskogo obshchestva. Tomsk: 66-67.
EEast, MAsia; PEST LIST

833 Rafes, P.M. 1964.
Pest insect outbreaks as a peculiar case of matter and energy turnover in forest biogeocenosis. In: Zashchita lesa ot vrednykh nasekomykh. Nauka, Moscow: 3-57.
-- The interdependence of outbreak phytophagous species and different biogeocenosis components is considered from the standpoint of matter and energy turnover. The gypsy moth is used as an example. The gradation of some insect species is important for metabolic processes, speeding up mineralization of organic matter entering the soil and stimulating changes in soil composition: after an outbreak, soil fertility improves dramatically, which leads to quicker growth of plants.
ECentral; DEFOLIATION, SOIL, TREE GROWTH

834 Rafes, P.M. 1980.
Biocenotic investigation of phytophagous insects. (Biotsenoticheskiye issledovaniya rastitel'noyadnykh lesnykh nasekomykh.) Nauka, Moscow. 167 p.
-- This monograph presents data on the structure and dynamics of forest biogeocenosis as a system determining the functioning of phytophagous insect populations. Using the gypsy moth as an example, the author considers phytophage population dynamics and gradations, their causes and results, the formation of stands as a source of food for phyllophages, and resistance of plants to phytophagy. Also discussed are ways of forming food plant population consortia and consumer competition, and the formation of phytophagous insect populations and their interaction with both plants and entomophagous enemies.
POPULATION DYNAMICS, REVIEW

835 Rafes, P.M. 1981.
Folivorous forest insects - food plants relationship. In: Itogi nauki i tekhniki. Seriya Entomologiya. VINITI AN SSSR, Moskva: 140-202.
-- This review covers relations between food plant and insect, identification of the food plant, the significance of food quality, plant resistance to defoliation by phytophages, compensation for damaged photosynthesis apparatus, and the character of damage. The system of interaction of food plants and insects is also considered. The author gives examples of turnovers of phytophagous insects, the role of food in phytophage population dynamics, the effect of pest gradations on food plant populations, and the relation of phytophage gradations to the condition of biogeocenoses and cenotic environment as a whole. Concepts are supported by data obtained using the gypsy moth as an example. These include feeding on different food plants in different parts of the area, stimulation and suppression of phytophage feeding by various secondary substances of plants, and the establishment of the gypsy moth in North America and the

formation of relations with new food plants as well as new behavioral traits.
FOLIAGE QUALITY, HOST PLANTS, REVIEW

836 Rafes, P.M. 1988.
On principles of studying gypsy moth behavior. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 15-16.
-- Continuous surveys of gypsy moth populations must involve (1) inventory by the relative number of egg masses and by the number of eggs in them and estimation of their condition (damage, diseases, parasitism); (2) biochemical analysis of leaves in the period of larval feeding; and (3) chemical analysis of the soil. In the course of an outbreak, all necessary data for compiling life tables should be recorded: larval mortality in nature should be compared with larval mortality in cages. When larvae are reared in the cages, larvae and food of the same biocenosis should be compared, and the results obtained should be applied only to the population of the given biocenosis. Only unavoidable deviations from natural conditions are permissible. Behavior in primary foci and migration foci and daily activity of larvae have not been adequately studied. Exact definition of the gypsy moth as a species and of the peculiarities of its population is needed.
EEast; EGG MASSES. FOLIAGE CHEMISTRY, PROGNOSIS, SAMPLING, SOIL

837 Raigorodskaya, I.A. 1966.
Order Lepidoptera - the moths. In: Vrediteli listvennitsy sibirskoy. Nauka, Moscow: 225-271.
-- The gypsy moth is regarded as one of the most serious larch pests in the Baikal Lake region. It also attacks numerous conifers and hardwood trees. General data on the species area are given, and life stages, behavior, and economic importance are described. Outbreaks were recorded in 1924-1925, 1928-1930, 1950, and 1964. Parasites that have been found in the region are *Palexorista bohemica, Exorista fasciata*, and *Carcelia bombicivora* (Tachinidae). The last two are outbreak species.
ESiberia; HOST PLANTS, OUTBREAKS, PARASITES

838 Raigorodskaya, I.A. 1967.
Review of the lepidopterous (Lepidoptera) pests of coniferous forests in Pribaikal'e region. Entomologicheskoye obozrenie. 44(2):311-318.
-- The gypsy moth is listed among 76 lepidopterous pests of conifers in the region west of Lake Baikal. The pest feeds on spruce, fir, pine, Siberian stone pine, and larch and on hardwood species. Microfoci occur periodically in Tunkinskaya valley and along the southern shore of Lake Baikal. For other tree species the gypsy moth is an incidental pest.
ESiberia; HOST PLANTS, PEST LIST

839 Raspopov, P.M. 1961.
Outbreak dynamics both of the gypsy and the nun moth and other pests in forests of the southwestern part of Chelyabinsk region. In: Trudy Il'menskogo gosudarstvennogo zapovednika. Sverdlovsk: 171-182.
-- In the period of population collapse, up to 70% of pupae in gypsy moth foci are parasitized by tachinids. In Chelyabinsk Province the gypsy moth primarily attacks aspen, linden, and birch. Since it has been found in great numbers in pure pine forests the larvae must have been wind-borne. Primary foci originate in forest-steppe regions with low precipitation (350 to 450 mm) and a high mean daily temperature in June (16-17° C). Outbreaks cover a vast area, starting simultaneously in separate stands. Later, foci shift to foothills (1- to 3-year time lag) and mountains (3- to 4-year time lag). Outbreaks start in dry years.
EEast; HOST PLANTS, PARASITES, POPULATION DYNAMICS, WEATHER

840 Raspopov, P.M. 1970.
Distinctions in gypsy moth population dynamics in forests of Kurgan, Chelyabinsk, and Sverdlovsk regions. In: Lesa Urala i khozyaystvo v nikh. Sverdlovsk: 84-86.
EEast; POPULATION DYNAMICS

841 Raspopov, P.M. 1971.
Population density of some forest insect species in the periods of sharp population decrease. In: Zashchita lesa ot vrednykh nasekomykh i bolezney. Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya. Doklady. Moscow: 109-112.
-- The population density of the most important phyllophagous insects, the gypsy moth included, was studied in Chelyabinsk Province over a 22 year period by close monitoring and annual surveys. Every population was found to have its own system of regulating dynamics, which is determined by specific features of the zone and cenosis.
EEast; PEST LIST, POPULATION DYNAMICS

842 Raspopov, P.M. 1977.
Effect of temperature on gypsy moth outbreak in the South Urals and Zauralye regions. In: Trudy instituta ekologii rasteniy i zhivotnykh UF AN SSSR. Sverdlovsk: 142-153.
EEast, WSiberia; OUTBREAKS, TEMPERATURE

843 Raspopov, P.M., Rafes, P.M. 1977.
Gypsy moth outbreaks in Chelyabinsk Region and their causes. In: Doklady Moskovskogo obshchestva ispytateley prirody. I-e polugodie, 1977. Zoologiya i botanika. Sektsiya zoologii, biotsenologii, gidrobiologii i ikhtiologii, biologicheskikh osnov zhivotnovodstva, botaniki. Ryazanskoye otdeleniye. Moskva: 25-27.
-- In Chelyabinsk Province, the favored food plant of the gypsy moth is birch; egg masses are deposited at the tree butt, and eggs hatch is synchronized with budbreak. Outbreaks were recorded from the late 1940s to 1956, and from 1958 to 1968; in 1974 a new outbreak started. The collapse of an outbreak is caused by unfavorable weather conditions, increases in numbers of entomophages and the incidence of disease, and deterioration of food quality.
EEast; HOST PLANTS, OUTBREAKS, OVIPOSITION SITE

844 Raspopov, P.M., Rafes, P.M. 1978.
Populatiuon dynamics in dendrophilous arthropods as a result of changes in the environment. In: Biologicheskiye metody otsenki prirodnoy sredy. Nauka, Moscow: 36-57.
-- The idea of a population environment is clarified by the concept of biogeocenosis. Phytophage gradation is regarded as a response to better food quality (an increase in the content of units that can be assimilated); it is also related to other changes in biogeocenosis. Gypsy moth outbreaks were recorded east of the Urals in 1950 to 1956, 1958 to 1968, and 1974. Factors decreasing the population numerically without suppressing an outbreak are enumerated. A relationship is established between outbreaks and an increase in egg mass sizes, which is evidence of better feeding conditions. Hence, gradation will cease if food quality becomes worse. During an outbreak the gypsy moth population affects soil-forming processes and probably food plant resistance. A relation between droughts and outbreaks is established.
EEast; FECUNDITY, FOLIAGE QUALITY, POPULATION DYNAMICS

845 Romanenko, K.Ye. 1958.
Pests of fast-growing woody species - poplar, willow, and elm in a shelter aforestation in Kirgizia. In: Trudy Kirgizskogoy lesnoy opytnoy stantsii. Frunze: 133-163.
-- The gypsy moth is mentioned among 37 important pests of poplar, willow, and elm. It is common in Kirgizia, attacking the majority of hardwood species in Chuya Valley. Data on pest phenology are given. Egg masses are found on the ground and on stones. Of entomophages, tachinids have been recorded attacking up to 27% of gypsy moth pupae; other predators are beetles, *Calosoma sycophanta*, and cuckoos. A pest outbreak was recorded in 1949 in northern Kirgizia.
MAsia; BIRDS, HOST PLANTS, OVIPOSITION SITE, PARASITES, PREDATORS

846 Romanenko, K.Ye. 1981.
***Ocneria dispar* L. - the gypsy moth.** In: Vrediteli zashchitnykh lesonasazhdeniy Kirgizii. Ilim, Frunze: 141-144.
-- In Kirgizia the gypsy moth is found in valleys and mountainous regions. In the south of the republic and in Chuya Valley it attacks elm, apple, willow, poplar, oak, pistachio, English walnut, maple, honeysuckle, and other hardwood species. The author believes that in some regions of Kirgizia gypsy moth outbreaks are suppressed by a complex of its natural enemies. The main parasite species are *Rogas pallidator* Thunb., *Pimpla instigator* F., and *Exorista larvarum* L. During the outbreak of 1951 in Chuya Valley, over 80% of pupae were parasitized by tachinids and larvae were eaten by *Calosoma sycophanta* and cuckoos. By 1952 that focus had been eliminated. In the sites where control measures were carried out (treatment of egg masses with petroleum, chemical treatments), outbreaks lasted as long as 6 years. Egg masses are deposited on tree trunks at heights of 10-12 m, but their distribution varies depending on ecological conditions of the focus. In the south, the majority of egg masses are deposited at the tree base, while in the north few egg masses can be found at the butt end of the tree. The northern and northwestern sides of trees are the preferred sites. Eggs hatch in March, larvae pupate in late May, and adults fly in June and July. Females lay an average of 850 eggs.
MAsia; HOST PLANTS, OVIPOSITION SITE, PARASITES, PHENOLOGY, PREDATORS

847 Romanenko, K.Ye. 1982.
Test of virin-ENSh preparation against the gypsy moth (*Ocneria dispar* L.) in nut plants of Kirgizia. In: Entomologicheskiye issledovaniya v Kirgizii. Frunze: 84-86.
-- The virus preparation virin-ENSh was tested in different concentrations in gypsy moth foci. The highest larval mortality (up to 80%) was recorded at a concentration of 1:10.
MAsia; MICROBIAL PESTICIDES, VIRUS

848 Romanenko, K.Ye. 1984.
Pest of pistachio in Kirgizia and methods of their control. (Vrediteli fistashki v Kirgizii i mery bor'by s nimi.) Ilim, Frunze. 154 p.
-- Information about gypsy moth can be found on pages 92-96. In Central Asian republics the gypsy moth is found in mountainous regions; in Kirgizia it is found everywhere. Data on species ecology are given. Larvae pupate between leaves tied up by a web. In pistachio stands, females usually oviposit at the tree base, on fresh stumps, and in bark cracks; during an outbreak, a lot of egg masses are deposited on stones and in cracks in the earth. On English walnut and poplar egg masses are found at a height up to 8 to 12 m, sometimes higher. A large gypsy moth outbreak was recorded in the late 1970's and early 1980's.
MAsia; OVIPOSITION SITE

849 Romanenko, K.Ye., Ponomareva, P.Ye. 1984.
Results of the introduction of the gypsy moth egg parasite (*Anastatus disparis* Rusch.) into nut plantations in Kirgizia. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 126.
-- *Anastatus* is a widespread entomophages of the gypsy moth in Kirgizia. Egg parasitism in natural conditions averaged 8%, ranging from 0 to 16% in different foci. In 1983 an attempt was made to introduce the parasite into a focus of high density. An autumn inventory showed egg mass parasitism in the experimental focus to be 21 to 26%, vs. 8 to 12% in the control. Thus, introduction of *Anastatus* from collapsing foci to foci where the pest population is increasing seems to be a promising control procedure.
MAsia; BIOLOGICAL CONTROL, EGGS, PARASITES

850 Romanyuk, I.O. 1879.
On occurrence of gypsy moth larvae in forests of Volsk district in Saratov Province in 1878. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. 11:23-26.
ECentral; DISPERSAL, LARVAE

851 Rotschild, Ye.V. 1958.
Extermination by rodents of the gypsy moth in the

area of mass reproduction. Byulleten' Moskovskogo obshchestva ispytatelei prirody. 63(4):129-130.
-- Three small mammal species in the forests east of the Ural Mountains (*Apodemus flavicollis, A. sylvaticus* and *Dyromys nitedula*) eat gypsy moth larvae and pupae. Stomachs contained all body parts except hair and often were filled with remains.
WSiberia; MAMMALS, PREDATORS

852 Rozhkov, A.S. 1982.
Gypsy moth in Middle and East Siberia. (Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri.) Nauka, Novosibirsk. 80 p.
-- Features of gypsy moth ecology, feeding, development, and fecundity in Siberia are described in 7 chapters by different authors. (See separate authors: 853.)
ESiberia; REVIEW

853 Rozhkov, A.S., Vasil'eva, T.G. 1982.
Gypsy moth in Eastern Siberia. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 4-19.
-- The authors consider gypsy moth distribution, gradation, and migration foci in East Siberia, relation of its development, survival, and fecundity to food plants. Larch is the favored food for local populations. Larvae develop better on dark coniferous species when feeding on young needles, but can develop on spruce only if they start feeding on young needles of current-year shoots after hatching. Experiments confirmed an earlier conclusion that even if the favored food is available, higher fecundity alone cannot enhance population density significantly in the course of 2-3 generations; higher survivorship is needed. Females of Transbaicalian population can fly up to 100 km.
ESiberia; FEMALE, FLIGHT, HOST PLANTS, POPULATION DYNAMICS

854 Rozov, S.M., Berdnikov, V.A. 1982.
Determination of lysine residue number positive charge and molecular lengths of histones H-1 and H-5 by an incomplete succinylation method. Biokhimiya. 47:1378-1385.
WSiberia; BIOCHEMISTRY

855 Rubtsov, I.A. 1938.
Effect of constant and fluctuating temperatures on egg development in the gypsy moth (*Porthetria dispar* L.). Zashchita rasteniy. 17:25-38.
-- A study of the effect of different temperature conditions on gypsy moth development and the sum of effective temperatures of overwintering eggs. Immediately after oviposition, eggs do not develop; in January the threshold of development is about 10° C, and in February it gradually changes to 5° to-6° C, a theoretical threshold being 3° to 4° C. The most exact and complete description of the process can be made with an exponential curve. A thermal constant varies regularly at steady temperatures, rising in zones of depression and falling to the minimum under optimum conditions. It has the same value at varying temperatures as it has at steady temperatures. The value of the thermal constant obtained when inactive phases develop at a steady temperature coincides in its absolute value with the constant at varying temperatures, which can be used for a short-term forecast.
ECentral; DEVELOPMENT, DIAPAUSE, EGGS, MODELS, TEMPERATURE

856 Rubtsov, I.A. 1948.
Biological method of pest insects control. (Biologicheskiy metod bor'by s vrednymi nasekomymi.) OGIZ, Moscow. 214 p.
-- The predator *Calosoma sycophanta* and the parasites *Apanteles melanoscelus* and *Anastatus japonicus* are listed as important entomophages
ECentral; PARASITES, PREDATORS

857 Rubtsov, I.A., Rubtsova, N.N. 1984.
Analysis of folivorous insects-oak tree interactions. (Analiz vzaimodeystviya listogryzushchikh nasekomykh s dubom.) Nauka, Moscow. 183 p.
-- In surveys of oak pest populations in Tellerman forestry (Voronezh Province) for a period of 30 years, the gypsy moth is mentioned as an important pest. The contribution of phyllophage outbreaks to oak tree mortality is estimated. The effect of climatic factors on wood increments of different phenological oak forms is considered.
ECentral; CLIMATE, PEST LIST, TREE GROWTH, WEATHER

858 Rudnev, D.F. 1950.
Experience in the control of gypsy moth. Agrobiologiya. (2):147-150.
-- A gypsy moth outbreak was recorded from 1947 to 1950 in oak groves of Zhitomir Province that had been subjected to anthropogenic impact. Treatment of egg masses with petroleum and collection of egg masses are advisable when egg masses are aggregated, but these measures are pointless when they are dispersed. Aerial treatments with calcium arsenite are not very effective. It is the author's opinion that the application of DDT and hexachloran does not have the limitations of the other methods. Results of production tests of these pesticides in Zhitomir Province are presented. Application in early June caused death not only of pest larvae but of other insects. Treatments should be done earlier in the season.
EWest; CHEMICAL INSECTICIDES

859 Rudnev, D.F. 1951.
Determination of egg production in the gypsy moth based on pupal parameters. Zoologicheskiy zhurnal. 30(3):229-237.
-- Irrespective of pupal size and factors causing variation, close correlation of egg production to pupal weight and other parameters holds. Egg production of the gypsy moth can be determined by the formula y=0.42x-6, where x is the pupal weight in mg.
EWest; FECUNDITY, MODELS, NUMERICAL DATA

860 Rudnev, D.F. 1951.
Forest pest insects and their control in Zakarpatye region. In: II ekologicheskaya konferentsiya po probleme: Massovyye razmnozheniya zhivotnykh i ikh prognozy. Izd.

KGU, Kiev: 217-218.
-- In oak groves of Zakarpatye Province, the gypsy moth is the most important primary pest. Aerial treatments with DDT are recommended as principal control measures.
EWest; CHEMICAL INSECTICIDES

861 Rudnev, D.F. 1952.
Effect of food quality on gypsy moth fecundity. In: Naukovi pratsi Institutu entomologii ta fitopatologii. Kiev: 5-21.
-- The mean weight of female pupae and the egg production of insects reared on different food plants proved to be different, though mean values for some plants were similar. Of 20 plants tested--willow, oak, some poplar species, birch, apple, maple, etc.--the most favored ones were white willow and English oak. Variations in pupal weight were reflected in variations in adult size, the number of eggs deposited by a female, and the weight of an egg mass and an egg. Hence, pupal weight is an indicator of conditions of larval development. Feeding on different foods also resulted in significant variations in larval survival. It is the author's opinion that feeding conditions and composition of food species are the main factors causing numerical fluctuations of pest populations in the foci.
EWest; FECUNDITY, HOST PLANTS, MODELS, NUMERICAL DATA, REARING

862 Rumyantsev, P.D. 1925.
On biology of the gypsy moth (*Lymantria dispar* L.). In: Izvestiya Stavropol'skoy stantsii zashchity rasteniy. Stavropol: 23-26.
-- A gypsy moth population was studied in the vicinity of Stavropol. Females deposited eggs along tree trunks, from the butt to a height of more than 20 m, but principally at the butt end. Lighting, side, availability of shelter, temperature, and humidity were of no importance. The number of eggs per mass ranged from 50 to 320, with most masses having 150 to 200. An outbreak was recorded in 1923-1924; by 1925 the foci had collapsed. A relation between the phenology of food plants and the pest was established. The author relates the decrease in severe frosts during the winter of 1924-1925 to a decrease in deaths of eggs. The gypsy moth attacks more than 50 species, the most favored ones being oak, hornbeam, elm, beech, linden, sweetbrier, apple, and barberry. Adults copulate immediately after emergence with copulation lasting more than 30 minutes. One male can mate with several females (up to 7). The following entomophages are recorded: egg parasites, ticks of the genus *Thrombidium*; parasites of larvae, tachinids and hymenopterans. Up to 5% of insects died of bacterial diseases.
Caucasus; BACTERIA, FECUNDITY, HOST PLANTS, MATING, OVIPOSITION SITE, PARASITES

863 Rushkovskiy, I.A. 1914.
Field pests in Ufa Province in 1913. In: Meropriyatiya Ufimskogo gubernskogo zemstva po uluchsheniyu sel'skogo khozyaystva v 1914 godu. Ufa: 1-22.
-- The gypsy moth is mentioned as a pest of agricultural crops. An outbreak was recorded in Bashkiria in 1913.
EEast; HOST PLANTS, PEST LIST

864 Ryazantseva, Ye.I. 1981.
Color variation of the gypsy moth adults in mountain forests of eastern Tannu-Ola. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 91-93.
-- An analysis of wing patterns of 1,300 females and 90 males of the gypsy moth collected in mountain forests of Tuva showed high variability in coloration. Five types of imago coloration are differentiated. The structure of aboriginal gypsy moth populations is not constant; it changes regularly at different gradation phases, as reflected in the ratio of different morphotypes of larvae and adults.
WSiberia; COLOR POLYMORPHISM, MORPHOMETRICS

865 Ryazantseva, Ye.I. 1982.
Morphometric analysis of gypsy moth larvae from the South Siberian population. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 67-74.
-- Gypsy moth populations in South Siberia are characterized by enhanced variability of morphometric parameters, which reflects regularities of structural changes at different gradation phases. A correlation is established between the morphometric parameters and biological parameters characteristic of species population dynamics in the forests of South Siberia.
WSiberia; MORPHOMETRICS

866 Ryvkin, B.V. 1951.
Some questions about the biology of the tachinid, *Sturmia inconspicua* Meig. (Diptera, Larvivoridae), and its economic importance. Doklady Akademii nauk SSSR. 76(5):755-758.
ECentral; PARASITES

867 Ryvkin, B.V. 1957.
Peculiarities of gypsy moth outbreaks and factors causing them. Zoologicheskiy zhurnal. 36(9):1355-1358.
-- Surveys were made in 91 gypsy moth foci in 74 areas of the European part of the USSR in 1951 to 1953. Frequent long outbreaks are related to low efficiency of entomophages in foci. *Anastatus disparis* was the most important parasite; parasitism of egg masses averaged 20%. Low efficiency results from high sensitivity of *Anastatus* to temperature, low dispersal activity of females, the lack of hosts during foci depression phase, and treatment of egg masses with petroleum. Additional entomophages registered were: *Dermestes erichsoni, Phorocera silvestris, Sturmia scutellata, Compsilura concinnata, Apanteles porthetriae*, and the sarcophagids *Parasarcophaga harpax* and *Pseudosarcophaga affinis*. Secondary parasites markedly reduced their efficiency. To promote survival and dispersion of *A. disparis*, collect small egg masses in autumn, keep them in a warm building, and release them in the spring. Treat egg masses with petroleum only in spring after parasites emerge.
EWest, ECentral; BIOLOGICAL CONTROL, EGGS, FOCI, PARASITES, TEMPERATURE

868 Ryvkin, B.V. 1958.
Entomophages of the most important silkworms and

sawflies in forests of the European part of the USSR. Avtoreferat dissertatsii doktora biologicheskikh nauk. Moscow. 33 p.
-- Investigations were carried on for more than 20 years to estimate the role of the entomophage complex in regulating populations of 10 phyllophagous pest species, including the gypsy moth. Unlike the entomophage complex of sawflies, entomophages of the gypsy moth are not effective; the complex functions slowly, which results in prolonged pest outbreaks. To enhance entomophage activity, a series of measures improving forest biocenoses is suggested.
EWest, ECentral; BIOLOGICAL CONTROL, PARASITES, PEST LIST

869 Ryvkin, B.V. 1959.
Importance of entomophages and their application for limiting folivore outbreaks. In: Biologicheskiy metod bor'by s vreditelyami rasteniy. Kiev: 113-119.
-- The author presents data from 25 years on the role of entomophages in regulating populations of 10 phyllophagous pest species, including the gypsy moth. The entomophage complex of the gypsy moth is not effective; its action is slow and pest outbreaks are of a prolonged nature. The most important entomophages are *Apanteles* species, *Anastatus disparis, Exorista larvarum, Drino gilva, Phorocera silvestris*, and *Sturmia scutellata*. To enhance entomophage activity, measures for protection and improvement of forest biocenoses are suggested with the aim of creating favorable conditions for feeding, providing shelters and additional hosts of parasites. Also suggested is intra-area introduction of entomophages from collapsing foci to the foci in which the pest population is increasing.
EWest; BIOLOGICAL CONTROL, PARASITES

870 Ryvkin, B.V. 1963.
The gypsy moth and its entomophages. In: Entomofagi i zashchita lesa. Izd. sel'skokhozyaistvennoi literatury, Minsk: 127-137.
-- Braconids of the genus *Apanteles*, predatory insects, and disease agents are regarded as the most important biotic controls of gypsy moths. The main egg parasites are *Anastatus disparis* and *Ooencyrtus kuvanae*; parasites of larvae are *Apanteles solitarius, A. liparidis, Phorocera agilis*, and *Compsilura concinnata. Perilampus violaceus* is mentioned as a secondary parasite. Data are presented on geographical distribution, biology, and the possibility of using some entomophagous species.
EWest; CHEMICAL INSECTICIDES, PARASITES

871 Sakharov, N.L. 1910.
Pest insects and their control. Saratovskiy sadovod. (3):67-73.
-- The gypsy moth is mentioned among orchard pests. Scratching off and treatment of egg masses with petroleum are suggested as control measures.
ECentral; CONTROL, EGG MASSES, PEST LIST

872 Sakharov, N.L. 1911.
Regulators of pest insect reproduction or parasites of insects. Saratovskiy sadovod. (1):27-31.
ECentral; PARASITES

873 Sakharov, N.L. 1914.
Pest insects recorded in Astrakhan province in 1912-1914. From the report on 1914. (Vrednyye nasekomyye, otmechennyye v Astrakhanskoy gubernii s 1912 po 1914 gg. Iz otcheta za 1914 g.) Izdanie entomologicheskogo obshchestva Astrakhani, Astrakhan. 29 p.
-- The gypsy moth is mentioned among agricultural and forest pests in Astrakhan Province. The pest is described and destruction of egg masses is suggested as a way to control it.
ECentral; CONTROL, EGG MASSES, PEST LIST

874 Sakharov, N.L. 1947.
***Porthetria dispar* L.** In: Vrednyye nasekomyye Nizhnego Povolzh'ya. Oblgiz, Saratov: 332-333.
-- The gypsy moth is mentioned among the most important orchard and forest pests. The species is described. Treatment of egg masses with petroleum is regarded as the most effective control measure.
ECentral; CONTROL, EGG MASSES

875 Sakharov, V.M., Kirov, Ye.I., Kutsenogiy, K.P., Larionov, G.V., Zhimerikin, V.N., Litvina, L.A., Bakhvalov, S.A. 1979.
The use of thermomechanical aerosols to disperse virus preparation for plant protection against insect pests. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. (2):135-140.
WSiberia; MICROBIAL PESTICIDES, VIRUS

876 Sakharov, V.M., Kutsenogiy, K.P., Kirov, Ye.N., Makarov, V.I., Chankina, O.V., Makhov, G.A., Larionov, G.V., Zhimerikin, V.I., Bakhvalov, S.A., Litvina, L.A. 1980.
Efficiency of thermomechanical aerosols. Zashchita rasteniy. (8):36-37.
-- A nuclear polyhedrosis virus is applied to second instars for the control of gypsy moth. Tests of virus suspension in diesel fuel and aqueous suspension of bacterial preparations have been made. The suspension is pumped into a stream of hot vapors at a temperature of 500 C. Efficacy of the aqueous suspension is 85% to 91%.
WSiberia; MICROBIAL PESTICIDES, VIRUS

877 Samoilovich, Ye.N. 1925.
Preliminary list of fruit pests in the northern area. Zashchita rasteniy. (1):6.
PEST LIST

878 Saradzhashvili, K.G., Tsintsadze, Ye.S. 1988.
Gypsy moth control with synthetic preparations and their antifeedant effect. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 41-42.
-- Gypsy moth outbreaks are periodically recorded in Georgia: in 1986-1987, local and migration foci resulted in heavy defoliation of poplar and pine in nurseries. The synthetic pyrethroids rovicurt (25% effective concentration) and carate (5% effective concentration) were suggested for application in pest control. The highest technical efficiency (92% to 100%) was achieved by application of rovicurt at a concentration of 0.06-08%

and carate at a concentration of 0.01-0.03% (by the preparation). The character of pyrethroid action on gypsy moth larvae was studied in the laboratory. A strong antifeedant effect of the preparations, carate in particular, was established. Thus rovicurt and carate are effective means for eliminating gypsy moth larvae.
Caucasus; BEHAVIOR, CHEMICAL INSECTICIDES, FEEDING

879 Sasova, L.Ye. 1984.
On ecology of the gypsy moth *Lymantria dispar praeterea* Kardin cedar-hardwood forests of Primorsk region. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 143.
-- Gypsy moth ecology was studied in and around the Ussury Preserve from 1978 to 1983. Under natural conditions, oviposition occurs within 10 to 12 days in August. The number of eggs per mass ranges from 275 to 320. Diapause lasts 9.5 months. Eggs hatch in mid-May; by June, larvae inhabit apple, willow, oak, maple, hawthorn, linden, and other tree and shrub species. In the laboratory, at a temperature of 17° to 22° C and relative humidity of 70 to 85%, larval development lasts 50 days on the average, and pupal development lasts 20 days. Adults fly from late July to mid-August. Outbreaks were recorded in 1979 to 1981. In other years the pest population was low.
EEast; DEVELOPMENT, HOST PLANTS, PHENOLOGY, REARING

