

MISCELLANEOUS PUBLICATIONS
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, NO. 98

**A Synopsis of the Tabanidae (Diptera)
of Michigan**

BY
KIRBY L. HAYS

ANN ARBOR
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN
December 21, 1956

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A SYNOPSIS OF THE TABANIDAE (DIPTERA) OF MICHIGAN*

INTRODUCTION

THE Tabanidae (horseflies and deerflies) constitute a very large and widely distributed family. More than 2,500 species are known. In Nearctic America north of Mexico 26 genera of almost 500 species are recognized. Seven genera and 96 species and subspecies compose the known tabanid fauna of Michigan.

For many years following the publication of Osten Sacken's "Pro-drome" (1876-78), the North American Tabanidae, as a group, seemed to stimulate little taxonomic activity. However, with the increasing appreciation of their importance as potential vectors of human and animal diseases, several comprehensive publications have appeared, notably the work of Brennan (1935) in his monograph of the Pangoniinae, Stone's (1938) monograph of the Tabaninae, and Philip's (1947) catalog of the Tabanidae, north of Mexico.

In an ecological study of the potential vectors of tularemia in Michigan, the Tabanidae have occupied a prominent place. Since transmission of this disease by biting flies is mechanical, many species may be regarded as potential vectors, depending upon their ecological association with the mammalian reservoirs and susceptible hosts. Therefore, as complete a survey as time and facilities permitted has been made of the Tabanidae of Michigan.

As a result of this study, 27 species have been added to the state list. Sixteen species have been reared from larval collections, and much information has been procured concerning their habits and ecological relations. This synopsis has been prepared to provide a taxonomic basis for further ecological studies. It is based on all available information, including my own field collections and the collections of Tabanidae belonging to the University of Michigan Museum of Zoology and to Michigan State University of Agriculture and Applied Science. The records of Mr. George Steyskal provided much information concerning distribution within the state. This synopsis includes original keys to the subfamilies, genera, and species and a brief description of each species. The male of *Chrysops venus* Philip is described for the first time.

Acknowledgments

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University of Michigan, for making facilities and specimens available for study; to Dr. C. B. Philip, National Microbiological Institute, Hamilton, Montana, for lending specimens for examination, comparison, and identification of doubtful species and for reading the manuscript; to Dr. Roland Fischer of Michigan State University of Agriculture and Applied Science; and to Mr. George Steyskal, Grosse Ile, Michigan, for valuable assistance.

BIONOMICS

Adult tabanids are flies of stout build, with large, prominent, brilliantly colored eyes. The antennae are three-jointed. The third joint is annulated, but never fitted with a true style. The proboscis is well developed, though variable in length, and fitted for piercing. The wing venation is simple and characteristic of the family, with the costal vein extending around the margin of the wing. Sexual dimorphism is exhibited to a high degree, especially in the head structure of the male. The eyes of the male are holoptic and usually are made up of both large and small facets. The antennae are more slender than those of the female, and the palpi are greatly reduced.

The eggs are usually laid in clusters on vegetation, rocks, and other objects in aquatic and semiaquatic environments. Occasionally, however, egg masses have been observed as far as 50 meters from water in very dry locations, but larvae have not been found in such places. The eggs hatch in from five to eight days, and the larvae burrow in the soil. Many are predaceous, feeding upon earthworms, snails, and insect larvae. Under conditions of dense population the larvae will prey on one another. Temperature appears to affect the length of the larval cycle. Some arctic species require three years to complete the larval development, whereas in the tropics the cycle may be completed in one year or less. Field evidence shows that in Michigan some species require one, and others two years for development. Upon completion of the last larval moult, the larvae migrate to a relatively dry situation where pupation takes place. The pupal period lasts about two weeks. The adults emerge from their puparia and make their way to the surface before their wings are fully expanded.

The life span of the adult is variable. Field evidence shows that some species occurring in Michigan live from three to six weeks. During this period feeding, mating, and egg laying take place. In Michigan the adult females are bloodsuckers, with the possible exception of *Goniops* and *Atylotus* spp., whereas the males, if they feed at all, feed on plant sap and nectar. The feeding habits probably account for the great preponderance of females in collections, since the males are not attracted to animals for food and are very wary. Experiments in rearing Tabanidae indicate that the two sexes are produced in approximately equal numbers.

ZOOGEOGRAPHY

The tabanid fauna of Michigan greatly exceeds that of neighboring states in number of species. From an analysis of the continental

distribution of the species occurring in Michigan it is evident that the Michigan fauna is made up of five distinct geographical groups which overlap in the state. The area occupied by each group is arbitrarily indicated in Map 1. The species included in each group are for the most part distributed over the entire range indicated for the group. They show no common morphological characteristics which would connect them phylogenetically, but each appears to be a part of a diverse fauna occupying a specific climatic or geographic area. These geographic groups do not conform to any accepted life zones or biotic proveniences.

Since all of Michigan was covered by ice during the Pleistocene, the present-day fauna must have entered the state following the retreat of the glaciers. The ranges of the species of tabanids occurring within the state suggest that postglacial invasion took place from various directions, some species appearing only in parts of the Lower Peninsula and some in the Upper Peninsula.

In Michigan 22 Boreal species are known. These are limited to the Upper Peninsula and the northern part of the Lower Peninsula. These same species range throughout the northern zone of the United States from the Pacific eastward to New England and northward to the Canadian tundra. Another northern group, designated here as the Northwestern Group, is made up of nine species confined to Isle Royale and the Upper Peninsula. Their North American distribution extends westward from Michigan to Washington and Alaska. A Northeastern Group of 21 species and an Eastern Group of 24 occur over the entire state, some extending their range westward to Wisconsin and Minnesota. The Northeastern Group is generally limited on the continent to a triangular area from the Lake States eastward to Pennsylvania and Labrador. The Eastern Group occupies the states east of the one hundredth meridian and extends slightly north of the Canadian border. The Atlantic Coastal Group of 19 species exhibits the most distinctive distribution. It extends from the Gulf Coast northward along the Atlantic Coast and east of the Appalachian Mountains to New England, and westward across Pennsylvania and New York to Wisconsin.

More detailed study of the distribution of these faunal groups should lead to a better understanding of the postglacial spread of the Tabanidae in North America and to a knowledge of phylogenetic relationships among the North American components of this complex family.

SYSTEMATICS

History of the Family

The genus *Tabanus* was established in 1758 in the tenth edition of Linnaeus' *Systema naturae*. Linnaeus and his contemporary, Carl DeGeer, described eight species of tabanids from the Americas under the genus *Tabanus*; DeGeer's *T. variegatus*, however, was later found to be a common Neotropical *Chrysops* (Philip, 1952).

Leach (1819) promoted the genus *Tabanus* to tribal rank in his paper in the *Edinburgh Encyclopedia*. The tribe was assigned family status by

GEOGRAPHICAL DISTRIBUTION OF MICHIGAN TABANIDAE



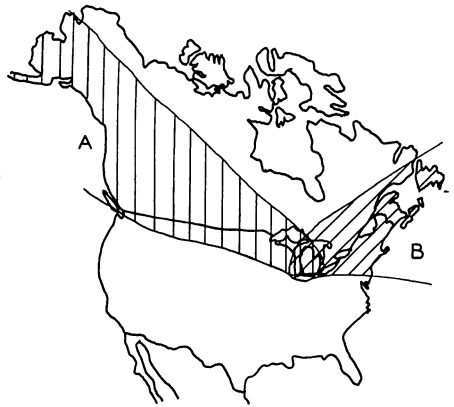
BOREAL FAUNAL GROUP



ATLANTIC COAST FAUNAL GROUP



EASTERN FAUNAL GROUP



A. NORTHWESTERN
B. NORTHEASTERN

FAUNAL GROUPS

Map 1

Agassiz (1850) in his *Nomenclator Zoologicus*. The first division of the genus was made by Meigen (1800), who erected the genus *Chrysops* for those individuals possessing spurs on the hind tibiae. This was the first attempt at a natural separation, placing the horseflies (*Tabanus*) and the deerflies (*Chrysops*) in the divisions which have persisted to the present time. Loew (1860), using the same divisional lines as Meigen, established the subfamilies Pangoniinae for the deerflies and Tabaninae for the horseflies to facilitate classification.

Osten Sacken's "Prodrome of a Monograph of the Tabanidae of the United States" may well be called the beginning of the systematics of this group in the United States. Although he did not modify the classification established by his predecessors, notably Loew, he described almost one-fourth of the North American species known today.

Shortly after the turn of the present century, Enderlein, a German dipterologist, proposed a new system of classification based on morphological differences. His purpose was to separate the larger genera of the Tabanidae into smaller and more workable groups; however, the characters used to split the cumbersome genus *Tabanus* were weak, and only one of his genera, *Hybomitra*, is generally accepted at the present time.

Bequaert (1930) recognized Loew's subfamilies and proposed a simple arrangement of tribes. In 1947 Philip, in his "Catalog of the Blood-sucking Fly Family Tabanidae of the Nearctic Region North of Mexico," revised the classification, clarifying many questionable matters and producing a more workable system than any formerly proposed. This study is based on Philip's classification. The present-day work of Mackerras on genitalia of the Tabanidae has shown interesting relationships between groups and when finished should provide a firm basis for future work.

Terminology

Only a few morphological structures of taxonomic value are to be found in the Tabanidae. Those present on the head are most frequently used, but are often supplemented by wing patterns and body coloration. Wing patterns are especially useful in separating members of the genus *Chrysops*.

The less familiar entomological terms used are defined as follows:

Pollen — A mealy-appearing surface covering, not a part of the chitin itself. Unless otherwise stated, all references to body color apply to this coating.

Frons — That part of the head between the lower inner angles of the eyes and the vertex. In males it is reduced to a small triangle.

Calli — Flattened elevations on the head. In the Tabaninae three calli are present: the median callus, an elongate line, spindle, or ellipse near the median part of the frons; the basal callus on the basal part of the frons; and the subcallus, just below and contiguous to the basal callus. In the Pangoniinae the term frontal callus is used for the single callus situated on the lower part of the frons.

The terminology applied to the wings in this paper is that used by Curran in his *Families and Genera of North American Diptera*, with slight modifications.

The two major geographic subdivisions of Michigan, the Upper and Lower Peninsulas, are designated herein as UP and LP, respectively. The counties are arranged alphabetically for each of these regions.

Specimens from counties designated by the superscript⁽¹⁾ are in the University of Michigan Museum of Zoology (UMMZ); those designated by the superscript⁽²⁾ are in the Department of Entomology Museum, Michigan State University of Agriculture and Applied Science (MSU); and those designated by the superscript⁽³⁾ are in the collection of the author (KLH). The records of Mr. George Steyskal are designated by the superscript⁽⁴⁾. Species known from the E. S. George Reserve are indicated by an asterisk (*) following Livingston County.

Key to the Subfamilies and Genera of Michigan Tabanidae

1. Hind tibiae with two apical spurs; wings usually with an infuscated crossband; subepaulets bare and uninflated Subfamily Pangoniinae 2
Hind tibiae without apical spurs; wings without infuscated crossband; subepaulets various, but not both bare and inflated. Subfamily Tabaninae 4
2. Antennal flagellum composed of five segments (picture-winged flies) *Chrysops* (p. 10)
Antennal flagellum composed of more than 5 segments 3
3. Eyes of the female with upper angles acute; wings with an irregular pattern *Goniops* (only Michigan species *G. chrysocoma* p. 32)
Eyes of the female with upper angles at least 90°; wings hyaline or tinted, without a pattern *Stonemyia* (p. 33)
- 4(1). Flagellum of antennae with four segments; eyes in life with irregular bands or spots; wings with mottled water marks *Chrysozona* (only Michigan species *C. americana* p. 34)
Flagellum of antennae with five segments; eyes in life regularly banded or unicolorous. 5
5. Frons without calli, or calli reduced; eyes distinctly pilose *Atylotus* (p. 35)
Frons with calli; eyes bare or pilose 6
6. Base of third antennal segment with a hooklike dorsobasal extension; eyes sparsely haired *Hamatabanus* (Michigan species *T. carolinensis* p. 37)
Base of third antennal segment rarely with a dorsobasal forward-directed hook; if hook is present eyes are bare 7
7. Female with an ocellar tubercle; eyes usually distinctly hairy. *Hybomitra* (p. 38)
Female without an ocellar tubercle; eyes seldom hairy *Tabanus* (p. 55)

Genus CHRYSOPS Meigen

Chrysops Meigen, *Nouv. class. mouches a deux ailes*, 1800, p. 23 (generotype *Tabanus caecutiens* Linnaeus).

Chrysopsis Dumeril, *Zool. analytique* . . . , 1806, p. 278 (nomen nudum).

Nemorius Rondani, *Prodom. Dipt. Ital.*, I(1856):171.

Haemophilia Kriechbaumer, *Verh. Zoöl. Bot. Ges. Wien.*, 23(1873):70.

Haematophilia Verrall, in Scudder, *Nomencl. Zoöl.*, I(1882):152 (lapsus).

Heterochrysops Kröber, *Zoöl. Jahrb.*, Abt. Syst., 43(1920):1-4, 50, 55.

Neochrysops Szilady, *Ann. Mus. Nat. Hung.*, 19(1922):126 (not Walton).

Ziemannia Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 544.

Kleineana Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 544.

Psylochrysoptis Szilady, *Zool. Anz.*, 66(1926):328 (change of name for *Neochrysoptis* Szilady).

Turanochrysoptis Stackelberg, *Bull. Ent. Res.*, 16(1926):326.

Chrisops Fraga, *Rev. Chilena Hist. Nat.*, 40(1936):248 (lapsus).

Generic characteristics.— Small flies rarely exceeding 12 mm. in length. Wings with an infuscated "picture." Eyes bare; in life, green with a purple pattern. Ocelli present. Female with a single frontal callus. Flagellum of antenna five-segmented; basal segment sometimes appearing annulated. Palps lanceolate; one-half to three-fourths the length of the proboscis. Dorsum of abdomen variable, usually with a pattern.