880 Savitskaya, Z. 1938.
Dynamics of water and lipid content in insect bodies relative to their cold resistance. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Vid. AN URSR, Kiev: 145-160.
-- The dynamics of water and fat content in the body of the gypsy moth and pine moth were studied. Cold resistance was determined by the increase in the temperature of heat capacity when insects were frozen. The content of water and lipids in the body of the gypsy moth determines its cold resistance at every life stage. Increases in water content cause an increase in the jump in the temperature of heat capacity when insects are frozen; i.e., cold resistance is decreased. On the other hand, the best physiological parameter of cold resistance is the log of lipid percentage calculated by the live weight, because it gives the highest coefficient of correlation in the jump temperature (r = -0.79). No regularities of this sort were established for the pine moth.
EWest; PHYSIOLOGY, TEMPERATURE

881 Savvin, I.M. 1979.
Forest pest insects and their role in dying of oak groves in the Chuvashian ASSR. (Vrednyye nasekomyye i ikh rol' v otmiranii dubrav Chuvashskoy ASSR.) Leningrad. 15 p.
-- General information about gypsy moth - one of the insect pests of oak forest in Tchuvashskaya ASSR
EEast; GENERAL BIOLOGY, PEST LIST, TREE HEALTH

882 Sekun, N.P. 1977.
Hemolymph profile of the infected gypsy moth (*Porthetria dispar* L.). In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Riga: 24-26.
-- The hemolymph pattern of gypsy moth larvae was studied in the norm and with intestinal poisoning with organic phosphor insecticides and their mixtures at the ratio of 1:1. With in 24 hours after poisoning, the hemolymph pattern changes: the content of proleucocytes, micronucleocytes, phagocytes, and killed cells decreases, and the cell structure is destroyed. Poisoning of insects with binary mixtures causes more pronounced disruption.
EWest; CHEMICAL INSECTICIDES, HEMOLYMPH

883 Selens, R.Yu., Gunzenok, N.Kh. 1972.
Tests of the synthetic analogue of juvenile hormone (3,11-dimethyl, 7-ethyltrideca-2,6,10-trienolic acid) against larvae of the fall webworm (*Hyphantria cunea* Drury) and the gypsy moth (*Porthetria dispar* L.). In: Naukovi pratsi USGA. Zakhist roslin vid shkidnikiv ta khvorob sel'skogospodarskikh kul'stur. USGA, Kiev: 81-83.
-- An intermediate product of juvenile hormone synthesis (3,11-dimethyl, 7-ethyltrideca-2,6,10-trienolic acid) was tested. Doses of 1 to 10 mkg/g of live weight were biologically active when administered topically, orally and by injections. The action of the synthetic acid was similar to that of juvenile hormone. Similar doses in comparable instars produced similar effect: molting delay of 3 to 5 days and pupation delay up to a week.
EWest; BIOASSAY, ENDOCRINOLOGY, GROWTH REGULATORS

884 Selikhovkin, A.V. 1981.
Impact of some air pollutants on development of the gypsy moth and the pine moth. In: Ekologiya i zashchita lesa. Leningradskaya lesitekhnicheskaya akademiya, Leningrad: 62-68.
-- Results of experiments aimed at estimating the effect of hydrogen fluoride, sulfuric anhydride, and methylmercaptan of different concentrations on the development of the gypsy moth and the pine moth are discussed. Conclusions are reached about the mechanism of action of these gases and the sensitivities of insects to pollutants.
ECentral; AIR POLLUTION, BIOASSAY, PHYSIOLOGY, REARING

885 Selikhovkin, A.V. 1981.
Effect of sulfur anhydrid on development of the gypsy moth (*Porthetria dispar* L.). In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 148-151.
-- Gypsy moth larvae were subjected to continuous treatment with gaseous sulfur dioxide at concentrations of 1.4 and 0.2 mg/m3 in gas chambers at a temperature of 24° C and relative humidity of 85% to 95%. Under the impact of the gas, mortality of first and second instars increased, and molting intensity and weight of early instars decreased. The gas did not affect pupation and development of late instars.
ECentral; AIR POLLUTION, BIOASSAY

886 Selikhovkin, A.V. 1982.

Effect of hydrogen fluoride on the gypsy moth development. In: Ekologiya i zashchita lesa. Leningradskaya lesotekhnicheskaya academiya, Leningrad: 83-86.
-- The effect of hydrogen fluoride on gypsy moth larvae of Moldavian and Tatar populations is discussed. The insects were reared in the laboratory on artificial nutrient medium; hydrogen fluoride proved to be related to a population's condition and the ways in which the toxicant enters an insect. A positive effect manifested itself in antiseptic action with regard to viral and bacterial diseases.
EWest, EEast; AIR POLLUTION, REARING

887 Selikhovkin, A.V., Fedorovich, Ye.Ye. 1984.
Objective classification of gypsy moth eggs based on chorion shape. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 148.
-- Oocytes and eggs of some lepidopterous insects, such as the gypsy moth, grow polytrophically, on the supply of nerve cells and cells of follicular epithelium. Chorion shape is assumed to be determined by egg shape, which in its turn must be related to quantity and quality of nutrients entering the egg. The task of objective description of chorion shapes was solved using the mathematics of Fourier series expansion. Classification of expansions was made by algorithms of the shortest connective net. The number of characters (spectrum harmonics) used in classification ranged from 3 to 7.
ECentral; EGGS, MODELS, MORPHOMETRICS

888 Semakov, V.V. 1982.
The antifeedant properties of microorganisms. Zashchita rasteniy. (5):29.
-- Bird cherry leaves were treated with an extract of blue-green algae against gypsy moth larvae. Mortality was 75%.
ECentral; BIOASSAY, NATURAL PLANT PRODUCTS

889 Semakov, V.V., Sirenko, L.A. 1984.
The toxicity of blue-green algae for some insect larvae. Gidrobiologicheskiy zhurnal. (4):69-72.
NATURAL PLANT PRODUCTS

890 Semevskiy, F.N. 1964.
Gypsy moth population dynamics at low density levels. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 17 p.
ECentral; POPULATION DYNAMICS

891 Semevskiy, F.N. 1967.
On autogenetic regulation of population density. In: Sbornik rabot Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 74-79.
-- Gypsy moths taken from populations in periods of depression and outbreak did not exhibit significant differences in morphology, fecundity, sex ratio, or egg weight. Experiments showed that inbreeding had no negative effect on survival, which was higher when larvae were reared only on the favored food plant (oak) than when they were reared alternately on favorable and unfavorable food plants. These factors demonstrate that the part played by genetic variations of insect populations in numerical regulation is insignificant.
ECentral; GENETICS, POPULATION DYNAMICS

892 Semevskiy, F.N. 1969.
Technique of quantitative studying of forest insect population dynamics. In: Sbornik rabot Moskovskogo lesotekhnicheskogo instituta. Voprosy lesnoy entomologii. MLTI, Moskva: 42-75.
-- This paper deals with methods of planning inventories, sampling tree crowns and soil, estimating insect survival, expressing results of population dynamics studies in curves and life tables, and estimating the efficiency of chemical controls. The gypsy moth is taken as an example.
ECentral; SAMPLING

893 Semevskiy, F.N. 1971.
Optimization of larval behavior in the gypsy moth (*Porthetria dispar* L.) during their dispersion within crown. Zhurnal obshchey biologii. 32(3):312-316.
-- The distribution of larvae migrating up to the crown can be expressed by an equation of gamma-function of the number of larvae. More than one larva appearing at a branch end means an increase in migratory activity; thus migration intensity appears to be functionally related to selectivity. The process in question provides density optimization (with regard to population density) and higher migration intensity if the optimum density is exceeded. Thus, as many insects remain on the tree as can be provided with food.
ECentral; DENSITY, DISPERSAL, LARVAE

894 Semevskiy, F.N. 1973.
Study of population dynamics in the gypsy moth, *Porthetria dispar* L. (Lepidoptera, Lymantriidae), at low density levels. Entomologicheskoye obozrenie. 52(1):39-46.
-- The population dynamics of two complete generations were studied in Kuibyshev and Moscow provinces in 1960 and 1963. The procedure involved the introduction of test insects into a biocenosis and the estimation of their mortality. In the period of depression, the greatest contribution to population dynamics was made by mortality caused by predators; in the period of outbreak, mortality caused by parasites did not increase significantly. Thus, it appears that diseases and intrapopulation processes, especially the migration of insects from foci of high density, are important for numerical regulation.
ECentral; DENSITY, POPULATION DYNAMICS

895 Semyonov, A.Ye. 1951.
Destructive entomofauna of unirrigated orchards in Kondar. In: Ushchel'ye Kondara. Izd. AN SSSR, Leningrad: 377-400.
-- Of 44 pest species of unirrigated orchards, 10 are lepidopterous species. The gypsy moth is a pest of orchards and forest hardwood species. In Central Asia it is found in foothills and adjacent valleys. In Kondar (Tadjikistan, the southern slope of Gissar Crest, near

Dushanbe), eggs hatch in late April-early May. Larvae heavily attack apricot, peach, plum, apple, willow, poplar, and pistachio. Pupation occurs in the second half of June and adults fly in early July. Egg masses usually are deposited at the base of tree trunks. Average fecundity amounts to 500 eggs per mass.
MAsia; FECUNDITY, HOST PLANTS, OVIPOSITION SITE, PEST LIST

896 Sergeev, L.M. 1930.
Fruit-growing in Tuapse region and orchard management at the Black Sea agricultural school. Vestnik vinogradosrstva, vinodeliya i vinotorgovli SSSR. (12):849-864.
-- The gypsy moth is mentioned among the most important orchard pests. During an outbreak it denudes orchards and forests.
EWest; PEST LIST

897 Sergeeva, V.L., Tur'yanov, R.A., Shulemetova, L.I. 1979.
The use of microbiological method of controlling the gypsy moth in Bashkirian ASSR. In: Entomopatogennyye microorganizmy v lesnykh biotsenozakh. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 148-149.
EEast; MICROBIAL PESTICIDES, PEST LIST

898 Sevast'yanov, I. 1914.
The trouble of inhabitants of Isfaganskaya valley. Turkestanskoe sel'skoe khozyaystvo. (6):530-555.
-- The gypsy moth is mentioned among the most serious orchard pests of Fergana Valley. Its preferred species are apricot, quince, apple, and cherry. Larvae and pupae are heavily attacked by tachinids.
MAsia; HOST PLANTS, PARASITES

899 Shakhmatova, I.G. 1988.
Effect of low concentrations of ash discharges by power station on ecological and physiological characteristics in gypsy moth. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 19-20.
-- Larvae from egg masses of gypsy moth populations of the forest-steppe regions surrounding the Kansk-Achinsk Heat Power Complex (KATEK) were used in experiments. Pollution was simulated by a microsprayer injection of various doses (0.02 mg/cbm, and 0.1 and 0.6 mg/cbm) of fine coal ash into a cage containing larvae, once a day. Larval weight, the length of instars, growth rate, mortality, pupal weight, female fecundity, and the sex ratio at the time of emergence were determined. An analysis of mortality showed that at the highest population level the majority of larvae died within the first days of feeding (69%); further mortality was negligible. At the minimum and medium pollution levels, high mortality of instars I and II was observed (54% and 52%); later these parameters declined. Total mortality was 22% lower in the control than in the experiments. There was a negative correlation between the growth rate of first instars and their survival. At the maximum pollution level, the sex ratio tends to shift toward females, their fecundity increasing. It is concluded that pollution can serve as a selection factor; therefore, more thorough monitoring of the gypsy moth population in KATEK territory is needed.
WSiberia; AIR POLLUTION, BIOASSAY

900 Shalvinskiy, I. 1913.
***Lymantria dispar* L. in Lebedinsky forest.** In: Zhizn' lesa i ekonomika. Tambov: 4.
ECentral; GENERAL BIOLOGY

901 Shapiro, V.A. 1956.
The most important gypsy moth (*Porthetria dispar* L.) parasites and prospects for their application. Zoologicheskiy zhurnal. 35(2):251-265.
-- Surveys were made in Voronezh and Balashov provinces of the RSFSR and in the Kurba region of Azerbaijan from 1950 to 1953. Thirty-four parasite species were found--20 hymenopterous species and 14 dipterous species--4 species of predators, and 1 nematode species. In younger larvae of the pest, hymenopterous parasites prevail, primarily braconids; in later instars, dipterous species prevail. The role of entomophages in decreasing the gypsy moth population is different at different stages of population dynamics in the foci. It is not one species but a complex of entomophages that suppresses a focus. Five parasite complexes are differentiated by the character of their relation to the host: specialized oligophages, species with alternate hosts, incidental parasites, parasites-predators (a sarcophagid complex), and secondary parasites. Dispersion of entomophages, especially of specialized oligophages, is suggested as a method of gypsy moth control.
ECentral, MAsia; BIOLOGICAL CONTROL, NEMATODES, PARASITES, POPULATION DYNAMICS, PREDATORS

902 Shapiro, V.A. 1964.
Gypsy moth entomophages and their role in stands in the Saval Forest in the Voronezh region. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 99-110.
-- The aim of an investigation of entomophages of the gypsy moth in the stands of the Saval Forest was to elucidate parasitism in the foci at different gradation phases. The distribution of parasites within the season was related to gypsy moth phenology and the selection of certain stations. Surveys were conducted in oak stands at different gradation phases, and in pure poplar, birch, linden, and aspen stands. Primary parasites of 15 species were extracted; in addition, a secondary parasite of Hymenoptera, *Dibrachys cavus*, which can parasitize up to 30% of *Apanteles* cocoons in the focus, was extracted. The following species were recognized as the most promising for gypsy moth control: the parasites *Apanteles liparidis, Phorocera silvestris*, and *Sturmia scutellata*; and the predators *Pseudosarcophaga affinis, Parasarcophaga harpax, Calosoma sycophanta*, and *Dermestes erichsoni*. As different entomophagous species are specific for different gradation phases of the gypsy moth, they should be selected with the view of killing the pest throughout its life cycle. Intra-area distribution and seasonal colonization of entomophages are advisable.
ECentral; BIOLOGICAL CONTROL, PARASITES, PREDATORS

903 Shapiro, V.A., Kamenkova, K.V. 1957.
On possibility of combined application of chemical treatments with DDT and parasites for controlling spring pest larvae complex in forest stands. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 99-114.
-- Gypsy moth fecundity was higher after treatment with DDT than in naturally collapsing foci (up to 400 eggs vs. 20 eggs per mass, respectively). It is advisable to combine parasite activity and chemical control measures against the gypsy moth and other phyllophagous lepidopterous insects. Forests should be treated in early spring (during the first instar and the beginning of the second instar of gypsy moth larvae), when preparations act on the most sensitive early instars, preparation expenditure is less, and the greatest number of entomophages survive, since a large number of them are still in diapause. For the maximum survival of entomophages, it is advisable to conduct focal treatment of forests.
CHEMICAL INSECTICIDES, PARASITES

904 Sharova, Ye.V. 1981.
Efficacy of a nuclear polyhedrosis virus depending on techniques of producing virus insecticides against the gypsy moth and the cabbage moth. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 23 p.
ECentral; MICROBIAL PESTICIDES, PREDATORS, VIRUS

905 Shchegolev, I.M. 1914.
The gypsy moth (*Lymantria dispar* L.) in the Crimea (by records made in 1913). Sadovodstvo. (1):18-30.
-- Gypsy moth life stages are described, as well as the condition of pest foci in the Crimea from 1912 to 1914. A population increase started in mountain forests in 1912. In 1913 larvae were brought to orchards by air streams, and late instars migrated to orchards after defoliating trees in the forests. Control measures (destruction of egg masses, application of sticky belts to tree trunks) produced little effect, but by the end of pest development in the season of 1913 the majority of larvae had been parasitized and infected with diseases, which brought about the collapse of the outbreak. Data are given on pest biology, phenology, and behavior in the Crimea.
EWest; CONTROL, DISPERSAL, LARVAE, GENERAL BIOLOGY

906 Shchegolev, I.M. 1914.
Pest insects and diseases in Tavricheskaya province. Report of a local entomologist. (Vrednyye nasekomyye i bolezni rasteniy v Tavricheskoy gubernii. Otchet pomoshnika zemskogo entomologa.) Simferopol. 24 p.
-- In 1913, a gypsy moth outbreak was recorded in a forest area covering more than 54,000 acres in the Crimea and continental regions of Tavricheskaya Province. Orchard crops were protected by drastic measures aimed at destruction of larvae. These measures included treatment with stomach poisons and application of sticky belts. Nearby, untreated forests were completely denuded. In the year when surveys were made, the outbreak collapsed owing to the presence of entomophages and diseases as well as the sterility of most females hatched. For oviposition, females preferred thick trunks, depositing eggs at the tree base; no side preferences were noted.
EWest; CONTROL, OVIPOSITION SITE, PEST LIST

907 Shchegolev, I.M. 1914.
Gypsy moth in the Crimea (by records made in 1913). In: Trudy estestvenno-istoricheskogo muzeya Tavricheskogo gubernskogo zemstva. Simferopol': 1-24.
-- The gypsy moth attacks orchards only in the period of outbreak, but pest control measures carried out at the proper time protect the crops. Data on gypsy moth biology are given. An outbreak in Crimean forests started in 1912, and in autumn and winter of 1912-1913, drastic measures were taken to protect orchards and gardens (such as destruction of egg masses in forest plots adjacent to orchards, elimination of stands closest to them, treatment of feeding larvae with stomach poisons, application of sticky belts, and digging of ground traps). Since all directions were followed thoroughly, the crops were protected. By the end of the larval stage, the majority of larvae had been killed by entomophages and diseases. The author also determined tree heights and sides preferred for oviposition and studied feeding preferences of larvae. Most egg masses were deposited at the tree base; no specific side was preferred. The most heavily attacked tree species were oak and apple; pear and cornel were attacked less heavily; ash was not attacked at all.
EWest; CONTROL, HOST PLANTS, OVIPOSITION SITE

909 Shchegolev, I.M. 1932.
The gypsy moth (*Porthetria dispar* L.). In: Borot'ba iz shkidnikami roslin u kolgospakh. Derzhsil' gospvidav, Kiev: 150-152.
-- General data on gypsy moth biology are presented. Females fly little, mainly in the twilight and at night, while males fly both in the daytime and at night. Larvae pupate in various kinds of shelters. Larval hairs can cause allergic reactions. The following control measures are suggested: treatment of egg masses with petroleum, treatment of plants with pesticides in the larval feeding period, application of sticky belts, and trenching around orchards during the period of migration of late instars.
EWest; CONTROL, FEMALE FLIGHT, GENERAL BIOLOGY

910 Shchegolev, V.N. 1960.
The gypsy moth. In: Sel'skokhozyaystvennaya entomologiya. Sel'khozgiz, Moscow: 319-321.
-- The northern boundary of the gypsy moth area matches the January isotherm of -10° C; the species prefers dry sites. Data on species biology are given. The maximum fecundity is 500 eggs. Females oviposit at the tree base, in various shelters, under stones, and in rock cracks. It is a serious pest during outbreak periods.
ECentral; DISTRIBUTION, GENERAL BIOLOGY, TEMPERATURE

911 Shchelkanovtsev, Y.K. 1926.
On summer and winter observations of insects at forest bungalows of the Voronezh Institute for Agriculture. In: Zametki Voronezhskogo

sel'skokhozyaystvennogo instituta. Voronezsh: 1-8.
-- The gypsy moth was a common species in Voronezh Province in 1924 and 1925. In 1924, gypsy moth females preferred northerly aspects; in 1925, eggs were deposited irrespective of aspects. This fact is accounted for by the hot weather in June 1924 and cool rainy weather in June 1925.
ECentral; OVIPOSITION SITE

912 Shcherbakov, F.S. 1914.
Notes on the gypsy moth, *Lymantria dispar* L. In: Trudy estestvenno-istoricheskogo muzeya Tavricheskogo gubernskogo zemstva. Simferopol: 34.
EWest; GENERAL BIOLOGY

913 Shcherbakova, L.N. 1982.
Effect of trophic factor on gypsy moth susceptibility to bacterial preparations. In: Ekologiya i zashchita lesa. Leningradskaya lesotekhnicheskaya akademiya, Leningrad: 79-83.
-- Laboratory tests were made to estimate the susceptibility of gypsy moth larvae reared on oak, apple, and bird cherry to different bacterial preparations: gomelin, bitoxibacillin, and entobacterin. Pest survival, length of development, and susceptibility to bacterial preparations were found to be strongly related to food species selected.
ECentral; BACTERIA, BIOASSAY, MICROBIAL CONTROL

914 Shcherbin-Parfenenko, A.L. 1954.
Shrinkage of oak groves in the North Caucasus. Lesnoye khozyaystvo. (6):38-44.
-- The death of a great many oak trees in groves of the North Caucasus has been recorded. The assumed cause, vascular tumor disease, was precipitated in some regions by a gypsy moth outbreak recorded from 1949 to 1951. This caused a physiological weakening of the trees making them susceptible to the development of fungi in tissues. Moreover, the gypsy moth spreads the infection to healthy trees, which makes it a particularly dangerous pest.
Caucasus; TREE HEALTH

915 Shengeliya, Ye.S. 1941.
On gypsy moth occurrence in Georgia and neighboring republics. In: Trudy zoologicheskogo sektora Gruzinskogo filiala AN SSSR. Tbilisi: 117-127.
-- Sites and dates of collection of 37 Bombycidae species are given, and the biology of some species is briefly described. The gypsy moth is a common species in Georgia. While it is of little economic significance, it defoliates hardwood species during outbreaks.
Caucasus; FAUNAL LIST

916 Shepelich, V.V. 1981.
Dendrophagous insects in broad-leaved forests of Ufa plateau. In: Vozobnovitel'nyye protsessy v gornykh shirokolistvenno-khvoynykh lesakh. Ufa: 83-89.
-- More than 400 dendrophilous insects have been registered, including 183 lepidopterous species. Hardwood stands are heavily attacked by the gypsy moth, haw moth, and other phyllophagous species.
EEast; FAUNAL LIST

917 Shevyrev, I.Y. 1890.
Insect pests recorded at south steppe forestries in 1889. Sel'skoe khozyaystvo i lesovodstvo. 164:183-208.
-- The gypsy moth is mentioned among polyphagous pests. A general description of the morphology, biology, and harmful effects of the species is given.
EWest; GENERAL BIOLOGY, PEST LIST

918 Shevyrev, I.Y. 1893.
Description of insect pests recorded at the steppe forestries and their control measures. (Opisaniye vrednykh nasekomykh stepnykh lesnichestv i sposobov bor'by s nimi.) St. Petersburg. 147 p.
-- Pests of plantations in steppe plots between the Dnieper and the Don were studied from 1889 to 1893. Six species were recognized as polyphagous pests: *Ocneria dispar*, Cossus ligniperda, Zeuzera pyrina, Porthetria chrysorrhoea, Hibernia defoliaria, and Heimatobia brumata. Also mentioned are about 30 insect species attacking a limited number of tree species. A short description of the life stages of the gypsy moth is given, and its biology is described in detail. Large aggregations of late instars and their "hungry migrations" have been recorded. Pest egg masses and pupae are found at tree bases or in shelters. Sometimes larvae pupate between leaves. It is the author's opinion that pest dispersal is realized through the flight of adults, migrations of late instars, and incidental dispersal of eggs by floods, birds, etc.
EWest; GENERAL BIOLOGY, PEST LIST, PHENOLOGY

919 Shevyrev, I.Y. 1901.
On activity of the Forest Department in insect pest control for 1900. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (6):1132-1136.
-- Information on the cost of forest pest control, gypsy moth control included, is given. The pest was recorded in forests in Penza, Saratov, Kherson, Bessarabia, Volyn, and Erivan provinces. Egg masses were treated with petroleum. In one of the forests, the pest oviposited at a height of more than 18 m.
EWest, ECentral, Caucasus; CONTROL, OVIPOSITION SITE

920 Shiryaeva, N.V. 1988.
On results of aerial spraying with microbial preparations against the gypsy moth in conditions of the North Caucasus. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 43-44.
-- One of the factors causing the death of oak stands in the North Caucasus is the regular defoliation of trees by phyllophagous insects, the gypsy moth in particular. An outbreak was recorded in Krasnodar Krai from 1982 to 1984. By the time of population peak, the forest area infested by the pest was about 200,000 ha. Aerial treatments with biopreparations were conducted as an extermination measure. The foci of phyllophagous insects were of a complex nature. Besides the gypsy moth, there were geometrids (the winter moth, brown-striped

geometer, scribbler, and hairy geometer); leaf rollers (the green oak leaf roller and apple-and-thorn skeletonizer); and the browntail moth. Concentrations of bacterial suspensions of dendrobacillin (a titer 82 billion/g) and gomelin (the titre 90 billion/g) proved to be highly efficient. Gypsy moth larval mortality was 90% to 100%, and stand defoliation after treatments was less than 30%. No negative effect on entomophages and litter inhabitants was observed. The cost of treatment was 9 to 13 roubles per ha.
Caucasus; AERIAL SPRAYING, BACTERIA, MICROBIAL PESTICIDES

921 Shiryaeva, N.V. 1990.
Peculiarities of gypsy moth development at Northern Caucasus. In: Uspekhi entomologii v SSSR: lesnaya entomologiya. Materialy X s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Lenungrad: 139-140.
Caucasus; GENERAL BIOLOGY

922 Shiryaeva, N.V., Sovin, I.M. 1980.
Effect of biopreparations and juvenile agents on beneficial entomofauna. Lesnoye khozyaystvo. (3):38-39.
-- The application of bacterial preparations and juvenoids (dimilin) on phyllophage complexes and entomophages was studied in Krasnodar Krai. Before treatment, more than 20% of gypsy moth larvae died of parasitism. Surveys and experiments showed the preparations to be harmless to beneficial entomofauna of oak groves, with the death of larvae caused by the preparations leading to a higher percentage of parasitism of surviving insects.
EWest; BACTERIA, GROWTH REGULATORS, MICROBIAL PESTICIDES, PARASITES

923 Shreider, Ya.F. 1901.
On some moths damaging the gardens. In: Trudy byuro po entomologii. St. Petersburg: 1-40.
-- This paper contains data on the gypsy moth, haw moth, browntail moth, tent caterpillar, and codling moth. The appearance of every species, the most important life stages, areas of gradations in 1880s, and control measures are described in detail. The following control measures are suggested for the gypsy moth: destruction of egg masses, treatment with petroleum, and application of sticky belts to the trees in the period of egg hatch.
ECentral; CONTROL, PEST LIST

924 Shreider, Ya.F. 1908.
About gypsy moth. Plodovodstvo. (2):254-255.
-- Gypsy moth egg masses have been found in the orchards of Chernigov Province. The pest is briefly described, and treatment of egg masses with petroleum is suggested as a control measure.
EWest; CONTROL, EGG MASSES, GENERAL BIOLOGY

925 Shreider, Ya.F. 1909.
Control of the most important insect pests in the orchards. VII. Pests of buds and leaves. Plodovodstvo. (6):523-539.
-- The gypsy moth is mentioned among the most important phyllophagous pests. A description of all life stages is given. Females oviposit on trunks of hardwoods and conifers, walls of houses, fences, stones, etc. Larvae feed on all hardwood species except ash, olive, and laurel. In the daytime they usually congregate on tree trunks and under shelters. Pupation occurs under shelters and between leaves connected with a web. Destruction of egg masses and treatment with petroleum are regarded as the most efficient control measures. Application of sticky belts to tree trunks also is mentioned.
ECentral; CONTROL, EGG MASSES, OVIPOSITION SITE

926 Shternishis, M.V. 1980.
Nucleic acid content in the virions from cytoplasmic polyhedra of the gypsy moth, *Lymantria dispar* L. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Riga: 125-128.
-- A Japanese strain of a cytoplasmic polyhedrosis virus of the gypsy moth was passed through gypsy moth larvae of an Orenburg population. The content of nucleic acids in virus particles isolated from polyhedra was determined; 7.74% of RNA and 0% of DNA were found.
EEast; BIOCHEMISTRY, VIRUS

927 Shternishis, M.V., Gulyi, V.V., Severina, N.I. 1977.
The use of chemical stressors in virus control of the gypsy moth. Sibirskiy vestnik sel'skokhozyaistvennoy nauki. (2):46-48.
-- To enhance the pathological effect of viruses on gypsy moth larvae, a solution of iron sulfate was used. Addition of the solution precipitates the death of larvae. Iron sulfate produces the same effect when added to virus preparations of nuclear and cytoplasmic polyhedroses. Increase of the concentration from 1% to 5% results in higher larval mortality caused by polyhedroses of both types, the highest mortality being observed when a 5% solution is applied. The addition of iron sulfate makes larval mortality 3 to 5 times higher than mortality caused by pure virus preparations.
WSiberia; BIOASSAY, VIRUS

928 Shugurov, A.M. 1907.
Outlines on gypsy moth ecology in forests. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (8):1218-1234.
ECOLOGY

929 Shumova, T.A. 1979.
Gypsy moth control in the USA. Lesnoye khozyaystvo. (12):67-68.
-- The author traces the history of gypsy moth, outbreaks and control measures in the USA, beginning with the moth's introduction in 1869. Dimilin, disparlure, and viral insecticides are widely used now for pest control. The history of entomophages introduced from Europe (hymenopterous species, tachinids) and the role of native entomophages in pest population dynamics are considered. A conclusion is reached based on the available information that extermination of the gypsy moth in America is impossible, but many opportunities for pest control in the foci are in sight.
CONTROL, REVIEW

930 Shvetsova, O.I., Evlakhova, A.A. 1949.
Observation of gypsy moth diseases relative to insect epizootics. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 125-130.
-- Factors causing the death of gypsy moths were studied in Rayzan Province. During an outbreak from 1944 to 1945, larvae in the foci died mostly of mixed infections: polyhedrosis and nosematosis. The most intensive development of diseases was observed at an elevated temperature (32° C). The fact that a great number of insects died in the laboratory under different rearing conditions suggested the infection of egg masses. This suggestion was confirmed in the course of investigation. Transovarian transfer of nosematosis and polyhedrosis was revealed, allowing for an estimation of the infection level at imago and egg stages.
ECentral; MICROSPORIDIA, REARING, VIRUS

931 Sikura, A.I., Simchuk, P.A., Baganich, M.I., Chokan, N.G. 1980.
Importance of nuclear polyhedrosis virus for suppression of the gypsy moth outbreaks in forests of southwestern part of the USSR. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Virusnyye bolezni rasteniy i nasekomykh. Riga: 87-90.
-- Biotic factors often play a decisive part in the collapse of a gypsy moth outbreak. The authors studied the role of nuclear polyhedrosis in the cessation of gypsy moth gradation in parts regions of Zakarpatye Province and Moldavia from 1972 to 1976. The pest population was estimated by the number of egg masses per tree and eggs per mass. Mortality caused by biotic factors was estimated for the generation. Killed insects were examined under laboratory and field conditions to establish causes of their death. At the maximum population level, epizootics of a nuclear polyhedrosis virus would occur, leading to a population decrease. Treatments with dendrobacillin and entobacterin were conducted in the foci as control measures. These preparations are quite effective.
EWest; BACTERIA, EGG MASSES, MICROBIAL PESTICIDES, POPULATION DYNAMICS, SAMPLING, VIRUS

932 Silantyev, S.S. 1892.
Performance of the weevil *Pissodes notatus* L. and the gypsy moth *Ocneria dispar* L. in Zasurk bungalow of Penza district. Russkoe lesnoe delo. (4):148-156.
-- A gypsy moth outbreak was recorded in Penza Province in 1892. Oak, linden, and birch were the species most heavily attacked. Pupation occurred primarily on birch branches with remaining leaves. Females oviposited on thick trees of different species, ignoring stumps and undergrowth, with the majority of eggs deposited at a height of 50 cm and below. From 3 to 29 egg masses were found on a tree; their size ranged from 583 to 824 eggs, and up to 20% of eggs were killed. Starvation of larvae caused by their high density is regarded as a control measure.
ECentral; DENSITY, FECUNDITY, HOST PLANTS, OVIPOSITION SITE

933 Simchuk, P.A. 1982.
The importance of environmental conditions in the rearing of Microsporidia. Zashchita rasteniy. 1:32.
EWest; MICROSPORIDIA, REARING

934 Simonova, A.S. 1967.
Virus diseases of the gypsy moth. In: Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 13-15.
-- Under laboratory conditions investigations were aimed at studying the susceptibility of the gypsy moth population from Rostov Province to nuclear polyhedrosis and cytoplasmic polyhedrosis viruses extracted from different pest populations. Polyhedrosis viruses proved to be highly effective against the gypsy moth, so they can be used in the control of this species. Infection of larvae with the native virus under laboratory conditions is the most effective method of infection.
EWest; BIOASSAY, VIRUS

935 Simonova, A.V. 1967.
On possibility of using a nuclear polyhedrosis virus for controlling some forest insects. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moscow: 29-35.
-- Nuclear polyhedrosis viruses of the loopers *Phigalia pedaria* F., *Biston hispidaria* Schiff., *Lycia hirtaria* Cl., and the gypsy moth were studied. An attempt was made to apply nuclear polyhedrosis and cytoplasmic polyhedrosis viruses of the gypsy moth in nature and in the laboratory. Experiments were carried on in a sparse pest population in Rostov Province. The data obtained from preliminary test larvae showed sufficient efficacy of preparations: under laboratory conditions 80-100% of insects died, and in the cages placed on branches more than 90% died.
ECentral; MICROBIAL PESTICIDES, VIRUS

936 Simonova, T.I., Kragina, M.V., Amirkhanov, D.V. 1985.
Biological activity of synthetic attractants of *Lymantria dispar* L. Vestnik sel'skokhozyaystvennoy nauki (Kazakhstana). (6):7-9.
MAsia; PHEROMONES

937 Sinitsina, L.P., Novikova, L.K., Meln'ikova, N.V., Zakrevskaya, M.V. 1979.
Technique of mass year around rearing of gypsy moth for biological estimation of entomopathogenic preparations. In: Mikrobiologicheskiye sredstva zashchity rastenii i bakteriologichekie preparaty. Moscow: 51-56.
ECentral; REARING

938 Sinitsina, L.P., Ostrogskaya, N.A., Shagov, Ye.M., Belova, N.A., Kolomiets, L.T., Birjukova, A.P., Vrublevskaya, L.S., Shamrayi, L.G. 1971.
Comparative efficacy of entomopathogenic preparations for controlling some field and forest pests. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 182-183.
-- The activity of entomobacterin, dendrobacillin, insecticin, BIP-837, BTS, beauverin, and other preparations was compared. Suspensions of highly active

preparations with equalized titers were used. Different insect species were found to possess different resistance to microbial preparations; dendrobacillin was highly effective against the gypsy moth.
EWest; BACTERIA, BIOASSAY, FUNGI, MICROBIAL PESTICIDES

939 Sinitskiy, N.N., Abdullaev, A.A., Kubaichuk, V.P. 1970.
Effect of pseudoallicin-150 on neurosecretory activity in gypsy moth larvae. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 36-40.
-- The action of pseudoallicin-150 on gypsy moth larvae was studied. Microscopic examination showed a number of pathological changes in neurosecretory cells.
EWest; NATURAL PLANT PRODUCTS, NEUROLOGY

940 Sinitskiy, N.N., Abdullaev, A.A., Kubaichuk, V.P. 1970.
Effect of pseudoallicins on morphology of hemolymph forming elements in the gypsy moth *Porthetria dispar* L. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 54-58.
-- The action of pseudoallicin-150, -252 and -280 on gypsy moth larvae was studied. Microscopic examination showed a number of significant changes in the majority of forming elements of hemolymph.
EWest; HEMOLYMPH, NATURAL PLANT PRODUCTS

941 Sinitskiy, N.N., Abdullaev, A.A., Kubaichuk, V.P. 1971.
Effect of pseudoallicin-150 and entobacterin-3 on physiological state of the gypsy moth, *Porthetria dispar* L. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 95-98.
-- The effect of pseudoallicin-150 and entobacterin-3 on gypsy moth larvae was studied separately and in combination. Pseudoallicin-150 causes substantial physiological weakening, making larvae highly susceptible to entobacterin infection.
EWest; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, NATURAL PLANT PRODUCTS

942 Sinitskiy, N.N., Balog, G.Ya. 1971.
Pathologic changes in neurosecretory cells of the central nervous system of gypsy moth larvae after treatment with insecticides. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 99-100.
-- Neurosecretory cells are distinguished in the cerebral ganglion of gypsy moth larvae of different instars, the medial group being subdivided into A-, B-, C- and D-types. When larvae of different instars were treated with insecticides, a granular secretion was produced that accumulated in neurosecretory cells which gradually turned into a homogenous mass. No exudation from neurosecretory cells to the axon was observed. Neurosecretory cells of treated larvae were intensively pigmented.
EWest; CHEMICAL INSECTICIDES, NEUROLOGY

943 Sinitskiy, N.N., Bilay, V.I., Kubaichuk, V.P., Shkaruba, N.G., Kostjukovskiy, M.G., Sinitskiy, V.N., Drakhlis, Ye.P. 1971.
Effect of mycotoxins and entobacterin-3 on respiration and activity of catalase, O-diphenyloxidase, succinat- and prolindehydrogenase in some lepidopterans. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 180-181.
-- The effect on respiration and activity of oxidation-reduction enzymes of different mycotoxins and entobacterin-3 was tested with larvae of various lepidopterous species, including the gypsy moth. Enzymes of larvae of different species with induced bacteriosis respond to the disease in different ways. Mycotoxins also reduce the activity of enzymes.
EWest; BACTERIA, ENZYMES, FUNGI, MICROBIAL PESTICIDES

944 Sinitskiy, N.N., Bilayi, V.I., Kubaichuk, V.P., Shkaruba, N.G., Sinitskiy, V.N. 1971.
Effect of mycotoxins and their mixtures with entobacterin and a nuclear polyhedrosis virus on gypsy moth larval vitality. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 178-180.
-- Pure mycotoxins do not always cause high mortality of the gypsy moth, but when applied in combination with entobacterin-3 and nuclear polyhedrosis preparations, they enhance the efficacy of these substances and they can serve as useful admixtures to microbial and viral preparations in agricultural pest control.
EWest; BACTERIA, BIOASSAY, FUNGI, MICROBIAL PESTICIDES, VIRUS

945 Sinitskiy, N.N., Blagodatskaya, G.G., Breznitskaya, N.M. 1973.
Changes in functional state of neurosecretory cells in the tent caterpillar and the gypsy moth when treated with insecticides. In: Naukovi pratsi USGA. Zakhist roslin vid shkidnikiv ta khorob. USGA, Kiev: 72-76.
-- Histopathological changes occur in nerve cells and tissues of ganglia of tent caterpillar and gypsy moth larvae after insecticides have been acting for some time. In normal larvae that have molted to the fifth instar, neurosecretory material gradually accumulates and the activity of neurosecretory cells increases. The sequence of these processes is disturbed in poisoned larvae. Histological changes occur primarily in the superesophageal ganglion and in the points of nerve branching; neurosecretory cells proper are the last to be affected.
EWest; CHEMICAL INSECTICIDES, HISTOLOGY, NEUROLOGY

946 Sinitskiy, N.N., Kireeva, I.M. 1968.
Lipid exchange dynamics in the pupae of the silkworm moth, the processionary moth and the gypsy moth in different ecological conditions. Vestnik zoologii. (4):51-55.
-- The three lepidopterous species had different lipid content at the pupal stage, but lipid exchange dynamics is absolutely the same. Maximum lipid expenditure occurs in the initial and final periods of development. Photothermal

conditions influence fat exchange dynamics. At low temperatures, an increase in duration of light decreases the length of metamophosis, while lipid exchange intensity increases. The highest sensitivity of pupae to temperature and light is observed at the final stage of their development and the highest tolerance is observed in the middle of metamorphosis.
EWest; PHOTOPERIOD, PHYSIOLOGY, TEMPERATURE

947 Sinitskiy, N.N., Kubaichuk, V.P. 1971.
Effect of pseudoallicin-150 on catalase activity in the gypsy moth larvae (*Porthetria dispar* L.). In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 57-59.
-- Alcoholic solutions of pseudoallicin-150 were injected into gypsy moth larvae and catalase activity was measured at different stages of poisoning. As early as the excitement stage, enzyme activity is reduced by 32%; at the coordination disorder stage, it is reduced by 29.5%. The convulsion stage is accompanied by an increase in enzyme activity to 11%. At the tremor stage, catalase activity returns to normal. Changes are due to indirect causes, since introduction of the poison into the homogenate does not affect enzyme activity.
EWest; BIOASSAY, ENZYMES, NATURAL PLANT PRODUCTS

948 Sinitskiy, N.N., Pokhiton, S.V. 1970.
Effect of beauverin with admixtures of DDT and a nuclear polyhedrosis virus on larval survival in the gypsy moth *Porthetria dispar* L. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 3-7.
-- An attempt was made to estimate the efficacy of different concentrations of beauverin against IV and V gypsy moth larvae and also in combination with reduced doses of insecticide and a nuclear polyhedrosis virus. The addition of a sublethal dose of DDT to beauverin containing spores of white muscarine fungus increases the efficacy of the biopreparation against larvae, which die with clear signs of fungus disease. Pure beauverin does not cause death. Larvae infected with a nuclear polyhedrosis virus have lower resistance to the fungus. Joint application of beauverin and a nuclear polyhedrosis virus causes death of larvae from viral infection.
EWest; BIOASSAY, CHEMICAL INSECTICIDES, FUNGI, MICROBIAL PESTICIDES, VIRUS

949 Sinitskiy, N.N., Voitenko, N.N., Pokhiton, S.V. 1970.
Effect of entobacterin-3 on neurosecretory activity in the gypsy moth larvae (*Porthetria dispar* L.). In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. USGA, Kiev: 17-21.
-- An investigation of histophysiological changes occurring in the medial group of neurosecretory cells of superesophageal ganglion and pathological changes in the nerve tissue of test larvae showed that application of the biopreparation entobacterin-3 initiates a protective response. Toxin released by *Bacillus cereus* var. *galleriae* (the active source of entobacterin) disrupts the sequence of neurosecretory processes, retards the exudation of neurosecretions, and causes degenerative changes in the structure of neurosecretory cells. Distinct histopathological changes in the nerve tissue of test insects were observed.
EWest; BACTERIA, HISTOLOGY, MICROBIAL PESTICIDES, NEUROLOGY

950 Sinitsyna, L.P., Ostrogskaya, N.A., Biryukova, A.P., Novikova, L.K. 1980.
Method for biological assay of biological insecticidal preparations. Biologicheskiy zhurnal Armenii. (4):379-384.
Caucasus; BIOASSAY, MICROBIAL PESTICIDES

951 Sirotkin, V.N. 1980.
Adaptive polymorphism of the gypsy moth juvenile instars. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 125-126.
-- Three coloration types of gypsy moth larvae are distinguished in Bashkiria. Aspen stands are inhabited mostly by red larvae, birch stands by gray larvae, and oak and linden stands by black larvae. Typical coloration begins with the third instar, when larvae become sedentary. Domination of larvae of one color is assumed to be related to the gradual elimination of larvae of other coloration types.
EEast; COLOR POLYMORPHISM, STAND COMPOSITION

952 Sirotkin, V.N. 1981.
Population morphological structure and gypsy moth density dynamics. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 172-173.
-- Distinguishing elementary, heritable discrete characters (phenes) of the gypsy moth allows the estimation of changes in a population's genetic structure occurring concurrently with numerical changes. It is the author's opinion that variations of head capsule patterns can be regarded as phenes of the gypsy moth. More than 50,000 larvae in every instar, belonging to different generations and gradation phases, were analyzed. Forty-eight phenes were distinguished and their quantitative distribution was analyzed. Dispersion coefficient was used as a parameter of population morphological diversity. With a decrease in the population, the variability of density increases, reaching its maximum at the crisis phase. This can be accounted for by the fact that different selection types act at different gradation phases. Only one of the three selection types (by Schmalhausen, I.I.) can act at a certain gradation phase. In the period of increase, the moving selection type is the most effective. Of the entire range of insects, it is the most adapted ones that multiply with the highest intensity. At the eruption phase, the stabilizing selection is "functioning," variability in the population decreases, and the number of insects is reduced. In the period of low population, suitable conditions for the disruptive selection are created; i.e., differentiation processes are favored and population variability increases. Thus, quantitative and qualitative variations in a gypsy moth population are interrelated, and the latter can be regarded not only as the object of

quantitative variations in the population, but also as their cause.
EEast; GENETICS, MORPHOMETRICS, POPULATION DYNAMICS

953 Sirotkin, V.N. 1984.
Some patterns of gypsy moth larvae behavior and vertical distribution in Bashkiria. In: Nauchno-tekhnicheskoye tvorchestvo molodykh uchyenykh - lesnomu khozyaystvu. Materialy VII nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Pushkino: 212-216.
-- To elucidate the behavior and vertical distribution of gypsy moth larvae in Bashkiria, 10, 25, and 100 larvae were released on three separate trees, and their location in the crown recorded three times a day. Instars II and III did not migrate far (to the litter, etc.), but departed from leaves to rest and molt, concentrating on thick branches and trunk. Vertical distribution is of an aggregated nature as a result of most larvae concentrating in the upper parts of the crown. Irrespective of the time of day and the total number of larvae in the crown, larval density increases with height. This dependence is expressed in terms of linear regression equations.
EEast; BEHAVIOR, DISPERSAL, LARVAE

954 Sirotkin, V.N. 1988.
Analysis of polymorphism as a method of evaluating state of the gypsy moth populations. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 16-17.
-- The basis of successful monitoring is the availability of parameters objectively reflecting the condition, gradation phase, and other important features of pest populations. As a result of studying gypsy moth population dynamics for many years, the author found it possible to use the manifestation of polymorphism as a discrete intrapopulation condition and gradation phase. Contrary to morphological variations in hypodermis coloration, which was suggested earlier, the author differentiates phenes by variations in the head capsule pattern of gypsy moth larvae, distinguishing about 50 variations of this parameter. At different gradation phases, the structure and degree of intrapopulation polymorphism of the gypsy moth are peculiar and can be used for diagnosing current outbreak phases.
EEast; COLOR POLYMORPHISM, MORPHOMETRICS, POPULATION DYNAMICS

955 Sirotkina, V.Ye., Sirotkin, V.N. 1986.
Some distributional patterns of the gypsy moth egg masses within a microstation in Bashkiria. In: Materialy IX nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Moscow: 161-165.
-- The distribution of gypsy moth egg masses by tree species and trees of different diameter is not stable, changing with the population and gradation phase. With a decrease in the population level (transition in an outbreak from culmination to crisis), the number of tree species preferred for oviposition grows, while the range and absolute value of tree diameters grow smaller. Thus, the distribution of egg masses can serve as a factor indicating the condition of a pest population.
EEast; OVIPOSITION SITE, POPULATION FLUCTUATION

956 Sivertsev, P. 1882.
Gypsy moth in oak groves of Khvalyn district. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (5):545-548.
-- A high population of gypsy moth was recorded in oak groves of Khvalyn district (Saratov Province) from 1880 to 1882. The author describes pest life stages, phenology, pupation and oviposition sites, and the behavior of adults. Females oviposit on all tree species, primarily in the butt zone; the average egg mass contains 250 eggs. The forecast for 1983 is unfavorable. The following control measures are suggested: applying sticky belts, collecting and destroying egg masses, and attracting birds to pest foci.
ECentral; BIRDS, CONTROL, OVIPOSITION SITE

957 Skvarskiy, S.P. 1914.
Gypsy moth invasion. Turkestanskoe sel'skoe khozyaystvo. (6):605-606.
-- Defoliation of orchards by the gypsy moth was recorded. The favored food species of the pest is elm, but orchards also are often attacked. A high population of this pest is usually recorded during a season; larvae and pupae are heavily parasitized and infected with diseases.
MAsia; HOST PLANTS

958 Skvarskiy, S.P. 1916.
Gypsy moth in Zaamin region. Turkestanskoe sel'skoe khozyaystvo. (3):368.
-- A gypsy moth outbreak was recorded in Zaamin (the second year of pest gradation). Larvae heavily defoliated orchards, particularly apple.
MAsia; HOST PLANTS

959 Skvarskiy, S.P. 1916.
Gypsy moth in Auleat. Turkestanskoe sel'skoe khozyaystvo. (6):584-585.
-- A gypsy moth outbreak occurred in the vicinity of Auleat, with orchards and poplars completely defoliated by the pest. Gypsy moth larvae were heavily parasitized by ichneumons. The pest population stayed high for 3 years.
MAsia; HOST PLANTS, PARASITES

960 Smirnov, B.A. 1959.
Ways of increasing natural resistance of forest stands to entomological pests. In: Biologicheskiye metody bor'by s vreditelyami rasteniy. Izd. UASKhN, Kiev: 141-146.
-- Anthropogenic factors, pesticide application in particular, contribute to the depletion of beneficial organisms and cause longer and more intense pest outbreaks, including gypsy moth outbreaks. To enhance resistance of forest stands to pests, forest management should be focused on the preservation and accumulation of entomophages.
EWest; BIOLOGICAL CONTROL, CHEMICAL INSECTICIDES

961 Smyshlyaev, S. 1892.
Notes on insects occurring Dzhekenlyn bungalow of Berdyansk Forest in Tavricheskaya Province. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (5):470-479.
-- Outbreaks of Urops ulmi Schiff are described. The gypsy moth is mentioned among hardwood pests of secondary importance found on oak in limited numbers.
EWest; PEST LIST

962 Sobolev, A.I. 1897.
History of gypsy moth outbreaks in Tula Province in 1892-1896. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (2):195-203.
ECentral; NUMERICAL DATA, OUTBREAKS

963 Sokolov, G.I. 1988.
Gypsy moth and its control in Chelyabinsk region. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 28-29.
-- Gypsy moth outbreaks are periodically recorded in Chelyabinsk Province, with the pest feeding on leaves of common birch and aspen. Eruption phases of population dynamics were registered in 1951-1954, 1959-1961, 1965-1968, 1976-1978, and 1984-1987 in areas covering 46,000 to 280,000 ha. Outbreaks originate one by one, moving from southeast to northwest, which can be accounted for by landscape and climatic conditions of the South Urals. Primary foci usually originate in mature light birch stands in the steppe and southern parts of the forest-steppe zone. Counts of the average number of overwintering gypsy moth eggs per tree made in 32 experimental plots show that an outbreak usually lasts 10 to 12 years. Intensive chemical treatments only retard outbreak development without suppressing it. They also disrupt biocenosis structure, and thus the number of treatments against the gypsy moth has been sharply reduced. Since 1975, virus-ENSh has been applied for pest control, first in areas of 200 to 300 ha and, since 1986, in areas of 3,000 ha in gypsy moth foci. Technical efficiency has ranged from 0% to 98%, depending on specific conditions. Satisfactory efficiency was achieved in foci with a density of more than two egg masses per tree. On the whole, the application of biopreparations is regarded as promising.
EEast; HOST PLANTS, MICROBIAL PESTICIDES, OUTBREAKS, SITE CONDITIONS, VIRUS

964 Sokolov, N.N. 1894.
Pest insects in gardens in the city of Tashkent. Sel'skoe khozyaystvo i lesovodstvo. 5:12.
-- Gypsy moth is one of the pests of gardens in Tashkent
MAsia; PEST LIST

965 Soldatova, N.V., Martynova, G.S., Mitina, I.V. 1980.
Cytomorphologic changes in cell cultures of the gypsy moth and the cabbage moth larvae caused by a nuclear polyhedrosis virus. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Virusnyye bolezni rasteniy i nasekomykh. Riga: 95-98.
-- The interaction of viruses with culture cells is complex. At different stages there are changes in metabolic processes that can be revealed by histochemical examination. This method is used to localize certain substances in cell metabolism and to detect pathological changes. The authors studied the dynamics of morphological variations, mitotic activity, and accumulation of glycogen and lipids in three continuous cell cultures in the norm and under the impact of a nuclear polyhedrosis virus of the gypsy moth and the cabbage moth.
EWest; CELL CULTURE, VIRUS

966 Soldatova, N.V., Martynova, G.S., Mitina, I.V., Stepanova, L.I. 1979.
Adaptation of inoculated cell culture to the medium 45 with serum NTS. In: Microbiologicheskiye sredstva zashchity rasteniy i bakterial'nyye preparaty. Moscow: 38-41.
ECentral; CELL CULTURE

967 Solonovich, D.I. 1985.
Gypsy moth occurrence and the conditions of Gomel region. In: Zhvotnyy mir Belorusskogo Poles'ya, okhrana i ratsional'noe ispol'zovanie. Gomel: 148-149.
EWest; DISTRIBUTION, PEST LIST

968 Spektor, M.P. 1971.
Occurrence of the important forest pest species in the Ukraine and improvement of their control measures. Avtoreferat dissertatsii kandidata sel'skokhozyaistvennykh nauk. Kiev. 27 p.
-- The gypsy moth is mentioned as one of the most important phyllophagous forest pests of the Ukraine. Data for total areas of foci from 1950 to 1965 are included. Drawbacks of the conventional measure of gypsy moth control, treatment of egg masses with petroleum, are considered. A unique hand spray is proposed.
EWest; CONTROL, EGG MASSES, FOCI, PEST LIST

969 Starchak, M.S. 1979.
Efficiency of bitoxibacillin for controlling folivorous pests in the gardens in Zakarpatye. In: Microorganizmy i virusy. Shtiintsa, Kishinev: 23-26.
-- In laboratory and laboratory-field experiments in Zakarpatye Province, mortality of second instar gypsy moth on the fifth day after treatment with a 0.5% solution of bitoxibacillin amounted to more than 93%; mortality of vaporer moth larvae and fall webworm larvae ranged from 80 to 98%, depending on the larval instar and preparation concentration.
EWest; BACTERIA, MICROBIAL PESTICIDES

970 Stark, V.N. 1931.
The gypsy moth *Lymantria dispar* L. In: Vrednyye lesnyye nasekomyye. Sel'khozizd, Leningrad: 215-216.
-- General data on gypsy moth ecology are given, life stages are described, and control measures such as treatment of egg masses with petroleum, collection of egg masses, sticky belts, and aerial treatment with pesticides are suggested.
ECentral; CONTROL, GENERAL BIOLOGY

971 Stark, V.N. 1961.

Resistance of forest stands to pest injuries. In: Zashchita lesov ot vrediteley i bolezney. Moscow: 116-127.
-- Outbreaks of various species are analyzed, including a gypsy moth outbreak from 1955 to 1959. The food quality of plants is assessed and the effect of the physiological condition of food species on pest population is discussed. More effective pest control is suggested on the basis of the ratio of favorable and unfavorable species in a stand. A system of forest protection measures is recommended.
ECentral; FOLIAGE QUALITY, SILVICULTURAL TREATMENTS, STAND COMPOSITION

972 Stepanova, V.K., Girfanova, L.N., Yafaeva, Z.Sh., Idrisova, I.T. 1978.
Lepidopterous pests and their entomophages in the forests of Bashkiria. In: Materialy po faune i ekologii zhivotnykh Yuzhnogo Urala. Bashkirskii gosudarsvennyi universitet, Ufa: 91-100.
-- Major food plants of the gypsy moth in the South Urals are oak, birch, and aspen. In Bashkiria, the gradation cycle lasts 8 to 14; years, survival stations in the period of depression are oak groves and birch stands on southern and eastern mountain slopes. Analysis of data for 85 years shows a correlation between 11-year solar activity and pest outbreaks: an outbreak is recorded in the period of solar activity decline. More than 85% of insects in gypsy moth populations are killed by biological agents (entomophages and entomopathogens). There are 42 entomophages of the gypsy moth in Bashkiria.
EEast; HOST PLANTS, POPULATION FLUCTUATION, SOLAR ACTIVITY

973 Strakhov, V.V. 1976.
Larval survival in lepidopterous forest pests. In: Trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moscow: 15-25.
-- To determine probable foliage losses in the foci of forest lepidopterans, larval survival in different instars is expressed analytically, with equations and graphs. Data on gypsy moth survival are included in data on 10 pest species. A model based on evaluation of a survival polynomial coefficient is suggested.
ECentral; DEFOLIATION, MODELS, PROGOSIS

974 Strakhov, V.V. 1976.
On forecasting outbreak realization by folivorous lepidopterans. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 21 p.
ECentral; PROGNOSIS

975 Strakhov, V.V. 1980.
Predicting defoliation of stands by Lepidoptera. Lesovedenie. (5):91-96.
-- A forecast is made on the basis of adjusted feeding rates of lepidopterous insects, the gypsy moth included.
ECentral; DEFOLIATION, PROGNOSIS

976 Sudeikin, G.S., Clutskiy, N.F. 1939.
The gypsy moth, *Porthetria dispar* L. In: Vredneyshiye nasekomyye i gribnyye bolezni lesa. Goslestekhizdat, Moscow: 42-45.
-- Species biology and life stages are described, economic importance is established, and control measures such as treating egg masses with petroleum, scratching off egg masses, treating with arsenic preparations, and applying sticky belts to tree trunks during larval dispersal are suggested.
ECentral; CONTROL, GENERAL BIOLOGY

977 Sukhovolskiy, V.G. 1988.
Method of estimating physiological state of gypsy moth larvae and pupae. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 17-18.
-- A method for estimating the condition of larvae and pupae of forest pests by measuring dielectrical parameters of tissues is discussed. Dielectrical parameters of insect tissues were measured with a portable alternating-current bridge for the frequency range of 0.1 to 100 kilohertz. Instar, linear parameters, and weight of every gypsy moth specimen were estimated. Dielectrical parameters of tissues of healthy gypsy moth larvae is given. When insects are subjected to various effects, dielectric properties of their tissues change considerably.
Wsiberia; PHYSIOLOGY, POPULATION QUALITY

978 Sukhuvolskiy, V.G. 1988.
Study of gypsy moth flight dynamics towards the source of ultraviolet radiation. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 18-19.
-- The dynamics of the flight of adult gypsy moth to a powerful (about 1 watt) UV source were studied. The portable source was powered by 373 units. Investigations were conducted in gypsy moth foci in the south of Krasnoyarsk Krai. The majority of adults flying to traps were females (99%). Their weight, wing area, and potential and actual fecundity were measured. To describe flight dynamics, a mathematical formula of the sequence of events theory was used (Kox, Lewis, 1969). The dynamics of female flight to the light trap can be described by a Poisson model: there is no interaction between insects, and events occur by chance. In different habitats, flight dynamics can be described either by a Poisson model with constant flight intensity or by a Poisson model in which flight intensity changes in steps overnight. Such morphological parameters as wing area and insect weight are not related to adult flight parameters, but there is a relation between insect fecundity and the moment of its arrival at the trap.
WSiberia; FEMALES, FLIGHT, LIGHT TRAPS, MODELS, MORPHOLOGY

979 Supatashvili, S.M., Chapidze, F.Ye., Todua, B.G. 1976.
Studies on the gypsy moth in Georgia. In: Sbornik nauchnykh rabot po izucheniyu bol'shogo elovogo luboeda v Gruzii. Institut gornogo lesovodstva, Tbilisi: 147-156.
Caucasus; BACTERIA, GENERAL BIOLOGY

980 Svistelin, G. 1916.
Don't miss the time to control fruit pests. Saratovskiy sadovod. (3-4):89-97.
-- The gypsy moth is mentioned among the most serious

orchard pests of Saratov Province. A short description of adults, egg masses, and larvae is given. Destruction of egg masses by scraping them off and applying sticky belts and spraying Paris green or arsenic preparations when larvae are feeding are suggested as control measures.
ECentral; CONTROL, LIFE STAGE DESCRIPTIONS

981 Taranukha, M.D. 1937.
Method of surveying gypsy moth feeding rates. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Kiev: 43-110.
-- Feeding rates of gypsy moth larvae were determined by weighing food plants before and after feeding, by estimating the leaf area consumed by the larvae, and by weighing frass. The aim was to work out a procedure of determining feeding rates for the most important hardwood pests, and to determine feeding rates for the entire larval stage and for separate instars of gypsy moth larvae, as well as for larvae of different sexes. Correlations between larval feeding rate and pupal weight and between frass weight and larval feeding rate (food utilization coefficient) were established. Weighing frass proved to be the most accurate way of determining feeding rates. A correlation between the weight of food consumed and pupal weight was established, and a coefficient of food consumption per unit of weight was calculated. The specific rate of larval development was determined.
EWest; ENERGETICS, FEEDING