Key to Michigan Females of *Chrysoptis*

1. Wing beyond crossband hyaline, shaded areas may be present, but no true infuscations; face black with median pollinosity except in *nigra* 2
True infuscation along anterior margin of the wing beyond crossband; face various 8
2. Dorsum of abdomen with distinct black and yellow pattern 3
Dorsum of abdomen without distinct pattern, black or darkened 5
3. Posterior margins of abdominal tergites gray; yellow lateral spots confined to tergites 1 and 2 *sordida* (p. 13)
Posterior margins of abdominal tergites brown to black; yellow lateral spots variable, sometimes with middorsal row of light triangles 4
4. Pile of thoracic pleurae yellow to orange; lateral yellow spots of abdomen frequently large *excitans* (p. 14)
Pile of thoracic pleurae gray to whitish; lateral yellow spots of abdomen less bright and confined to tergites 1 and 2 *cuclux* (p. 14)
5. Second basal cell hyaline; face yellow in middle *nigra* (p. 15)
Second basal cell infuscated; face black 6
6. Thoracic pleurae with bright orange pile *celeris* (p. 15)
Thoracic pleurae with dull yellow or gray pile 7
7. Base of fifth posterior cell with hyaline spot; smaller species, 7-9 mm. *carbonaria* (p. 16)
Base of fifth posterior cell infuscated; larger species, 9-11 mm.; frequently with suggestions of a median row of white abdominal triangles *mitis* (p. 16)
- 8(1). Frontal callus mostly yellow 9
Frontal callus darkened (almost black) 17
9. Crossband having mottled appearance owing to presence of hyaline areas along the veins *shermani* (p. 17)
Crossband uniform 10
10. With four dark stripes on yellow abdomen 11
Abdomen otherwise marked 13
11. Mid-abdominal lines not converging on first tergite; scutellum entirely bright yellow *vittata* (p. 17)
Mid-abdominal lines converging on first tergite; scutellum dark or with reddish margins 12
12. Apical hyaline triangle of wing reaching well forward of furcation. *striata* (p. 18)
Apical hyaline triangle of wing barely reaching forward of furcation *aberrans* (p. 19)

13. Apical infuscation narrow, concentrated along costal vein, entering second submarginal cell only slightly; abdominal pattern distinct, black and yellow . . . 14
 Apical infuscation wider, at least half filling second submarginal cell, abdominal pattern indistinct, brown and tan 15
14. Fifth posterior cell not infuscated, except along Cu2; thorax with grayish stripes *pubica* (p. 19)
 Fifth posterior cell infuscated, at least basally; thorax with yellowish stripes *sackeni* (p. 20)
15. Scape and pedicel of antenna noticeably swollen; abdominal pattern obscure; apical hyaline triangle extending forward to a point halfway between second and third veins *brunnea* (p. 20)
 Scape and pedicel of antenna not noticeably swollen; abdomen with distinct middorsal triangles; apical hyaline triangle extending almost to second vein . 16
16. Wing pattern darker, all tarsi and apices of fore and middle tibiae darkened; dorsal abdominal pattern darker *flavida* (p. 20)
 Wing pattern light; legs lighter; dorsal abdominal pattern lighter *atlantica* (p. 21)
- 17(8). Apical infuscation confined to narrow band along front margin of wing, extending only slightly, if at all, into second submarginal cell 18
 Apical infuscation wider; second submarginal cell at least half infuscated . . . 25
18. Entirely black (sometimes with very faint middorsal white triangles) *noctifera pertinax* (p. 21)
 Abdomen with black and yellow pattern 19
19. Dark, with parallel-sided mid-abdominal yellow line, completely darkened laterally *wiedemanni* (p. 22)
 Abdomen otherwise marked in black and yellow 20
20. Fifth posterior cell not infuscated 21
 Fifth posterior cell infuscated, at least basally 22
21. Fore and middle legs with yellow trochanters and femora; basal halves of fore and middle tibiae yellow, apical halves darker *pubica* (p. 19)
 All legs almost uniformly dark *delicatula* (p. 22)
22. All femora yellow 23
 All femora dark 24
23. Thoracic pleurae with thick bright yellow pile *furcata* (p. 23)
 Thoracic pleurae with yellow-white or gray pile *sackeni* (p. 20)
24. Third posterior cell with both apex and posterior parts often hyaline; black triangle encroaching upon lateral yellow area of second abdominal tergite *aestuans* (p. 23)
 Third posterior cell usually infuscated in at least three-fourths of total length; usually no triangular encroachment of black upon lateral yellow area of second abdominal tergite *callida* (p. 24)
- 25(17). Abdomen with four dorsal longitudinal black lines on yellow background 26
 Abdomen otherwise marked 31
26. Apical infuscation not reaching posterior branch of third vein; second submarginal cell not completely infuscated 27
 Apical infuscation reaching posterior branch of third vein; completely filling second submarginal cell except at extreme apex 29
27. Anterior part of apical hyaline triangle reaching vein 2; fifth posterior cell partly infuscated *montana* (p. 24)
 Anterior part of apical hyaline triangle reaching only halfway between veins 2 and 3; fifth posterior cell infuscated only along veins 28

28. Apical hyaline triangle reaching well forward of furcation *striata* (p. 18)
 Apical hyaline triangle barely reaching forward of furcation . . . *aberrans* (p. 19)
29. Apical hyaline triangle enclosed in second and third posterior cells
 *moecha* (p. 25)
 Apical hyaline triangle extending forward into additional cells 30
30. Lateral abdominal stripes incomplete, absent on first and second abdominal
 tergites *pikei* (p. 25)
 Lateral abdominal stripes present on first and second abdominal tergites
 *sequax* (p. 26)
- 31(25). First basal cell not, or only partly, infuscated 32
 First basal cell completely infuscated 37
32. With a row of mid-abdominal triangles not forming a continuous line 33
 With a row of mid-abdominal triangles forming a continuous line 35
33. Dark inverted V on second tergite contiguous to dark part of third tergite
 *dimmocki* (p. 26)
 Dark area of second tergite pentagonal, separated from dark part of third
 tergite by band of yellow 34
34. Posterior tibiae completely black; transverse yellow abdominal stripes wide;
 apical infuscation larger *venus* (p. 27)
 Posterior tibiae with some brown; yellow abdominal stripes narrow; apical
 infuscation smaller *frigida* (p. 28)
35. Abdomen completely dark, except middorsal stripe and (sometimes) smaller
 secondary longitudinal stripes basally *obsoleta* (p. 29)
 Abdomen with large lateral yellow areas on first and second tergites 36
36. Second abdominal tergite with two lateral black spots. *geminata geminata* (p. 29)
 Second abdominal tergite completely yellow *geminata impuncta* (p. 30)
- 37(31). Dark, with gray middorsal line; sides of abdomen dark; at least basal half of
 third femur dark; apical hyaline triangle narrow, extending forward to second
 vein 38
 Light, with yellow middorsal line; sides of abdomen yellow; third femur com-
 pletely yellow; apical hyaline triangle wider, extending into second submarginal
 cell, but not to second vein 39
38. Fore coxae brown; wing picture light brown *fuliginosa* (p. 30)
 Fore coxae yellow; wing picture dark brown *dacne* (p. 30)
- 39(37). Black lateral lines converging on second abdominal tergite *inda* (p. 31)
 Black lateral lines not usually converging on second abdominal tergite
 *univittata* (p. 31)

Chrysops sordida Osten Sacken

Chrysops sordida Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):376.

Female. — Length 9-10 mm. Frons yellow pollinose, darkened at the vertex. Callus black. Genae and clypeus black with yellow pollen. Palps black with some brown laterally. First antennal segment dark brown; second and third segments black.

Dorsum of thorax black, pattern indistinct. Plurae gray, with light yellow hairs. Sternum and legs black. Wings as figured (Pl. III).

Dorsum of abdomen blackish with an indistinct row of middorsal white

triangles; posterior margins of abdominal tergites grayish. Small sublateral yellow spots on tergites 1 and 2, never extending far dorsad or encroaching upon other tergites. Venter dark.

Michigan distribution. — U.P.: Gogebic,³ Houghton,³ Iron,³ Luce,⁴ Marquette,⁴ and Schoolcraft¹ counties.

Specimens examined. — 1 female UMMZ; 10 females KLH.

Chrysops excitans Walker

Chrysops excitans Walker, *Dipt. Saund.*, 1(1850):72.

Chrysops sordidus Washburn, *10th Rep. State Ent. Minn.*, 1905, p. 79.

Female. — Length 8-13 mm. Frons yellow pollinose, darkened near vertex. Callus black. Genae and clypeus black with patches of yellow pollen. Palps brown. First and second antennal segments brown; third segment black, lighter basally, annulets black.

Dorsum of thorax dark with yellow hairs. Pleurae gray with yellow hairs. Sternum and coxae gray. Legs gray. Wings as figured (Pl. I).

Dorsum of abdomen variable. Usually with evidences of a row of mid-dorsal triangles. Sublateral yellow areas on first, second, and generally on third tergite, usually contrasting and sharp. Venter light basally, dark tinged apically.

Michigan distribution. — U.P.: Alger,^{1,2} Chippewa,¹ Delta,¹ Dickinson,¹ Gogebic,^{1,3} Iron,³ Keweenaw,⁴ Luce,⁴ Mackinac,^{1,2} Marquette,¹ and Schoolcraft¹ counties and Isle Royale.⁴ L.P.: Alcona,⁴ Benzie,⁴ Berrien,¹ Charlevoix,^{1,2} Cheboygan,^{1,2} Clare,¹ Crawford,⁴ Emmet,⁴ Gladwin,⁴ Grand Traverse,¹ Gratiot,¹ Huron,¹ Iosco,⁴ Kalkaska,⁴ Lake,² Manistee,² Mecosta,² Midland,⁴ Missaukee,¹ Montmorency,¹ Oakland,¹ Oceana,² Ogemaw,² Osceola,² Oscoda,¹ Otsego,¹ Presque Isle,^{1,2} Roscommon,⁴ Shiawassee,² and Wexford¹ counties.

Specimens examined. — 237 females UMMZ; 21 females MSU; 121 females KLH.

Chrysops cuclux Whitney

Chrysops cuclux Whitney, *Can. Ent.*, 11(1879):35

Chrysops cuchix Ricardo, *Ann. Mag. Nat. Hist.*, Ser. 7, 8(1901):300 (lapsus).

Female. — Length 9-10 mm. Frons yellow pollinose, blackened near the vertex. Callus black. Genae black with yellow pollen. Clypeus black, yellow pollen medianly. Palps brown. First and second antennal segments and base of third brown, remainder of third segment and annulets black.

Dorsum of thorax dark with white hairs. Pleurae gray with white hairs. Sternum gray. Legs black; fore coxae gray, bases of hind tarsi yellow. Wings as figured (Pl. I).

Dorsum of abdomen black with sublateral pale yellow spots on tergites

1 and 2, never extending into tergite 3. Venter uniformly dark. Both dorsum and venter with gray hairs.

Michigan distribution. — U.P.: Alger,¹ Gogebic,¹ Luce,⁴ Mackinac,¹ Marquette,⁴ and Schoolcraft¹ counties. L.P.: Clinton,² Gladwin,⁴ Grand Traverse,¹ Lapeer,¹ Oakland,¹ Saginaw,⁴ and Washtenaw¹ counties.

Specimens examined. — 40 females UMMZ; 2 females MSU.

Chrysops nigra Macquart

Chrysops nigra Macquart, *Dipt. exot. nouv. peu connus*, I(1838), Pt. 1:161.
Chrysops carbonarius var. *B.* Walker, *List*, I(1848):203.

Female. — Length 7-9 mm. Frons yellow pollinose with large black area at vertex. Callus black. Genae dark with yellow pollen. Clypeus yellow. Palps dark brown. First antennal segment light brown to yellow with black hairs; other segments darker; annulets black.

Dorsum of thorax dark with white hairs, four pale stripes. Pleurae alternately light and dark striped, with light hairs. Sternum and coxae dark gray. Legs uniformly dark; mid- and hind tarsi lighter. Wings as figured (Pl. II).

Dorsum and venter of abdomen black with some light hairs.

Male. — Colored as the female except all hairs black.

Distribution. — U.P.: Alger,^{1,2} Chippewa,¹ Gogebic,³ Houghton,³ Iron,³ Marquette,¹ and Schoolcraft¹ counties. L.P.: Allegan,² Arenac,¹ Berrien,² Branch,⁴ Calhoun,² Clare,² Clinton,⁴ Eaton,⁴ Grand Traverse,⁴ Ingham,² Ionia,⁴ Isabella,¹ Jackson,⁴ Kent,¹ Livingston,^{1*} Manistee,² Midland,⁴ Missaukee,⁴ Montmorency,¹ Oakland,¹ Oceana,² Osceola,¹ Oscoda,¹ Otsego,⁴ St. Joseph,^{1,2} Washtenaw,^{1,2} Wayne,⁴ and Wexford¹ counties.

Specimens examined. — 78 females and 1 male UMMZ; 17 females MSU; 126 females KLH.

Chrysops celeris Osten Sacken

Chrysops celeris Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):376.

Female. — Length 8-10 mm. Frons yellow pollinose; black near the vertex. Callus black. Genae and clypeus black with patches of yellow pollen. Palps brown. First and second antennal segments brown with black hairs; base of third brown, remainder and annulets black.

Dorsum of thorax black with white hairs, faint light markings posteriorly. Pleurae black with bright orange pubescence. Sternum uniformly dark. Legs black with mid- and hind tarsi brown. Wings as figured (Pl. I).

Dorsum of abdomen dull, black, sometimes with greenish tinge, with some white hairs laterally. Venter uniform, dull, black.

Male. — Antennae black, palps small, black; thoracic pleurae with black hairs; wings with more basal infuscation.

Michigan distribution. — U.P.: Alger,¹ Gogebic,³ Houghton,³ Iron,³ and Marquette¹ counties. L.P.: Allegan,² Antrim,² Berrien,¹ Branch,² Calhoun,¹ Cheboygan,¹ Clare,¹ Clinton,⁴ Eaton,⁴ Gladwin,⁴ Grand Traverse,⁴ Gratiot,¹ Ingham,⁴ Iosco,¹ Isabella,² Kalkaska,⁴ Lapeer,^{1,2} Livingston,^{1*} Mecosta,² Midland,² Missaukee,¹ Montmorency,¹ Oakland,¹ Ogemaw,⁴ Otsego,¹ St. Clair,¹ St. Joseph,^{1,2} Shiawassee,² Van Buren,² Washtenaw,^{1,2} and Wayne¹ counties.

Specimens examined. — 46 females and 2 males UMMZ; 18 females MSU; 26 females KLH.

Chrysops carbonaria Walker

Chrysops carbonaria Walker, *List*, I(1848):203.

Chrysops niger Walker (not Macquart), *List*, I(1848):202.

Chrysops provocans Walker, *Dipt. Saund.*, I(1850):73.

Chrysops fugax Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):375.

Female. — Length 7-9 mm. Frons gray, darkened near the vertex. Callus black. Genae black with spots of gray pollen. Clypeus black, denuded. Palps dark, base of second segment lighter. First and second antennal segments brown; third segment and annulets black.

Dorsum of thorax black with scattered white hairs. Pleurae dull black with light hairs. Sternum black. Legs black except for brown bases of mid- and hind tarsi. Wings as figured (Pl. I).

Dorsum of abdomen black, shining, some white hairs posteriorly. Venter black with white hairs.

Michigan distribution. — U.P.: Alger,^{1,2} Gogebic,¹ Houghton,¹ Iron,⁴ Luce,⁴ Mackinac,^{1,2} Marquette,¹ and Schoolcraft¹ counties and Isle Royale.^{1,2} L.P.: Benzie,⁴ Berrien,¹ Branch,¹ Charlevoix,^{1,2} Cheboygan,¹ Clare,^{1,2} Clinton,⁴ Crawford,^{1,2} Grand Traverse,¹ Ingham,² Iosco,² Kalkaska,² Keweenaw,¹ Lake,¹ Manistee,² Missaukee,⁴ Montcalm,¹ Montmorency,¹ Newaygo,¹ Oakland,¹ Oceana,² Oscoda,¹ Otsego,^{1,2} and Washtenaw¹ counties.

Specimens examined. — 132 females UMMZ; 37 females MSU; 15 females KLH.

Chrysops mitis Osten Sacken

Chrysops mitis Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):374.

Female. — Length 9-11 mm. Frons yellowish gray, darker near the vertex. Callus and genae black with yellow-gray pollen. Clypeus black, denuded. Palps dark brown at the base, black at the apex. First antennal segment yellow, second segment darker, third segment brown basally; annulets black.

Dorsum of thorax dark with two faint white sublateral lines. Pleurae light gray with light yellow to white hairs. Sternum and coxae gray. Legs black. Wings as figured (Pl. II).

Dorsum of abdomen black, sometimes with small gray middorsal triangles. Venter black with some white hairs.

Male. — Completely dark except yellow pollen on clypeus and white hairs on venter of abdomen. Palps minute.

Michigan distribution. — U.P.: Alger,^{1,2} Chippewa,¹ Dickinson,¹ Iron,³ Gogebic,³ Houghton,^{1,3} Keweenaw,¹ Mackinac,¹ Marquette,¹ and Schoolcraft¹ counties and Isle Royale.¹ L.P.: Charlevoix,¹ Cheboygan,¹ Clare,² Crawford,² Delta,¹ Grand Traverse,^{1,2} Gratiot,¹ Jackson,¹ Kalkaska,¹ Kent,⁴ Lake,¹ Livingston,¹ Luce,¹ Manistee,⁴ Mecosta,⁴ Midland,⁴ Missaukee,¹ Oakland,¹ Osceola,⁴ Oscoda,¹ Presque Isle,² Wayne,⁴ and Wexford¹ counties.

Specimens examined. — 47 females and 3 males UMMZ; 17 females MSU; 147 females and 5 males KLH.

Chrysops shermani Hine

Chrysops shermani Hine, *Ohio Nat.*, 8(1907):229.

Female. — Length 9-10 mm. Frons yellow pollinose with a dark line above callus, and darkened at the vertex. Callus yellow. Genae and clypeus yellow with yellow pollen. Palps yellow, tinged with brown. First antennal segment light basally, darkened apically; second and third segments black except light line at base of third segment.

Dorsum of thorax black with four yellow stripes. Scutellum unicolorous tinged with green. Pleurae with alternate dark brown and yellow stripes. Sternum and mid- and hind coxae dark brown; fore coxae yellow. Legs yellow; apex of fore tibiae and all tarsi tinged with brown. Wings as figured (Pl. III).