982 Taranukha, M.D. 1938.
Feeding rates of *Porthetria dispar* L. in natural conditions. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Kiev: 75-100.
-- Data are presented on gypsy moth feeding rates on oak in the laboratory (1934) and under natural conditions (1936). Feeding rate and injury rate were determined both as a sum for males and females throughout larval development and for each sex and instar separately. A correlation of the weight of food consumed to pupal body weight was established (feeding coefficient). The proportion of oak leaves injured but not consumed by larvae was estimated. A comparison of the amount of food consumed by one larva with pupal weight suggested that larval feeding intensity is lower under natural conditions than in the laboratory. Intensity of feeding is lower on oak than on apple. The author ascribes this fact to different food quality. On the other hand, food quantity does not produce a noticeable effect on the feeding coefficient and the specific growth rate of larvae.
EWest; ENERGETICS, FEEDING, NUTRITION, REARING

983 Taranukha, M.D. 1950.
Effect of food and light on gypsy moth development and fecundity. In: II ekologicheskaya konferentsiya po probleme: Massovyye razmnozheniya zhivotnykh i ikh prognozy. Izd. KGU, Kiev: 227-230.
-- Oak, apple, hornbeam, and violet willow are equally optimum food species of the gypsy moth; ash-leaved maple and ash are less suitable food (food consumption ratio is 1:1.9 for females and 1:1.6 for males; pupal weight ratio is 1.8:1 for females and 1.4:1 for males). Feeding on oaks well-exposed to light was more favorable than feeding on shaded ones (40.4% and 19.5% of larvae pupated; the ratio of pupal weight was 1.7:1 for females and 1.3:1 for males). It is concluded that light stimulates larval development and decreases mortality, which is the result of the different chemical composition of food. Worsening of developmental conditions primarily affects females, with their weight and fecundity decreasing.
EWest; ENERGETICS, FOLIAGE QUALITY, HOST PLANTS, NUTRITION

984 Taranukha, M.D. 1952.
Gypsy moth development depending on food and illumination degree. In: Naukovi pratsi Institutu entomologii ta fitopatologii. Kiev: 22-48.
-- The author studied the effect of food quality on larvae of both sexes feeding on different food plants, including the length of larval development, larval survivorship, and growth energetics under different feeding conditions and at different light intensities. The most favorable food plants were oak and willow; the least favorable was maple. Good lighting favors normal larval development. Larvae developing in shadow are smaller in size; it takes them longer to develop, and their survival rate is lower. These data can account for the origination of primary foci in well-lit oak stands of a density of 0.5-0.6.
EWest; HOST PLANTS, NUTRITION, STAND COMPOSITION

985 Taranukha, M.D. 1952.
Role of food plant chemistry in gypsy moth growth and fecundity. In: Naukovi pratsi Institutu entomologii ta fitopatologii. Kiev: 49-68.
-- The relation of insect fecundity to the content of protein- free nutrides in the body and the relation of these parameters to food quality are established. Young leaves contain more protein substances and water but fewer soluble carbohydrates. On the other hand, mature leaves contain less moisture and protein but more dry matter and soluble carbohydrates. Food of high quality contributes to an increase in pest survival and fecundity. The protein-carbohydrate ratio of food is a crucial factor.
EWest; BIOCHEMISTRY, FECUNDITY, FOLIAGE CHEMISTRY, NUTRITION

986 Ter-Grigoryan, M.A. 1944.
Pest entomofauna of parklands in the cities of Erevan and Leninokan. In: Zoologicheskiy sbornik. Erevan: 15-21.
-- Gypsy moth was mentioned as a pest of forest shelter belts
Caucasus; PEST LIST

987 Tiderman, G. 1877.
Notes on some pest insects in the forests of Kazan Province. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. 7(2):24.
ECentral; PEST LIST

988 Tikhomirov, F.A. 1973.
Effect of ionizing radiation on the gypsy moth population. Ekologiya. (5):15-21.

-- The author studied the effect of radiation on populations of the gypsy moth and parasites in the birch stands with a high content of radionucleides introduced 2 years before the investigation. Radiation doses of 40 to 200 rad caused an increase in the percentage of egg hatch; doses more than 1,000 rad caused a decrease in the percentage of egg hatch. Larval and pupal survivorship was higher at a high contamination level than in the control. Tachinids were the most important parasites in the focus, which was at the outbreak phase. The number of other parasites was insignificant. Parasitism of larvae decreases with a higher level of radioactivity. Survival was 1.5 times higher in the experiment than in the control, with a positive correlation of mortality to parasitism.
WSiberia; EGG HATCH, IRRADIATION, PARASITES

989 Timchenko, G.A., Kvint, V.L., Orlovskaya, E.V. 1978.
Results of tests of the virus preparation virin-ENSh against gypsy moth in Kherson region. Lesovodstvo i agroleso-melioratsiya. 51:60-68.
-- Ground application of the preparation virin-ENSH against instar II gypsy moth in the foci at different gradation phases caused infection and death in several steps as a result of secondary infection. Application in collapsing foci resulted in elimination of larvae within one season. The virus infection propagates within a radius of 300 to 600 m. In the foci of increasing population, a concentration of the working suspension of 7 of 10 polyhedra in 1 ml of solution is not effective.
EWest; MICROBIAL PESTICIDES, VIRUS

990 Timchenko, G.A., Meshkova, V.L. 1985.
Test of the virus preparations virin-ENSh and Gypcheck against gypsy moth. Lesnoye khozyaystvo. (3):59.
-- In 1983 a comparative test of the virus preparations virin-ENSh (USSR) and Gypcheck (USA) against instar I and II gypsy moth was conducted in shelter belts of orchards in Kiev Province. Ten times as many insects died of diseases in treated plots as in the control. Mortality caused by entomophages was nearly the same. The technical efficacy of the preparations was about the same, amounting to 93% to 95%. A ten-fold decrease in number was observed in the generation; the source of infection remained in the foci through the following year. A conclusion is reached of the high efficacy and similar action of both preparations.
EWest; MICROBIAL PESTICIDES, VIRUS

991 Timofeeva, Ye.P. 1952.
Importance of food factor in polyhedral disease of the gypsy moth. In: Trudy Vsesoyuznogo NII zashchity rasteniy. Leningrad: 56-68.
-- Rearing of gypsy moth larvae on different food plants (oak, linden, birch, apple, maple) showed the weight increment and reserve of lipids accumulated to be determined by the food plant. Also of importance is the quality of food from the same species and the degree of leaf maturity. The least resistant to polyhedrosis infection are instar I and II larvae. In later instars, the level of susceptibility is determined by the physiological condition of the organism. Of the larvae in the same instar (earlier instars), the most resistant to polyhedrosis are those feeding on oak just after leafing begins. When larvae are reared on mature leaves of oak or other food plants from the very beginning, they grow less resistant to polyhedrosis. Prolonged larval development and an insignificant content of reserve substances also contribute to the development of disease. Larvae weakened by nosematosis or bacterioses experience physiological changes contributing to polyhedrosis development.
ECentral; FOLIAGE QUALITY, HOST PLANTS, NUTRITION, PHYSIOLOGY, REARING, VIRUS

992 Timofeeva, Ye.P. 1952.
Gypsy moth diseases and their dependence on physiological status of an insect. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Leningrad. 26 p.
-- The author studied the effect of food quality (larvae were reared on different food plants, young and mature leaves) and some abiotic factors (low temperatures) on the susceptibility of gypsy moth larvae to polyhedrosis, nosematosis, and bacterial diseases. Insects weakened by unfavorable food and diseases were highly susceptible to viruses. Infection is transmitted by surviving insects to the next generation, reducing its fecundity and worsening its physiological condition.
ECentral; FOLIAGE QUALITY, REARING, TEMPERATURE, VIRUS

993 Tobias, V.I. 1971.
Review of braconids (Hymenoptera, Braconidae) of the USSR. In: Trudy Vsesoyuznogo entomologicheskogo obshchestva, vypusk 54. Parasiticheskiye nasekomyye - entomophagi. USSR Academy of science, Leningrad: 156-268.
-- *Apanteles melanoscelus* is listed as a primary gypsy moth parasite.
Far East; PARASITES, REVIEW

994 Toktosupov, A., Kulakova, P.I. 1958.
Pests of the pistachio stands. In: Trudy molodykh nauchnykh rabotnikov Akademmi nauk Kirgizskoy SSR. Izd. AN Kirg. SSR, Frunze: 36.
-- The gypsy moth heavily defoliated pistachio trees in 1954.
MAsia; HOST PLANTS, PEST LIST

995 Tolstikov, G.A., Azhemilen, U.M., Balezina, G.G., Krivonogov, V.P. 1978.
Insect pheromones and their analogs. Part 2, Synthesis of the sexual attractant of an unpaired silkworm racemic DL disparlure. Khimiya prirodnykh soedineniy. 6:792-795.
EEast; PHEROMONES

996 Tolstikov, G.A., Odinokov, V.N., Galeeva, R.I., Bakeeva, R.S., Rafikov, S.R. 1978.
New synthesis of disparlure, a sexual attractant of the gypsy moth. Doklady Akademii nauk SSSR. 239:1377-1380.
EEast; PHEROMONES

997 Trenin, I. 1892.
Gypsy moth control in oak forests of Khvalyn district. Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal. (6):34-37.
EWest; CONTROL, GENERAL BIOLOGY

998 Tretyakova, M.F. 1979.
Larval resistance in the carabid beetles *Calosoma denticolle* and *Ophonus rufipes* to entobacterin. In: Mikroorganizmy i virusy. Shtiintsa, Kishinev: 22-23.
-- The effect of entobacterin was studied on gypsy moth and tent caterpillar larvae and their predators, the carabids *Calosoma denticolle* Gebl and *Ophonus rufipes*. Inoculation was made by feeding larvae on leaves treated with 0.5% entobacterin solution. In the experiment all larvae died; in the control mortality was 12 to 20%. Carabids did not die in the experiment; their food consumption was reduced to 70 to 84% of larvae eaten in the control. It is concluded that treatments with entobacterin are harmless to predators.
EWest; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, PREDATORS

999 Tretyakova, M.F. 1979.
Effect of biological preparations on the tachinid fly *Exorista larvarum* L. In: Mikroorganizmy i virusy. Shtiintsa, Kishinev: 20-22.
-- Gypsy moth larvae infected with virus and bacterial diseases in the fourth instar were used in experiments. The percentage of fully developed tachinid larvae parasitizing the gypsy moth was 82 to 86% in the control, while in the experiments with application of nuclear polyhedrosis virus at concentrations of 106 and 108 polyhedra per ml parasitism was 54% and 22%, respectively. In the variants with application of entobacterin, 28 to 30% of tachinid larvae emerged. Thus, there was a 2- to 4-fold decrease in tachinid survival in comparison with the control. This is the result of the premature death of hosts and, probably, of the presence of endotoxins in larval hemolymph. Thus, there is a negative effect of biological preparations on tachinid survival.
EWest; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, PARASITES, VIRUS

1000 Treyman, F.S. 1935.
Some data on larval and pupal survival in the gypsy moth and on density variations depending on feeding conditions in nature. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Kiev: 127-156.
-- Survivorship was found to be determined by living conditions of larvae. In three variants of the experiment (100% defoliation, 50-60% defoliation, 0.5% defoliation), larval survivorship ranged from 0.05 to 1.5%. The lowest rate of survival was in the first variant (0.05 to 0.13%). High correlation coefficients for pupal length and weight and for pupal weight and imago fecundity were recorded.
EWest; DEFOLIATION, FOLIAGE QUALITY, NUTRITION

1001 Treyman, F.S. 1938.
Number of larvae hatched from gypsy moth eggs and their survival in juvenile instars depending on feeding conditions of maternal generation. In: Zbornik prats' viddilu ekologii nazemnykh tvarin. Academiya Nauk Ukrainskoy SSR. Kiev: 117-144.
-- Insufficient feeding of the maternal generation is reflected in the physiological condition of the filial generation at all life stages. The proportion of unhatched eggs is higher, and the mean weight of late instars and pupae is lower. These data should be taken into account when making forecasts.
EWest; NUTRITION, POPULATION QUALITY

1002 Trifonov, P.M., Amirkhanov, D.V., Tur'yanov, R.A. 1981.
A new method of surveying gypsy moth in forests of Bashkiria. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 189-190.
-- Disparlure-baited glue traps for monitoring gypsy moth distribution and population dynamics were tested in an area of more than 200,000 ha. Four levels of pest captures corresponding to certain gradation phases were differentiated: (1) throughout the flight season not more than 60 males per trap were captured, depression; (2) up to 120 males per trap, onset of gradation; (3) up to 190 males per trap, increase in number; (4) more than 190 males per trap, outbreak in the following year.
EEast; PHEROMONE TRAPS

1003 Trotsky, N.N. 1926.
The gypsy moth. In: Vrednyye nasekomyye v plodovykh i yagodnykh sadakh. Novaya derevnya, Moscow: 17-19.
-- A brief description of the gypsy moth's biological peculiarities, harmful effects, and control measures (destruction of egg masses and treatment with insecticides) are suggested.
ECentral; CONTROL, GENERAL BIOLOGY

1004 Tsankov, G. 1985.
Reference list of entomophages of the gypsy moth (*Lymantria dispar* L.) and the European pine shoot moth (*Rhyacionia buoliana* Den. et Schiff.) in Bulgaria. Informatsionnyy byulleten' VPS MOBB. 10:25-31.
-- Fifty-one entomophagous species of the gypsy moth are listed: 16 ichneumon species, 14 braconid species, 2 chalcid species, 1 encirthid species, 1 eupelmid species, 1 perilampid species, 1 torimid species, 5 tachinid species, 2 sarcophagid species, 7 coleopterous species, and 1 tick species. For each species, data are given on biology, ecology and area, hosts are enumerated, food relations with hosts are characterized, efficiency levels are estimated, and practical applications are discussed.
EWest; PARASITES, PREDATORS, REVIEW

1005 Tsankov, G., Bochev, N., Tomovskiy, Kh. 1989.
The use of synthetic pheromone disparlure in long-term control of population density of the gypsy moth (*Lymantria dispar* L.). In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. VPS MOBB, Moscow: 170-174.
-- Gypsy moth population dynamics were studied with pheromone-baited traps in Bulgaria from 1977 to 1985. In southern Bulgaria, more than 20 captures per trap during

a season can be regarded as a sign of an approaching outbreak.
EWest; PHEROMONE TRAPS

1006 Tsap, L.I. 1965.
Studies on the most important pests of oak forests in the Crimea. Lesovodstvo i agroleso-melioratsiya. 6:103-107.
-- Forty-five pest species were found in oak groves of the Crimea with the total area of forests under survey about 20,000 ha. The most serious oak pests in the Crimea are the gypsy moth, the green oak leaf roller, and the big oak capricorn beetle. In felled areas, four other capricorn beetle species, two buprestids, and the oak cambium beetle are threats to the forest. Weakening of oak groves by unfavorable growth conditions and anthropogenic impact contributes to outbreaks. The highest infestation of gypsy moths is recorded in light stands. The author suggests aerial chemical treatments as a drastic measure aimed at forest protection, but he also points out the necessity of creating conditions for maximum preservation of entomophages.
EWest; PEST LIST, STAND CONDITION, TREE HEALTH

1007 Tsereteli, L., Khelidze, M. 1930.
Test of methods of controlling pests and diseases in the fruit gardens. In: Soobshcheniye otdela po zashchite rasteniy Narkomzema po sel'skomu khozyaystvu Gruzinskoy SSR. Tbilisi: 150-188.
Caucasus; CONTROL

1008 Tsvetaeva, I.A. 1977.
Characteristics of the gypsy moth (*Porthetria dispar* L.) offspring reared in the laboratory. Zoologicheskiy zhurnal. 56(10):1557-1560.
-- Gypsy moths reared in a laboratory on an artificial medium produced viable offspring for four generations. Survival of laboratory-reared insects was 33 to 82%, female fecundity was 225 to 351 eggs, mean pupal weight was 788 to 1,146 mg (females) and 304 to 386 mg (males), and mean egg weight was 0.64-0.78 mg. Generation development lasted 2 months. In their biological parameters, laboratory-reared insects did not differ significantly from natural populations fed on the same medium.
ECentral; NUMERICAL DATA, REARING

1009 Tsvetaeva, I.A. 1983.
Regulation of the proportion of males and females. Zashchita rasteniy. (11):26-27.
ECentral; POPULATION QUALITY

1010 Turchinskaya, I.A. 1963.
Effect of leaf grazing by the gypsy moth and other folivores on oak growth. Zoologicheskiy zhurnal. 42(2):8-255.
-- Work was carried on in Voronezh Province from 1958 to 1961 to estimate the increment and general condition of oak groves after a phyllophage outbreak from 1950 to 1961, when there were high populations of the gypsy moth, winter moth, green oak leaf roller, and oak leaf caterpillar. In the forest plots that had been completely defoliated during 2 or 3 successive years, trees did not die, but there was a loss in increment, with a total one-time defoliation of 66.2-75.4% and a partial defoliation of 41.3-37.7%. Throughout the given period, the loss of increment varied from 15 to 52%. These data can be used to estimate losses of forestries and potential danger to oak groves during phyllophage outbreaks.
ECentral; DEFOLIATION, PEST LIST, TREE GROWTH

1011 Turova, G.I. 1986.
Biological patterns of the gypsy moth in the Far East. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Problemy ratsional'nogo lesopol'zovaniya na Dal'nem Vostoke. Dal'NIILKh, Khabarovsk: 117-124.
Far East; ECOLOGY, HOST PLANTS, POPULATION DYNAMICS

1012 Turova, G.I. 1988.
Spatial distribution of the gypsy moth foci in the Far East. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 29.
-- One of the largest gypsy moth outbreaks occurred in the Far East from 1978 to 1984. Foci were located for the most part at watersheds, in upper and middle parts of southern and eastern slopes of different steepness, and in terraces and ravines. In the Far East the gypsy moth attacks 45 tree and shrub species, the favored ones being Mongolian oak, larch, Manchurian nut, and hazel. Pest foci were found not only in the south but also in the lower Amur region. Gradation was recorded in the vicinity of Komsomolsk. In the lower Amur region, major food plants of the pest were larch, birch aspen, sweetbrier, honeysuckle, and currant. Gradation foci of the gypsy moth were located in flood cherry thickets, at light forest edges, and along roads.
Far East; HOST PLANTS, OUTBREAKS, SITE CONDITIONS

1013 Turova, G.I. 1989.
Entomophages of the gypsy moth and their role in reducing pest abundance in the Far East. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 110-118.
-- In Khabarovsk and Primorie regions there are 35 species of insect parasites of the local gypsy moth population. 6 of them belong to Ichneumonidae, 2 - Braconidae, 17 - Tachinidae, 7 - Sarcophagidae, 2 - Muscidae, 1 - Eupeimidae. The list of secondary parasites consists of 11 species: 1 - Bombyliidae, 9 - Ichneumonidae, and 1 - Eupelmidae. The most numerous parasites were the tachinids *Blepharipa schineri* and *Parasetigena agilis*. The most abundant sarcophagids were *Robineuella pseudoscoparia* and *Kramerea schuetzei*. The mortality of gypsy moth due to parasites was estimated in different habitats at main stages of population gradation.
Far East; PARASITES

1014 Turova, G.I. 1990.
Ecological and economic estimation of gypsy moth area in the Far East. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 138-147.

Far East; DISTRIBUTION, ECOLOGY, OUTBREAKS

1015 Turova, G.I. 1992.
Gypsy moth of the Far East forests (distribution, biology, economic significance, management). Institute of Forest, Siberian Branch, Russian Academy of Science, Krasnoyarsk. 24 p.
-- Studies were conducted in the years 1981-1992 in forest steppe and taiga around the Amur River area, and in oak stands in the south of Khabarovsk province and in Primorski Krai. Its range extended to 55 degrees and 30 minutes in Khabarovsk Province and in Amur Province up to the city of Bomnak. The basic host plants were Mongolian oak and David's aspen, larch, birch, hazelnut, Rosa canina and alder. Less than 2% of the larvae hatched in the fall. The yearly average of population density ranged from 0.006 to 10.6 egg masses per tree, and 0.06 to 103.4 eggs per 100 points of oak growth. Females are strong fliers and deposit eggs on the leaves of both host and non-host trees. Trees with large leaves are preferred. Eggs also are laid on rocks and in towns on houses and light poles. The dispersion of egg masses in the forest was studied and a formula for correlation between density and dispersion given. A probability of 50% defoliation is predicted at 5 young larvae per oak branch and strong defoliation is expected if there are 2 egg masses per tree. Twenty-five primary parasites were recorded: *Exorista fasciata, Parasetigena silvestris, Phorocera assimilis, Phryxe heraclei, Senometopia excisa, Blepharipa schineri, Tachina micado, Agria affinis, Agria monachae, Kramerea schuetzei, Parasarcophaga harpax, Parasarcophaga uliginosa, Robineuella pseudoscoparia, Sarcorodendorfia antilope, Muscina stabulans, Muscina levida, Anastatus japonicus, Phobocampe unicincta, Casinaria nigripes, Lymantrichneumon disparis, Apechtis capulifera, Theronia atalantae, Hyposoter* sp., *Apanteles liparidis*. The most abundant were *T. micado* and *P. heraclei*, but *B. schineri* and *P. silvestris* also were very abundant.
Far East; EGG MASSES, FEMALES, FLIGHT, HOST PLANTS, MODELS,, NUMERICAL DATA, PARASITES, PROGNOSIS, SAMPLING

1016 Tur'yanov, R.A. 1981.
Combined application of chemical and bacterial insecticides for lowering gypsy moth numbers. In: Sbornik nauchnykh trudov Bashkirskoy lesnoy opytnoy stantsii. Ufa: 107-111.
-- Seventeen chemical and 8 bacterial preparations were tested by conventional procedures. Insecticides were selected for toxicity to larvae, including the development rate of poisoning or disease. The most effective insecticides tested were dimilin and the synthetic pyrethroids ambush, decis, and cymbush. In Bashkiria, gypsy moth larvae appeared to be nearly immune to bacterial preparations, which were effective only under laboratory conditions, when larvae were reared on an artificial nutrient medium. Good results were achieved by adding chlorophos to the biopreparation. The most promising bacterial preparations in Bashkiria are lepidocide, dendrobacillin, and bitoxibacillin. It is advisable to apply microbiological preparations against instars I and II in the stands close to settlements, recreational areas, etc. Weather conditions and the pest gradation phase should be taken into account since during an outbreak, biopreparations are less effective than chemical preparations.
EEast; BACTERIA, BIOASSAY, CHEMICAL INSECTICIDES, MICROBIAL PESTICIDES, REARING

1017 Tur'yanov, R.A. 1983.
***Study of effect of* pyrethroid insecticides on the gypsy moth.** In: Molodyye uchenyye k yubileyu instituta. Trudy nauchnoy konferetsii aspirantov i nauchnikh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva Gosleskhoza SSSR. VNIILM, Pushkino: 223-226.
-- The effect of the synthetic pyrethroids ambush decis, and cymbush on gypsy moth larvae was tested in the laboratory and in the field. Under laboratory conditions the aim was to estimate their toxicity, how long their toxic properties were retained, and mean lethal concentrations. All pyrethroids outperform the reference preparation, chlorophos, with ambush being the best in all parameters tested. Under field conditions it can effectively protect trees against defoliation.
EEast; BIOASSAY, CHEMICAL INSECTICIDES, WEATHER

1018 Tur'yanov, R.A. 1988.
Monitoring and control of gypsy moth populations using synthetic pheromone and insecticide complex. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 47-48.
-- The potential use of disparlure and biological and chemical insecticides to monitor and control gypsy moth populations were studied for many years. It was found that pheromone-baited traps should be used only to find areas with increased pest density in the period of depression and to specify the time of population transfer to the phase of increase. A number of highly effective preparations for population control such as biological, hormonal, and organic phosphorous and pyrethroid, which cause little harm to the environment are suggested. They can be applied either by aerial spraying or in aerosols (synthetic pyrethroids). Investigations have been made to estimate the efficiency of pest control at different gradation phases.
EEast; AERIAL SPRAYING, CONTROL, PHEROMONE TRAPS

1019 Tur'yanov, R.A., Amirkanova, D.V. 1979.
From experience on the use of biological method of controlling gyspy moth in Bashkiria. In: Itogi i perspektivy nauchnykh issledovaniy v oblasti lesnogo khozyaystva. Tezisy dokladov. Pushkino: 251-253.
-- Laboratory and field experiments were conducted to estimate the susceptibility of gypsy moth larvae to bacterial preparations. Godealin, gomelin, dendrobacillin, lepidocide, insectin, and tuverin-2 were tested in suspensions of two concentrations: 1.5 and 3 billion per ml. Application of lepidocide gave the best results, but the susceptibility of gypsy moth larvae to bacterial preparations was generally low. A higher concentration does not substantially increase larval mortality. Among

cultures isolated from gypsy moth larvae killed by natural infections, one could retain virulence for at least 2 years.
EEast; BACTERIA, BIOASSAY, MICROBIAL PESTICIDES, VIRUS

1020 Tur'yanov, R.A., Amirkhanova, D.V. 1981.
Test of insecticides against the gypsy moth. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Pushkino: 195-196.
-- Fourteen chemical and 8 bacterial insecticides effective against the gypsy moth were tested in Bashkiria. Dimilin and the synthetic pyrethroids ambush, decis, and cymbush proved to be the most effective chemical preparations. Pure bacterial preparations appeared insufficient for effective forest protection against the pest. Testing of preparations together with sublethal doses of chlorophos gave satisfactory results. Dipel and the domestic preparation lepidocide were the best bacterial preparations tested. Dimilin can be used instead of bacterial preparations in regions where their application is limited by climatic conditions, but if the pest population can cause 100% defoliation, chemical insecticides must be applied.
EEast; BACTERIA, CHEMICAL INSECTICIDES, GROWTH REGULATORS, MICROBIAL PESTICIDES

1021 Tur'yanov, R.A., Davlyatshin, P.G. 1986.
Rhythm of sexual activity in the normal gypsy moth population and at elevated concentration of synthetic pheromone. In: Materialy IX nauchnoy konferentsii aspirantov i nauchnykh sotrudnikov VNII lesovodstva i mekhanizatsii lesnogo khozyaystva. VNIILM, Moscow: 166-170.
-- Gypsy moth males in Bashkiria fly during the day with the majority of males (up to 90%) captured by traps baited with synthetic pheromone. Mating occurs around the clock, without a marked peak. Observations show that against the background of enhanced concentration of synthetic pheromone, males are not pheromone-oriented, the peak of flight to tree trunks is in the twilight, and mating occurs mostly at night.
EEast; BEHAVIOR, MATING, PHEROMONES

1022 Tur'yanov, R.A., Sakhautdinov, P.A. 1988.
Susceptibility in gypsy moth males to synthetic pheromone at different population density levels. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 47-48.
-- The sensitivity of gypsy moth males to different doses of racemic disparlure was estimated in the laboratory and in the field against the background of low and increased pest populations. Disparlure doses from 5×10^7 to 5×10^5 mkg per disperser, differing by an order of magnitude, were tested. In the laboratory, threshold doses ranged from 5×10^7 to 5 x 0-4. In the field experiment, various pheromone doses were used to capture males, the maximum doses being 10 billion times higher than the minimum ones. Such a range of adequate concentrations means that in the pest population there are males differing greatly in the range and threshold of sensitivity, males without a sensitivity threshold oriented to the source of odor only by anemotaxis. Male response to different pheromone doses was not the same at different population densities. When population was low, negative parabolic dependence was observed; when it was high, the dependence was positive. Application of dose 5 resulted in the highest number of captures at a low density and in the lowest number of captures at a high density. The lack of an adequate increase in male captures with increase in population density may be partially due to variations in sensitivity; thus, it is advisable to use 2 or 3 significantly different pheromone doses for monitoring. In this case, peak captures with specific doses can show the direction of changes in population density.
EEast; BEHAVIOR, BIOASSAY, PHEROMONES

1023 Tur'yanov, R.A., Yangirov, I.M. 1988.
Improvement of an aerosol technique in the gypsy moth control. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 19.
-- In test of synthetic pyrethroid applications against first-instar gypsy moth, the width of effective covering was 0.9 to 1.2 km and the expenditure rate of preparations of the permetrin group was 10 to 20 g/ha, of the cipermetrin group 5 to 10g/ha, and of the deltametrin group 1.2 g/ha. When pyrethroid aerosols were applied against instars II and III, the width of effective covering usually did not exceed 0.8 km, and the preparation expenditure rate was sometimes higher than that for spraying. One of the main reasons for this inefficiency may be the filtration of aerosol particles by negative elements. To increase the width of covering, a technique of taking out aerosol clouds by tree crowns was tested, resulting in an increase in the width of covering by 0.4 km and a 1.4-fold reduction of the preparation expenditure rate.
EEast; CHEMICAL INSECTICIDES

1024 Tuzkov, I.V., Kharitonov, V.I. 1964.
Gypsy moth entomophages. In: Zashchita rasteniy ot vrediteley i bolezney. Moskva: 37.
-- In Kirgizia, the gypsy moth prefers large poplars and English walnuts for oviposition. In the outbreak of 1950, 30-50 egg masses were recorded on these trees, 5 to 8 on the average. Birds destroy up to 15% of egg masses during winter. About 20% of late instars are parasitized by tachinids (*Sturmia* and *Phorocera* sp.) and 75% to 83% of pupae are parasitized by tachinids. The most active predators in the foci were carabids of the genus *Calosoma*, and dermestids of the genus *Dermestes*. Larvae attack poplar, elm, maple, willow, apple, alycha, hawthorn, Mahaleb cherry, and pistachio; less heavily attacked are English walnut and ash.
MAsia; BIRDS, HOST PLANTS, OVIPOSITION SITE, PARASITES, PREDATORS