Dorsum of thorax yellow with four black longitudinal lines. Center lines converging on second tergite. Lateral lines fade and do not appear on first tergite. Venter yellow with three dark lines.

Michigan distribution. — U.P.: Alger,⁴ Delta,⁴ Gogebic,³ Houghton,³ Iron,³ Keweenaw,² Mackinac,⁴ and Marquette¹ counties. L.P.: Cheboygan,⁴ Clare,² Emmet,¹ Iosco,⁴ Kalkaska,¹ Missaukee,⁴ Montmorency,⁴ and Presque Isle⁴ counties.

Specimens examined. — 4 females UMMZ; 6 females MSU; 40 females KLH.

Chrysops vittata Wiedemann

Chrysops vittata Wiedemann, *Dipt. exot.*, 1(1821):106.

Chrysops areolatus Walker, *List*, I(1848):197.

Chrysops lineatus Jaennicke, *Neue exot. dipt.*, 1867, p. 334.

Female. — Length 7-10 mm. Frons yellow, darkened near vertex. Callus yellow, slightly brownish tinged in some specimens. Genae and clypeus yellow with yellow pollen. Palps yellow. First and second antennal segments light brown; third segment brown at base, darkened apically; annulets black.

Dorsum of thorax black with four yellow lines, yellow hairs. Pleurae with alternately yellow and brown lines. Sternum and mid- and hind coxae dark. Legs yellow; tarsi tinged with black. Wings as figured (Pl. III).

Dorsum of abdomen yellow with four dark stripes; middle pair reaching first tergite; lateral stripes usually fading on second tergite. Venter yellow with three faint dark stripes.

Male. — Colored as the female except lateral stripes sometimes reach first tergite.

Michigan distribution. — U.P.: Alger,¹ Delta,⁴ Gogebic,^{1,3} Houghton,³ Iron,³ Marquette,⁴ Menominee,² Ontonagon,⁴ and Schoolcraft¹ counties. L.P.: Allegan,^{1,2} Antrim,¹ Benzie,¹ Berrien,¹ Calhoun,² Charlevoix,¹ Cheboygan,^{1,2} Clare,¹ Clinton,⁴ Eaton,⁴ Emmet,¹ Grand Traverse,¹ Gratiot,¹ Hillsdale,² Huron,¹ Ingham,² Ionia,¹ Iosco,⁴ Jackson,¹ Kalamazoo,² Kalkaska,¹ Kent,² Lake,^{1,2} Lapeer,¹ Lenawee,² Livingston,^{1*} Luce,² Manistee,^{1,2} Mason,¹ Menominee,² Midland,⁴ Missaukee,⁴ Montcalm,⁴ Montmorency,¹ Muskegon,¹ Newaygo,¹ Oakland,^{1,2} Oceana,⁴ Osceola,⁴ Otsego,¹ Presque Isle,⁴ Roscommon,^{1,2} Shiawassee,² St. Joseph,⁴ Tuscola,¹ Van Buren,² Washtenaw,^{1,2} and Wayne¹ counties.

Specimens examined. — 440 females and 1 male UMMZ; 88 females MSU; 48 females KLH.

Chrysops striata Osten Sacken

Chrysops striata Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):391.

Chrysops pilaris Washburn, *10th Rep. State Ent. Minn.*, 1905, p. 79 (lapsus).

Chrysops vittatus Bellardi (not Wiedemann), *Sagg. Ditt. Mess.*, 1(1859):74.

Female. — Length 7-9 mm. Frons yellow pollinose, dark denuded area at vertex. Callus black (very occasionally brown). Genae and clypeus yellow with yellow pollen. Palps yellow, slightly tinged with brown. First antennal segment yellow; second and third tinged with brown; annulets black.

Dorsum of thorax black; pattern indistinct although at least two light stripes may be seen on some specimens. Scutellum with light-colored posterior margin. Pleurae yellow with yellow hairs. Sternum dark grayish yellow. Legs yellow, apices of fore tibiae and tarsi and basal half of hind femora dark. Wings as figured (Pl. III).

Dorsum of abdomen yellow with four dark stripes; median stripes converging on anterior of second tergite. Lateral stripes absent from first tergite. Venter yellow tinged with black apically.

Michigan distribution. — U.P.: Dickinson,⁴ Gogebic,³ Houghton,³ Iron,³ and Luce⁴ counties. L.P.: Cheboygan,⁴ Clinton,² Clare,² Genesee,⁴ Gladwin,² Grand Traverse,⁴ Huron,¹ Ingham,² Ionia,⁴ Iosco,⁴ Jackson,^{1,2} Kalkaska,⁴ Kent,² Livingston,^{1,2*} Lenawee,² Manistee,⁴ Mecosta,⁴ Midland,⁴ Missaukee,⁴ Montcalm,⁴ Muskegon,¹ Newaygo,¹ Oakland,⁴ Oscoda,² Roscommon,^{1,2} St. Joseph,⁴ Van Buren,⁴ and Washtenaw^{1,2} counties.

Specimens examined. — 91 females in UMMZ; 18 females MSU; 27 females KLH.

Chrysops aberrans Philip

Chrysops aberrans Philip, *Proc. Ent. Soc. Wash.*, 43(1941):122.

Female. — Length 9-11 mm. Frons yellow with dark area at the vertex. Callus yellow (very occasionally brown). Genae and clypeus yellow. Palps yellow, tinged with brown laterally. First antennal segment yellow; second segment darkened; third segment yellow at base; annulets and distal two-thirds of segment dark brown to black.

Dorsum of thorax dark brown with two yellow-green stripes. Scutellum posteriorly margined with yellow. Pleurae dark with three yellow longitudinal stripes. Sternum dark. Fore coxae yellow, mid- and hind coxae dark. Legs yellow; basal half of hind femora, apical half of fore tibiae, and fore tarsi darkened. Wings as figured (Pl. I).

Dorsum of abdomen yellow with four dark stripes. On some specimens the median rows merge on first tergite. Venter yellow with median and lateral dark stripes.

Michigan distribution. — L.P.: Charlevoix,¹ Cheboygan,⁴ Clinton,¹ Emmet,¹ Grand Traverse,¹ Ingham,² Ionia,¹ Jackson,^{1,2} Kalamazoo,² Kent,² Livingston,^{1*} Mason,⁴ Mecosta,¹ Midland,⁴ Montcalm,¹ Oakland,¹ Roscommon,¹ Sanilac,¹ Shiawassee,² St. Joseph,⁴ Van Buren,⁴ and Washtenaw⁴ counties.

Specimens examined. — 52 females including one "paratype" UMMZ; 5 females including one "paratype" MSU.

Note. — This species differs from *C. striata* in two respects: It has a brown or yellow callus, and the hyaline triangle does not reach forward of the furcation.

Chrysops pudica Osten Sacken

Chrysops pudica Osten Sacken (partim equals *C. sackeni* O.S.), *Mem. Boston Soc. Nat. Hist.*, 2(1875):381.

Female. — Length 7-8 mm. Frons gray darkened near the vertex. Callus yellow or black. Genae and clypeus yellow with gray pollen. Palps brownish yellow. First, second, and base of third antennal segments yellowish brown, apex of third segment darker; annulets black.

Dorsum of thorax black with four lighter stripes. Pleurae with alternate brown and gray stripes. Sternum and coxae brown to gray-brown. Legs yellow; apices of fore femora, tibiae, and tarsi dark; hind femora dark. Wings as figured (Pl. III).

Dorsum of abdomen yellow with black V on the first tergite; second tergite with black inverted V; V's separated by thin yellow line. Rest of abdomen black; tergites bordered posteriorly with yellow. Middorsal row of yellow triangles present. Venter yellow tinged with black posteriorly.

Male. — Colored as the female.

Michigan distribution. — L.P.: Jackson,¹ Kalamazoo,² Livingston,^{1*} Van Buren,⁴ and Washtenaw¹ counties.

Species examined. — 16 females and 8 males UMMZ; 1 female MSU.

Chrysops sackeni Hine

Chrysops sackeni Hine, *Ohio State Acad. Sci. Spec. Papers*, No. 5(1903):42.
Chrysops pudica Osten Sacken (partim), *Mem. Boston Soc. Nat. Hist.*, 2(1875):382.

Female. — Length 8-10 mm. Frons light yellow; darker, denuded at vertex. Callus yellow or black. Genae and clypeus yellow with yellow pollen. Palps yellow. First, second, and third antennal segments brown, first two with dark hairs; annulets black.

Dorsum of thorax blackish with four yellow stripes; yellow hairs. Pleurae with alternate dark brown and yellow stripes and light yellow hairs. Sternum and mid- and hind coxae dark. Legs yellow; fore tarsi, apical parts of fore tibiae, bases of hind tibiae, and mid- and hind tarsi tinged with black. Wings as figured (Pl. III).

Dorsum of abdomen with first and second tergites yellow. The first tergite with dark rectangle posterior to the scutellum; the second with dark inverted V. Remaining tergites dark with a median row of yellow triangles and yellow posterior borders. Venter yellow with a median black spot on each sternite.

Michigan distribution. — U.P.: Schoolcraft¹ County and Isle Royale.²
 L.P.: Alcona,⁴ Antrim,² Cass,⁴ Charlevoix,¹ Cheboygan,¹ Clare,¹ Emmet,⁴ Gladwin,¹ Gratiot,⁴ Iosco,¹ Kent,² Mecosta,⁴ Midland,⁴ Monroe,¹ Montcalm,¹ Montmorency,⁴ Oakland,¹ Oceana,¹ St. Joseph,⁴ and Washtenaw^{1,2} counties.

Specimens examined. — 16 females UMMZ; 5 females MSU.

Chrysops brunnea Hine

Chrysops brunnea Hine, *Ohio State Acad. Sci. Spec. Papers*, No. 5(1903):34.

Female. — Length 8-10 mm. Frons yellow, darkened at the vertex. Callus yellow. Genae and palps yellow. Clypeus yellow, denuded. First and second antennal segments light brown, much enlarged, and densely covered with black hairs. Third segment light orange-yellow; annulets black.

Dorsum of thorax dark with four grayish stripes, scutellum uniformly brown. Pleurae yellow-brown with brown stripe running from the wing base anteriorly. Sternum uniformly brown. Legs light brown to yellow, tarsi somewhat darker. Wings as figured (Pl. I).

Dorsum of abdomen with no definite pattern, broadly brown, darkened medianly in each segment. Venter uniformly dark brown.

Michigan distribution. — L.P.: Wayne¹ County.

Specimens examined. — 7 females UMMZ.

Chrysops flavida Wiedemann

Chrysops flavida Wiedemann, *Dipt. exot.*, 1(1821):105.

Chrysops canifrons Walker, *List*, I(1848):197.

Chrysops guiterasi Brunetti, *Bull. Ent. Res.*, 13(1923):401.

Female. — Length 8-10 mm. Frons and callus yellow. Genae yellow. Clypeus yellow, denuded. Palps yellow with yellow hairs. First and second antennal segments yellow with black hairs; third segment darker; annulets black.

Dorsum of thorax brown with four yellow-gray stripes. Pleurae alternately brown and yellow striped. Sternum and coxae brown. Legs yellow, tarsi and apical half of fore tibiae tinged with brown. Wings as figured (Pl. II).

Dorsum of abdomen brown with a middorsal row of yellow triangles. Each tergite banded posteriorly with yellow. Sublateral pale spots on tergites 1, 2, and occasionally 3. Venter yellow tinged with brown toward the apex.

Michigan distribution. — L.P.: Jackson,¹ Oakland,¹ and Washtenaw^{1,2} counties.

Specimens examined. — 41 females UMMZ; 13 females MSU.

Chrysops atlantica Pechuman

Chrysops atlantica Pechuman, *Can. Ent.*, 81(1948):79.

Female. — Length 7-8 mm. Frons yellow; denuded at the vertex. Calus yellow. Genae and clypeus yellow with yellow pollen laterally. Palps yellow. First two antennal segments yellow, with black hairs; third segment yellowish orange with blackened annulets.

Dorsum of thorax yellowish with darker yellow stripes. Pleurae and sternum yellow with yellow pollen and hairs. Legs yellow, tarsi tinged with black. Wings as figured (Pl. I).

Dorsum of abdomen dark yellow with lighter median triangles. Posterior borders of tergites yellow. Venter yellow with lighter posterior borders to the sternites.

Michigan distribution. — L.P.: Alcona⁴ County.

Specimens examined. — 3 females UMMZ.

Chrysops noctifera pertinax Williston

Chrysops pertinax Williston, *Trans. Kans. Acad. Sci.*, 10(1887):132.

Chrysops nigriventris Bigot, *Mem. Soc. Zool. France*, 5(1892):604.

Chrysops noctifer Hine (partim), *Ohio Nat.*, 5(1904):224.

Chrysops noctifera pertinax. Philip, *Amer. Midl. Nat.*, 37(1947):278.

Female. — Length 8-10 mm. Frons gray; darkened at the vertex. Calus black, shining. Genae and clypeus black with patches of yellow pollen. Palps black. Antenna black, base of first segment reddish; first two segments with black hairs.

Dorsum of thorax black with black hairs; a few white hairs around wing base. Pleurae and sternum black with white to grayish hairs. Legs black. Wings as figured (Pl. II).

Dorsum of abdomen black with white hairs on posterior border of tergites. White median triangles present in some specimens. Venter black.

Michigan distribution. — Unknown. Reported from Michigan by Philip, 1947, *Amer. Midl. Nat.*, 37: 278.

Specimens examined. — 9 females UMMZ.

Chrysops wiedemanni Kröber

Chrysops wiedemanni Kröber, *Stettin. Ent. Ztg.*, 87(1926):267.

Chrysops fraternus Kröber, *Stettin. Ent. Ztg.*, 87(1926):317.

Chrysops obsoletus of authors (not Wiedemann, 1821, *Dipt. exot.*, 1:108).

Female. — Length 6-9 mm. Frons yellow pollinose; denuded and black at vertex. Callus black. Genae and clypeus yellow tinged with black; pollen yellow. Palps dark brown to black. First antennal segment yellow; second brown; both with black hairs; third segment brown basally; apex and annulets black.

Dorsum of thorax black with two indistinct light stripes. Scutellum black, margined posteriorly with yellow. Pleurae alternately yellow and dark brown striped. Sternum, mid- and hind coxae dark. Legs yellow; bases of hind tibiae, apices of fore tibiae, and tarsi dark. Wings as figured (Pl. III).

Dorsum of abdomen dark brown, with a light-colored, median, parallel-sided stripe. Small sublateral pale spots sometimes present on first and second tergites. Venter yellow basally, black posteriorly.

Male. — Colored as the female.

Michigan distribution. — U.P.: Mackinac⁴ County. L.P.: Berrien,² Calhoun,⁴ Charlevoix,¹ Cheboygan,^{1,2} Clinton,² Isabella,⁴ Jackson,¹ Kalamazoo,² Kent,² Lake,⁴ Lapeer,^{1,2} Livingston,^{1,2*} Manistee,¹ Mason,⁴ Midland,⁴ Montcalm,¹ Montmorency,¹ Muskegon,¹ Newaygo,^{1,2} Oakland,^{1,2} Otsego,⁴ St. Joseph,² Sanilac,¹ Shiawassee,² Van Buren,² and Washtenaw^{1,2} counties.

Specimens examined. — 50 females and 1 male UMMZ; 35 females MSU.

Chrysops delicatula Osten Sacken

Chrysops delicatula Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):380.

Female. — Length 6-8 mm. Frons gray, denuded and black at the vertex. Callus black. Genae and clypeus yellow with yellow pollen. Palps yellow tinged with brown laterally. First antennal segment yellow; second brown; both with dark brown hairs; third segment brown basally; apex and annulets black.

Dorsum of thorax dark brown with gray lines and white hair. Pleurae with alternate brown and gray lines and brownish hairs. Sternum and mid- and hind coxae dark brown. Fore coxae light brown basally, dark apically. Legs dark brown; fore femora light basally; mid-femora and tibiae light medianly; basal segments of mid- and hind tarsi light. Wings as figured (Pl. I).