1025 Uchakina, V.A. 1977.
Role of entomophages in abundance of the tent caterpillar and the gypsy moth. Lesnoye khozyaystvo. (1):78-80.
-- The gypsy moth and the tent caterpillar are serious pests in Rostov Province. In the period of outbreak, entomophages and entomopathogens play an important part in pest control. The following biological agents

attacking the pests are known: the egg parasites *Telenomus laevisculus, Anastatus disparis*, and *Trichogramma evanescens*; and the entomophages of larvae and pupae *Apanteles glomeratus, A. liparidis, A. spurius, Meteorus versicolor, Pteromalus purpureus, Pimpla instigator, P. examinator, Compsilura concinnata, Eudomyia megnicornis, Zenillia libatrix*, and *Calosoma sycophanta*. Average parasitism by entomophages is 7.6% of gypsy moth eggs, 6.4% of larvae, and 32% of pupae, and 30% of tent caterpillar eggs and 12% of larvae. Muscardine (*Plistophora schubergi*) is a common disease. The most important population regulators are egg parasites, but entomophages of larvae and pupae are also important for pest control in the foci.
ECentral; NUMERICAL DATA, PARASITES

1026 Uchakina, V.A. 1980.
Experience on disparlure application in Rostov region. Khimiya v sel'skom khozyaistve. 18(12):25-26.
-- The use of disparlure for capturing gypsy moth males in the Rostov Botanic Garden is described.
ECentral; PHEROMONES

1027 Ushatinskaya, R.S. 1948.
The gypsy moth (*Lymantria dispar* L.). In: Osnovnyye meropriyatiya po zashchite plodovykh sadov ot sel'skokhozyaystvennykh vrediteley. Pishchepromizdat, Moscow: 31-33.
-- Gypsy moth ecology, phenology, area, and damage zones are briefly described. The following control measures are suggested: scratching egg masses off and treating with petroleum, and treatment with stomach or contact insecticides in the period of larval development.
ECentral; CONTROL, GENERAL BIOLOGY

1028 Ustimenko, A.O. 1983.
Comparative efficiency of microbiological and some phosphororganic preparations against the gypsy moth. Zakhyst roslin. 30:15-18.
-- The author studied comparative efficacy of beauverin (1.2×10^6 and 6.6×10^6 spores per insect), entobacterin (3×10^5 and 1.2×10^6 spores per insect), clorophos (0.1 mkg/5 mg and 0.1 mkg /15 mg of weight), and methation (0.1 mkg/5 mg and 0.1 mkg/15 mg of weight) against gypsy moth instars III and V. Individual inoculation of larvae showed that the stability of infection grows with development and is determined by the preparation applied and the value of the dose. According their toxicological effect, preparations could be ranked as follows: methation, chlorophos, entobacterin, and beauverin.
EWest; BIOASSAY, CHEMICAL INSECTICIDES, FUNGI, MICROBIAL PESTICIDES

1029 Uvarov, B.P. 1920.
The gypsy moth (*Lymantria dispar* L). In: Sel'skokhozyaystvennaya entomologiya. Tiflis: 126-129.
-- General data are given on gypsy moth biology, phenology, damage, economic importance, and control measures (scratching off egg masses, treatment with petroleum, and application of insecticides).
EEast; COLOR POLYMORPHISM, CONTROL, GENERAL BIOLOGY

1030 Vainrub, F.P., Gitsau, Ye.S. 1979.
Determination of disparlure by thin-layer and gas-liquid chromatography techniques. In: Novyye metody v zashchite rasteniy. Shtiintsa, Kishinev: 17-19.
-- To study the rate of disparlure extraction from different substrates, the effect of light and pH on its stability, vapor pressure, and methods of qualitative and quantitative estimation of the preparation are suggested. A number of mobile systems of chromogenic reagents and various sorbents were examined, and the best were chosen to separate cis-transisomeres of disparlure. The content of transisomere can be semiquantitatively estimated and regulated in the process of attractant synthesis and purification by the method of thin-layer chromatography. The method of gas-liquid chromatography was used in studying preparation stability.
EWest; PHEROMONES

1031 Vainshtein, B.A. 1949.
Entomofauna defoliating oak in shelter belts in the south of Ukrainian SSR and its dependence on forest ecological factors. Zoologicheskiy zhurnal. 28(6):495-508.
-- Injuries to oak trees by phyllophagous entomofauna, including the gypsy moth, in steppe and forest-steppe zones of the European part of the USSR depend on stand age, composition, density, and quality.
EWest; PEST LIST, SITE CONDITIONS, STAND COMPOSITION

1032 Vainshtein, B.A. 1950.
Changes in the forest pests composition under the influence of forest-ecological factors. Doklady Akademii nauk SSSR. 70(3):515-518.
-- As density, age, and quality of stands increase, the proportion of mesophilous species in the entomofauna grows, and the number and abundance of xerophilous species decrease. However, with stand growth, other economic parameters also change, e.g., natural thinning of the stand occurs, so the number of some xerophilous species may increase. For instance, the gypsy moth and the oak leaf roller mostly attack trees in young and old open stands. Aspen has a negative effect on pests and causes a decrease in their populations.
ECentral; SITE CONDITIONS, STAND COMPOSITION

1033 Vainshtein, B.A. 1951.
On the gypsy moth ecology. Zoologicheskiy zhurnal. 30(3):238-242.
-- The gypsy moth is a sun-loving species, occurring mostly in well-heated stands of low density and quality. Inside a stand, larvae select sunlit branches and trees. Some unfavored species, such as aspen and pear, when mixed with oak decrease the gypsy moth population. A population increase is due to higher survivorship. Larval and pupal mortality amounts to about 99.6% in the years of population depression, while in the phase of population increase it is less than 99.5%. Over 80% of older larvae and pupae die as a result of tachinid parasitization. *Sturmia gilva* Hartig prevailed, while there were few *Larvaevora larvarum* and *Ptilotachina* sp. Younger larvae are parasitized by *Apanteles* species; *Calosoma*

sycophanta was the most effective predator, destroying more than 20% of the pupae.
EWest; MODELS, PARASITES, PREDATORS, SITE CONDITIONS

1034 Vakarenko, V.I., Petrusenko, A.A., Simochko, M.D. 1978.
Ecological analysis of feeding of the great tit (*Parus major*) L.(Aves, Paridae) nestlings in the oak groves of Zacarpatye. Vestnik zoologii. (6):81-85.
-- Stomach contents of great tits were examined. Gypsy moths, browntail moths, tent caterpillars, satin moths, nun moths, American white moths, and some tussock moths were eaten. On the whole, tits eat insects of at least 55 species and eat the gypsy moth at any life stage.
EWest; BIRDS, PREDATORS

1035 Varkonda, S., Covac, J., Konechny, V., Gaher, S., Kubala, V. 1975.
Insecticidal and acaricidial properties of insecticide-793. In: Tezisy dokladov VIII Mezhdunarodnogo kongressa po zashchite rasteniy. Nauka, Moscow: 124.
EWest; CHEMICAL INSECTICIDES

1036 Vasechko, G.I. 1980.
On factors of the gypsy moth population dynamics. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 17-19.
-- Gypsy moth larvae of three populations were placed in a healthy plot of oak forest and in a highly weakened one to feed. Larval survivorship seemed to depend not on leaf quality but on a population's resistance to diseases and on availability and activity of entomophages, especially parasites. Larvae taken out of a population in its crisis phase died under any feeding conditions.
EWest; FOLIAGE QUALITY, POPULATION DYNAMICS, POPULATION QUALITY

1037 Vasechko, G.I. 1981.
Behavioral factors of the gypsy moth population dynamics. In: Povedeniye nasekomykh kak osnova dlya razrabotki mer bor'by s vreditelyami sel'skogo i lesnogo khozyaystva. Minsk: 41-45.
-- To settle the question of population dynamics of any species, including the gypsy moth, it is necessary to not only study experimentally the factors of survival at different gradation phases, but also to study behavioral peculiarities of the species, taking into account historical and biogeographical aspects. The formation of closed stands in forest-steppe and of understory in open stands of the zone of insufficient moisture will bring about favorable conditions for the development of parasites and lessen the harmful effect of the gypsy moth.
EWest; PARASITES, SILVICULTURAL TREATMENTS, STAND COMPOSITION

1038 Vasic, M. 1975.
Experiments on the chemical control of leaf-eating insect pests of forests and orchards by using a mixture of insecticides and pyrotechnic substances. In: Tezisy dokladov VIII Mezhdunarodnogo kongressa po zashchite rasteniy. Nauka, Moscow: 46-50.
EWest; CHEMICAL INSECTICIDES

1039 Vasil'ev, I.V. 1924.
Garden pests and their control. (Nasekomyye, vredyashchiye v sadu i bor'ba s nimi.) Kharkov. 51 p.
-- The gypsy moth is listed among serious garden pests. It attacks and injures fruit plants. All life stages and species biology are briefly described. Collection and destruction of egg masses as well as treatment with petroleum are suggested as control measures.
EWest; CONTROL, EGG MASSES, PEST LIST

1040 Vasil'ev, V.P. 1955.
The gypsy moth, *Porthetria dispar* L. In: Vrediteli sadovykh nasazhdeniy. Izd. AN Ukrainskoy SSR, Kiev: 185-91,243-4.
-- General data are given on the main causes of outbreaks and the zones of highest susceptibility. Apple is the fruit tree preferred for oviposition. Egg development before diapause lasts for 14 to 15 days at a temperature of 14 to 32 C; humidity ranging from 10 to 100% had no significant effect on the duration of development. The sum of effective temperatures of prediapause development is 310° C. The temperature threshold of spring development is about 6°C, and the sum of effective temperatures of postdiapause development is about 106° C. In an insectary, hatching of one egg mass usually lasts 7 to 12 days. Pupation occurs in June and July with large-scale oviposition occurring in the second half of July. Control measures suggested were: treatment with petroleum and scratching off egg masses, and spraying with calcium arsenite (Paris green is not effective), DDT or oil emulsions.
ECentral; CHEMICAL INSECTICIDES, CONTROL, DIAPAUSE, EGG MASSES, PHENOLOGY, TEMPERATURE

1041 Vasil'eva, V.L., Yatsenko, V.G., Trusov, B.I. 1983.
Results of testing of virus preparation for gypsy moth control in the gardens: efficacy, safety. Molekulyarnaya biologiya. 34:41-42.
-- Virin-ENSh is highly effective in gypsy moth control when applied for focal treatment of egg masses on not more than 5% of infested trees and when sprayed against feeding larvae. The pest population decreases by 92-99% and 76-87%, respectively. The immunofluorescent method showed the death of larvae to be caused by a virus identical to that in the preparation. Other species of wild fauna were not observed to die. Medical observation of the people performing treatments did not show any deviation from the norm.
MICROBIAL PESTICIDES, VIRUS

1042 Vasov, V.M. 1979.
The gypsy moth. Zashchita rasteniy. (7):59.
ECentral; GENERAL BIOLOGY

1043 Veizer, Y. 1972.
Microbiological methods to control insect pests. (Microbiologicheskiye metody bor'by s vrednymi nasekomymi.) Kolos, Moscow. 580 p.

-- Signs of various diseases of the gypsy moth can be found on pages 25, 71, 75, 98, 130, 196, 511, 512, 515, 518, and 554 of this manual.
PATHOGENS, REVIEW

1044 Vereshchagin, B.V. 1970.
Dendrophilous insect pests in Moldavia. Avtoreferat dissertatsii doktora biologicheskikh nauk. Kishinev. 41 p.
-- The gypsy moth is mentioned among 120 dendrophilous insects. As an outbreak pest species, it injures the foliage of many tree species.
EWest; PEST LIST

1045 Vereshchagina, V.V. 1952.
Silvicultural measures of forest protection against the oak tortrix and the gypsy moth. Lesnoye khozyaystvo. (2):86-87.
-- The effect of light on the rate of stand infestation by the green oak leaf roller and the gypsy moth was studied in 1949-1950 in shelter belts of Kamennaya steppe (Voronezh Province). The population of the two species was found to be higher in stands where leaf canopy is not closed and where there are no margins, second growth, and undergrowth, as well as in the open work belts. This testifies to the fact that the species are light-requiring. Stands of high density differ from those of low density not only in the total stock of egg masses but in the way the egg masses are distributed over the belt. At high density, the majority of egg masses is at forest edges, and at a low density the egg masses are distributed almost evenly throughout the belt. It is concluded that measures taken to decrease light intensity under the canopy of shelter belts will contribute to protection from the green oak leaf roller and the gypsy moth.
ECentral; OVIPOSITION SITE, SILVICULTURAL TREATMENTS, STAND COMPOSITION

1046 Vereshchagina, V.V. 1952.
Role of light conditions in behavior and distribution of the gypsy moth and the oak tortrix in forest shelter belts. Zoologicheskiy zhurnal. 31(1):25-32.
-- Gypsy moth males were found to be active all through the light part of the 24-hour period, but they are active on a large scale only where there are females. Females fly in open stands on calm, warm evenings at a light intensity of 180 to 490 lx; their flight is slow, and their wings do not flutter. Males also are active during this period. Males and females mate on the lower part of trunks, on stumps, etc. Females usually oviposit in the same places. The activity threshold of males is 18°C, and they can be found in great numbers in the morning and in the evening at windward forest edges. During the day when solar radiation and temperature increase, they migrate to forest belts. After sunset, at a temperature below the threshold (10° C), they are not seen. On the whole, adults concentrate in plots of thinned stands.
ECentral; FEMALES, FLIGHT, MALES, MATING, OVIPOSITION SITE, STAND COMPOSITION, TEMPERATURE

1047 Verves, J.G., Kotenko, A.G., Nikitenko, G.N. 1977.
Flesh flies (Diptera, Sarcophagidae) in the steppe zone of the Ukraine. Vestnik zoologii. (3):62-66.
-- Of 55 sarcophagid species found in Kherson Province, *Agria affinis* and *Parasarcophaga emdeni* are regarded as entomophages of the gypsy moth. *P. jacobsoni* and *P. crassipalpis* often occur in pest foci, feeding on dead larvae and pupae of the pest.
EWest; PARASITES

1048 Vlasov, Y.I. 1979.
Method of vaccination against viruses. Zashchita rasteniy. (7):20-21.
-- A problem of creating immunity infection from using strains of low pathogenicity is discussed.
ECentral; VIRUS

1049 Vnukovskiy, V.V. 1926.
New forms of *Lymantria dispar* in Siberia and Semirechye. Russkoe entomologicheskoe obozreniye. 20(1-2):78-81.
-- Siberian and Semirechye (Central Asian) species of the gypsy moth are distinctly different from the typical form. They are larger in size, females have yellow-smoky wings, males have lighter brown-gray wings, there is a reduction in coloration, and females are able to fly. The author regards them as a transitional race from *typica* and *japonica* subspecies, and distinguishes a number of color aberrations.
MAsia, WSiberia; FEMALE FLIGHT, GEOGRAPHIC VARIATION, MORPHOLOGY, TAXONOMY

1050 Voitenko, N.M. 1968.
Pathologic changes in gypsy moth hemolymph caused by insecticides. In: Naukovi pratsi USGA. Doslidzhennya z entomologii ta fitopatologii. UKSKhA, Kiev: 76-80.
-- Tiophos, phosphamide, chlorophos, Sevin, and DDT affect the hemocyte formula of the gypsy moth. Organic phosphorous preparations have the most pronounced effect. Sevin and DDT also have a significant unfavorable effect on the ratio of hemolymph- forming elements.
EWest; BIOLOGICAL CONTROL, CHEMICAL INSECTICIDES, HEMOLYMPH

1051 Volkov, O.G., Izhevskiy, S.S., Mironova, M.K. 1989.
Introduction of the gypsy moth parasite *Oencyrtus kuvanae* (How.). In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma. VPS MOBB, Borzhomi: 59-62.
-- The chalcid *Ooencyrtus kuvanae*, introduced in the USSR from South Korea, parasitizes gypsy moth eggs at all stages of embryonic development. There are 3 to 4 generations a year. Fertilized females overwinter, and in spring parasitize gypsy moth eggs before hatch. The entomophage was released in some regions of the USSR in 1988. It has overwintered well in Moscow.
Far East, ECentral; EGGS, PARASITES

1052 Vorobjeva, N.N., Larionov, G.V., Guliy, V.V. 1968.
Comparative study of antigenic properties and pathogenicity of nuclear polyhedrosis of *Ocneria dispar* L. in different geographic zones. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 106-107.

-- The authors studied the antigenic properties and virulence of nuclear polyhedrosis and "Serbia" and "Slovenia" strains in Amur and Samarkand provinces. Antigenic properties were determined in cross-reactions of agglutination and precipitation in gel by conventional methods. Immune serums against polyhedra were obtained in the laboratory. Different strains of a nuclear polyhedrosis virus were found to have a close relationship. In the precipitation reaction, clear strains between polyhedral antigenes and serums, both homologous and heterologous, were established. The course of disease was most intensive in larvae of first instars; the majority died on the 9th day. In later instars, most larvae died on the 14th or 15th day.
EWest, ECentral, MAsia, WSiberia; VIRUS

1053 Vorontsov, A.I. 1950.
Dermestid beetles as predators of the gypsy moth. Zoologicheskiy zhurnal. 29(5):406-416.
-- Dermestids greatly affected gypsy moth outbreaks in oak groves of the lower reaches of the Volga River and of Vinnitsa Province (Ukraine), destroying pest eggs and pupae. In years of depression, the beetles live on animal cadavers and different organic remnants in bird nests, insect nests, etc. Adjustment of their development and feeding to gypsy moth egg masses in the years of outbreaks and quick readjustment to different food in the years of depression, as well as active searching for prey and low susceptibility to enemies, make dermestids an important factor for gypsy moth control.
EWest, ECentral; PREDATORS

1054 Vorontsov, A.I. 1954.
Pests of forest shelter belts in Low Povolzhye. In: Trudy Instituta lesa AN SSSR. AN SSSR, Moscow: 34-57.
-- The gypsy moth is mentioned among other serious pests of hardwood shelter belts in the lower reaches of the Volga River. During outbreaks it defoliates most species almost completely. Entomophages and diseases are unimportant for pest control.
ECentral; PEST LIST

1055 Vorontsov, A.I. 1957.
Biology of the searcher *Calosoma sycophanta* and its application for forest pest control. In: Trudy Moskovskogo lesotekhnicheskogo instituta. Sbornik rabot po zashchite lesa. MLTI, Moscow: 15-27.
-- When *Calosoma sycophanta* is numerous, it is an effective entomophage, exterminating hairy caterpillars, especially gypsy moth larvae. Data on the ecology of this carabid, the amount of food consumed, and its role in gypsy moth foci are presented.
ECentral; PREDATORS

1056 Vorontsov, A.I. 1958.
Biology of the gypsy moth and its control. Vestnik sel'skokhozyaystvennoy nauki. (4):101-108.
-- Outbreaks of gypsy moths have been recorded in the European part of the USSR during 104 of 120 years between 1837-1927. Some outbreaks are described in detail, and primary and secondary foci of the pest are characterized. The range of food plants in the European part of the USSR also is presented. Phenology, elements of interaction between food and physiological condition of larvae, and gradation phases are described. The role of entomophages and diseases of the gypsy moth in the species population dynamics is assessed. The following control measures are recommended: destruction and treatment of egg masses with petroleum, and aerial chemical treatment with DDT, HCCH, and chlorophos. Preventive measures include counts, monitoring and reports on the state of the primary foci, good forest management, and bird protection.
EWest, ECentral; CHEMICAL INSECTICIDES, CONTROL, GENERAL BIOLOGY

1057 Vorontsov, A.I. 1958.
Gypsy moth outbreaks and their prediction. Zashchita rasteniy. (2):65-70.
-- Data on gypsy moth ecological peculiarities, outbreaks, formation of secondary and migration foci, and control measures are presented. The activity of this species has been known in Russia since 1837. Outbreaks have been nearly continuous in hardwood forests in the European part. Outbreaks were frequent and extensive in the late 1920's in oak groves of steppe and forest-steppe regions. In Kazakhstan and the Altai Mountains, the pest endangers coniferous forests. Major food plants throughout the area are oak (especially its early species), birch and hornbeam in oak stands, and elm, poplar, and willow along riverbeds. Primary foci are formed in stands growing on poor soils or on soils that have degraded as a result of human economic activity.
MAsia, WSiberia; HOST PLANTS, OUTBREAKS, SITE CONDITIONS

1058 Vorontsov, A.I. 1958.
Gypsy moth outbreaks in Moscow Region. In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 19-20.
-- In Moscow Province, gypsy moth foci are usually small and unstable and collapse without man's interference. They occur not only in typical habitats but in mixed stands, in birch forests with excessive moisture, and in spruce forests with abundant aspen and alder. Female fecundity is 80 to 250 eggs per mass, the weight of an egg is 0.4-0.5 mg, and survival of first instars is below the norm. The species composition of parasites and predators is not diverse, but tachinids parasitize up to 20-30% of late instars; few dermestids have been noted as entomophages. The most serious outbreaks were observed in Moscow Province in 1921-1922, 1937, 1948-1950, and 1957. If insects were dispersed by wind, band-shaped foci corresponded to wind direction.
ECentral; FECUNDITY, HOST PLANTS, OUTBREAKS, PARASITES, PREDATORS, STAND COMPOSITION

1059 Vorontsov, A.I. 1960.
Biological backgrounds of forest protection. (Biologicheskiye osnovy zashchity lesa.) Vysshaya shkola, Moscow. 342 p.
-- This is a text book for students, specializing on forest protection. The book includes a description of forest biocenoses, and conditions determining pest dispersal and fluctuations in pest numbers in different regions, as well as a review of principal forest protection measures.

The gypsy moth is one example of a phyllophagous species.
GENERAL BIOLOGY

1060 Vorontsov, A.I. 1967.
Criteria for the chemical control assignment in hardwood forests. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moscow: 19-29.
-- The effect of various pests on stands is characterized. Control measures for the most important pests of hardwood species are suggested on the basis of a number of criteria including biocenosis condition in general, loss of increment growth, and long-term implications of defoliation. The author believes that in the forest zone, control of gypsy moth and other phyllophages should be performed only in orchards and nearby sites. In forest-steppe and steppe zones, gypsy moth and browntail moth control should be performed each time heavy defoliation is predicted, but in stands with linden constituting 4-6 units, treatments are not needed. To make timely control, thorough and continuous monitoring of primary pest foci is needed.
ECentral; CONTROL, MONITORING, STAND COMPOSITION

1061 Vorontsov, A.I. 1977.
Some results of the gypsy moth study. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 3-25.
-- A review of data on the conditions of gypsy moth outbreak formation, pest population dynamics, biological control measures, etc. Domestic and foreign studies of recent years that were not reviewed elsewhere are discussed.
REVIEW

1062 Vorontsov, A.I. 1978.
The Gypsy Moth. Zashchita rasteniy. (3):36-37.
-- A history of gypsy moth outbreaks in the territory of the USSR. Stands susceptible to outbreaks are characterized. Pest life stages and female fecundity are described. Places where egg masses are deposited, composition of food species, and factors limiting the numbers of the pest in foci--diseases, predators, and parasites--are discussed. Monitoring and control measures are suggested.
ECentral, WSiberia, ESiberia; GENERAL BIOLOGY, REVIEW

1063 Vorontsov, A.I. 1978.
The integrated method in forest protection. Zashchita rasteniy. (1):32-34.
-- The gypsy moth attacks the same trees during not more than 2 successive years, otherwise its survival and fecundity decrease. A complex of control measures is effective, including specialized entomophages.
ECentral; CONTROL, FOLIAGE QUALITY, PARASITES

1064 Vorontsov, A.I. 1982.
Forest entomology. (Lesnaya entomologiya.) Vysschaya schkola, Moscow. 250 p.
-- This is a text book for students, specializing in forest entomology. The nun moth, gypsy moth, browntail moth, satin moth, and the vaporer moth are mentioned as important tree pests. The ecology of every species is briefly described, and monitoring systems and pest control measures are suggested.
CONTROL, GENERAL BIOLOGY

1065 Vorontsov, A.I. 1988.
Parasite complexes of the gypsy moth in different ecological and geographical conditions of the European part of the USSR. In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institute lesa i drevesiny SO AN SSSR, Krasnoyarsk: 49-52.
-- On the basis of a literature review and personal observation, complexes of entomophages of the gypsy moth of different populations are estimated. They include a great many nonspecialized parasites, which serve as the main factor of differentiation. Geographical variability of parasite complexes is noted: species composition becomes drastically less diverse at the northern border of the area and in stands subject to heavy anthropogenic loads. In general, the number of entomophages found in different gypsy moth populations ranged from four (Vladimir and Yaroslav provinces) to 105 (the Asian part of the USSR). Complexes of entomophages have a delayed effect on pest population, and the time needed for the effect to show can be different depending on the character of population increase and availability of second-order parasites. For efficient use of entomophages for gypsy moth population control, it is recommended that these complexes be studied at the population level in terms of ecology and geography.
ECentral; GEOGRAPHIC VARIATION, PARASITES

1066 Vorontsov, A.I., Golubev, A.V., Mozolevskaya, Ye.G. 1981.
Updating the methods of counting and forecasting needle- and leaf-eating insects. In: Nadzor za vreditelyami i boleznyami lesa i sovershentsvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 34-35.
-- During the last decade, new methods have been devised to count and forecast numbers of the most important phyllophagous insects including the nun moth, pine moth, pine looper, pine noctuid, star moth, green oak leaf roller, gypsy moth, browntail moth, and buff tip moth. Population structures were studied and types of insect distribution in populations, the character of the gradation curve, fecundity, age structure, and polymorphism were investigated. Additionally, survival tables were analyzed and the real food rate was calculated. On the basis of these data, model methods of counting insects in the crown, on the trunk, and in the soil were developed and tested on species whose numbers had been difficult to assess.
ECentral; MODELS, PROGNOSIS, SAMPLING

1067 Vorontsov, A.I., Golubev, A.V., Mozolevskaya, Ye.G. 1983.
Current methods of estimating and forecasting abundance of xylem- and leaf-chewing insects. In: Trudy Vsesoyuznogo entomologicheskogo obshchestva. Nauka, Leningrad: 4-19.
-- The spatial distribution of insects is described with various models. Optimum methods of pest inventory in the tree crown, on the trunk, and in the soil are

suggested.
ECentral; MODELS, PROGNOSIS, SAMPLING

1068 Voroshilov, N.V. 1978.
Prospects of selective improvement of entomophages. Sel'skokhozyaystvennaya biologiya. (4):507-511.
ECentral; GENETICS, PARASITES

1069 Vshivkova, T.A. 1978.
Gypsy moth growth rates on different food species. In: Ekologiya pitaniya lesnykh zhivotnykh. Nauka, Novosibirsk: 88-96.
-- Growth and development of gypsy moth larvae reared in cages and those living on trees of 10 food species were compared. The growth rate of larvae decreased on tree species in the following order: willow, larch, birch, aspen, bird-cherry, alder, sweetbrier, fir, pine, and mountain ash.
WSiberia; HOST PLANTS, REARING

1070 Vshivkova, T.A. 1978.
Gypsy moth growth rate and feeding at different density of a test population. In: Biotsenoticheskiye gruppirovki tayezhnykh zhivotnykh. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 54-66.
-- Groups of different numbers of larvae were fed leaves of drooping birch in the laboratory. In a group of two larvae of instars I-III, a "group effect" is observed; i.e., intensity of larval development is directly related to the number of larvae in the group. From the fourth instar this relation becomes inverse. In older instars, density increase is related to a "mass effect" and is accompanied by lower consumption. Food utilization by larvae is independent of population density.
WSiberia; DENSITY, ENERGETICS

1071 Vshivkova, T.A. 1980.
Role of food biochemical composition in the gypsy moth vitality. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 26-27.
-- Results of larvae feeding on birch, aspen, bird-cherry, and mountain ash leaves on trees and in cages are given. The effect of content and ratio of food components (total nitrogen, carbohydrates, lipids, cellulose, and water) on larval survival also are discussed.
WSiberia; FOLIAGE CHEMISTRY, NUTRITION, REARING

1072 Vshivkova, T.A. 1980.
Individual energetic balance in gypsy moth under experimental conditions. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 128.
-- A study of the distribution of total food energy throughout the cycle of gypsy moth development from egg to imago while feeding on larch needles.
WSiberia; ENERGETICS, FEEDING, REARING

1073 Vshivkova, T.A. 1981.
Gypsy moth energetics and feeding on hardwood species in Siberia. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 139-140.
-- Energy utilization depends on larval instar and the biochemical composition of food. Larch needles and willow leaves are utilized best of all. Birch, aspen, bird-cherry, and mountain ash leaves were also used in the experiments. The highest metabolic expenditures were observed when larvae fed on larch needles and mountain ash leaves.
WSiberia; ENERGETICS, HOST PLANTS, REARING

1074 Vshivkova, T.A. 1982.
Analysis of larval growth and development in two different gypsy moth populations. In: Neparnyy shelkopryad v Sredney i Vostochnoy Sibiri. Nauka, Novosibirsk: 35-41.
-- Parameters of growth and development of gypsy moth larvae from Bashkiria and Tuva are compared. In the two geographically distant gypsy moth populations, which in natural conditions develop mainly on birch, larval and pupal weights are the same through the fifth instar. Growth rates of late instars, mean daily food consumption per unit of weight, and utilization of food consumed also are compared. Duration of development and growth rates of first- to third-instars are different, probably due to ecological and geographical peculiarities. Additional instars can be indicators of ecological conditions.
EEast, WSiberia; ENERGETICS, GEOGRAPHIC VARIATION, NUTRITION

1075 Vshivkova, T.A. 1983.
Ecological and physiological parameters of the gypsy moth development on the main food plants in Siberia. In: Rol' vzaimootnosheniy rasteniye-nasekomoye v dinamike chislennosti populyatsiy lesnykh vrediteley. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 126-137.
-- Nutritional indices of gypsy moth larvae fed on *Pinus sylvestris, Larix sibirica, Abies sibirica, Betula pendula, Alnus fruticosa, Salix caprea, Populus tremula, Padus asiatica, Sorbus sibirica*, and *Rosa cinnamomea* through all 6 instars are given. *Larix, Betula* and *Rosa* appeared to be the most suitable hosts in this experiment.
WSiberia; ENERGETICS, HOST PLANTS, NUTRITION

1076 Vshivkova, T.A. 1984.
Trophic background of gypsy moth larval growth. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk. 24 p.
WSiberia; ENERGETICS, HOST PLANTS, NUTRITION

1077 Vshivkova, T.A. 1984.
Characteristic of trophic relations in gypsy moth larvae on the basis of food indexes. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukova Dumka, Kiev: 99.
-- Gypsy moth instars I to IV held in cages were fed on tree leaves. First instars fed on larch needles had the maximum energy utilization (60%). Later this parameter became lower. Coefficients of energy utilization of sixth instars fed on larch, willow, sweetbrier, mountain ash, bird-cherry, birch, alder, and aspen were respectively 53,

45, 42, 42, 39, 37, 35, and 33%. The value of the C coefficient of the gypsy moth was extremely low compared to that of other insect species.
WSiberia; ENERGETICS, HOST PLANTS, NUTRITION

1078 Vshivkova, T.A. 1987.
Effect of nitrogen substances on gypsy moth growth. In: Ekologiya i geographiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 146-147.
-- The content of total nitrogen in food does not affect larval growth. However, the relative growth rate of older larvae is determined by their ability to utilize nitrogenous substances.
WSiberia; DEVELOPMENT, ENERGETICS, FOLIAGE CHEMISTRY, NUTRITION

1079 Vshivkova, T.A. 1988.
Characteristic of gypsy moth larval development. In: *Neparnyy shelkopryad: itogi i perspektivy issledovaniy.* Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 8-9.
-- Due to their physiological peculiarities, gypsy moth larvae require different types of food quality at different stages of their development. The biochemical composition of food changes concurrently with larval growth and development. Phenotypic responses of different instars from two ecological and geographical populations were studied. Younger larvae from the two populations were found to differ in intensity of growth and duration of development. In the fourth instar, the growth rate appeared to depend on both quality and quantity of food consumed. In the fifth and sixth instars, the quality of food is determined by the content of water and sugars. These requirements are the same as those of younger larvae, but in this case it is not feeding effectiveness that is determined but the level of food consumption. The data obtained prove that gypsy moth larvae of different instars are clearly differentiated in growth and development. These parameters are to be taken into consideration in planning forest protection measures.
WSiberia; FOLIAGE CHEMISTRY, ENERGETICS, GEOGRAPHIC VARIATION, NUTRITION, PHYSIOLOGY

1080 Vshivkova, T.A. 1988.
Substance and energy expenditures at some stages of the gypsy moth ontogenesis. In: Ekologicheskaya energetika zhivotnykh. Vsesoyuznoe soveshchaniye, Suzdal', 1988. Tezisy dokladov. Pushkino: 31-32.
-- Having determined the amount of substance and energy used to form a moth's body and exuviae, one can calculate the expenditure of energy on metabolism. For instance, expenditures of gypsy moth males fed on larch needles and birch and willow leaves were 60% of energy content in the pupa body, and expenditures of females fed on the same species were about 40%. Feeding on bird-cherry gave opposite results. Thus, expenditures of metabolism are determined by the sex and food quality.
WSiberia; ENERGETICS, NUTRITION

1081 Vshivkova, T.A. 1989.
Energetics of gypsy moth larval feeding and growth in different instars. Zhurnal obshchey biologii. 50(1):108-115.
-- The growth of gypsy moth larvae of all instars is analyzed in connection with parameters of food energy consumption and utilization. The growth of instars I to III is due to their ability to utilize various food objects in the most effective way. The growth rate of older larvae is determined by the level of consumption of needles and leaves of major food species.
WSiberia; DEVELOPMENT, ENERGETICS, NUTRITION

1082 Vshivkova, T.A., Romanova, T.A. 1976.
Comparative estimation of the food quality of protein in birch and larch leaves for the gypsy moth. In: Issledovaniye komponentov lesnykh biogeotsenozov Sibiri. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 59-60.
-- Instars II to VI gypsy moth were fed birch leaves and larch needles to estimate the content of total nitrogen in food and frass as well some energy parameters. The time and consumption were the same, except that sixth instars consumed more birch leaves than larch needles. Though the content of nitrogen is 6% higher in birch leaves than in larch needles, larch proteins are utilized by larvae better than birch leaf proteins. Larvae consume a smaller amount of needles than leaves per unit of weight increment and grow heavier (1.01 g vs. 0.68 g). Thus, for gypsy moth larvae of the population under study, larch needles were more favorable as food.
WSiberia; FOLIAGE CHEMISTRY, HOST PLANTS, NUTRITION

1083 Yafaeva, Z.Sh. 1958.
Representatives of the families Ichneumonidae and Braconidae parasitizing Lepidoptera in Bashkiria. In: Issledovaniya ochagov vrediteley lesa v Bashkirii. Ufa: 46-51.
-- Data on 110 parasite species (90 ichneumonid species and 20 braconid species) parasitizing lepidopterous insects in Bashkiria. Fifteen parasites attack the gypsy moth: the ichneumons *Trogus lutorius* F., *Pimpla instigator* F., *P. examinator* F., *P. spuria* Graw., *Apechtis brassicaria* Poda, *Theronia atalantae* Poda, *Casinaria tenuiventis* Graw., and *Angitia chrysosticta* Gmel.; and the braconids *Apanteles liparidis* (Bouche), *A. fulvipes* (Hal.), *A. solitarius* (Ratz.), *A. inclusus* (Ratz.), *Microgaster tibialis* Nees, *Meteorus gyrator* Thub., and *M. pulchricornis* Wesm.
EEast; PARASITES, REVIEW

1084 Yafaeva, Z.Sh. 1959.
Natural enemies and their role in lowering gypsy moth population in Bashkiria. In: Biologicheskiye metody bor'by s vreditelyami rasteniy. Kiev: 223-229.
-- The following entomophages of the gypsy moth were recorded in Bashkiria from 1952 to 1957: 27 hymenopterous species, 7 species of predatory insects, and 1 nematode species. Of these, 5 species are egg parasites and predators: *Anastatus disparis* Rusch., *Telenomus verticillatus* Kiefer., *Dermestes erichsoni* Gull., *D. lardarius* L., and *Megatoma undata* L. In some years average parasitism by Anastatus ranged from 10 to 20%, the maximum parasitism being 60%. *Telenomus* parasitized about 1% of egg masses, and dermestids destroyed 25 to 30% of egg masses. Larvae were

attacked by 16 entomophagous species, the most important of which was *Apanteles liparidis* Boche, on which secondary parasites were found: Euritoma appendigaster Gwod., Gelis vigil Forst., Hemiteles nanus Grav., Mesochorus pectoralis Rtzb., and *A. fulvipes* (Hal.). The last-mentioned species was attacked by *Gelis pulcaria* Forst., *Gelis* sp. Of predators, *Calosoma sycophanta* L. was recorded. Eight parasite species were extracted from pupae, the most common being *Pimpla examinator* F. and *P. spuria* Grav. Larval and pupal parasitism by hymenopterous species amounted to 70-80%. On the whole, gypsy moth mortality caused by entomophages was 47.6% in 1953, 60% in 1954, 46% in 1955, 34.6% in 1956, and 20.3% in 1957. It is the author's opinion that *Anastatus disparis* and *Apanteles liparidis* are the most promising parasites that can be transferred from collapsing foci of the pest to new ones within the area.
EEast; NUMERICAL DATA, PARASITES, PREDATORS

1085 Yafaeva, Z.Sh. 1962.
Hemocytes of the gypsy moth larvae as indicators of state of an organism. In: Issledovaniye ochagov vrediteley lesa Bashkirii. Ufa: 73-80.
-- Gypsy moth larvae were found to possess six types of hemocytes: enocytoids, proleucocytes, macronucleocytes, micronucleocytes, eosinophils, and phagocytes. Blood cells of unknown origin calling for further investigation also were found. The ratio of hemolymph-forming elements changes with larval instars. Instars V and VI have fewer proleucocytes and more micronucleocytes than early instars. The proportion of phagocytes and killed cells does not change with instars. Cells of unknown origin are first found in the blood of larvae in the third instar; the maximum number is found in the sixth instar. The structure of blood cells and their ratio are disrupted in parasitized larvae. The common feature of blood of larvae parasitized by the tachinid and *Apanteles* is a lack of enocytes and a drastic decrease in the number of eosinophils. At initial stages of parasite development, the proportion of phagocytes and killed cells increases.
EEast; HEMOLYMPH

1086 Yafaeva, Z.Sh. 1963.
Gypsy moth in Bashkiria and role of natural enemies in its number limitation. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Moscow. 18 p.
-- The following entomophages of the gypsy moth were found in Bashkiria: 27 hymenopterous species, 7 predatory species, and 1 nematode species. Five are egg parasites and predators; the most active are the egg parasite Telenomus, parasitizing 10% to 20% of eggs (sometimes 60%), and dermestids, destroying 25 to 30% of egg masses. Sixteen are entomophages of larvae, the most active being braconids of the genus *Apanteles* and *Calosoma sycophanta*. Eight are pupal parasites: ichneumons of the genus *Pimpla*. Parasitism of larvae and pupae by hymenopterous insects sometimes amounted to 70% to 80%; on the average it was 20% to 60%. It is the author's opinion that the braconid Apanteles is the most promising entomophage for gypsy moth control; it can be dispersed within an area.
EEast; NEMATODES, PARASITES, PREDATORS

1087 Yafaeva, Z.Sh. 1967.
Key of the gypsy moth hymenopterous parasites. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. Voprosy zashchity lesa. MLTI, Moscow: 79-84.
-- A table describing 28 species of hymenopterous parasites of the gypsy moth in 8 families registered in Bashkiria: *Ichneumonidae, Braconidae, Chalcidae, Eurytomidae, Perilampidae, Pteromalidae, Eupelmidae,* and *Pfoctobrupidae.*
EEast; PARASITES

1088 Yafaeva, Z.Sh., Girfanova, L.N. 1977.
Beneficial insects in the forests of Bashkiria. In: Nasekomyye - vrediteli lesov Bashkirii. Ufa: 122-136.
-- Outbreaks of lepidopterous insects (the gypsy moth, nun moth, tent caterpillar, Siberian moth, pine moth, browntail moth, haw moth, turnip moth, and pine noctuid) are the most common outbreak pests in Bashkiria. Populations are limited largely by entomophages. Parasites are represented by hymenopterous species of the families Ichneumonidae, Braconidae, Chalcidae, Scelionidae, Pteromalidae, and Eupelmidae, and dipterous species of the family Tachinidae. Predators are represented by dipterous species of the family Sarcophagidae, and hymenopterous and coleopterous species of the families Carabidae, Deremestidae, and Silphidae. The authors recorded about 400 entomophagous species, about 50 of them being parasites and predators of the gypsy moth at different life stages of the pest.
EEast; PARASITES, PREDATORS

1089 Yafaeva, Z.Sh., Girfanova, L.N., Khanislamov, M.G. 1962.
Initiation of epizooty in the gypsy moth and other pests. In: Nauchnaya konferentsiya po voprosam massovykh razmnozheniy vrediteley lesa. Ufa: 114-120.
-- Any unfavorable factors such as worsening of hydrothermal and trophic conditions, overheating, X-rays and UV-radiation, passage of a latent disease, parasitism, consumption of food infected with viruses of other insects, and even consumption of food containing dry tissues of insects of its own species can cause the activation of viral, bacterial, and protozoan diseases followed by the death of insects.
EEast; POPULATION DYNAMICS, VIRUS

1090 Yafaeva, Z.Sh., Idrisova, N.T. 1981.
Studyies on gypsy moth fecundity in Bashkiria. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 185-189.
-- The condition of embryos was studied by the method of luminescent examination. Average female fecundity in the populations of the region west of the Urals was 346 $\pm$ 28.4 eggs; in the populations of the South Urals it was 294 +- 26.6 eggs. No correlation between fecundity and gradation phase was established. High fecundity was recorded in comparison with data found elsewhere.
EEast; FECUNDITY

1091 Yafaeva, Z.Sh., Khanislamov, M.G. 1962.
Luminescence of eggs and hemolymph of abundant forest pests. In: Issledovaniya ochagov vrediteley lesa v

Bashkirii. Ufa: 67-72.
-- The author studied the UV luminescence of egg contents (fertilized, unfertilized, parasitized by *Anastatus*, and killed eggs) and hemolymph of larvae (healthy, infected with beauverin, treated with a mixture of beauverin and DDT, and parasitized by tachinids and hymenopterous parasites), pupae, and adults of the gypsy moth as well as the nun moth, tent caterpillar, and pine noctuid. Differences in luminescence coloration of the egg contents and larval hemolymph in the treatment groups reflect physiological condition. Stability of samples is an advantage of the method: they retain their properties for not less than a year in a temperature range of 5° to 40° C and humidity of 40 to 90%.
EEast; CHEMICAL INSECTICIDES, EGGS, HEMOLYMPH, PHYSIOLOGY

1092 Yafaeva, Z.Sh., Stepanova, R.K., Mukhamedsyanova, F.V. 1974.
Dynamics of gypsy moth parasitism by helminths in Bashkiria. In: Gel'minty zhivotnykh, cheloveka i rasteniy na Yuzhnom Urale. Ufa: 159-162.
-- Data on dynamics of parasitism of gypsy moth larvae by entomohelminths for a period of 21 years is discussed. Surveys were made in two pest foci in Bashkiria. Nematodes emerged from instar IV to VI, one or two, sometimes seven from a single larva, and from any part of the body. Helminthosis of the gypsy moth is of an irregular character, ranging from 0 to 20 to 26%. No correlation between incidence of helminthoses and specific gradation phases of the gypsy moth has been established. A high level of parasitism in some years suggests application of entomohelminths in gypsy moth control, but development of effective methods requires an in-depth study.
EEast; NEMATODES

1093 Yafaeva, Z.Sh., Trifonov, P.M. 1974.
Studies on gypsy moth outbreaks in Bashkiria. In: Okhrana, ratsional'noye ispol'zovanie i vosproizvodtsvo lesnykh resursov Bashkirii. Ufa: 34-36.
EEast; GENERAL BIOLOGY

1094 Yakhontov, V.V. 1937.
Pests of subtropic crops in Central Asia. Sovetskie subtropiki. (1):68-71.
-- The gypsy moth heavily attacked nut and pistachio crops in mountainous areas of Central Asia from 1933 to 1935.
MAsia; HOST PLANTS

1095 Yakhontov, V.V. 1953.
The gypsy moth. In: Vrediteli sel'skokhozyaystvennykh rasteniy i produktov Sredney Azii i bor'ba s nimi. Gosizdat Uzb.SSSR, Tashkent: 512-514.
-- In Central Asia, gypsy moth larvae feed on apple, pear, cherry, plum, apricot, pistachio, English walnut, almond, and ornamental trees such as oak, poplar, willow, maple, and ash. Heavily defoliated fruit trees do not bear fruit in the year of defoliation or in the following year. General data on species area, life stages, and ecology are presented. Chemical treatments and destruction of egg masses are suggested as extermination measures.
MAsia; CONTROL, HOST PLANTS, TREE HEALTH

1096 Yakhvalov, S.A., Bakhvalova, V.I., Larionov, G.V. 1982.
Polycaryocytes in hemolymph of the gypsy moth, *Lymantria dispar* L., larvae with nuclear polyhedrosis. Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk. 10(2):125-129.
-- For the first time, structures morphologically similar to polycaryocytes of vertebrates were studied in gypsy moth larvae with nuclear polyhedrosis. Because there were virus-infected cells in these structures, a phagocytic function is suggested.
WSiberia; HISTOLOGY, VIRUS

1097 Yanovskiy, V.M. 1977.
Dendrophagous insects of Mongolia. In: Nasekomyye Mongolii. Nauka, Leningrad: 30-59.
ESiberia; PEST LIST

1098 Yanovskiy, V.M. 1980.
The main insect forest pests of the Mongolian People's Republic. In: Lesa Mongol'skoy Narodnoy Respubliki (khozyaystvennoye ispol'zovaniye). Nauka, Moscow: 116-137.
-- General information on the biology of gypsy moth in Mongolia can be found on pages 119-120. The main food plants are *Larix sibirica, L. dahurica, Betula platyphylla, Ulmus pumila, Salix* spp., and *Caragana* spp. Modest defoliation of forests from *Pinus sylvestris* was recorded with the density of 100 pupae per tree.
ESiberia; GENERAL BIOLOGY, HOST PLANTS

1099 Yanovskiy, V.M., Pleshanov, A.S., Agafonova, T.A., Epova, V.I. 1991.
Entomological regioning of forest in the river Dzhida region. In: Problemy ecologii lesov Pribaykal'ya. Sibirskji Institut Fisiologii i Biokhimii Rastenji SO AN SSSR, Irkutsk: 121-148.
ESiberia; PEST LIST

1100 Yatsemirskiy, K.B. 1938.
Nut forests in Alman-Kutan. In: Trudy Uzbekskogoy lesnoy opytnoy stantsii. Tashkent: 9-17.
-- The gypsy moth is mentioned among pests of nut forests in Alman-Kutan.
MAsia; PEST LIST

1101 Yatsenko, V.G. 1980.
The use of virus preparation virin-ENSh against the gypsy moth, *Ocneria dispar* L., in orchards. In: Trudy Latviyskoy sel'skokhozyaystvennoy akademii. Riga: 131-133.
-- Focal treatment of gypsy moth egg masses with the preparation virin-ENSh and spraying of trees to eliminate larvae were carried out in the orchards of Yagotin region of Kiev Province, where a population increase and outbreak were recorded in poplar shelter belts and in orchards from 1975 to 1979. Treatment of egg masses proved to be the most effective measure: in the following season the pest population decreased by 94%.
EWest; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

1102 Yatsenko, V.G., Ivlev, V.I. 1983.
The use of a nuclear polyhedrosis virus of gypsy moth in orchard shelter belts. In: Ekosistemy gornogo Kryma, ikh optimatizatsiya i okhrana. SGU, Simferopol: 190-192.
-- The efficacy of virin-ENSh was studied in the orchards of Kiev Province. Technical efficacy varied from 84 to 95% in treatment of egg masses and from 59 to 82% in treatment of instars I and II. The preparation was sufficiently effective, though a latent form of the virus was found in the control.
EWest; EGG MASSES, MICROBIAL PESTICIDES, VIRUS

1103 Yatsenko, V.G., Rudnev, A.G. 1989.
Results of the test of virin-ENSh in gypsy moth foci. In: Biologicheskiye i tekhnologicheskiye problemy sozdaniya virusnykh preparatov dlya integrirovannoy zashchity rasteniy. Novosibirsk: 75.
-- Gypsy moth egg masses were treated with virin-ENSh at a concentration of 0.1% with 0.04% admixtures of OP-7. On 20% to 50% of the trees, egg masses were treated by thorough brushing with virus suspension. The biological efficacy was 83.0 to 84.4%. The pest population decreased by 65.2%, on the average, in the year of treatment, by 96.1% in the second year, and by 99.5% in the third year, compared to the population in the spring of 1978. Infestation decreased from 87.4 egg masses per tree in the spring of 1978 to 0.4 in autumn 1980. The decrease in gypsy moth population in shelter belts around orchards after one focal treatment with virin-ENSh can be accounted for by the fact that viral infection is retained in natural populations.
EGG MASSES, MICROBIAL PESTICIDES, VIRUS

1104 Yatsentovskiy, A.V. 1931.
The gypsy moth. In: Glavneishiye vrednyye nasekomyye v lesakh SSSR. Sel'khozgiz, Moscow: 251-258.
-- The distribution of the species in the USSR is briefly described, and a general description of the imago, last instar, and phenology of the gypsy moth are given. The favored food plants are oak, linden, and birch, and sometimes the pest feeds on conifers. Pupation occurs on tree trunks and branches, and between leaves. One defoliation leads to the loss of annual increment and repeated defoliation results in weakening and death of trees. Destruction of egg masses, attraction of insectivorous birds, and aerial chemical treatments are suggested as control measures.
BIRDS, CONTROL, DISTRIBUTION, TREE GROWTH

1105 Yefremova, V.A., Insarov, G.Ye., Semevskiy, F.N. 1977.
An optimal system of monitoring the forest insect population density. Zhurnal obshchey biologii. 38(1):27-40.
ECentral; MONITORING

1106 Yegorov, N.I. 1951.
Population dynamics of some insect pests in the forest shelter belts of the Altai region over the last 20 years (1930-1949). In: II ekologicheskaya konferentsiya po probleme: Massovyye razmnozheniya zhivotnykh i ikh prognozy. Izd. KGU, Kiev: 77-79.
-- Pest outbreaks occurred in shelter belts of the steppe region of Altai Krai in 1939-1949. Of greatest importance were the nun moth, gypsy moth, Siberian moth, and pine cutworm. Gypsy moth outbreaks were recorded in 1938-1940 and again in 1946. Aspen was heavily damaged, birch was less damaged, and fir only slightly damaged (when it was close to foci and the more favored food had been consumed). Oviposition occurred primarily on rocks, often far from foci; few egg masses were found on the butts of aspen, birch, and fir. During the first outbreak, aerial chemical treatment of foci was made; the second outbreak collapsed by itself. Aspen and birch stands recovered quickly after defoliation.
WSiberia; HOST PLANTS, OVIPOSITION SITE, TREE GROWTH

1107 Yegorov, N.N. 1958.
Mass outbreaks of insect pests in the pine forest belts over last 25 years. Nauchnyye doklady vysshey schkoly, lesoinzhenernoe delo. (3):43-46.
-- Outbreaks of phyllophages were observed every 5 years within a period of 25 years, involving eight lepidopterous species and one sawfly. The largest outbreak of gypsy moth was observed in 1953. In spring 1954, most larvae in eggs were dead, the probable cause of death being jaundice (Saratov). Gypsy moth outbreaks usually occurred 1-2 years after a drought; they were suppressed mainly by parasites and diseases, and once by a late frost.
ECentral; OUTBREAKS, WEATHER

1108 Yelizarov, Yu.A., Barybkina, M.I., Berseneva, O.V. 1978.
Ultrastructure of smell organs of antennae in gypsy moth males. In: Khemoretseptsiya nasekomykh. Vilnius: 47-54.
-- Five types of sensilla were found on antennae of the gypsy moth male: trichoid, basiconic, coeloconic, chaetoid, and styloconic. Registration of action potentials from sensilla receptor cells suggests that the olfactory function should be performed by trichoid and basiconic sensilla. Receptors of a trichoid sensillum are two sensitive cells whose peripheral unbranched appendages can be traced in the hollow of the hair. The surface of the cuticular part of the sensillum is covered with pores with a diameter of 200 a, the density of their distribution being 1 to 3 pores per 1 sq. mu. The receptor part of the basiconic sensillum consists of 4-5 sensitive cells whose peripheral appendages can have branches. It is concluded that the entire receptor apparatus of gypsy moth male antennae is specific to perception of sex pheromones.
ECentral; MORPHOLOGY, NEUROLOGY, PHEROMONES

1109 Yelizarov, Yu.A., Kovalev, B.G., Barybkina, M.N., Stan, V.V. 1979.
Activity of synthetic sex attractant disparlure and its homologue for the male gypsy moth, *Lymantria dispar* L. In: Prostranstvennaya orientatsiya nasekomykh i kleshchey. Izdatel'stvo Tomskogo universiteta, Tomsk: 19-25.
-- The activity of disparlure, a synthetic sex attractant,

and its homologue is estimated. Mechanisms of processing sensory information and forming responses are discussed.
ECentral; PHEROMONES

1110 Yemchuk, Ye.N. 1938.
Catalase dynamics in the gypsy moth, *Porthetria dispar* L., and the pine moth, *Dendrolimus pini* L., during their development. In: Zbornik pratsviddilu' ekologii VUAN. Kiev: 161-180.
-- The relation of cold resistance to catalase activity was studied. The dependence of catalase activity of the gypsy moth and the pine moth on food and periodic fasting was established. Third-instar pine moth had the highest catalase index, which characterizes intensity of metabolism in an organism. The higher catalase index of adults, males in particular, must be related to sexual activity. After cooling, which does not cause death, catalase activity is usually high. High activity of catalase observed after cooling and overwintering could be due to increased intercellular exchange. The question, however, requires further study.
EWest; ENZYMES, PHYSIOLOGY, TEMPERATURE

1111 Yemelyanova, N.A. 1924.
Temperature effect on secondary sexual features of *Lymantria dispar* L. Russkiy zoologicheskiy zhurnal. 4(1-2):210-226.
-- Males responded to higher temperatures (39° C during 24 hours) by insignificant changes in wing coloration and structure of antennae; there was no sex instinct. Females had a shift in habit toward males; in general there was a shift in biology toward the opposite sex in both males and females. Lower temperatures (6° C during 26-32 days) also caused a shift in female appearance toward males. Extreme temperatures brought about intersexes. A preliminary explanation is that temperature affects the hormonal system.
ECentral;GENETICS, MORPHOLOGY, TEMPERATURE

1112 Yermakov, N.I. 1981.
Interaction of entomopathogenic microorganisms and the insect cell culture. In: Fauna i ekologiya chlenistonogikh Sibiri. Nauka, Novosibirsk: 41-42.
-- A study was made of the interaction between entomopathogenic viruses, microsporidia, entomofluorine fungi, and gypsy moth cell culture. Twenty hours after a nuclear polyhedrosis virus was introduced into gypsy moth cell culture, hypertrophy of nuclei and cells as a whole was observed, and fibroblast-like cells grew roundish; in 48 hours virus inclusions were found; on the fourth day cells filled with polyhedra broke, and polyhedra appeared in the medium.
WSiberia; CELL CULTURE, VIRUS

1113 Yevgen'ev, M.B., Sheineker, V.S., Levin, A.V., Braude-Zolotareva, T.L., Titarenko, Y.A., Shuppe, N.G., Karaev, K.K., Ul'masov, K.A. 1987.
Molecular mechanisms of higher organism adaptation to hyperthermia. Zhurnal molekulyarnoy biologii. 21(2):484-494.
-- Proteins were synthesized by thermal shock in the cells of cultures of three Bombycidae species and in different organs of larvae of different geographical origin. Cells of Bombycidae species of southern origin and the processionary moth were exceptionally resistant to high temperature. At 40° to 45° C not only proteins were synthesized, but intensive transcription of corresponding RNA also occurred. Under these conditions protein synthesis ceased.
ECentral; CELL CULTURE, PHYSIOLOGY, TEMPERATURE

1114 Yevgen'ev, M.B., Sheinke, V.S., Levin, A.V., Braude-Zolotareva, T.Y., Titarenko, Ye.A., Shuppe, N.L., Karaev, K.K., Ul'masov, H.A. 1987.
Molecular mechanisms of adaptation to hyperthermia in eucaryotic organisms: 1. Synthesis of heat-shock proteins in cell cultures of different silkworm species and in larvae. Molekulyarnaya biologiya. 21(2):94-484.
ECentral; CELL CULTURE, PHYSIOLOGY, TEMPERATURE

1115 Yevstaf'ev, I.L. 1983.
Weighing methods to evaluate the average number of eggs in gypsy moth egg masses. Lesnoye khozyaystvo. (1):63.
-- One of the main parameters of gypsy moth population is the average number of eggs per mass. A simplified counting method to estimate the number of eggs per mass is suggested.
EWest; FECUNDITY, MODELS, SAMPLING

1116 Yevstaf'ev, I.L. 1983.
Behavioral patterns of forest pest larvae. In: Povedeniye zhivotnogo v soobshchestvakh. Materialy III Vsesoyuznoy konferentsii po povedeniyu zhivotnykh. Nauka, Moscow: 97-99.
-- Larvae are divided into two groups: living a solitary life during the whole period of development or those living in a group during some of the period of development. Larvae of the second group constantly build shelters because they regularly migrate for food. Some solitary larvae also build shelters such as rolled and folded leaves, oases, etc. Behavior of larvae after hatching (formation of aggregations) and their behavior after they start feeding are described. In the latter case, the author believes that up to pupation gypsy moth larvae are aggressive only to individuals of the same species. Gypsy moth larvae aggregate in preferred pupation sites.
EWest; BEHAVIOR, LARVAE

1117 Yevstaf'ev, I.L. 1985.
Ecological and biological characteristics of gypsy moth egg masses. In: Voprosy lesnoy biotsenologii, ekologii i okhrany prirody v stepnoy zone. Kuibyshev: 150-152.
-- Gypsy moth egg masses are deposited at the base of trunks in populations of low density, while in high density populations they occur some meters high. The average weight of eggs plus hairs of an egg mass is 81.65 ± 3.98 mg. The average number of eggs per mass can be determined by weighing 30 egg masses and multiplying their weight by 0.04. On trees with crooked trunks most

egg masses are on the side facing the ground.
EWest; FECUNDITY, MODELS, NUMERICAL DATA, OVIPOSITION SITE

1118 Yurchenko, G.I. 1986.
Counting egg clusters of *Lymantria dispar* in oak forests of the Far East. Lesnoye khozyaystvo. 4:69-71.
Far East; EGG MASSES, SAMPLING

1119 Yurchenko, G.I., Turova, G.I. 1984.
Distribution of gypsy moth egg masses in forests of the Far East and justification of a counting technique. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 141-152.
-- Studies on deposition of gypsy moth egg masses clearly revealed variations in pest behavior. In natural biocenoses of this region, gypsy moth females prefer to oviposit on tree leaves. The bulk of egg masses are deposited in the crown at a height of 2 to 6 m; egg masses are not found higher than 9 m. Sometimes egg masses are found on stones and in rock clefts, although tree species are in close proximity. Females usually prefer young oak, maple and linden. Preference of some food species for oviposition is not determined by its food quality, but the height at which the lower edge of the crown is found. Such deposition of egg masses can occur with high humidity due to monsoon rains during the period of oviposition. The data have been analyzed using the aggregation index and the exponents of negative binomial distribution. The character of distribution is described with a set of equations. Inventory methods are suggested to forecast pest numbers in forests of the Far East.
Far East; OVIPOSITION SITE, STAND COMPOSITION