Dorsum of abdomen with first tergite black medianly, light laterally; second tergite yellow with black posterior border and median stripe and yellow posterior triangle. Rest of tergites black with yellow posterior borders and median triangles. Venter yellow with black bases to the sternites.

Michigan distribution.—L.P.: Ingham,² Jackson,¹ Kent,² Livingston,¹ Montmorency,¹ and Washtenaw¹ counties.

Specimens examined. — 7 females UMMZ; 2 females MSU.

Chrysops furcata Walker

Chrysops furcata Walker, *List*, I(1848):199.

Chrysops lupus Whitney, *Can. Ent.*, 36(1904):205.

Chrysops proclivis Cameron, *Bull. Ent. Res.*, 17(1926):24.

Female. — Length 9-10 mm. Frons gray, darker at the vertex. Callus black. Clypeus yellow. Genae yellow, darker posteriorly, with yellow pollen. Palps yellow. First antennal segment yellow; second and third segments and annulets black.

Dorsum of thorax dark brown to black with four inconspicuous light stripes. Scutellum dark, covered with dense pubescence. Pleurae with alternate yellow and dark brown stripes and dense light yellow hairs. Sternum, middle, and hind coxae dark. Legs yellow tinged with brown. Wings as figured (Pl. II).

Dorsum of abdomen yellow with a black rectangle on first tergite; second tergite with dark inverted V; other tergites with a yellow median line with two lateral spots; median spots tend to be triangular. Venter yellow with various black markings.

Michigan distribution. — Unknown. Reported by Philip, 1947, *Amer. Midl. Nat.*, 37:274.

Specimens examined. — 4 females UMMZ.

Chrysops aestuans Van der Wulp

Chrysops aestuans Van der Wulp, *Tijdsch. v. Ent.*, 10(1867):135.

Chrysops moerens Walker, *List*, I(1848):201 (preoccupied).

Female. — Length 10-11 mm. Frons grayish yellow, darkened at the vertex. Callus black, shining. Genae and clypeus yellow. Palps yellow, darker laterally. Antenna black with base of third segment brown.

Dorsum of thorax dark with four greenish gray stripes; median stripes converge behind the head. Scutellum uniformly dark. Pleurae and sternum uniformly greenish gray, coxae slightly darker. Legs black. Wings as figured (Pl. I).

Abdomen with light triangles on at least segments 2, 3, and 4. All segments posteriorly margined with yellow. Sublateral pale spots on segments 1 and 2, occasionally extending laterally into segment 3. Venter gray, pattern obscure.

Male. — Colored as the female, except that the sublateral light areas are less extensive and basal cells of wing are infuscated.

Michigan distribution. — L.P.: Arenac,⁴ Bay,¹ Cheboygan,¹ Huron,¹ Iosco,⁴ Leelanau,¹ Mason,² Mecosta,¹ Midland,⁴ Monroe,¹ Montmorency,¹ Oakland,¹ Roscommon,¹ Shiawassee,⁴ St. Joseph,¹ and Tuscola¹ counties.

Specimens examined. — 21 females and 2 males UMMZ; 3 females MSU.

Chrysops callida Osten Sacken

Chrysops callida Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):379.

Chrysops callidula Philip, *Proc. Ent. Soc. Wash.*, 43(1941):117.

Female. — Length 8-10 mm. Frons gray darkened at the vertex. Callus black. Genae yellow. Clypeus yellow, denuded. Palps brown. First and second antennal segments yellow with black hairs; third segment dark, lighter basally.

Dorsum of thorax dark with four light stripes; median pair not reaching scutellum. Scutellum uniformly dark. Pleurae dark with two light stripes. Sternum uniformly dark. Legs black except bases of tibiae of mid- and hind tarsi. Wings as figured (Pl. I).

Dorsum of abdomen black, with median row of yellow triangles. All tergites except first and second banded posteriorly with yellow. Sublateral pale spot on first and second tergites sometimes laterally encroaching on third tergite. Small rounded light areas sometimes found laterally on segment three.

Michigan distribution. — L.P.: Alpena,⁴ Arenac,¹ Berrien,¹ Calhoun,² Cheboygan,⁴ Eaton,⁴ Gladwin,⁴ Huron,¹ Ingham,⁴ Ionia,⁴ Iosco,¹ Isabella,⁴ Jackson,¹ Kalamazoo,² Kent,⁴ Lapeer,¹ Lenawee,⁴ Livingston,¹ Macomb,¹ Mecosta,¹ Midland,¹ Monroe,⁴ Oakland,^{1,2} Saginaw,⁴ St. Joseph,¹ Shiawassee,² Tuscola,¹ Van Buren,⁴ Washtenaw,^{1,2} and Wayne⁴ counties.

Specimens examined. — 85 females UMMZ; 28 females MSU.

Chrysops montana Osten Sacken

Chrysops montana Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):382.

Chrysops furcatus Hine, *Ohio Nat.*, 5(1904):223.

Female. — Length 8-10 mm. Frons yellow pollinose, darker near the vertex. Callus black. Genae and clypeus yellow with yellow pollen. Palps yellow with yellow hairs. First and second antennal segments yellow with dark hairs; base of third segment light becoming black; annulets black.

Dorsum of thorax dark with two greenish sublateral stripes. Scutellum greenish. Pleurae with yellow hairs and alternate yellow and brown longitudinal stripes. Sternum and coxae dark. Legs yellow, apices of fore tibiae and tarsi dark. Hind legs tinged with brown. Wings as figured (Pl. II).

Dorsum of abdomen yellow with four black lines; median lines converg-

ing on second tergite. Usually only a black spot present on first tergite. Outer lines often indistinct; may be absent on segments 1 and 2. Venter yellow tinged with brown apically.

Michigan distribution. — U.P.: Marquette¹ and Schoolcraft¹ counties. L.P.: Huron,¹ Ingham,² Ionia,² Jackson,¹ Kent,² Manistee,⁴ Mason,⁴ Montcalm,⁴ Newaygo,⁴ Oakland,¹ Osceola,⁴ Van Buren,² and Washtenaw^{1,2} counties. Specimens examined. — 74 females UMMZ; 7 females MSU.

Chrysops moecha Osten Sacken

Chrysops moecha Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):315.
Chrysops moechus Segal, *Journ. N.Y. Ent. Soc.*, 44(1936):147 (lapsus).

Female. — Length 8-9 mm. Frons yellow, slightly darkened at the vertex. Callus black. Genae and clypeus yellow with yellow pollen. Palps yellow with dark hairs. First and second antennal segments yellow with dark hairs; base of third segment yellow, with apex and annulets darker.

Dorsum of the thorax dark with a sublateral pale green stripe on each side. Pleurae with alternating dark and light stripes. Sternum and coxae dark. Legs yellow except for darkened apices of fore tibiae and fore tarsi. Wings as figured (Pl. II).

Dorsum of abdomen with first abdominal tergite yellow except small median black rectangle posterior to the scutellum. Second to fourth tergites dark posteriorly with a yellow median line and sublateral yellow areas. Rest of tergum usually dark. Venter yellow tinged with black posteriorly.

Male. — Uniformly dark brown except yellow genae and clypeus.

Michigan distribution. — L.P.: Alpena,⁴ Arenac,¹ Berrien,¹ Clare,¹ Gladwin,⁴ Ingham,² Ionia,⁴ Jackson,¹ Lake,¹ Lapeer,¹ Mecosta,¹ Menominee,² Midland,¹ Missaukee,¹ Muskegon,⁴ Oakland,⁴ Oceana,² Ogemaw,⁴ Shiawassee,² Van Buren,² and Washtenaw¹ counties.

Specimens examined. — 27 females and 2 males UMMZ; 8 females and 2 males MSU.

Chrysops pikei Whitney

Chrysops pikei Whitney, *Can. Ent.*, 36(1904):205.

Female. — Length 7-8 mm. Frons yellow pollinose; darker near the vertex. Callus black. Genae slightly darker than clypeus, but both with rich yellow pollen. Palps yellow. First and second antennal segments light brownish to yellow with black hairs; third segment darker with black annulets.

Dorsum of thorax black with four yellowish lines, and scattered yellow hairs. Pleurae alternately yellow and dark striped, with sparse yellow hairs. Sternum and coxae dark brown. Legs yellow; fore tarsi and apical halves of tibiae dark. Wings as figured (Pl. III).

Dorsum of abdomen yellow with four black stripes; lateral stripes fading on first and second tergites. Middorsal pair sometimes merging on first tergite. Venter yellow, with two lateral dark stripes; tinged with black apically.

Male. — Colored as the female.

Michigan distribution. — L.P.: Arenac,⁴ Bay,⁴ Berrien,⁴ Gladwin,⁴ Gratiot,⁴ Huron,¹ Ingham,² Lake,¹ Midland,⁴ Monroe,⁴ Saginaw,¹ Shiawassee,⁴ Tuscola,¹ Van Buren,² Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 11 females and 2 males UMMZ; 8 females MSU.

Chrysops sequax Williston

Chrysops sequax Williston, *Trans. Kans. Acad. Sci.*, 10(1887):133.

Female. — Length 8-9 mm. Frons yellow pollinose; dark, denuded at vertex. Callus black. Genae and clypeus yellow mottled with brown, with yellow pollen. Palps yellow, darkened laterally. First antennal segment yellow, second segment light brown, third segment dark brown to black; annulets black.

Dorsum of thorax dark brown with four yellow stripes, hairs yellow. Pleurae with alternate yellow and dark brown bands and yellow hairs. Sternum dark with mid-ventral band of yellow pollen. Coxae dark. First pair of legs yellow, with apices of tibiae and tarsi darkened. Middle and hind legs yellow, basal parts of femora, apices of hind tibiae, apical segments of middle and hind tarsi black. Wings as figured (Pl. III).

Dorsum of abdomen yellow with four black longitudinal stripes; the median pair narrowly converging on tergite 1; the lateral pair extending the whole length of the abdomen. Venter yellow with three dark stripes; the broad center stripe present on all sternites; the narrow lateral stripes absent from first sternite.

Michigan distribution. — Unknown. Reported from Michigan by Philip, 1947, *Amer. Midl. Nat.*, 37:281.

Specimens examined. — 2 females UMMZ.

Chrysops dimmocki Hine

Chrysops dimmocki Hine, *Ohio Nat.*, 6(1905):393.

Chrysops pudica Osten Sacken (*partim*), *Mem. Boston Soc. Nat. Hist.*, 2(1876):381.

Female. — Length 7-9 mm. Frons gray with dark denuded area near vertex. Callus black. Genae and clypeus yellow with yellow pollen. Palps brown. First and second antennal segments yellow with black hairs; base of third antennal segment yellow; apex and annulets black.

Dorsum of thorax blackish with four light stripes; median pair fading posteriorly. Pleurae with alternate light and dark stripes. Sternum and mid- and hind coxae dark. Legs yellow; apices of tibiae and tarsi black. Wings as figured (Pl. I).

Dorsum of abdomen yellow with dark rectangle posterior to scutellum; second tergite with a dark inverted V. Other tergites dark, bordered behind with yellow; and with a row of yellow median triangles. Venter yellow with median black spots on sternites 3 to 5; posteriorly black, bordered behind with yellow.

Michigan distribution. — Unknown. Reported by Philip, 1947, *Amer. Midl. Nat.* 37:272.

Specimens examined. — 54 females UMMZ.

Chrysops venus Philip

Chrysops venus Philip, *Ann. Ent. Soc. Amer.*, 42(1949):457-58.

Female. — Length 9-11 mm. Length of "paratype" 11 mm. Frons black with grayish brown pollen. Callus black. Genae and clypeus black with patches of yellow pollen and yellow hairs. Palps brown with brown and yellow hairs. First segment of antennae brown tinged with black, with black hairs; second and third segments dark brown to black; second segment with black hair.

Dorsum of thorax dark brown with lighter lines. Scutellum black. Pleurae alternately yellow and brown striped with yellow hairs. Sternum and legs dark brown; bases of fore and mid-tarsi somewhat lighter. Wings as figured (Pl. III).

Dorsum of abdomen yellow with dark area around scutellum; second tergite yellow with a black middorsal pentagonal spot almost touching black spot of first tergite. Other tergites black, banded with wide stripes of yellow posteriorly. Venter yellow anteriorly; bases of posterior tergites darkened.

"Allotype". — 9 mm. in length. Reared from larva collected in Iron County, Michigan, sec. 30, T. 46 N., R. 36. Larva collected 30 May, pupated 2 June, and emerged 13 June 1955.

Head black around ocelli; genae and clypeus with yellow pollen and hairs. Palpi and proboscis black with black hairs. First antennal segment brown tinged with black; second and third segments black; first and second segments black with black hairs.

Dorsum of thorax black with median and lateral rows of yellow hairs. Pleurae with alternate rows of black and yellow pollen; pile yellow. Venter black with sparse yellow hairs. Legs black; femora with yellow hairs, tibiae and tarsi with black hairs. Wings as in the female except more infuscation in basal cells.

First abdominal segment yellow with wide black band around posterior border of scutellum, extending medianly to the posterior border of the segment. Second segment yellow with black semicircular area on the anteromedian half of segment. Other segments black with yellow posterior borders. First three ventral segments yellow with black median spots; remainder black with yellow posterior borders.

A second larva from the same locality which emerged as a male, 17 June, varies but little from the "allotype." A third male collected by Dr. G. B. Fairchild from Cheboygan County, Michigan, 4 June 1955, differs

from the above description by being only 8 mm. in length, having the first antennal segment black, and the bases of the mid-tibiae and mid- and hind tarsi brown.

The allotype along with pupal case is now in the collection of Dr. C. B. Philip, Hamilton, Montana. The second specimen and pupal case are in UMMZ, and the third specimen has been placed in the U.S. National Museum.

Michigan distribution. — U.P.: Alger,² Gogebic,³ Houghton,^{2,3} Iron,³ Keewenaw,¹ Luce,² Mackinac,⁴ and Ontonagon² counties. L.P.: Cheboygan³ County.

Specimens examined. — 1 "paratype" female UMMZ; 4 females MSU; 13 females KLH; males as indicated above.

Chrysops frigida Osten Sacken

Chrysops frigida Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):384.
Chrysops canadensis Kröber, *Stettin. Ent. Ztg.*, 87(1926):277.

Female. — Length 7-11 mm. Frons yellow darkened at the vertex. Callus black. Genae black with yellow pollen. Clypeus typically black with yellow pollen medianly. Palps brown. First antennal segment brown, rest dark brown to black.

Dorsum of thorax dark with lighter median stripe; bounded laterally by gray stripes with yellow hairs. Scutellum black. Pleurae alternately gray and black striped with yellow hairs. Sternum and coxae dark. Legs black except brown basal halves of mid-tibiae and basal segments of the coxae. Wings as figured (Pl. II).

Dorsum of abdomen with first tergite yellow, black line around the scutellum; second tergite yellow with a dark middorsal rectangle completely surrounded by yellow; Other segments black, banded posteriorly with yellow. Venter with sternites 1 to 3 yellow, remainder black, banded posteriorly with yellow.

Michigan distribution. — U.P.: Chippewa,¹ Gogebic,³ Houghton,³ Iron,³ and Schoolcraft¹ counties, and Isle Royale.⁴ L.P.: Alcona,⁴ Berrien,⁴ Charlevoix,² Cheboygan,⁴ Clare,² Crawford,⁴ Ingham,² Iosco,⁴ Kalkaska,⁴ Kent,² Livingston,⁴ Mecosta,⁴ Midland,⁴ Missaukee,⁴ Oakland,⁴ Oceana,⁴ Ogemaw,⁴ Otsego,⁴ Osceola,⁴ Roscommon,⁴ Washtenaw,^{1,2} Wayne,¹ and Wexford⁴ counties.

Specimens examined. — 9 females UMMZ; 8 females MSU; 46 females KLH.

Chrysops obsoleta Wiedemann

Chrysops obsoleta Wiedemann, *Dipt. exot.*, I(1821):108.

? *Chrysops trinotata* Macquart, *Dipt. exot. nouv. peu connus*, I, Pt. 1(1838):161.

Chrysops morosus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):389.

Chrysops lugens Hine, *Ohio State Acad. Sci. Spec. Papers*, No. 5(1903):39.

Chrysops lugens morosus Daecke, *Ent. News*, 18(1907):142.

Female. — Length 7–8 mm. Frons yellow pollinose; darker at the vertex. Callus black. Genae and clypeus yellow with a dark spot on each side. Palps dark. Basal segment of antenna yellow with black hairs; second segment darker with black hairs; third segment and annulets black.

Dorsum of thorax black with four grayish green stripes. Scutellum dark, yellow laterally and posteriorly. Pleurae alternately yellow and brown striped, with thin yellow hairs. Sternum and coxae dark brown. Legs yellow; fore tarsi and apical halves of tibiae dark. Wings as figured (Pl. III).

Dorsum of abdomen dark brown with an orange median stripe. Venter dark with large sublateral pale areas on first to fourth sternites.

Male. — Colored as the female. Middorsal abdominal stripe somewhat more narrow.

Michigan distribution. — U.P.: Alger¹ County. L.P.: Berrien,¹ Jackson,¹ Montmorency,¹ Otsego¹ and Washtenaw¹ counties.

Specimens examined. — 37 females and 1 male UMMZ.

Chrysops geminata geminata Wiedemann

Chrysops geminata Wiedemann, *Auss. zweifl. Ins.*, 1(1828):205.

Chrysops fallax Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):392.

Female. — Length 7–8 mm. Frons yellow, darkened near the vertex. Callus black. Genae yellow with yellow pollen. Clypeus denuded, yellow tinged with black laterally. Palps light brown. First, second, and base of third antennal segments brown; apex of third segment and annulets darker.

Dorsum of thorax dark brown with sublateral gray-green stripe. Pleurae alternately yellow and brown striped with yellow hairs. Sternum and coxae dark. Legs dark brown except basal halves of fore tibiae. Apices of femora, tibiae, tarsi of midleg, and tarsi of hind leg yellow. Wings as figured (Pl. II).

Dorsum of abdomen black and yellow. First tergite yellow except black border around scutellum. Second tergite yellow except black mid-dorsal inverted V. Rest of abdomen black with a row of middorsal yellow triangles and yellow posterior borders of the segments. Venter yellow with median dark areas.

Male. — Colored as the female.

Michigan distribution. — L.P.: Kalamazoo,² Kent,² Mason,⁴ Newaygo,⁴ Oakland,¹ Oceana,² Shiawassee,² Van Buren,² and Washtenaw¹ counties.

Specimens examined. — 11 females and 1 male UMMZ; 10 females MSU.

Chrysops geminata impuncta Kröber

Chrysops geminata impuncta Kröber, *Stettin. Ent. Ztg.*, 87(1926):301.

Female. — Varies from the typical *C. geminata* only in having the second abdominal segment entirely yellow.

Michigan distribution. — Unknown. Reported by Philip, 1947, *Amer. Midl. Nat.*, 37:275.

Specimens examined. — 6 females UMMZ.

Chrysops fuliginosa Wiedemann

Chrysops fuliginosa Wiedemann, *Dipt. exot.*, 1(1821):109.

Chrysops plangens Wiedemann, *Auss. zweifl. Ins.*, 1(1828):210.

Female. — Length 5 mm. Frons grayish yellow; denuded at the vertex. Callus dark brown. Genae and clypeus brown with patches of yellow pollen. Palps brown and short. First two antennal segments yellowish brown with black hairs; third segment and annulets dark brown.

Dorsum of thorax dark brown to black; pattern obscure. Pleurae and sternum grayish brown with brown hairs. Legs almost uniformly brown. Wings as figured (Pl. II).

Dorsum of abdomen brownish, tergites with narrow, light posterior margins. Venter lighter, posterior margins more narrow.

Michigan distribution. — L.P.: Oakland⁴ County.

Specimens examined. — 1 female UMMZ.

Note. — Female examined, collected 6 June 1905. In poor condition.

Chrysops dacne Philip

Chrysops lugens of authors.

Chrysops dacne Philip, *Rev. Brasil. Ent.*, 3(1955):99-103.

Female. — Length 7-9 mm. Frons gray; black rectangle at the vertex. Callus black. Genae dark with yellow pollen. Clypeus dark with light areas. Palps dark brown. First and second antennal segments brown with black hairs; third segment light at base, black apically; annulets black.

Dorsum of thorax dark brown to black with four faded light stripes. Pleurae with alternate dark brown and yellowish stripes. Sternum, mid- and hind coxae dark. Legs bicolored; fore coxae, femora, and bases of tibiae yellow; mid- and hind legs with yellow apices of femora and tibiae. Wings as figured (Pl. I).

Dorsum of abdomen dark brown with light median line. Venter uniformly dark.

Michigan distribution. — Berrien⁴ County.

Specimens examined. — 15 females UMMZ and 1 "paratype" female UMMZ; 1 "paratype" female KLH.

Chrysops inda Osten Sacken

Chrysops inda Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):383.
Chrysops pilummus Kröber, *Stettin. Ent. Ztg.*, 87(1926):329.

Female. — Length 8-9 mm. Frons yellow pollinose, darker near the vertex. Callus black. Genae yellow with yellow pollen. Clypeus yellow, denuded. Palps light brown. First antennal segment light brown to yellow; second segment darker; third segment black except basally.

Dorsum of thorax dark with two sublateral gray stripes on each side. Pleurae with alternating yellow and brown stripes, yellow hairs. Sternum brown to yellow. Legs yellow except dark fore tarsi and apical halves of fore tibiae. Wings as figured (Pl. II).

Dorsum of abdomen yellow with two black lines converging on the second abdominal tergite. Venter yellow tinged with black.

Male. — Colored as the female except more extensive dark areas on abdomen and more infuscation on the wing.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ Delta,¹ Gogebic,³ Houghton,³ Iron,³ Mackinac,⁴ and Schoolcraft¹ counties. L.P.: Alpena,¹ Arenac,⁴ Bay,⁴ Berrien,¹ Cheboygan,¹ Clare,^{1,2} Clinton,² Crawford,⁴ Eaton,² Genesee,¹ Gladwin,¹ Grand Traverse,^{1,2} Huron,¹ Ingham,² Iosco,^{1,2} Isabella,⁴ Jackson,¹ Kalamazoo,² Kalkaska,^{1,2} Kent,⁴ Lake,^{1,2} Lapeer,¹ Livingston,^{1*} Mecosta,¹ Midland,¹ Missaukee,^{1,2} Monroe,⁴ Montcalm,¹ Montmorency,¹ Oakland,¹ Oceana,^{1,2} Ogemaw,⁴ Osceola,¹ Otsego,¹ Presque Isle,² Roscommon,¹ Saginaw,⁴ Sanilac,⁴ Shiawassee,² Washtenaw,¹ Wayne,⁴ and Wexford⁴ counties.

Specimens examined. — 139 females and 1 male UMMZ; 49 females and 2 males MSU; 82 females KLH.

Chrysops univittata Macquart

Chrysops univittata Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 36.
Chrysops fascipennis Macquart, *Hist. nat. dipt.*, 1(1834):216.

Female. — Length 7-8 mm. Frons yellow pollinose, denuded and black at vertex. Callus black. Genae and clypeus yellow with yellow pollen. Palps yellow tinged with brown. First antennal segment yellow; second segment and base of third brown; apex of third segment and annulets black.

Dorsum of thorax black with two light greenish yellow stripes. Scutellum yellow posteriorly; anterior dark area reduced to a small triangle. Pleurae alternately yellow and brown striped. Sternum, mid- and hind coxae dark. Legs yellow; apical halves of fore tibiae and fore tarsi darkened. Wings as figured (Pl. III).

Dorsum of abdomen with a median yellow stripe bounded on each side with irregular black areas. First tergite completely yellow. Venter yellow basally, black apically.

Male. — Colored as the female except dorsum of abdomen shows two distinct black stripes.

Michigan distribution. — U.P.: Alger^{1,2} County. L.P.: Berrien,^{1,2} Cass,² Ingham,² Jackson,¹ Kalamazoo,⁴ Kent,⁴ Mason,² Muskegon,⁴ Oakland,¹ Oceana,² Van Buren,² and Wayne¹ counties.

Specimens examined. — 21 females and 1 male UMMZ; 23 females MSU.

Genus GONIOPS Aldrich

Goniops Aldrich, *Psyche*, 6(1892):236-37.

Goniops Kertész, *Catalogus Tabanid.*, 1900, p. 25 (lapsus).
(generotype: *Pangonia chrysocoma* Osten Sacken)

Generic characteristics. — Eyes bare; separated in the female, not separated in the male; eyes acutely angulate above in the female. Flagellum of antenna composed of eight segments. Proboscis distinctly shorter than the head. Anterior part of the wings infuscated.

Goniops chrysocoma (Osten Sacken)

Pangonia chrysocoma Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):368.

Goniops hippoboscoides Aldrich, *Psyche*, 6(1892):236.

Goniops chrysocoma. Hine, *Ent. News*, 11(1900):362.

Female (characteristics after Osten Sacken, 1875 and Brennan, 1935). — Frons and genae yellow pollinose. Clypeus denuded, yellow. Palps yellow with short black hairs. Antennae yellow; third segment reddish.

Dorsum of thorax yellow, reddish on the disc; with a faint, darkened, longitudinal line. Legs pale yellow; apical tarsal segments darker. Halteres yellow. Wings infuscated as follows: Cells R, 2d M and 1st A except at their extreme bases and a small round hyaline spot in cell 2d M at the bifurcation of vein M, also the apical part of cell 1st A is more or less hyaline along vein 2d A; cell R, apically from yellow stigma; cells R₃ and R₄ entirely, except for a subhyaline area along the apical part of the latter; the proximal half of cell R₅ (in this cell the color is solid up to the bifurcation of veins M₁ and M₂, from which it extends across to the bifurcation of vein R₄ and R₅, thence tapering along R₅); the proximal third of cell 1st M₂; the extreme base of cell M₃; the basal part of cell Cu₁ and tapering along vein Cu₂

Dorsum of abdomen shining, golden yellow; each segment slightly darkened anteriorly.

Male. — Colored as the female.

Michigan distribution. — L. P.: Ingham¹ County.

Specimens examined. — 1 male MSU.

Genus STONEMYIA Brennan

Stonemyia Brennan, *Univ. Kans. Sci. Bull.*, 22(1935):360.
(generotype: *Pangonia tranquilla* Osten Sacken).

Generic characteristics. — Head convex in lateral aspect. Eyes bare or pubescent; contiguous in the male, separate in the female. Ocelli present. Flagellum of antenna composed of eight segments. Palps very slender, one-third to one-half the length of the proboscis. First posterior cell open.

Key to Michigan Females of *Stonemyia*

1. All femora blackish; posterior borders of abdominal tergites orange
..... *tranquilla* (p. 33)
- All femora brown; posterior borders of abdominal tergites yellowish gray
..... *rasa* (p. 33)

Stonemyia rasa (Loew)

Pangonia rasa Loew, *Dipt. Amer. sept. ind.*, II(1869):119 (Pt. VIII, No. 7).
Buplex rasa. Bequaert, *Psyche*, 31(1924):33.
Stonemyia rasa. Brennan, *Univ. Kans. Sci. Bull.*, 22(1935):363.

Female. — Length 13 mm. Frons grayish, calli absent. Genae and clypeus grayish with white hairs. Palps very slender; yellow with black hairs. First and second antennal segments yellow-brown with black hairs; third segment dark brown.

Dorsum of thorax black with indistinct lines of white pollen and white hairs. Pleurae, sternum, and coxae grayish with white hairs. Legs yellowish brown, hind tibiae darker. Wings hyaline with light yellow veins.

Dorsum of abdomen brown. Posterior borders of tergites light with white hairs. Venter brown, darkened posteriorly.

Michigan distribution. — L.P.: Ingham² County.

Specimens examined. — 1 female MSU.

Stonemyia tranquilla (Osten Sacken)

Pangonia tranquilla Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):367.
Corizoneura tranquilla. Surcouf, *Gen. Ins.*, Fasc. 175(1921):134.
Buplex tranquilla. Bequaert, *Psyche*, 31(1924):33.
Stonemyia tranquilla. Brennan, *Univ. Kans. Sci. Bull.*, 22(1935):365.

Female. — Length 10 to 14.5 mm. Frons dark brownish black. Calli absent. Genae and clypeus yellowish gray with yellowish hairs. Palps very slender, dark brown with yellowish hairs; one-half as long as proboscis. Antenna entirely black.

Dorsum of thorax blackish with gray pollen in indistinct stripes and

whitish hairs. Pleurae, sternum, and coxae light gray with very light yellow hairs. Legs dark brown; bases of tibiae lighter. Wings with slight infuscation along anterior margins.

Dorsum of abdomen dark brown with thin gray pollen, light hairs, and orange posterior borders to the tergites; second tergite orange laterally with a darkened anteromedian spot. Venter dark brown with gray pollen, sternites with light hairs and light orange posterior borders.

Michigan distribution. — U.P.: Alger,¹ Baraga,¹ and Chippewa¹ counties. L.P.: Cheboygan¹ County.

Specimens examined. — 24 females UMMZ.

Genus CHRYSOZONA Meigen

Chrysozona Meigen, *Nouvelle class. mouches a deux ailes*, 1800, p. 23.

(generotype: *Tabanus pluvialis* L.)

Haematopota Meigen, *Illiger's Mag.*, 2(1803):267.

Generic characteristics. — Small, slender; eye pilose; frons very broad, basal callus transverse; first antennal segment at least one and one-half times as long as wide; third segment with four divisions, without a distinct dorsal angle; wing infuscated, with irregular hyaline maculations.

Chrysozona americana (Osten Sacken)

Haematopota americana Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1875):395.

Chrysozona americana. Philip, *Amer. Midl. Nat.*, 37(1947):286.

Female. — Length 8-11 mm. Frons gray with two distinct black spots above the callus. Genae gray with black punctations. Antenna black, first segment elongate and swollen. Callus rectangular, denuded, four times as long as wide. Second palpal segment cream-colored, slightly swollen basally; first palpal segment darker than second. Proboscis slightly longer than palps.

Dorsum of thorax dark brown with three light stripes; also light stripes from humeral lobes to wing bases. Pleurae, sternum, and coxae gray with light hairs. Femora dark gray; basal third of fore tibiae light, apical part and first tarsus dark; second and third tibiae with four alternating light and dark bands. First segments of middle and hind tarsi mostly light. Wings brownish with light maculations; apical maculations not completely cutting across wing.

Dorsum of abdomen dark brown above with a median row of light triangles on segments 2 through 6. Sublateral rounded gray spots on tergites 2 through 6, reaching greatest size on tergite 5. Venter uniformly dark gray.

Michigan distribution. — L.P.: Delta¹ County.

Specimens examined. — 3 females UMMZ.

Genus ATYLOTUS Osten Sacken

Atylotus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):426 (subgenus)
 (generotype: *Tabanus bicolor* Wiedemann)
Ochrops Szilady, *Ent. Mitt.*, 4(1915):93.
Dasystypia Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):347.

Generic characteristics. — Small yellow to grayish species; eye pilose, usually with a single diagonal purple band; no ocellar tubercle; median and basal calli absent or much reduced; second palpal segment of female much enlarged basally.

Key to the Michigan Females of *Atylotus*

- 1. Frons with denuded calli *incisuralis* (p. 35)
 Frons with no denuded calli 2
- 2. Pleurae yellow. *bicolor* (p. 36)
 Pleurae grayish. 3
- 3. Lighter hairs of abdomen white. *ohioensis* (p. 36)
 Lighter hairs of abdomen yellow. 4
- 4. Hairs of venter of abdomen almost white; many black hairs on palpus
 *pematicus* (p. 37)
 Hairs of venter of abdomen yellow; few black hairs on palpus. . *thoracicus* (p. 37)

Atylotus incisuralis (Macquart)

Tabanus incisuralis Macquart, *Dipt. exot. nouv. peu connus*, Sup. II, 1847, p. 21.
Tabanus intermedius Walker, *List*, I(1848):173.
Tabanus insuetus Osten Sacken, *West. Dipt.*, 1877, p. 219.
Atylotus insuetus Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):62.
Atylotus incisuralis. Philip, *Can. Ent.*, 73(1941):105.

Female. — Length 10-11 mm. Frons yellow-brown; parallel-sided; about five times as high as basal width. Median callus black, shining, round. Basal callus black, shining, subround. Basal callus yellow-brown pollinose. Genae and clypeus yellow-gray with yellow hairs. Palps creamy, with black hairs; strongly inflated basally, tapering rapidly to a point. First two antennal segments light brown with black hairs; third segment dark brown; annulets almost black.