1120 Yurchenko, G.I., Turova, G.I. 1984.
Distribution of gypsy moth egg masses in deciduous and mixed forests in the Far East. In: IX s"yezd Vsesoyuznogo entomologicheskogo obshchestva. Tezisy dokladov. Naukova Dumka, Kiev: 260.
-- Primary habitats of the gypsy moth in Primorye Krai, southern parts of Khabarovsk Krai and the Amur Province are the Mongolian oak, and conifer/broad-leaved and small-leaved forests, where aspen and birch prevail. In this region, oak, aspen, birch and various willow species are the preferred food plants of the gypsy moth. Adults oviposit on the underside of oak, maple (3 species), linden (2 species), Manchurian ash, Amor acacia, Amor lilac, and hazel leaves. The maximum height at which eggs are deposited in the crown is 8 m. The majority of egg masses are found at a height of 2 to 5 m. Egg masses are deposited in groups. Analysis using the aggregation index supports the conclusion of such a type of egg mass deposition in the crown and in the litter. Empirical series of egg mass distribution in the samples taken at low and high densities do not comply with accepted theoretical models of distribution. In some cases the distribution pattern supported the negative binomial distribution theory; a medium density in crowns and high density in sample plots.
Far East; HOST PLANTS, MODELS, OVIPOSITION SITE, STAND COMPOSITION

1121 Yurchenko, G.I., Turova, G.I. 1988.
Indicators of gypsy moth population dynamics in the far eastern part of the area. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 31-32.
-- Gypsy moth outbreaks occurred every 10 years during the last 40 years in the southern part of the Far East. The outbreak often collapsed quickly because of infection with polyhedrosis or parasitization. An investigation began at the eruption phase of the 1978-1984 outbreak found droughts preceding and during the outbreak (1976 to 1980, 1982, and 1983). Although droughts were associated with population increase, high temperatures produced a negative effect on feeding of late instars, which resulted in a considerable decrease in fecundity in some primary foci. The dynamics of density, indexes of multiplication and fecundity in different parts of the gradation curve were different than the dynamics of those factors typical of the gypsy moth in the forest steppe of the southeastern European part of the former USSR (Znamenskiy, 1984). Generally, the outbreak period was shorter (3-4 years vs. 6-7), due to biotic factors, virus epizootics in particular. During the eruption phase, up to 35% of the larvae died of polyhedrosis, and 30% were parasitized by the tachinids *Blepharipa schineri* and *Parasetigena agilis*. During the crisis phase these parameters varied over a wider range; 27 to 90% infected with polyhedrosis, and up to 50% parasitized. During the eruption phase mortality caused by the egg parasite *Anastatus disparis* was 12%, and during the crisis phase it was 25%. This outbreak can be called prodromic because the exogenous regulatory mechanisms are slightly delayed.
Far East; OUTBREAKS, PARASITES, TEMPERATURE, VIRUS, WEATHER

1122 Zavizion, L.P., Zubov, P.A., Verzunova, L.I., Chalova, Z.I., Shkolina, L.A., Pyatnova, Y.U.B. 1980.
Synthesis and biological activity of disparlure, gypsy moth attractant. In: Khimicheskie sredstva zashchity rasteniy. : 14-20.
ECentral; PHEROMONES

1123 Zelenev, N.N. 1976.
Natural enemies of the gypsy moth and the gold-tail moth in mountain oak forests. Lesnoye khozyaystvo. (5):66-77.
-- need to check this
ECentral; PARASITES

1124 Zelenev, N.N. 1984.
The importance of parasitic entomophages and ways of increasing their effectiveness in forests. Lesnoye khozyaystvo. 2:56-59.
ECentral; PARASITES

1125 Zelinskaya, L.M. 1961.
Insect pests of the forest kolkis at the Black Sea Preserve. In: Pratsi Institutu zoologii Akademii Nauk URSR. Kiev: 19-28.
-- About 130 insect species are listed as pests of forest "islands." Among oak, birch, alder, and blackthorn pests, the gypsy moth is mentioned. Species phenology in the

Black Sea Preserve is briefly given. The periodic occurrence of outbreaks has been recorded. Entomophage activity and the treatment of egg masses with petroleum are regarded as causes of collapse. Parasites are *Apanteles tetricus, A. porthetriae, Meteorus striatus, Microgaster nitidula, Eurytoma* sp., *Anastatus disparis, Phorocera silvestris,* and *Sturmia* sp.; predators are *Calosoma sycophanta* and *Dermestes erichsoni.* Birds also play an important part in destroying the pest.
EWest; OUTBREAKS, PARASITES, PEST LIST, PHENOLOGY, PREDATORS

1126 Zelinskaya, L.M. 1964.
The gypsy moth and the oak tortrix in forests of the lower Dnieper region. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kiev. 19 p.
-- Surveys made in Kherson Province from 1958 to 1963 covered a population decrease, a crisis, and the beginning of a population increase (the previous outbreak started in 1954). This study presents data on gypsy moth phenology, fecundity, sex ratio, effect of unfavorable feeding conditions on larvae, composition of entomophage complexes and their role in decreasing the pest population, significance of pathogens, and population dynamics. A hematological examination of healthy and diseased larvae was made. The author endeavored to estimate the relative importance of mortality factors for pest population dynamics in foci. On the basis of the data obtained, measures for gypsy moth control in the lower Dnieper region are suggested.
EWest; POPULATION DYNAMICS

1127 Zelinskaya, L.M. 1968.
Gematological investigation of the gypsy moth and prediction of its abundance. Vestnik zoologii. (2):52-60.
-- Pathological changes in the hemolymph of gypsy moth larvae, pupae, and adults infected with a polyhedrosis virus or microsporidia of *Plistophora schubergi* were studied in Kherson Province from 1962 to 1965. The pest was at the phases of depression and the beginning of a population increase. Pathogens were found to become active under feeding conditions unfavorable for larvae, primarily when larvae did not get enough food because of cold, rain, high density, etc. In this case the majority of larvae died. Highly viable insects either survive by combating an infection, as in some cases of microsporidia infection, or they produce offspring that are carriers of latent infection.
EWest; HEMOLYMPH, MICROSPORIDIA, VIRUS

1128 Zelinskaya, L.M. 1968.
Prognosis of *Porthetria dispar* L. viability by data on its hemolymph analysis. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 109.
-- The paper describes a study of changes in the hemolymph pattern of gypsy moths infected with microsporidiosis and polyhedrosis and feeding on different food plants in Kherson and Nikolaev provinces.
EWest; HEMOLYMPH, MICROSPORIDIA, VIRUS

1129 Zelinskaya, L.M. 1980.
Role of microsporidia in the gypsy moth, *Porthetria dispar* L., population dynamics in forest stands of the lower Dnieper region. Vestnik zoologii. (1):57-62.
-- The part played by microsporidia in the control of gypsy moths was studied in oak-birch and alder "islands" of the Black Sea Preserve and willow stands of the Dnieper River floodplain in 1976-1977. At the egg stage, microsporidiosis was found to kill up to 6.4% of insects, the majority of eggs being destroyed by dermestids and birds. The disease killed 1.3% of first instars, 17.4% of second and third instars, and 25.6% of fourth to sixth instars. On the whole, 36.1% of the insects were killed by microsporidia at the larval stage, and 28.9% were killed by parasites. At the pupal stage, 11% of insects died of the disease; 69% of the females of a new generation were infected with microsporidia and laid infected eggs. The extent to which infection manifested itself was found to be related to pest population density. Population decreases were caused by microsporidiosis not only as a result of the death of infected insects but also as a result of lower fecundity and fertilization of eggs of the next generation.
EWest; MICROSPORIDIA, NUMERICAL DATA

1130 Zelinskaya, L.M. 1980.
Nosematosis of the gypsy moth and its significance for forecast and control. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii. Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 47.
-- This study was carried out in gypsy moth foci in hardwoods of southern Ukraine in 1975-1978, where insects were infected with microsporidia, primarily *Nosema serbica.* Infection intensity depended on the population density in the focus and on the gradation phase. In the period of population increase, 12-19% of the larvae and about the same number of adults were infected; in the period of outbreak up to 60% of insects were infected, at the crisis phase, 80-100%.
EWest; MICROSPORIDIA, MORTALITY, NUMERICAL DATA

1131 Zelinskaya, L.M. 1981.
Sex ratio and mortality in *Anastatus japonicus* (Hymenoptera, Eupelmidae) relative to the host population density. Vestnik zoologii. (2):57-62.
-- Changes in sex index and population dynamics of the egg parasite *Anastatus* were studied in connection with gypsy moth population dynamics. *Anastatus* and some other egg parasites were found to have a shift in sex ratio toward males when developing in small eggs of the host, which can be observed at the crisis phase. The author believes this shift and the death of entomophages at the larval stage is due to infection of the parasite with microsporidia and polyhedrosis when it feeds on infected host eggs. The data suggest that for intrahabitat distribution of egg parasites, host egg masses should be taken from the foci of increasing gypsy moth populations.
EWest; BIOLOGICAL CONTROL, EGGS, EGG MASSES, MICROSPORIDIA, PARASITES

1132 Zelinskaya, L.M. 1981.
Factors determining egg mortality in the gypsy moth

in forest stands of the South Ukraine. In: Noveyshiye dostizheniya lesnoy entomologii. Vilnius: 52-54.
-- The highest egg mortality in low populations of the gypsy moth, in the period of depression or at the beginning of an outbreak, is caused by tits (up to 30%). When the population is high, egg mortality is caused largely by the parasite *Anastatus disparis* (in some egg masses up to 70% of eggs are parasitized by its larvae and 15% die of punctures made by the adult parasite). Microsporidia infects up to 90% of eggs. Dermestids also attack eggs. Environmental conditions have an indirect effect on egg mortality. The role of *Anastatus* sharply decreases in dry seasons; if winter is warm and spring is prolonged, mortality caused by microsporidia becomes higher. In bastard acacia stands, polyhedrosis plays an important part in egg death.
EWest; BIRDS, EGGS, MICROSPORIDIA, NUMERICAL DATA, PARASITES, VIRUS, WEATHER

1133 Zelinskaya, L.M. 1981.
The use of the parasitization index of moths by microsporidia spores for forecasting gypsy moth outbreaks. Lesnoye khozyaystvo. (14):58-60.
EWest; MICROSPORIDIA, PROGNOSIS, WEATHER

1134 Zelinskaya, L.M. 1986.
Effect of abundant folivorous insects on state of oak stands in kolkii forests at the Black Sea State Preserve. In: Problemy okhrany genofonda i upravleniya ekosistemami v zapovednoy lesnoy zone. Tezisy dokladov. Moscow: 89-91.
EWest; PEST LIST, TREE HEALTH

1135 Zelinskaya, L.M. 1988.
Results on study of the gypsy moth population dynamics in forest kolki at the Black Sea State Biosphere Reserve. In: Neparnyy shelkopryad: itogi i prespektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 23.
-- Gypsy moth population dynamics were studied in oak-birch-aspen "islands" of the Black Sea Preserve from 1961 to 1987, with outbreaks occurring at intervals of 5 or 6 years. The initial phase lasts 1 year, the increase phase 1 or 2 years, the culmination phase 2 years, the crisis phase 1 year, and depression phase 1 or 2 years. The outbreak of 1980-1981 was the largest. Parameters that regularly changed in the course of gradation were established to predict the onset of the following gradation phase. Data show changes in fecundity coefficient, survivorship, parasitism, and infection with diseases related to a gradation phase.
EWest; OUTBREAKS, POPULATION DYNAMICS, PROGNOSIS

1136 Zelinskaya, L.M., Karpov, A.Ye., Zolotarenko, A.I. 1981.
On the possibility of application of a nuclear polyhedrosis introduction by superphosphate in integrated garden protection for lowering abundance of the gypsy moth, *Porthetria dispar* L. (Lepidoptera, Lymantriidae), larvae. Molekulyarnaya biologiya. 29:85-87.
-- Spraying of apple leaves with a 0.5% aqueous solution of triple superphosphate led to activation of a latent nuclear polyhedrosis virus in not less than 50% of larvae of a Kherson population of the gypsy moth, the total mortality was 61.2%. Adding a sub-lethal dose of the chemical insecticide mataphos to the phosphorous fertilizer caused 100% larval mortality. Spraying of food plants with superphosphate together with insecticides at a decreased concentration can be used for gypsy moth control.
EWest; CHEMICAL INSECTICIDES, CONTROL, VIRUS

1137 Zemkova, R.I. 1963.
Application of light traps to detect insect pests in the mountainous regions of the western Sayany mountains. In: Zashchita lesov Sibiri ot nasekomykh-vrediteley. Izd. AN SSSR, Moscow: 189-194.
-- To study the species composition of forest pests, UV-light traps were used. Moths of more than 30 dendrophilous species were captured, including the gypsy moth.
WSiberia; LIGHT TRAPS, PEST LIST

1138 Zemkova, R.I. 1963.
The study of insect pests in cedar forests of the Western Sayany mountains. In: Zashchita lesov Sibiri ot nasekomykh-vrediteley. Izd. AN SSSR, Moscow: 183-188.
-- Thirty-five insect species having trophic relations with the Siberian pine have been detected; of lepidopterans, the gypsy moth, the Siberian moth, and the pine tussock moth are listed.
WSiberia; PEST LIST

1139 Zerova, M.D., Kotenko, A.G., Seregina, L.Y., Tolkanits, V.I. 1989.
Entomophages of the green oak leaf roller moth and the gypsy moth in the southwest of the European part of the USSR. (Entomofagi zelenoy dubovoy listovertki i neparnogo shelkopryada yugo-zapada evropeyskoy chasti SSSR.) Naukova dumka, Kiev. 200 p.
-- This monograph is the first summary of data on entomophagous insects of two major phyllophagous oak pests, the green oak leaf roller and the gypsy moth, in the southwestern European part of the USSR:. It includes a description of species composition of parasites and predators of the orders Coleoptera, Hymenoptera, and Diptera, which control the numbers of the green oak leaf roller and the gypsy moth, and information on the host-parasite relationship, phenology, and peculiarities of development. The part played by entomophages in the population dynamics of these pests is discussed, including possible ways of increasing the efficacy of entomophages, introducing them in pest foci, and protecting them in biocenoses. The catalogue includes more than 200 entomophagous species.
EWest, ECentral; BIOLOGICAL CONTROL, PARASITES, PREDATORS, REVIEW

1140 Zharkov, D.G., Tvaradze, M.S. 1984.
Entomophages of the gypsy moth foci at the forests of Georgia. In: Trudy Instituta gornogo lesovodstva. Voprosy zashchity gornykh lesov. Ministerstvo lesnogo khosyaistva

GSSR, Tbilisi: 31-42.
-- The list of parasites and predators includes: *Itoplectis alternatus, Apechtis conpunctor, Pimpla turionellae, Meteorus versicolor, Apanteles lacteicolor, Apanteles porthetriae, Monodontomerus aereus, Dibrachys cavus, Drino inconspicua,* and *Calosoma inquisitor.*
Caucasus; PARASITES, PREDATORS

1141 Zharkov, D.G., Tvaradze, M.S. 1988.
Gypsy moth and its entomophages in the forests of Georgia. In: Neparnyy shelkopryad: itogi i perspektivy issledovaniy. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk: 22.
-- The gypsy moth is a serious pest in Georgia, inhabiting light, well-heated, shrubwoods composed mainly of oak and hornbeam. The biggest outbreak was recorded in 1971-1972. Pest foci are at an altitude of 50 to 100 m above sea level. Oviposition sites can be different depending on microclimatic conditions in a focus in the period of oviposition. Egg masses are usually found on tree trunks, in hollows, and under stones. Hatching occurs in early April and pupation in mid-June (in the mountains in July); adults fly from July to September. The entomophage complex includes 31 species. The most effective entomophages are dermestids, which can destroy up to 70% of egg masses. Braconids of the genus *Apanteles* and tachinids are the most effective parasites.
Caucasus; OVIPOSITION SITE, PARASITES, PHENOLOGY, PREDATORS, SITE CONDITIONS

1142 Zhigunova, A.S. 1967.
Role of food biochemical components in gypsy moth vitality. In: Materialy 3 zoologicheskoy konferentsii pedinstitutov RSFSR. Volgograd: 291-292.
-- Experiments conducted in 1965 and 1966 rearing gypsy moth larvae on various food plants showed that in the Middle Volga region the most favorable trophic zones for this pest are pure oak and aspen stands as well as mixed oak-aspen stands. Less favorable species are pure birch stands; maple and willow stands are unfavorable, and larvae feeding on these plants usually die. Apple is another favorable food plant for gypsy moth. Examination of leaf biochemical composition showed the viability of larvae to grow was positively related to leaf lipid content, though additional investigations are needed.
ECentral; FOLIAGE CHEMISTRY, HOST PLANTS, NUTRITION, REARING, STAND COMPOSITION

1143 Zhigunova, A.S. 1967.
Food preference and effect of some food biochemical components on growth and development of gypsy moth larvae. In: Uchenyye zapiski Kuybyshevskogo gosudarstvennogo pedagogicheskogo instituta. Kuibyshev: 59-67.
-- The author studied the effect of various food plants on the growth and development of gypsy moth larvae, establishing a relation between their developmental stages and changes in the chemistry of food plant leaves. In Kuibeshev Province the most favorable species for the gypsy moth are oak and apple. The following species were used in the experiments: oak, aspen, Norway maple, willow, birch, and apple. The pairs oak-apple, oak-aspen, oak-birch, and oak-willow were used for the change in the third instar. Larval weight, development rate, mortality, fecundity, and sex ratio were taken into account. The content of total nitrogen and lipids in leaves was determined. Full 100% mortality was observed in maple, the most prolonged development was on willow, and the lowest weight and fecundity of larvae were also recorded on willow. The maximum biological parameters were recorded on the preferred food species, oak and apple. Analysis of the biochemical composition of food showed that during the season the content of water and total nitrogen decreases while the total content of lipids increases. These parameters are similar for all the plants under study and can be used as a criterion for finding out if the a food is favorable.
ECentral; FOLIAGE CHEMISTRY, HOST PLANTS, NUTRITION

1144 Zhikharev, I.I. 1928.
Harmful and other lepidopterans (Lepidoptera) at the Darnits forest bungalow. In: Trudy z lisovoi doslidnoi spravi na Ukraini. Kiev: 231-330.
-- This paper contains data on 748 lepidopterous species of various families, the gypsy moth included. In 1925 the pest was rare; in 1926-1927 numbers began to increase. The early oak race was noted to be much more heavily attacked by larvae than the late one. Gypsy moth outbreaks were recorded near Kiev in 1884, 1886, 1895-1899, 1904, and 1918. The destruction of gypsy moth eggs by dermestids also was recorded.
EWest; HOST PLANTS, OUTBREAKS, PEST LIST, PHENOLOGY, PREDATORS

1145 Zhukovskiy, S.G., Novozhilov, K.V., Rakitin, A.A. 1976.
Male chemoreceptor response to female sex attractant of the gypsy moth (*Porthetria dispar* L). In: Byulleten' VNII zashchity rasteniy. VNII zashchity rasteniy, Leningrad: 38-42.
-- When gypsy moth males perceive molecules of female sex pheromone, an excitation wave that has originated in the dendrites of chemoreceptors can spread through axons of the antennary nerve to secondary nerve elements located in the olfactory center of the brain. Males respond to attractant molecules emitted by endocrine glands of live females and to extracts of isolated abdomens. The response is registered in axons connecting the olfactory center of the brain to the cercus apparatus and involves 4 specific secondary neurons generating action potentials of different amplitude and frequency. When the mechanism of sex pheromone chemoreception is initiated, the activity of neurons in the abdominal nerve chain is drastically inhibited. An experimental procedure is suggested for quick evaluation of synthesized attractants; a diagram of the installation for evaluating male response is given.
ECentral; NEUROLOGY, PHEROMONES, PHYSIOLOGY

1146 Zhuravlev, G.P., Mashin, A.S. 1973.
Infection of forests by the Siberian moth and the gypsy moth in Amur Province. In: Trudy Dal'nevostochnogo NII lesnogo khozyaystva. Dal'NIILKh, Khabarovsk: 306-313.

-- Following a survey of forests in the central and northeastern parts of Amur Province in 1971, an entomological description of plots and data on the status of populations of the gypsy moth and Siberian moth were recorded. The biology, phenology, and ecology of the gypsy moth and forecasts of Siberian moth outbreaks are discussed. Other outbreak pest species are mentioned.
Far East; GENERAL BIOLOGY, SAMPLING

1147 Zimin, L.S., Kolomiets, N.G. 1984.
Parasitic dipterans (Diptera, Tachinidae) of the fauna of the USSR. (Paraziticheskiy dvukrylyye (Diptera, Tachinidae) fauny SSSR.) Nauka, Novosibirsk. 233 p.
-- Fundamental taxonomic review of Tachinidae fauna of the USSR. Ecological information also can be found.
EWest, ECentral, EEast, WSiberia, ESiberia, Caucasus, Far East; PARASITES, REVIEW, TAXONOMY

1148 Zinovieva, L.A., Zakharchenko, I.S. 1974.
Semi-synthetic diet for the gypsy moth larvae. In: Nauchnyye trudy Moskovskogo lesotekhnicheskogo instituta. MLTI, Moskva: 164-170.
-- An attempt to develop an artificial nutrient medium for the gypsy moth that will be cheap and simple to produce, based on media developed by Manjoler, Shori, and Ride. The suggested variant of the medium is simple to produce and cheap in comparison with the originals, but biological parameters of the insects reared on it are worse than those of insects feeding on natural food. Limited use and further testing of the medium are suggested.
ECentral; ARTIFICIAL DIET, NUTRITION, REARING

1149 Zinovieva, L.A., Zakharchenko, I.S., Golosova, M.K. 1958.
Impact of phosphorous organic insecticides on development of the gypsy moth larvae under different ecological conditions. In: I-ya mezhvuzovskaya konferentsiya po zashchite lesa. Tezisy dokladov. Moscow: 32-33.
-- When food plants of the gypsy moth are treated with sublethal concentrations of pesticides, conditions stimulating development of larvae are sometimes created. During a long light period, the treated larvae develop quicker and mortality decreases. Untreated larvae have a higher mortality during a long light period. If the light period is short, the opposite effect is observed. Pupae that developed from larvae treated with chlorophos had the heaviest weight, treatment with tiophos gave middle weight, and treatment with octamethil gave the lightest weight.
ECentral; CHEMICAL INSECTICIDES, PHOTOPERIOD

1150 Zinovjeva, L.A. 1971.
Laboratory breeding of the gypsy moth larvae. In: Biologicheskaya zashchita plodovykh i ovoshchnykh kul'tur. Kishinev: 146-147.
-- Gypsy moth larvae were reared on semisynthetic nutrient media that provided normal feeding behavior and development. Cheaper rearing media and simpler rearing methods were developed. The experiments showed that the composition of media determined the rate of development, survival, and weight of late instars. The life cycle of one generation lasts from 45 to 56 days.
EWest; ARTIFICIAL DIET, DEVELOPMENT, NUTRITION, REARING

1151 Ziogas, A. 1978.
New insecticides against *Ocneria dispar*. In: Tezisy Konferentsii molodykh uchenykh instituta zoologii i parazitologii AN Litovskoy SSR. AN Litovskoi SSR, Institut zoologii i parasitologii, Vilnius: 79-81.
EWest; CHEMICAL INSECTICIDES

1152 Zlatanova, A.A. 1988.
Gypsy moth. Zashchita rasteniy. (3):50-51.
-- An outline of the morphology of different life stages of the pest, its ecology, major entomophages, and diseases.
ECentral; GENERAL BIOLOGY

1153 Zlatanova, A.A., Zlatanov, B.V. 1984.
Gypsy moth and its parasites in the southeast of Kazakhstan. Vestnik sel'skokhozyaystvennoy nauki (Kazakhstana). (5):37-40.
-- Data on gypsy moth biology and parasites of the pest are presented; a gradual increase in population is recorded. Laboratory rearing of *Apanteles* is discussed.
MAsia; GENERAL BIOLOGY, PARASITES, REARING

1154 Zlotin, A.Z. 1966.
Experimental substantiation of the year-round breeding of the gypsy moth *Ocneria dispar* L. and advice on the use in applied entomology. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Kharkov. 23 p.
-- A procedure for rearing the gypsy moth on acorns year-round has been developed to provide biological material for estimating the toxicity of new compounds, to obtain females for producing natural attractant, to produce pathogenic preparations, to rear entomophages, etc. Criteria for the laboratory assessment of viability of gypsy moth populations are suggested.
EWest; REARING

1155 Zlotin, A.Z., Treml, A.G. 1964.
The gypsy moth, *Ocneria dispar* L., development in laboratory conditions. Zoologicheskiy zhurnal. 43(2):287-290.
-- Ways of improving the rearing of gypsy moths on acorns under laboratory conditions is described. Insects were taken from foci in periods of outbreak and depression; those taken from foci at the depression phase had much higher survival. Material from such foci should be used in laboratory populations.
ECentral; POPULATION QUALITY, REARING

1156 Znamenskiy, V.S. 1967.
Effect of insecticide pollution and spraying on entomofauna of mesophilic, deciduous high oak forests. In: Zashchita lesa ot vrediteley. Moscow: 4-7.
-- Oak groves infested by dendrophilous lepidopterons, the gypsy moth included, were examined before and after treatment with pesticides. Phyllophage mortality of 95-99% and mortality of other neutral and beneficial organisms was recorded after spraying. The most harmful treatment for beneficial entomofauna is dusting. It is advisable to spray the stands with regard to the phenology

of pests, entomophages, and vegetation.
ECentral; CHEMICAL INSECTICIDES

1157 Znamenskiy, V.S. 1975.
After effect of insecticide on survival of the gypsy moth and the green oak leaf roller moth. In: Zashchita lesa ot vrediteley i bolezney. Puschkino: 66-75.
-- A rapid decrease in numbers resulting from the application of insecticides does not always mean that stands are protected from pests, as it often upsets intra- and interspecific mechanisms of populations. Treatment with insecticides kills natural enemies of a phytophage, decreases population density, and makes the population stronger owing to the death of weak or diseased insects, leading to higher survival and fecundity of the remaining population and a rapid increase in number. Treatments should be made when hatched gypsy moth larvae migrate to the crown but not when middle- and late-instars are feeding. This can make control measures highly effective and preserve the most important entomophages. Further surveys (1967-1970) proved that the strategy suggested was correct, because in the stands subjected to treatment, higher survival of pests at all stages was observed in the subsequent years. However, in experimental plots no outbreaks were observed over this period, which must account for a small stock of pests and by the fact that there were enough entomophages in the neighboring plots. An analysis of sample insects from control and experimental plots did not reveal any reliable differences in the general level.
ECentral; CHEMICAL INSECTICIDES, PHENOLOGY

1158 Znamenskiy, V.S. 1980.
Regularities of changes in areas of gypsy moth foci and prediction of pest outbreaks. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 49-51.
-- Areas of gypsy moth foci in a number of regions of Russia are found to change according to a certain regularity and to have a systematic periodicity. Outbreak occurrence is usually related to dry weather in the period of larval development. Changing weather conditions do not stop further development of pandemic outbreaks, but they influence the rate of focus development and outbreak intensity. Regular variations of focus area depend on the effects that intrapopulation and biocenotic regulating mechanisms have on pest population dynamics. Deviations from regular variations are caused by external factors, primarily weather conditions.
ECentral; POPULATION DYNAMICS, WEATHER

1159 Znamenskiy, V.S. 1981.
Factors of gypsy moth population dynamics in the southeast of European part of the USSR. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 71-73.
-- Investigations were made in oak groves of Saratov Province from 1961 to 1980; the outbreaks started in 1963 and 1972. Entomophages were the most important factor regulating population dynamics. No epizootics were recorded. With an increase in number, intrapopulation regulation mechanisms got involved resulting in a decrease in fecundity, egg weight, and survival, a shift of sex ratio toward males, etc. Under given conditions, a gypsy moth population cannot be stable at a low level, which means that forest biocenosis resistance is weakened.
ECentral; POPULATION DYNAMICS

1160 Znamenskiy, V.S. 1984.
Significance of entomophages in the sparse gypsy moth populations. In: Tezisy dokladov IX s"yezda Vsesoyuznogo entomologicheskogo obshchestva. Naukoa Dumka, Kiev: 186.
-- The following entomophages of the gypsy moth prevail in oak groves of Saratov Province: the egg parasite *Anastatus japonicus*; the parasites of larvae *Apanteles liparidis* and *Parasetigena silvestris*; the parasite of larvae and pupae *Blepharipoda scutellata*; the predators *Calosoma sycophanta, C. inquisitor*, and *Xylodrepa quadripunctata*; and insectivorous birds and rodents. Fluctuations in egg mortality are found to be strongly correlated to parasitism by *Anastatus* ($r = 0.97$ at $p = 0.01$). Larval mortality is due primarily to predator activity ($r = 0.98$ at $p = 0.01$). Pupal and prepupal mortality correlates to parasitism by the tachinid *B. scutellata* ($r = 0.93$ at $p = 0.01$). Thus, gypsy moth survival at various stages of ontogeny is largely determined by entomophage activity. Predators are of the greatest significance in sparse populations (0.08 - 0.008 egg mass per tree).
ECentral; BIRDS, MAMMALS, NUMERICAL DATA, PARASITES, PREDATORS

1161 Znamenskiy, V.S. 1984.
Gypsy moth population dynamics in mesophilic, deciduous oak forests of the forest-steppe. Lesovedenie. (4):12-20.
-- Changes in gypsy moth numbers, mortality at some stages, and generations were observed in 1975-1983 in forest-steppe oak groves of Saratov Province. The role of regulating and modifying factors was established, and peculiarities of species population dynamics were discovered. In the period of culmination, dipterous parasites, a decrease in fecundity, and the value of the sex ratio were of primary importance; at the crisis phase and in the period of depression, various entomophages were most important. Regulating factors fail to stabilize gypsy moth population density at a low level, therefore species outbreaks are cyclic. Weather conditions can hasten or slow down a regular process of population dynamics.
ECentral; POPULATION DYNAMICS, WEATHER

1162 Znamenskiy, V.S. 1987.
Decision making about necessity of forest protection against folivorous insects. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 15-19.
-- Major oak pests (green oak leaf roller, gypsy moth, browntail moth) show strong and reliable correlations between pest number, degree of damage, and condition of an area (r is from 0.854 to 0.934). Regression

equations were used to calculate losses of increment and to establish an economic threshold of damage equal to the number of pests causing 30% and higher defoliation. If this threshold is exceeded, forest protection measures should be taken. The approach suggested can be used to establish thresholds of damage for other phyllophagous pests.
ECentral; DEFOLIATION, MODELS, PROGNOSIS, TREE GROWTH

1163 Znamenskiy, V.S. 1989.
Role of entomophages in gypsy moth population dynamics. In: Biologicheskaya i integrirovannaya bor'ba s vreditelyami v lesnykh biotsenozakh. Materialy simpoziuma. Moscow: 60-65.
-- About 40 entomophagous species were detected in the period of gypsy moth outbreak in oak groves of Saratov Province in 1975-1985. The most effective were the egg parasite *Anastatus japonicus* (Eupelmidae), the larval parasites *Apanteles melanoscelus, A. liparidis* (Braconidae), *Parasetigena silvestris*, and *Blepharipoda scutellata* (Tachinidae), the pupal parasite *Agria affinis*, and three sarcophagid species. The following predators were recorded: the carabids *Calosoma sycophanta* and *C. inquisitor*, the burying beetle *Xylodrepa quadripunctata*, and some dermestid species. The role of entomophages at different gradation phases also is discussed.
ECentral; PARASITES, PREDATORS

1164 Znamenskiy, V.S., Kupriyanova, V.A. 1973.
Interaction of parasites and pathogenic microorganisms during gypsy moth infection. In: Lesokhozyaystvennaya informatsiya. Referativnyy vypusk. Moscow: 16-18.
-- Deaths caused by parasites and total insect mortality were registered in experiments. The probability of death caused by some factor over a certain period was determined by the formula Pm = mi:ni where ni is the total number of insects and mi is the number of killed insects; hence the probability of survival in spite of the factor over the same period is t = Psi = 1-Psi. Total mortality is equal to the product of separate factors. The estimate of the role of parasites was close to absolute probability of death or survival. But as some insects whose death was caused by parasites were also infected with diseases, the probability of mortality due to diseases must be defined as conditional: m2 = m0 - m1. According to the probability theory, if $mi = m^1 \times m^2$ these factors act independently. Analysis of samples of gypsy moth instars V-VI confirmed these conclusions: actual and theoretical survivals were 7.80% and 7.76%.
ECentral; MODELS, PARASITES, PATHOGENS

1165 Znamenskiy, V.S., Lyamtsev, N.I. 1980.
Effect of population density on qualitative indicators of gypsy moth population dynamics. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 21-39.
-- Correlations between quantitative and qualitative parameters of gypsy moth population dynamics were established on the basis of an analysis of 60 parameters. Correlations between number, sex ratio, degree of parasitism by dipterous species, and the general mortality level of larvae are represented as linear regression equations.
ECentral; MODELS, NUMERICAL DATA, PARASITES, POPULATION DYNAMICS

1166 Znamenskiy, V.S., Lyamtsev, N.I. 1983.
Criteria for segregation of stands - the gypsy moth reservations. Lesnoye khozyaystvo. (1):60-61.
-- The gypsy moth usually prefers light stands or southern edges of dense stands, forming foci in shrubwoods weakened by a heavy recreation load. In the forests of the European part of the USSR, primary foci are formed in stands of early English oak, birch, and hornbeam, in flood plains, and in stands of poplar and willow. Many factors determining the spatial distribution of gypsy moth populations must be taken into account to obtain an objective and simple quantitative criterion for detecting pest reservations. The method of discriminant analysis has been used. From the value of the given criterion, any forest plot can be assigned to reservations or to stands less favorable for species development. The reliability of the method is very high.
ECentral; MODELS, STAND COMPOSITION

1167 Znamenskiy, V.S., Lyamtsev, N.I. 1983.
Regression models in prediction of the gypsy moth population density. Lesnoye khozyaystvo. (9):61-63.
-- As the result of an analysis of 150 population parameters, correlations between various parameters and factors of gypsy moth population dynamics were established. Multiple regression models allowed the forecast of pest population dynamics for a year on the basis of counts of egg masses and analysis of forest ecological and weather conditions. The models were checked for their validity and prognostic value.
ECentral; EGG MASSES, MODELS, PROGNOSIS, SAMPLING, WEATHER

1168 Znamenskiy, V.S., Lyamtsev, N.I. 1985.
Indicators of the gypsy moth outbreaks. Lesnoye khozyaystvo. (2):60-62.
-- Various ecological population parameters of gypsy moth life stages were studied in relation to gradation phases. Conventional parameters for forecasting were evaluated, and a number of new parameters that can serve as indicators of gradation phases were established. On the basis of the data obtained, prediction tables can be compiled for separate foci and forecasts of population dynamics can be made.
ECentral; MODELS, PROGNOSIS

1169 Znamenskiy, V.S., Lyamtsev, N.I. 1987.
Methods of monitoring and prediction of the gypsy moth population density. In: Sbornik nauchnykh trudov VNII agrolesomelioratsii. Zashchita agromeliorativnykh nasazhdeniy i stepnykh lesov ot vrediteley i bolezney. Volgograd: 31-41.
-- Long-term forecasts of gypsy moth population dynamics were made in oak groves of Saratov Province. An effective method of pest counts in sparse populations by means of artificial shelters is suggested. To forecast population dynamics and to distinguish gradation phases, a system of numerical criteria has been developed. For

short-term forecasts, regression models of numerical forecasts are used.
ECentral; LARVAE, MODELS, MONITORING, PROGNOSIS, SAMPLING

1170 Znamenskiy, V.S., Lyamtsev, N.I., Novikova, Ye.I. 1982.
Instructions on gypsy moth management. (Rekomendatsii po nadzoru za neparnym shelkopryadom.) VNII lesovodstva i mekhanizatsii lesnogo khozyaistva, Moscow. 45 p.
-- Recommendations for gypsy moth population monitoring and control in the forests of the European part of Russia, Belorussia, and the Ukraine are part of the computer information system "Forecast in Forest Protection."
ECentral; CONTROL, MONITORING, PROGNOSIS

1171 Znamenskiy, V.S., Lyamtsev, N.I., Polyakova, L.A. 1981.
Methods to inventory the gypsy moth number in sparse populations. Lesnoye khozyaystvo. (6):49-51.
-- To control gypsy moth populations at low levels, application of sticky belts to tree trunks is suggested. Some first instars migrate daily from the crown to the butt to rest in the light period, and beginning with the third instar 10-30% of larvae take part in daily migrations. On the basis of sampling, the number of trees for application of sticky belts is determined to establish the average number of larvae per tree at three density levels.
ECentral; LARVAE, MODELS, MONITORING, SAMPLING

1172 Znamenskiy, V.S., Novikova, V.N. 1981.
Information and search system: Forecasting in forest protection. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 73-74.
-- Studies of the gypsy moth were the first stage in development of this information retrieval system, distinguishing various parameters and characters of the gypsy moth population and forest biogeocenosis. In creating a data base, facilities of an input-output generator were used to describe data, to locate data in magnetic-disk storage, and to allow access by users.
ECentral; MODELS, PROGNOSIS

1173 Zubareva, L.M. 1950.
Lepidopterous pests of Siberia and their control. Avtoreferat dissertatsii kandidata biologicheskikh nauk. Institut lesa i drevesiny SO AN SSSR, Krasnoyarsk. 24 p.
WSiberia; CONTROL, PEST LIST

1174 Zubkova, T.I. 1981.
Role of various factors in gypsy moth population dynamics. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 74-75.
-- In Rostov Province gypsy moth egg masses were damaged by rodents, birds, and predaceous insects such as dermestids. In some years entomophages destroyed up to 34.6% of eggs. A few eggs were damaged by *Anastatus*; some embryos in open egg masses died in winter from low temperatures and as a result of usually long floods in floodplain biotopes. Total egg mortality due to biotic and abiotic factors amounted to 88.3% in some years. Mortality caused by tachinids was 88% in some foci, and mortality caused by hymenopterous insects amounted to 44%.
ECentral; BIRDS, EGGS, MAMMALS, PARASITES, PREDATORS, WEATHER

1175 Zubkova, T.I., Safronov, A.I. 1986.
Sanitary state of floodplain high oak forests and measures of their protection against insect pests. In: Byulleten' Vsesoyuznogo NII agrolesomelioratsii. Vsesoyuznyy NII agrolesomelioratsii, Volgograd: 36-38.
-- Floodplain oak groves of Voronezh and Rostov provinces were surveyed in 1977-1979 and found to have lost resistance and were dying rapidly. Sanitary cuttings and artificial recovery are recommended. Oaks are attacked by more than 900 pest species, including 600 phyllophagous species. However, no more than 16 species are of economic importance. In the period of survey the following pests were destructive: four species of leaf rollers (green oak leaf roller, rose ugly-nest tortricid, haw leaf roller, golden leaf roller), gypsy moth, and browntail moth. Crown defoliation amounted to 30-50% in some years. To protect floodplain oak groves, it is advisable to apply pyrethroids and bacterial preparations containing sublethal doses of insecticides.
EEast; CONTROL, PEST LIST

1176 Zubov, P.A. 1968.
Establishment of integral foci of folivorous pests in the oak stands in the southeast of the USSR. In: Trudy XIII Mezhdunarodnogo entomologicheskogo kongressa. Nauka, Moscow: 112.
-- Continuous outbreaks of various phyllophages occur in oak groves of forest-steppe and steppe in the southeastern USSR. Outbreaks of lepidopterous species, the gypsy moth included, occur frequently, and sometimes different species have simultaneous outbreaks. Because of unfavorable conditions for forest growth, protective measures cannot control pest populations, so extermination measures must be intensified.
EEast; OUTBREAKS

1177 Zubov, P.A. 1980.
The use of disparlure in the forestry. Khimiya v sel'skom khozyaistve. 18(12):24-25.
-- Results of field tests of Soviet disparlure for attracting gypsy moth and nun moth males are described.
EEast; PHEROMONES

1178 Zubov, P.A. 1981.
Application of attractants in management of folivorous pests. In: Nadzor za vreditelyami i boleznyami lesa i sovershenstvovaniye mer bor'by s nimi. Tezisy dokladov. VNIILM, Moscow: 76-78.
-- Attractants are used on gypsy moth and nun moth males and on leaf rollers, especially the green oak leaf roller. It is proposed to produce attractants of the pine noctuid, browntail moth, gypsy moth, Siberian moth, and other phytophagous species. Attractants are primarily applied in surveys to control pest population dynamics, to detect the beginning of outbreaks, and to determine the

time when forest protective measures must be taken.
EEast; MONITORING, PHEROMONE TRAPS

1179 Zubov, P.A., Antipenko, T.A. 1976.
Prospects of disparlure application in forest protection. In: Ispol'zovaniye chimicheskikh i biologicheskikh sredstv v bor'be s vreditelyami lesa. VNIILM, Moscow: 55-57.
-- The use of disparlure is regarded as a promising means of gypsy moth control. A light cylindrical trap made of Tetropack material is most practical. The expenditure of active substance is higher in open traps that soon become ineffective. Disparlure should be used for surveys only in periods of depression and increase in number. In periods of high population, attractants are used as a means of control. Two ways of using them are suggested: mass capture and destruction of males (male vacuum), and disorientation of males and decrease in the number of matings. The data obtained by the authors support disorientation.
EEast; MATING DISRUPTION, PHEROMONE TRAPS

1180 Zubov, P.A., Antipenko, T.A., Gerasimova, T.A. 1975.
Study of biological activity of disparlure - sex attractant of gypsy moth. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 3-14.
-- Disparlure activity was studied in the field. The trap was a cylinder in which a cartridge made of filter paper soaked with attractant was suspended; an insert was covered with glue for insects. The trap proved to be highly effective. Disparlure should be used for pest control in the period between outbreaks. It is not clear yet why the number of males captured decreases at high concentrations of the attractant.
EEast; PHEROMONE TRAPS

1181 Zubov, P.A., Minyaeva, T.L. 1980.
Improving the management of abundant folivorous insects by using synthetic pheromones. In: Rol' dendrophil'nykh nasekomykh v tayezhnykh ekosistemakh. Tezisy dokladov Vsesoyuznoy konferentsii, Divnogorsk, 1980. Institut lesa i drvesiny SO AN SSSR, Krasnoyarsk: 51.
-- The onset of a gypsy moth outbreak and the crisis phase can be confirmed by the use of disparlure-baited traps. When disparlure is applied to paper filters, the most effective doses for catching gypsy moths range from 0.05-5.0 mkg; doses higher than 5 mkg cause a decrease in the number of insects caught. For the nun moth, effective doses range from 200 to 500 mkg.
EEast; BIOASSAY, PHEROMONES

1182 Zubov, R.A., Amirkhanov, D.V., Tur'yanov, P.A. 1980.
Experiment on the use of disparlure for lowering the gypsy moth abundance. In: Zashchita lesa ot vrediteley i bolezney. Moscow: 58-59.
-- The disorientation of males in stands of various densities by the application of synthetic disparlure in microcapsules and on expanded clay aggregates was tested. The effect of disorientation effect was found to be directly related to expenditure and frequency of treatments. Possible mechanisms of disorientation are discussed.
EEast; MATING DISRUPTION, PHEROMONES

1183 Zurabova, Ye.R., Pokozii, I.T., Yatsenko, V.G., Vavilov, V.G. 1986.
Lepidocide against Lepidoptera on fruit- and berry-bearing plants. Zashchita rasteniy. (5):26-27.
-- Lepidocide in concentrated powder in a titer of 1 billion viable spores per 1 g is applied against phyllophagous insects feeding on apple and berry crops in the Ukraine. In complex foci of the tent caterpillar, gypsy moth, apple-leaf skeletonizer, winter moth, brown-banded leaf roller, apple-leaf trumpet miner, and browntail moth, spraying with the preparation at a rate of 1.2 kg/ha is 85 to 94% effective.
EWest; MICROBIAL PESTICIDES, VIRUS

1184 Zverozomb-Zubovskiy, Ye.I. 1918.
Written report about activity of the Don office on agricultural pest control in 1917 and list of field pests of Don region. (Pis'mennyy otchet o rabote Donskogo byuro po kontrolyu za vreditelyami sel'skokhozyaystvennykh rasteniy.) Rostov. 36 p.
EWest; CONTROL, PEST LIST

1185 Zverozomb-Zubovskiy, Ye.M. 1916.
Control of the garden pests in winter. (Zimnyaya bor'ba s vreditelyami sada.) Stantsiya po borbe s vreditelyami rastenii pri Voronezhskom gubernskom zemstve, Voronezh. 3 p.
-- Hibernating stages of major orchard pests (haw moth, browntail moth, gypsy moth, tent caterpillar, apple moth) were studied. Gypsy moth egg masses should be either collected and burned or treated with petroleum.
ECentral; CONTROL, EGG MASSES, PEST LIST

Appendix 1

Journals cited in the bibliography that are principal sources of articles on entomology in the former U.S.S.R.

Transliteration of Russian journal title, (city of publishing), ISSN number	English translation of journal title	No. citations
Biokhimiya (Moskva) 0320-975	Biochemistry	2
Bioorganicheskaya khimiya (Moskva) 0132-3423	Bioorganic Chemistry	3
Byulleten' Moskovskogo obshchestva ispytateley prirody (Moskva) 0027-1403	Bulletin of the Moscow Society of Naturalists	5
Doklady Akademii nauk SSSR (Moskva) 0869-5652	Transactions of the Academy of Sciences of the U.S.S.R.	6
Doklady Akademii nauk Ukrainskoy SSR (Dopovidni Akademii Nauk Ukrains'koy RSR) (Kiyev)	Transactions of the Ukrainian Academy of Sciences	2
Ekologiya (Sverdlovsk) 0367-0597	Ecology	2
Entomologicheskoye obozreniye (Leningrad) 0367-1445	Entomological Review	14
Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya biologicheskikh nauk (Novosibirsk) 0568-6547	Annals of Siberian Branch of the U.S.S.R. Academy of Sciences, Series of Biological Sciences	12
Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR, seriya khimicheskikh nauk (Novosibirsk) 0002-3426	Annals of Siberian Branch of the U.S.S.R. Academy of Sciences, Series of Chemical Sciences	2
Izvestiya Timiryazevskoy sel'skokhozyaistvennoy akademii (Chekhov) 0021-342X	Annals Timiryazev Agricultural Academy	4
Izvestiya vysshykh uchebnykh zavedeniy, lesnoy zhurnal (Arkhangel'sk) 0536-1036	Annals of Higher Education, Forestry Journal	13
Khimiya prirodnykh soedineniy (Tashkent) 0023-1150	Chemistry of Natural Compounds	1
Lesnoye khozyaystvo (Moskva) 0024-1113	Forest Management	57
Lesovedeniye (Moskva) 0024-1148	Forestry	9
Mikrobiologicheskiy zhurnal (Kiyev) 0201-8462	Microbiological Journal	2
Molekulyarnaya biologiya (Moskva) 0026-8984	Molecular Biochemistry	5
Nauchnyye doklady vysshey shkoly, biologicheskiye nauki (Moskva) 0470-4606	Scientific Transactions of Higher Education, Biological Sciences	6
Plodovodstvo (Moskva)	Fruit Culture	6

Continued

Appendix 1—Continued

Transliteration of Russian journal title, (city of publishing), ISSN number	English translation of journal title	No. citations
Prikladnaya biokhimiya i microbiologiya (Moskva) 0555-1099	Comprehensive Biochemistry and Microbiology	2
Priroda (Moskva) 0032-874X	Nature	2
Russkiy zoologicheskiy zhurnal	Russian Zoological Journal	6
Russkoe entomologicheskoye obozreniye	Russian Entomological Review	7
Sadovodstvo	Horticulture	5
Sibirskiy vestnik sel'skokhozyaystvennoy nauki (Novosibirsk) 0370-8799	Siberian Bulletin of Agricultural Sciences	2
Vestnik Moskovskogo universiteta, seriya VI, biologiya, pochvovedeniye (Moskva) 0579-9422	Bulletin of the Moscow University, Series VI, Biology, Soil Science	2
Vestnik sel'skokhozyaystvennoy nauki (Moskva) 0206-6335	Bulletin of the Agricultural Science	2
Vestnik sel'skokhozyaystvennoy nauki (Kazakhstana) (Alma-Ata) 0042-4684	Bulletin of Agricultural Science (Kazakhstan)	3
Vestnik zoologii (Kiyev) 0084-5604	Bulletin of Zoology	22
Voprosy virusologii (Moskva) 0507-4088	Virology Problems	1
Zakhyst roslyn (Kiyev)	Plant Protection (Kiev)	7
Zashchita rasteniy (Moskva) 0044-1864	Plant Protection (Moscow)	44
Zhurnal evolutsionnoy biokhimii i fiziologii (Leningrad) 0044-4529	Journal of Evolutionary Biochemistry and Physiology	2
Zhurnal obshchey biologii (Moskva) 0044-4596	Journal of General Biology	4
Zoologicheskiy zhurnal (Moskva) 0044-5134	Zoological Journal	36

APPENDIX 2

Parasitoids and Predators of Gypsy Moth
Arranged by Taxa

Preferred nomenclature as best determined by authors of this bibliography,
species with a taxon in parentheses indicate that the accepted taxon may vary.
Alternate names used in reference abstracts are in italics

Acarina
Aceosejidae
Protolaelaps bickizi
Laelapidae
Androlealaps casalis
Microzetidae
Trichoribates trimaculatus
Trombidiidae
Allothrombium fuliginosum (Herman)
Coleoptera
Carabidae
Calosoma auropunctatum (Herbst)
Calosoma calidum (Fabricius)
Calosoma denticolle Gebl.
Calosoma inquisitor L.
Calosoma sycophanta (L.)
Harpalus rufipes (De Geer)
Ophonus rufipes
Dermestidae
Anthrenus verbasci (L.)
Attagenus seniculus (Solskiy)
Attagenus unicolor (Brahm)
Attagenus piceus Oliver
Dermestes ater DeGeer
Dermestes bicolor F.
Dermestes erichsoni Ganglbauer
Dermestes lardarius L.
Dermestes undulatus Brahm
Globicornis marginata Paykull
Megatoma conspersa Solskiy
Megatoma undata L.
Melyridae
Malachius aeneus L.
Malachius viridis F.
Silphidae
Villa morio (L.)
Anthrax morio L.
Glischrochilus quadripunctata (L.)
Xylodrepa quadripunctata L.
Diptera
Muscidae
Muscina levida (Harris)
Muscina stabulans (Fallen)
Sacrcophagidae
Agria punctata (affinis) Robineau-Desvoidy
Agria affinis (Fallen)
Pseudosarcophaga affinis (Fallen)
Sarcophaga affinis (Fallen)
Agria monachae (Kramer)
Bellieriomima (Sarcophage) subulata (Pandellé)
Thyrsocnema laciniata Pandellé
Kramerea (Sarcophaga) schutzei (Kramer)
Parasarcophaga (Sarcophaga) albiceps (Meigen)
Parasarcophaga (Sarcophaga) emdeni Rohdendorf
Parasarcophaga (Sarcophaga) harpax (Pandellé)
Parasarcophaga (Sarcophaga) portschinskyi
Rohdendorf
Parasarcophaga (Sarcophaga) similis
Parasarcophaga (Sarcophaga) subharpax Rohdendorf
Parasarcophaga (Sarcophaga) tuberosa (Pandellé)
Parasarcophaga (Sarcophaga) uliginosa (Kramer)
Phallosphaera konakovi Rohdendorf
Robineauella (Sarcophaga) pseudoscoparia (Kramer)
Parasarcophaga pseudoscoparia (Kramer)
Robineauella (Sarcophaga)scoparia (Pandellé)
Parasarcophaga scoparia (Pandellé)
Roeselia antiqua Merg.
Sarcorohdendorfia antilope (Bottcher)
Tachinidae
Blepharipa schineri (Mesnil)
Blepharipa pratensis (Meigen)
Blepharipa scutellata (Robineau-Desvoidy)
Blepharipoda scutellata (Robineau-Desvoidy)
Sturmia scutellata (Robineau-Desvoidy)
Blondelia nigripes (Fallen)
Carcelia tibialis (Robineau-Desvoidy)
Ceromasia rubifrons (Macquart)
Compsilura concinnata (Meigen)
Drino bohemica Mesnil
Palexorista bohemica (Mesnil)
Drino (Palexorista) gilva (Hartig)
Sturmia gilva (Hartig)
Sturmia inconspicua (Meigen)
Drino (Palexorista) inconspicua (Meigen)
Exorista fasciata (Fallen)
Exorista larvarum (L.)
Exorista noctuarum Rondani
Larvaevora larvarum L.
Exorista rossica Mesnil
Exorista rustica (Fallen)
Larvaevora rustica (Fallen)
Linnaemyia picta (Meigen)
Lynnaemyia retroflexa Pandellé
Masicera sphingivora (Robineau-Desvoidy)
Masicera zimini Kolomiets
Microphthalma europaea Egger
Pales pavida (Meigen)
Parasetigena silvestris (Robineau-Desvoidy)
Parasetigena agilis (Robineau-Desvoidy)
Phorocera agilis (Robineau-Desvoidy)
Phoro--cera silvestris (Robineau-Desvoidy)
Phryxe heraclei (Meigen)
Senometopia excisa (Fallen)
Carcelia excisa (Fallen)

Continued

Senometopia separata (Rondani)
Carcelia bombicivora (Robineau-Desvoidy)
Sturmia bella (Meigen)
Tachina fera (L.)
Tachina grossa (L.)
Tachina micado (nupta) (Kirby)
Tachina orientalis (nupta) Zimin
Echinomyia magnicornis (Zimin)
Zenillia libatrix (Panzer)

Hemiptera

Nabidae
Nabis apterus Fabricius

Pentatomidae
Picomerus conformis Herrich-Schaeffer

Reduviidae
Rhynocoris iracundus (Poda)

Hymenoptera

Braconidae
Aleiodes pallidator (Thunberg)
Rogas pallidator Thunberg
Apanteles tetricus Beinh.
Cotesia glomerata (L.)
Apanteles glomeratus L.
Cotesia melanoscelus (Ratzeburg)
Apanteles solitarius
Apanteles melanoscelus
Cotesia ocneriae (Ivanov)
Apanteles ocneriae Ivanov
Cotesia spurius (Wesmael)
Apanteles spurius Wesmael
Dolichogenidea lacteicolor (Viereck)
Apanteles lacteicolor Viereck
Glyptapanteles fulvipes Haliday
Apanteles fulvipes Haliday
Glyptapanteles inclusus (Ratzeburg)
Apanteles inclusus Ratzeburg
Glyptapanteles liparidis (Bouche)
Apanteles liparidis Bouche
Glyptapanteles melitaearum Wilkinson
Apanteles melitaearum Wilkinson
Glyptapanteles porthetriae (Musesebeck)
Apanteles porthetriae Muesebeck
Glyptapanteles vitripennis (Curtis)
Apanteles vitripennis Haliday
Meteorus dubius Ruthe
Meteorus gyrator Thunberg
Meteorus pulchricornis (Wesmael)
Meteorus striatus Thoms.
Meteorus versicolor (Wesmael)
Microgaster nitidula
Microgaster tibialis Nees
Phanerotoma atra Snaffak

Chalcidadae
Brachymeria intermedia (Nees)

Encyrtidae
Phorocera assimilis (Fallen)
Ooencyrtus telenomicida (Vassiljev)
Ooencyrtus flavofasculitis Mercet
Ooencyrtus kuvanae (Howard)
Ooencyrtus kuwanae
Ooencyrtus kuwanai
Schedius kuwanae

Eupelmidae
Anastatus japonicus Ashmead
Anastatus disparis Ruschka

Formicidae
Formica polyctena Forster
Formica pratensis Retzius
Formica rufa L.

Ichneumonidae
Apechthis compunctor L.
Apechtis brassicaria (Poda)
Ephialtes capulifera (Kriechbaumer)
Apechtis capulifera Kriechbaumer
Calajoppa cirrogaster (Schrank)
Trogus lutorius Fabricius
Campoletis tricincta (Holmgr.)
Anilasta tricincta Holmgr.
Casinaria nigripes (Gravenhorst)
Casinaria tenuiventris (Gravenhorst)
Diadegma chrysostictos (Gmelin)
Angitia chrysosticta Gmelin
Gelis pulicarius Fabricius
Ischnus inquisitorius Muller
Pimpla inquisitorius Mull.
Itoplectis alternans (Gravenhorst)
Itoplectis alternatus
Itoplectis viduata (Gravenhorst)
Hoplectis viduata (Gravenhorst)
Pimpla viduata (Gravenhorst)
Lymantrichneumon disparis (Poda)
Phobocampe pullchella Thomson
[misidentification]
Phobocampe unicincta (Gravenhorst)
Pimpla hypochondriaca (Retzius)
Pimpla instigator (Fabricius)
Pimpla spuria (Gravenhorst)
Coccygomimus spurius Gravenhorst
Pimpla turionellae (L.)
Coccygomimus turionellae (L.)
Pimpla examinator
Pristomertus vulnerator (Panzer)
Theronia atalantae (Poda)

Pteromalidae
Dibrachys cavus (Walker)
Mesopolobus aequus (Walker)
Pteromalus purpureus (Walker)

Scelionidae
Gryon dichropterum
Eremioscelio dichropterus Kozlov
Gryon howardi (Mokrzecki et Ogloblin)
Gryon lymantriae (Masner)
Eremioscelio lymantriae (Masner)
Habronotus howardi Mokrzecki et Ogloblin
Telenomus laevisculus (Ratzeburg)
Telenomus phalaenarum Nees
Telenomus verticillatus Kiefer
Trissolcus grandis (Thomson)
Telenomus grandis Mayr.

Scoliidae
Scolia saturniae Robineau-Desvoidy

Torymidae
Monodontomerus aereus Walker

Trichogrammatidae

Continued

Appendix 2—Continued

Trichogramma evanescens Westwood	*Platycleis grisea* (Fabricius)
Orthoptera	**Nematoda**
Mantidae	**Mermithidae**
Mantis religiosa L.	Complexomeris elegans
Tettigoniidae	Hexamermis albicans (Siebold)
Platycleis albopunctata (Fabricius)	

Appendix 3

Index to References of Parasitoids and Predators of Gypsy Moth Listed by Specific Name

Continued

sycophanta, Calosoma 24, 48, 74, 213, 471, 702, 732, 822, 830, 845, 846, 856, 902, 1025, 1033, 1055, 1084

Continued

Appendix 3—Continued

APPENDIX 4

Keywords

Continued

Continued

Continued

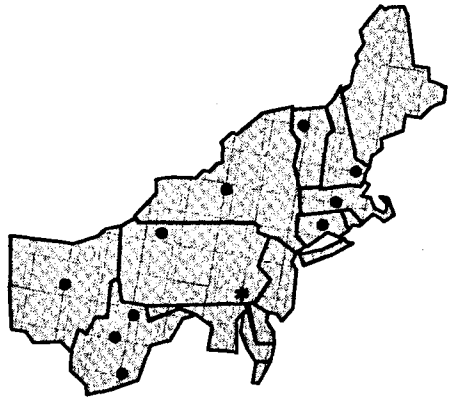
Continued

Appendix 4—Continued

Baranchikov, Yuri N.; Nikitenko, Galina N.; Montgomery, Michael E. 1998. **Russian and Ukrainian literature on the gypsy moth: an annotated bibliography.** Gen. Tech. Rep. NE-253. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 166 p.

This bibliography contains 1185 references to literature on the gypsy moth published from 1837 to 1991 in the territory occupied by the former U.S.S.R.. The bibliography is designed to assist researchers within and outside the former U.S.S.R. to identify, locate, and correctly cite the original Russian or Ukrainian references in English. The bibliography contains publications on gypsy moth ecology, physiology, biochemistry, distribution, behavior, and control. The bibliography also presents indices of key words and natural enemies are cross-referenced to the citations. Introductory remarks give information on locating gypsy moth and other literature in libraries of the former U.S.S.R., bibliographic styles used in the U.S.S.R., transliteration of the Cyrillic alphabet to the Latin alphabet, and a listing of Soviet and pre-Soviet journals with papers on forest entomology and forest protection.

Keywords: *Lymantria dispar*, bibliography, population dynamics



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