Dorsum of thorax blackish with thin gray pollen forming indistinct light stripes. Pleurae, sternum, and coxae gray with yellow hairs. Femora grayish brown, tibiae and tarsi light brown; apices of fore tibiae, and fore tarsi almost black. Wings hyaline; vein R₄ angulate basally.

Dorsum of abdomen dark grayish brown, yellowish laterally; indistinct median and sublateral pale spots scarcely visible in some specimens. Venter dark grayish brown.

Male. — Body colored as the female except pollen and hair of the head more gray than yellow.

Michigan distribution. — Isle Royale.⁴

Specimens examined. — 3 females and 2 males UMMZ.

Atylotus bicolor (Wiedemann)

Tabanus bicolor Wiedemann, *Dipt. exot.*, 1(1821):96.

Tabanus fulvescens Walker, *List*, I(1848):171.

Tabanus ruficeps Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 85.

Atylotus bicolor. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):62.

Female. — Length 10-15 mm. Frons yellow with dark hairs; calli absent. Genae orange-yellow. Palps short and stout with black hair. Proboscis slightly longer than palps. Antenna orange-yellow, black hairs on first and second segments.

Dorsum of thorax brown with dense orange-yellow hairs. Legs orange-yellow with black hairs on femora and tibiae. Wings hyaline, veins yellow, costal cells tinged with yellow.

Dorsum of abdomen variable; usually with dark spots and orange-yellow hairs. Venter uniformly light.

Male. — Colored as female.

Michigan distribution. — U.P.: Schoolcraft² County. L.P.: Charlevoix,¹ Clinton,² Cheboygan,^{1,2} Kent,² Livingston,⁴ Midland,⁴ Osceola,⁴ Otsego,² and Washtenaw^{1,2} counties.

Specimens examined. — 2 males and 2 females UMMZ; 2 females and 3 males MSU.

Atylotus ohioensis (Hine)

Tabanus ohioensis Hine, *Can. Ent.*, 33(1901):28.

Tabanus pruinosis Hine, *Can. Ent.*, 32(1900):248.

Atylotus ohioensis. Stone, *USDA Misc. Publ.*, No. 305(1938):22.

Female (characteristics after Stone, 1938). — Length 8.5-10 mm. Eye with rather dense, yellowish pile. Frons, subcallus, clypeus, and genae pale yellowish, somewhat gray below. Frons about two and one-half times as high as wide, the sides parallel; no calli or ocellar tubercle. First two antennal segments yellow, with yellow or sometimes blackish hair; third orange-yellow, short and stout basally, with a blunt dorsal angle and no excision, the basal part from three-fourths as broad as long to as broad as long; annulate part short and stout with only three distinct annuli. Palps yellow, second segment stout, with a rather blunt apex and long, erect, yellow and blackish hair.

Thorax and coxae dark gray, with whitish hair. Wing hyaline, with yellowish veins; venation normal. Legs yellowish brown, with yellowish and blackish hair; all femora somewhat darkened at base.

Abdomen nearly uniformly brownish black, the sides of tergites 1 and 2 sometimes yellowish brown.

Male. — Eye densely pilose, the areas of large and small facets rather distinctly differentiated. Coloration essentially as in female, but sides of tergites 1 through 3 yellowish.

Michigan distribution. — L.P.: Cheboygan⁴ County.

Specimens examined. — One male KLH.

Atylotus pemeticus (Johnson)

Tabanus pemeticus Johnson, *Boston Soc. Nat. Hist. Occ. Papers*, 5(1921):11.
Atylotus pemeticus. Stone, *USDA Misc. Publ.*, No. 305(1938):24.

Female. — Length 10 mm. Frons yellowish brown with yellow pubescence. Calli absent. Genae grayish white with white pubescence. Second palpal segment yellowish, swollen basally, sharply pointed apically; with many black hairs. Proboscis slightly longer than palps. First two antennal segments yellow with black hairs; third segment orange yellow.

Dorsum of thorax dark brown, with golden hairs. Pleurae, sternum, and coxae gray with whitish pubescence. Legs yellow with black hairs; fore tarsi and apical part of tibiae darker. Wings hyaline with yellow veins.

Dorsum of abdomen dark with yellow hairs. Venter gray with light hairs.

Michigan distribution. — L.P.: Cheboygan⁴ and Van Buren² counties.
 Specimens examined. — 2 females UMMZ; 1 female MSU.

Atylotus thoracicus (Hine)

Tabanus thoracicus Hine, *Can. Ent.*, 32(1900):248.
Atylotus thoracicus. Stone, *USDA Misc. Publ.*, No. 305(1938):24.

Female. — Length 8-10 mm. Frons pale yellowish with yellow pollen. No calli. Genae gray with gray hairs. Palps slightly swollen basally with long gray hairs mixed with fewer black hairs; palps tapering to a fine point distally. Proboscis slightly longer than palps. First two antennal segments yellow with black hairs; third segment orange-yellow.

Dorsum of thorax gray with light yellow hair. Pleurae, sternum, and coxae gray with whitish hairs. Legs yellow with dark hair. Wings hyaline with yellow veins.

Dorsum of abdomen dull yellow above, sides paler; with yellow hairs. Venter yellow with yellow hairs.

Male. — Colored as the female except darker. Bases of femora gray, abdomen gray beneath.

Michigan distribution. — L.P.: Cheboygan,^{1,2} Clinton,² Kalamazoo,² Livingston,^{1,2*} Midland,⁴ Wayne,⁴ and Wexford⁴ counties.

Specimens examined. — 2 males and 1 female UMMZ; 5 females MSU.

Genus HAMATABANUS Philip

Hamatabanus Philip, *Can. Ent.*, 73(1941):6, 13.
 (generotype: *Tabanus scitus* Walker = *T. carolinensis* Macq.)
Di cladocera Stone (partim), *USDA Misc. Publ.*, No. 305(1938).

Characteristics. — Rather stout species of variable size; eyes finely pilose; without ocelli or ocellar tubercle; wide postocular rims. Third

antennal segment with five divisions; the first prominently produced dorsad and forward. Subcallus without erect black hairs. Abdominal pattern with three rows of spots.

Hamatabanus carolinensis (Macquart)

Tabanus scitus Walker, *List*, I(1848):181.

Tabanus histioculatus Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 53.

Tabanus cerastes Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):462.

Di cladocera scita Stone, *USDA Misc. Publ.*, No. 305(1938):16.

Hamatabanus carolinensis. Philip, *Amer. Midl. Nat.*, 43(1950):433.

Female. — Length 13-16 mm. Frons dark with black hairs at vertex. Median callus slender. Basal callus brown, shining. Subcallus gray pollinose. Genae gray with white hairs. Palps creamy white with a few black hairs. Antenna orange-brown. First two antennal segments with black hairs. Third segment produced dorsad and forward; annulets darker.

Dorsum of thorax reddish brown with mixed pale and black hairs. Pleurae, sternum, and coxae gray with white hairs. Legs reddish brown with light hairs; some black hairs on tibiae and tarsi. Wings hyaline with brown veins.

Dorsum of abdomen reddish brown with a median row of white triangles. Sublateral pale spots present on tergites 1 through 6; sublateral spots on segments 1 and 2 may form large pale areas; spots on tergites 3 through 6 separate and rounded. Venter pale.

Michigan distribution. — Unknown. Reported from the state by Philip, 1947, *Amer. Midl. Nat.*, 37:290.

Specimens examined. — 13 females UMMZ.

Genus HYBOMITRA Enderlein

Hybomitra Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):347.

(generotype, *Hybomitra solox* Enderlein = *Tabanus rhombicus* Osten Sacken).

Theriopectes of authors, not Zeller, *Isis von Oken*, 1842, p. 819.

Therisplectes Marten, *Can. Ent.*, 14(1882):210 (lapsus).

Poecilosoma Lutz, *Inst. Oswaldo Cruz em Manguinhos*, 1909, p. 29.

Stypommia Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):346.

Dasyommia Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):346.

Tylostypia Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):347.

Dasyphyrtia Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):344.

Hybopelma Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):351.

Hylopelma Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):355 (lapsus), 409 (corrected).

Tylostypina Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 545.

Sipala Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 545.

Sziladynus Enderlein, *Zool. Anz.*, 62(1925):181.

Poecilochlamys Lutz, *Zool. Med. Sep. Folha Med.*, 1922, pp. 9 and 11.

Poeciloderas Borgmeier, *Rev. Ent.*, 3(1933):299.

Aploecera Enderlein, *Deutsche Ent. Zeitschr.*, 1933, p. 144.

Characteristics. — Small to large, rather compact flies with denuded ocellar tubercle; eyes usually distinctly pilose, flagellum of antenna with

five subdivisions, and frons variable with a correspondingly wide basal callus.

Key to the Michigan Females of *Hybomitra*

1. Subcallus denuded 2
Subcallus pollinose 10
2. Sublateral pale spots on abdomen confluent and large, brown to orange, covering whole lateral area of abdomen 3
Sublateral pale spots on abdomen small, confined to each tergite 7
3. Orange-yellow spots confined to first three abdominal tergites . . . *cincta* (p. 40)
Orange-yellow spots on more than first three abdominal tergites 4
4. No infuscated spot at furcation; sublateral pale spots smaller 5
Distinct infuscation at furcation; sublateral pale spots larger 6
5. Proboscis elongate; second palpal segment slender *longiglossa* (p. 41)
Proboscis normal; second palpal segment inflated basally *difficilis* (p. 41)
6. First tergite broadly orange laterally; wings with a distinct spot at the furcation; cross veins margined with brown *lasiophthalma* (p. 42)
First tergite broadly black laterally; spot at furcation and margins of cross veins obscure *nuda* (p. 43)
7. Palps small, black; thorax black, shining; legs black; small species, less than 13 mm. *hinei* (p. 44)
Palps light, thorax dull black to gray; legs brown; larger species, more than 13 mm. 8
8. Wing with a distinct spot at the furcation; antenna with a distinct dorsal excision; smaller species, less than 15 mm. *metabola* (p. 44)
Wing without a distinct spot at the furcation; antenna without a distinct dorsal excision 9
9. Prescutal lobe black *rhombica* (p. 45)
Prescutal lobe reddish *liorhina* (p. 45)
- 10(1). Abdomen blackish, with row of mid-abdominal white triangles; no sublateral pale spots *trispila* (p. 46)
Abdomen various, with sublateral pale spots if mid-abdominal white triangles present 11
11. Abdomen without sublateral pale spots; with broad transverse yellow bands formed by yellow hair on yellow pollen, may slightly encroach laterally *zonalis* (p. 47)
Abdomen with sublateral pale spots 12
12. Abdomen broadly orange laterally; pale spots not conspicuous 13
Abdomen not broadly orange-brown laterally; pale spots conspicuous 20
13. Lateral yellow areas on first three tergites only, abruptly terminating at the border of the third tergite *criddlei* (p. 47)
Lateral yellow areas extending beyond third tergite 14
14. Second palpal segment very slender 15
Second palpal segment swollen basally 18
15. Third antennal segment with a distinct dorsal excision 16
Third antennal segment without a distinct dorsal excision 17

16. Basal callus rugose; third antennal segment shallowly excised; palps more slender and shaggy *gracilipalpis* (p. 48)
 Basal callus smooth; third antennal segment more deeply excised; palps more robust *affinis* (p. 48)
17. Frons with almost parallel sides; femora except base of hind femur orange-brown; palps very small; smaller species, 12 mm. or less . . . *minuscula* (p. 49)
 Frons widened toward the apex; femora dark brown; palps larger; larger species, greater than 12 mm. *trepida* (p. 49)
- 18(14). Palps dark cream-colored to orange with almost all hairs black. . . *affinis* (p. 48)
 Palps light yellow with mixed dark and light hairs 19
19. Frons narrow below, at least five times as high as wide; palps sharply pointed *epistates* (p. 50)
 Frons wide below, not over four times as high as wide; palps bluntly pointed *haemaphora* (p. 51)
- 20(12). Lateral pale spots originating as encroachments from the posterior margins of the segments 21
 Lateral pale spots not encroachments, but originate from the anterior margin of the segment or lie wholly within the center of the segment. 23
21. Second palpal segment enlarged basally *microcephala* (p. 51)
 Second palpal segment slender 22
22. Prescutal lobe usually black; third antennal segment narrow basally; hairs of second palpal segment longer; larger species. *astuta* (p. 52)
 Prescutal lobe reddish; third antennal segment wide basally; hairs of second palpal segment short; smaller species *typha* (p. 52)
- 23(20). Second palpal segment very slender *minuscula* (p. 49)
 Second palpal segment enlarged basally 24
24. With a distinct spot at the furcation; third antennal segment moderately excised above *illota* (p. 53)
 Without a spot at the furcation; third antennal segment slightly excised above 25
25. Frons distinctly wider above; usually with a stump vein near the furcation *tetrica hirtula* (p. 54)
 Frons only slightly widened above; usually without a stump vein near the furcation 26
26. Abdomen with large contiguous light areas; more yellow on antenna; lateral pile of thorax and abdomen yellow *frontalis frontalis* (p. 54)
 Abdomen with lateral light areas not contiguous; darker antennae; lateral pile of thorax and abdomen grayish *frontalis septentrionalis* (p. 54)

Hybomitra cincta (Fabricius)

Tabanus cinctus Fabricius, *Ent. Syst.*, 4(1794):366.

Theriopectes cinctus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Dasyommia cincta. Enderlein, *Mitt. Zool. Mus. Berlin*, 10(1922):346.

Hybomitra cincta. Philip, *Amer. Midl. Nat.*, 37(1947):293.

Female. — Length 20 mm. Frons grayish brown widened above; about five times as high as basal width. Median callus elongate, black, broadly joined to basal callus. Basal callus dark brown, higher than wide, not touching eyes. Subcallus denuded above, dark brown, shining. Genae and clypeus dark grayish brown with dark brown hairs. Second palpal segment

dark brown; bluntly pointed and with black hairs. Antenna orange-brown; first two segments with black hairs; annulets black.

Dorsum of thorax dark brown with dark brown hairs. Pleurae, sternum, and legs dark brown with brown hairs. Wings brownish; infuscated along veins and cross veins.

Dorsum of abdomen with first three tergites yellow; dark line from scutellum ending on second tergite; rest of abdomen black. Venter with first four sternites yellow, rest black.

Male. — Colored as female except black line from scutellum ending on third tergite; base of third antennal segment orange with apex black.

Michigan distribution. — U.P.: Alger² and Iron² counties.

Specimens examined. — 1 female and 3 males MSU.

Hybomitra longiglossa (Philip)

Tabanus longiglossus Philip, *Minn. Agric. Exper. Sta. Tech. Bull.*, 80(1931):110-11.

Hybomitra longiglossa. Philip, *Amer. Midl. Nat.*, 37(1947):296.

Female. — Length 12-14 mm. Frons grayish, about two and one-half to three times as high as basal width; slightly widened above. Median callus irregular, narrow, and not joined to basal callus. Basal callus dark brown, rectangular, with upward extensions along the eyes. Subcallus dark brown, denuded except along lower margin. Genae and clypeus black with thin gray pollen and whitish hairs. Second palpal segment yellowish brown, extremely slender, with mixed black and yellowish hairs. Proboscis elongate. First two antennal segments orange-brown, with gray pollen and black hairs; the second projecting upward and forward; the third segment orange-brown; annulets darkened.

Dorsum of thorax black with indistinct grayish stripes. Prescutal lobe orangish. Pleurae, sternum, and coxae with grayish pollen and whitish hairs. Legs orange-brown, the bases of the femora and tarsi darkened. Wings hyaline; wing base and costal cells yellowish.

Dorsum of abdomen black, segments 1 to 3 reddish laterally. Posterior margins of the segments with narrow yellowish brown bands. Venter blackish tinged with red.

Michigan distribution. — Unknown. Reported from the state by Philip, *Ann. Ent. Soc. Amer.*, 1954, 47:32.

Specimens examined. — 1 female from the collection of Dr. C. B. Philip, Hamilton, Montana.

Hybomitra difficilis (Wiedemann)

Tabanus difficilis Wiedemann, *Auss. zweifl. Ins.*, 1(1828):165.

Hybomitra difficilis, Philip, *Ann. Ent. Soc. Amer.*, 43(1950):120.

Tabanus and *Hybomitra carolinensis* of authors not Macquart; Philip, *Ann. Ent. Soc. Amer.*, 43:120.

Female. — Length 14 mm. Frons gray about three and one-half times as

high as basal width; widened above; denuded at the vertex. Median callus brown, elongate; separated from basal callus. Basal callus subtriangular, brown. Subcallus denuded, brown. Genae and clypeus gray with long gray hairs. Second palpal segment cream-colored with mixed black and white hairs; swollen basally. First and second antennal segments orange with black hairs; third segment bright orange tinged with black, annulets blackish.

Dorsum of thorax dark brown with golden-brown hairs mixed with white apically and posteriorly. Pleurae, sternum, and coxae brown to gray with dense light gray hairs. Legs reddish to brown; fore tarsi and apices of fore tibiae darkened. Wings hyaline with brown veins; costal cells and wing bases brownish.

Dorsum of abdomen brownish black with a row of median white triangles and brownish sublateral spots. Tergites bordered posteriorly with narrow bands of white. Venter orange-gray, darker posteriorly.

Male. — Colored as female except darker. Pleurae and sternum dark gray.

Michigan distribution. — L.P.: Clinton² and Wayne¹ counties.

Specimens examined. — 2 females and 1 male UMMZ; 2 females MSU.

Hybomitra lasiophthalma (Macquart)

Tabanus lasiophthalmus Macquart, *Dipt. exot. nouv. peu connus*, Pt. I, 1838, p. 143.

Tabanus punctipennis Macquart, *Dipt. exot. nouv. peu connus*, Sup. II, 1847, p. 23.

Tabanus notabilis Walker, *List*, I(1848):166.

Theriopectes lasiophthalmus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Tylostypia lasiophthalmus. Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):363.

Theriopectes (sic) lasiophthalmus. Kröber, *Zool. Anz.*, 86(1930):258.

Hybomitra lasiophthalma. Philip, *Amer. Midl. Nat.*, 37(1947):295.

Female. — Length 12-16 mm. Frons yellowish gray with black hairs, about three and one-half times as high as basal width; slightly widened above. Median callus oblong, separated from the basal callus. Basal callus shining, black to brown; almost square, rounded above; not touching eyes. Subcallus denuded; shining, black to brown; margined with yellow pollen. Genae and clypeus yellow to white pollinose with white hairs, sometimes mixed with black. Second palpal segment creamy orange with black hair; slightly swollen basally; tapering to a sharp apex. First two antennal segments brown with black hairs; third segment orange basally, black apically, tinged with black above; annulets black.

Dorsum of thorax almost black with lines of lighter pollen and hairs. Prescutal lobe reddish brown. Pleurae, sternum, and coxae gray tinged with red; with mixed gray and black hairs. Femora gray basally, orange-brown apically; tibiae and tarsi orange-brown with black hairs; the anterior tibiae slightly darker. Wings hyaline; costal cells infuscated.

Dorsum of abdomen orange-yellow with a black median stripe which widens posteriorly. Small whitish median triangles present in some specimens. Venter yellow-brown.

Male. — Colored as female except venter tinged with black mesad and caudad.

Michigan distribution. — U.P.: Alger,^{1,2} Delta,¹ Gogebic,³ Houghton,³ Iron,³ Luce,¹ Mackinac,^{1,2} Marquette,⁴ Ontonagon,¹ and Schoolcraft¹ counties and Isle Royale.⁴ L.P.: Allegan,² Bay,¹ Benzie,¹ Berrien,¹ Branch,⁴ Charlevoix,^{1,2} Cheboygan,^{1,2} Clare,^{1,2} Clinton,² Crawford,⁴ Eaton,⁴ Emmet,¹ Genesee,¹ Gladwin,⁴ Grand Traverse,¹ Huron,¹ Ingham,² Iosco,¹ Isabella,¹ Jackson,¹ Kalamazoo,² Kalkaska,¹ Kent,² Lake,⁴ Lapeer,¹ Lewanee,² Livingston,^{1*} Menominee,² Mecosta,¹ Midland,^{1,2} Missaukee,¹ Montmorency,⁴ Newaygo,¹ Oakland,⁴ Osceola,¹ Oscoda,¹ Otsego,¹ Presque Isle,⁴ Roscommon,⁴ Saginaw,¹ St. Clair,⁴ St. Joseph,^{1,2} Van Buren,² Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 94 females and 17 males UMMZ; 74 females and 2 males MSU; 38 females KLH.

Hybomitra nuda (McDunnough)

Tabanus nudus McDonnough, *Can. Ent.*, 53(1921):143.

Hybomitra nuda. Philip, *Amer. Midl. Nat.*, 37(1947):296.

Female. — Length 12-17 mm. Frons yellow-brown; about four times as high as basal width. Ocellar tubercle reddish. Median callus black, oblong; not touching basal callus. Basal callus dark brown to black, shining, almost square, rounded above; touching eyes at lower corners. Subcallus dark brown, shining; at least partly denuded; pollen yellow when present. Genae and clypeus white pollinose, with white hairs. Second palpal segment cream-colored, short, very stout basally, with mixed white and black hairs. First two antennal segments orange-yellow with black hair; third segment orange basally, black apically; annulets black.

Dorsum of thorax brownish black, with distinct stripes of yellow-brown hairs; prescutal lobe brown with black hairs. Pleurae, sternum, and coxae gray with white hairs. Femora gray; tibiae orange to orange-brown; tarsi dark, fore tarsi darkest. Wings hyaline; costal cells and margins of veins tinged with yellow-brown; faint infuscation at the furcations.

Dorsum of abdomen orange brown with a median black stripe widening posteriorly; median row of white to yellowish white triangles present. Venter orange-brown; tinged posteriorly with black.

Male. — Colored as female.

Michigan distribution. — U.P.: Chippewa,¹ Delta,¹ Gogebic,³ Iron,³ Houghton,³ Mackinac,⁴ Marquette,⁴ Ontonagon,⁴ and Schoolcraft¹ counties. L.P.: Charlevoix,² Cheboygan,^{1,2} Clare,² Emmet,⁴ Gladwin,⁴ Jackson,⁴ Kalkaska,⁴ Lake,² Lapeer,⁴ Livingston,^{1*} Mason,⁴ Midland,⁴ Osceola,⁴ and Roscommon⁴ counties.

Specimens examined. — 13 females and 1 male UMMZ; 16 females MSU; 123 females KLH.

Hybomitra hinei (Johnson)

Tabanus hinei Johnson, *Psyche*, 11(1904):15.

Theriopectes politus Johnson, *Ent. News*, 11(1900):325.

Hybomitra hinei. Philip, *Amer. Midl. Nat.*, 37(1947):294.

Female. — Length 11-12 mm. Frons dark gray to black; four times as high as basal width; slightly widened above; vertex with a shining black triangle. Dark red ocellar tubercle. Median callus black, shining; joined to basal callus by a thin line. Basal callus almost square; black, shining; touching or almost touching eyes. Subcallus denuded, shining, black. Genae and clypeus shining, black; with sparse light yellow hairs. Second palpal segment very slender; dark brown to black; covered with black hairs. First and second antennal segments brown with black hairs; not produced dorsad; third segment orange basally; black apically; annulets black.

Dorsum of thorax black, shining, with three obscure light lines. Pleurae black, shining, with light hairs. Sternum and legs black, shining, with a mixture of black and light hairs. Tibiae and tarsi occasionally brownish. Wings with clouds near the stigmas; darker spots at the furcations; costal cells brown.

Dorsum of abdomen shining black with a median row of very small yellowish triangles; with yellow-brown sublateral spots at least on tergites 2 and 3. Venter black with lighter sublateral areas.

Michigan distribution. — U.P.: Houghton^{1,3} and Iron^{1,3} counties. L.P.: Van Buren² county.

Specimens examined. — 2 females UMMZ; 1 female MSU; 14 females KLH.

Hybomitra metabola (McDunnough)

Tabanus metabolus McDunnough, *Can. Ent.*, 54(1922):239.

Hybomitra metabola. Philip, *Amer. Midl. Nat.*, 37(1947):296.

Female. — Length 12-14 mm. Frons gray; about three times as high as basal width; black hairs at vertex. Ocellar tubercle black. Median callus black, short, and wide; separated from basal callus. Basal callus nearly square; slightly invaginated above; dark brown, shining; touching eyes at lower corners. Subcallus brown, denuded above; with a thin line of cream-colored pollen below. Genae and clypeus gray pollinose with white hairs. Second palpal segment stout basally; cream-colored with mixed black and white hairs. First and second antennal segments orange with gray pollen and black hairs; third segment orange basally, black apically; annulets black.

Dorsum of thorax almost black, with gray lines and orange-brown pre-scutal lobe. Pleurae, sternum, and coxae dark gray with mixed dark and whitish hair. Legs nearly black, hind tibiae and tarsi tinged with brown. Wings hyaline; costal cells brown; small spots at furcations.

Dorsum of abdomen black, with a median row of yellowish triangles.

Sublateral spots yellowish gray; encroaching from the posterior of tergites 1 through 6; tergites 3 and 4 usually with largest spots. Venter gray.

Michigan distribution. — U.P.: Gogebic,³ Houghton,³ and Iron³ counties and Isle Royale.¹ L.P.: Charlevoix² County.

Specimens examined. — 4 females UMMZ; 2 females MSU; 14 females KLH; 1 female from collection of Dr. C. B. Philip, Hamilton, Montana.

Hybomitra rhombica (Osten Sacken)

Tabanus rhombicus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):472.

Theriopteries rhombicus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):57.

Tabanus centron Marten, *Can. Ent.*, 14(1882):211.

Hybomitra solox Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):364.

Hybomitra rhombica. Philip, *Amer. Midl. Nat.*, 37(1947):298.

Female. — Length 13 mm. Frons gray; about three times as high as basal width, distinctly widened above. Median callus black, shining; twice as long as wide; connected to basal callus by a thin line. Basal callus black, shining; touching eyes at the lower corners; rounded above. Subcallus denuded; black, shining. Genae and clypeus gray with white hairs. Second palpal segment cream-colored, with mixed black and white hairs; slightly enlarged basally. First two antennal segments dark brown to black, with gray pollen, hairs black; third antennal segment orange basally, tinged with black apically; annulets black.

Dorsum of thorax dark gray, with three lighter lines. Pleurae, sternum, and coxae gray with whitish hairs. Legs dark brown; tibiae black apically. Wings hyaline; faint spots at furcations.

Dorsum of abdomen black with a median row of white triangles and dull grayish sublateral spots; sublateral spots oblique widening toward the posterior of the tergite. Venter dull grayish.

Male. — Colored as female except dorsum of thorax black, and abdominal sublateral spots larger. Frontal triangle bare and shining black.

Michigan distribution. — U.P.: Chippewa⁴ County.

Specimens examined. — 1 female and 1 male UMMZ.

Hybomitra liorhina (Philip)

Tabanus liorhinus Philip, *Can. Ent.*, 68(1936):151.

Hybomitra liorhina. Philip, *Amer. Midl. Nat.*, 37(1947):295.

Female. — Length 13 mm. Frons gray, widened at the vertex; twice as high as basal width. Ocellar tubercle small, light orange. Median callus brown, short and stout; connected to the basal callus. Basal callus dark brown, shining; touching eyes. Subcallus denuded except lateral and ventral margins; concolorous with the basal callus. Genae and clypeus mottled brown, with gray pollen and pale hairs. Palps creamy white with scattered black hairs; second segment enlarged basally and tapering to a

fine point. First and second antennal segments orange with black hairs; third segment orange basally, black apically; annulets black.

Dorsum of thorax dark gray with indistinct light stripes. Pleurae light brown with mixed dark and white hairs. Sternum gray. Legs reddish brown; tibiae and tarsi with dark hairs. Wings hyaline; short stump vein present; faint infuscation at the furcation.

Dorsum of abdomen dark grayish brown with a median row of white triangles, and oblique sublateral spots on tergites 2 through 5. Venter light brown; darker posteriorly.

Michigan distribution. — Unknown. Reported as probable by Philip, 1947, *Amer. Midl. Nat.* 37:295.

Specimens examined. — 1 paratype from the collection of Dr. C. B. Philip, Hamilton, Montana.

Hybomitra trispila (Wiedemann)

Tabanus trispilus Wiedemann, *Auss. zweifl. Ins.*, 1(1828):150.

Tabanus sodalis Williston, *Kans. Acad. Sci. Trans.*, 10(1887):139.

Theriopectes trispilus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Hybomitra trispila. Philip, *Amer. Midl. Nat.*, 37(1947):299.

Female. — Length 12-15 mm. Frons gray tinged with yellow; slightly widened above; about three and one-half times as high as basal width. Median callus oblong, black, sometimes connected to the basal callus by a thin line. Basal callus black; almost square, rounded above; not touching eyes. Subcallus, genae, and clypeus gray pollinose, tinged with yellow; genae with yellow hairs. Second palpal segment creamy yellow; moderately stout basally, blunt at apex, with black hairs. First and second antennal segments orange-yellow with gray pollen and black hairs; third segment orange tinged with black; annulets black.

Dorsum of thorax dark, with thin gray lines. Pleurae, sternum, and coxae gray, with hairs mostly yellow. Legs grayish black; tibiae brownish. Wings strongly tinged with brown especially along veins.

Dorsum of abdomen black with a median row of white triangles and white posterior borders on tergites. Venter gray with a median brownish stripe.

Male. — Colored as female except hairs of pleurae black, with darker dorsum of thorax and legs. No white triangle on first abdominal tergite. Venter mostly dark.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ Gogebic,³ Houghton,³ Iron,³ and Marquette⁴ counties. L.P.: Alcona,⁴ Antrim,⁴ Charlevoix,¹ Cheboygan,¹ Clare,² Emmet,¹ Ingham,² Ionia,⁴ Iosco,⁴ Jackson,^{1,2} Kent,² Lapeer,¹ Livingston,^{1*} Midland,⁴ Missaukee,⁴ Montcalm,⁴ Montmorency,¹ Oakland,¹ Oceana,² Washtenaw^{1,2} and Wayne¹ counties.

Specimens examined. — 73 females and 5 males UMMZ; 11 females MSU; 29 females KLH.

Hybomitra zonalis (Kirby)

Tabanus zonalis Kirby, *Fauna Bor-Amer.*, 4(1837):314.

Therioplectes zonalis. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Tabanus tarandi Walker, *List*, I(1848):156.

Tabanus terrae-novae Macquart, *Dipt. nouv. peu connus*, Sup. IV, Pt. 1, 1849, p. 35.

Tabanus flavocinctus Bellardi, *Sagg. Dipt. Mess.*, 1(1859):61.

Hybomitra zonalis. Philip, *Amer. Midl. Nat.*, 37(1947):300.

Female. — Length 15-17 mm. Frons yellowish; about three and one-half times as high as basal width; slightly widened above. Ocellar tubercle reddish, located in denuded triangle at vertex. Median callus dark, wide; connected to basal callus. Basal callus black, shining, slightly narrowed above; not touching eyes. Subcallus, genae, and clypeus yellow pollinose; genae with a mixture of black and yellow hairs. Second palpal segment dark brown with mixed black and yellow hairs; slightly swollen basally. First and second antennal segments orange with black hairs; third segment orange, slightly tarnished with black above; annulets black.

Dorsum of thorax black with an indistinct pattern of black and yellow hairs. Prescutal lobe reddish. Pleurae, sternum, and coxae dark reddish gray with predominantly black hairs. Legs bicolored; femora black, tibiae and tarsi orange-yellow. Wings hyaline, slightly tinged with yellow along veins; stump vein present from R_4 .

Dorsum and venter of abdomen black with wide bands of yellow pollen on the posterior margins of the tergites.

Male. — Colored as female except yellow abdominal bands narrowed.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ Gogebic,³ Iron,³ Houghton,³ Keweenaw,² Mackinac,² and Schoolcraft¹ counties and Isle Royale.¹ L.P.: Emmet,² Ingham,² and Cheboygan² counties.

Specimens examined. — 5 females and 1 male UMMZ; 4 females MSU; 23 females KLH.

Hybomitra criddlei (Brooks)

Tabanus criddlei Brooks, *Can. Ent.*, 77(1946):234.

Hybomitra criddlei. Philip, *Amer. Midl. Nat.*, 37(1947):293.

Female. — Length 18 mm. Frons yellow-brown pollinose; four times as high as basal width; dark hairs at vertex. Median callus elongate, dark; broadly joined to basal callus. Basal callus dark, subtriangular; not touching eyes. Subcallus, genae, and clypeus light brownish yellow pollinose; hairs sparse, yellow; second palpal segment slender, dark orange, covered with black hairs. First two antennal segments dark orange with black hairs; third segment orange tinged with black; annulets blackish.

Dorsum of thorax blackish with faint brownish lines. Prescutal lobe reddish. Pleurae, sternum, and legs blackish with black hairs. Wings with light brown costal cells; light brown infuscations along wing veins and cross veins.

Dorsum of abdomen black; first three tergites yellow, except black

middorsal line narrowing posteriorly and not touching fourth tergite. Rest of tergum black. Venter yellow, blackened posteriorly.

Male. — Colored as female except black mid-abdominal line contiguous to fourth tergite, and yellow area extending slightly upon fourth tergite.

Michigan distribution. — U.P.: Alger,^{1,2} Houghton,³ Iron,^{2,3} and Keeweenaw² counties.

Specimens examined. — 1 female and 1 male UMMZ; 2 females MSU; 6 females KLH.

Hybomitra gracilipalpis (Hine)

Tabanus gracilipalpis Hine, *Can. Ent.*, 55(1923):143.

Tabanus cristatus Curran, *Can. Ent.*, 58(1927):81.

Hybomitra gracilipalpis. Philip, *Amer. Midl. Nat.*, 37(1947):294.

Female. — Length 14-16 mm. Frons from three to three and one-half times as high as basal width, widened above; grayish with black hairs. Median callus black, elongate, and connected to basal callus. Basal callus black, rugose, rectangular, and not touching the eyes. Subcallus, clypeus, and genae yellowish gray, with yellowish hairs. First two antennal segments gray with black hair; third, orange basally, annulets darker; dorsal angle distinct. Second palpal segment slender, dark yellowish brown, with shaggy black hair.

Dorsum of thorax blackish with indistinct stripes. Prescutal lobe sometimes reddish. Pleurae, sternum, and coxae gray with mixed dark and light hair. Femora black; tibiae orange-brown; apices of tibiae and coxae black. Wing subhyaline. Anterior edge yellowish.

Dorsum of abdomen black, with orange sides; median band broad, black, with light triangles. Venter yellowish brown with darkened base and apex.

Michigan distribution. — U.P.: Gogebic,^{1,3} Houghton,^{1,3} and Iron^{1,3} counties.

Specimens examined. — 4 females UMMZ; 3 females KLH; 5 females in the collection of Dr. Philip, Hamilton, Montana.

Hybomitra affinis (Kirby)

Tabanus affinis Kirby, *Fauna Bor.-Amer.*, 4(1837):313.

Theriopectes affinis. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Tabanus triligatus Walker, *List*, V., Sup. 1(1854):183.

Hybomitra affinis. Philip, *Amer. Midl. Nat.*, 37(1947):292.

Female. — Length 16-19 mm. Frons brown with short black hair; four times as high as basal width; slightly widened above. Median callus black, elongate; usually contiguous with basal callus. Basal callus dark brown, shining; not touching eyes. Subcallus, genae, and clypeus yellow pollinose; genae with yellow hairs. Second palpal segment enlarged basally; orange

with black hairs. First two antennal segments orange with black hairs; third segment orange basally, black apically; annulets black.

Dorsum of thorax dark brownish black with faint light lines; prescutal lobe orange. Pleurae gray with yellowish hairs. Sternum and coxae gray with yellowish hairs. Legs black except bases of fore tibiae and mid- and hind tibiae and tarsi. Wings almost hyaline, costal cell and some cross veins brownish; faint spot at furcation.

Dorsum of abdomen black with large sublateral orange spots covering sides of tergites 1 through 4; posterior margins of tergites with pale borders and median triangles. Venter deep orange; darkened posteriorly.

Michigan distribution. — U.P.: Alger,^{1,2} Gogebic,^{2,3} Houghton,^{1,3} Iron,³ Luce,⁴ Mackinac,² Marquette,¹ and Schoolcraft¹ counties and Isle Royale.¹ L.P.: Berrien,¹ Charlevoix,^{1,2} Cheboygan,^{1,2} Clare,² Kalamazoo,² Lake,² Missaukee,⁴ and Ogemaw⁴ counties.

Specimens examined. — 36 females UMMZ; 16 females MSU; 123 females KLH.

Hybomitra minuscula (Hine)

Tabanus minusculus Hine, *Ohio Nat.*, 8(1907):226.

Hybomitra minuscula. Philip, *Amer. Midl. Nat.*, 37(1947):296.

Female. — Length 10-12 mm. Frons gray to brownish, about three times as high as basal width, slightly widened medianly. Ocellar tubercle reddish brown. Median callus dark, broad; joined to basal callus. Basal callus brown; almost square; touching the eyes laterally. Subcallus, genae, and clypeus gray pollinose; genae with white hairs. Second palpal segment elongate, yellowish brown with black hairs. First and second antennal segments light orange with black hairs; third segment orange tinged with black; annulets dark.

Dorsum of thorax black with brown pollinose stripes. Prescutal lobe reddish. Hairs of dorsum mixed black and brownish. Pleurae brown with yellowish hairs. Sternum black. Legs orange-brown; tarsi darker. Wings hyaline with brown veins.

Dorsum of abdomen black with sublateral yellowish orange spots; spots sometimes occupying the whole dorsum except median black line. A distinct median row of light triangles present. Venter orange-brown tinged with black laterally and posteriorly.

Male. — Colored as female; sublateral spots usually larger.

Michigan distribution. — U.P.: Chippewa,¹ Gogebic,³ Iron,³ and Schoolcraft¹ counties. L.P.: Livingston^{1*} County.

Specimens examined. — 13 females and 3 males UMMZ; 7 females KLH.

Hybomitra trepida (McDunnough)

Tabanus trepidus McDunnough, *Can. Ent.*, 53(1921):142.

Hybomitra trepida. Philip, *Amer. Midl. Nat.*, 37(1947):299.

Female. — Length 13-16 mm. Frons grayish tinged with brown; about three and one-half times as high as basal width; widened above. Ocellar tubercle reddish. Median callus black, at least twice as long as wide; not connected to basal callus. Basal callus dark brown; almost square, rounded above. Subcallus, genae, and clypeus yellowish gray with light yellow to white hairs. First and second antennal segments yellowish brown, with mixed black and yellow hairs; third segment orange basally, black apically; annulets black.

Dorsum of thorax blackish with lines of yellow pollen. Prescutal lobe reddish to orange. Pleurae, sternum, and coxae gray with yellowish hairs. Legs blackish, tibiae tinged with brown. Wings hyaline, slightly tinged with brown.

Dorsum of abdomen orange-brown laterally, with a black median stripe widening posteriorly; middorsal row of yellow triangles present. Venter yellowish to brownish.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ Gogebic,^{1,3} Houghton,³ Iron,³ Luce,² Mackinac,² Marquette,¹ and Schoolcraft¹ counties. L.P.: Charlevoix,¹ Cheboygan,⁴ Clare,² Crawford,¹ Emmet,¹ Grand Traverse,¹ Huron,¹ Ingham,⁴ Iosco,⁴ Kalamazoo,⁴ Livingston,^{1,2*} Missaukee,⁴ Montmorency,¹ Ogemaw,⁴ Otsego,¹ Roscommon,⁴ and Washtenaw² counties.

Specimens examined. — 59 females UMMZ; 6 females MSU; 43 females KLH.

Hybomitra epistates (Osten Sacken)

Tabanus epistates Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2 (sup.)(1878):555.

Tabanus socius Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):467.

Theriopectes epistates. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Tabanus epistatus Hine, *Ohio State Acad. Sci. Spec. Papers*, 5(1903):50 (lapsus).

Tabanus californicus Hine (not Marten), *Ohio Nat.*, 5(1904):236.

Hybomitra epistates. Philip, *Amer. Midl. Nat.*, 37(1947):293.

Female. — Length 14-16 mm. Frons gray; five to six times as high as basal width; slightly widened above. Ocellar tubercle brown. Median callus dull brown, oblong, joined to basal callus. Basal callus dull brown; roughly pentagonal; not touching the eyes. Subcallus, genae, and clypeus whitish gray; genae with whitish hairs. Palps cream-colored; second segment with mixture of black and white hairs. First and second antennal segments orange with black hairs; third segment orange with darkened apex and annulets.

Dorsum of thorax dark gray with indistinct light markings and mixed black and white hairs. Pleurae, sternum, and coxae gray with lighter hairs. Femora gray; tarsi red to black; tibiae orange, apices of fore tibiae black. Wing venation normal; margin tinged with brown.

Dorsum of abdomen black with a median row of white triangles and orange sublateral spots covering the sides of tergites 1 through 4. Venter orange-brown tinged with black apically.

Male. — Colored as female. Second palpal segment distinctly swollen and ocellar tubercle very distinct.

Michigan distribution. — U.P.: Alger,⁴ Chippewa,⁴ Gogebic,³ Houghton,³ and Iron³ counties and Isle Royale.¹ L.P.: Allegan,² Benzie,¹ Cheboygan,^{1,2} Clare,² Crawford,⁴ Gladwin,⁴ Grand Traverse,¹ Huron,¹ Livingston,^{1*} Mecosta,⁴ Midland,⁴ Missaukee,⁴ Montmorency,⁴ Osceola,¹ Oscoda,¹ Wash-tenaw,^{1,2} and Wexford⁴ counties.

Specimens examined. — 100 females and 2 males UMMZ; 8 females MSU; 36 females KLH.

Note. — Some females examined showed a partly denuded subcallus. The denuded area was dark brown and dull.

Hybomitra haemaphora (Marten)

Tabanus haemaphorus Marten, *Can. Ent.*, 14(1882):210.

Hybomitra haemaphora. Philip, *Amer. Midl. Nat.*, 37(1947):294.

Female. — Length 15-17 mm. Frons yellowish gray; about four and one-half times as high as basal width. Median callus black, shining; widened; not connected to basal callus. Basal callus dark brown, shining; wider than high, rounded above. Subcallus, genae, and clypeus yellowish gray with yellow hairs. Second palpal segment orange-yellow; rather stout; with mixed yellow and black hairs. First and second antennal segments cream-colored with black hairs; both segments produced dorsad; third antennal segment orange, apex black; annulets black.

Dorsum of thorax black with gray pollinose lines; prescutal lobe reddish; dorsum with mixed yellow and black hairs. Pleurae, sternum, coxae, and femora gray tinged with reddish; hairs mixed black and yellowish. Tibiae orange; apices of fore tibiae black. Fore tarsi black; mid- and hind tarsi orange. Wings hyaline; faint spot at the furcations.

Dorsum of abdomen broadly orange with a black median stripe widening posteriorly. Median row of yellow triangles present. Venter orange; posterior darkened.

Michigan distribution. — L.P.: Cheboygan⁴ County.

Specimens examined. — 4 females UMMZ.

Hybomitra microcephala (Osten Sacken)

Tabanus microcephalus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):470.

Theriopectes microcephalus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Hybomitra microcephala. Philip, *Amer. Midl. Nat.*, 37(1947):296.

Female. — Length 13-16 mm. Frons gray; about three and one-half times as high as basal width. Denuded area at vertex bearing the ocellar tubercle. Median callus elongate and broadly attached to basal callus. Basal callus chestnut brown; nearly square, rounded above. Subcallus, genae, and clypeus yellowish to gray pollinose; genae with gray hairs. Second palpal segment yellowish brown; greatly swollen basally; with mixed white and black hairs. Proboscis short. First and second antennal

segments brown with black hairs; third segment brown tinged with black; annulets black.

Dorsum of thorax including prescutal lobe black with gray lines. Pleurae, sternum, and coxae gray with whitish hairs. Legs almost uniformly orange-brown; tarsi slightly darker. Wings hyaline with dark brown veins.

Dorsum of abdomen dark brown to black; sublateral light areas on tergites 1 through 3 extend to posterior margin only. Other tergites with spots not reaching either margin. Median row of light triangles present. Venter reddish brown.

Male. — Colored essentially as female.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ Gogebic,¹ Mackinac¹ and Marquette¹ counties and Isle Royale.⁴ L.P.: Cheboygan,¹ Crawford,² Grand Traverse,¹ and Oscoda¹ counties.

Specimens examined. — 33 females and 1 male UMMZ; 1 female MSU.

Hybomitra astuta (Osten Sacken)

Tabanus astutus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):471.

Theriopectes astutus Osten Sacken, *Smithsonian Misc. Coll.*, No. 270 (1878):56.

Hybomitra astuta. Philip, *Amer. Midl. Nat.*, 37(1947):292.

Female. — Length 14 mm. Frons gray; about three times as high as basal width; widened above; with black hairs near vertex. Ocellar tubercle reddish brown. Median callus black, slender; not connected to basal callus. Basal callus brown, shining; wider than high; not touching eyes. Subcallus gray pollinose. Genae and clypeus yellowish gray pollinose with white hairs. Second palpal segment slender, with black hairs. First and second antennal segments orange-black with gray pollen and black hairs; third segment orange basally, black apically; annulets black.

Dorsum of thorax black with gray pollinose lines. Prescutal lobe black. Pleurae, sternum, and coxae gray with mixed gray and dark hairs. Legs dark; hind femora gray; fore and hind tibiae with some light hairs. Wings nearly hyaline; costal cell slightly infuscated.

Dorsum of abdomen black with a median row of white triangles and sublateral pale spots encroaching from posterior. Venter yellowish gray with lighter posterior margins on the sternites.

Michigan distribution. — U.P.: Houghton³ and Iron³ counties.

Specimens examined. — 5 females KLH; 1 female from the collection of Dr. C. B. Philip, Hamilton, Montana.

Hybomitra typha (Whitney)

Tabanus typhus Whitney, *Can. Ent.*, 36(1904):206.

Hybomitra typha. Philip, *Amer. Midl. Nat.*, 37(1947):299.

Female. — Length 11–13 mm. Frons brownish gray; about three times

as high as basal width; slightly widened above. Ocellar tubercle reddish. Median callus black; connected to basal callus in some specimens. Basal callus black, rounded above; usually not touching eyes. Subcallus, genae, and clypeus gray pollinose; genae with white hair. Second palpal segment slender; creamy orange, with predominantly black hair. First and second antennal segments orange-brown with gray pollen and black hairs; base of third segment orange; apex and annulets black.

Dorsum of thorax black with five indistinct gray lines. Prescutal lobe reddish. Pleurae, sternum, and coxae grayish with whitish hairs. Legs black tinged with brown. Wings hyaline, with brown veins and faint spot at the furcations.

Dorsum of abdomen black with a median row of white triangles. Sublateral pale spots encroaching from posterior border of tergite. Posterior margins of tergites narrow gray. Venter dark gray with lighter spots.

Michigan distribution. — U.P.: Alger,¹ Gogebic,³ Houghton,³ Iron,³ and Marquette¹ counties and Isle Royale.¹ L.P.: Cheboygan,^{1,2} Iosco,¹ Livingston,¹ Oscoda,¹ Roscommon,⁴ and Wexford⁴ counties.

Specimens examined. — 17 females UMMZ; 3 females MSU; 53 females KLH.

Hybomitra illota (Osten Sacken)

Tabanus illotus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):469.

Therioplectes illotus. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

Hybomitra illota. Philip, *Amer. Midl. Nat.*, 37(1947):294.

Female. — Length 11-13 mm. Frons gray; four times as high as basal width; widened above. Ocellar tubercle brown. Median callus black, short, narrow; connected to the basal callus by a thin dark line. Basal callus dark brown to black, shining; almost square; not touching eyes. Subcallus gray pollinose. Genae and clypeus gray pollinose, with white hairs occasionally mixed with black near the basal callus. Second palpal segment swollen basally; light orange with black-tinged apex; mixed black and white hairs. First and second antennal segments dorsally produced, orange with black hairs; third segment orange-black basally, apex of third segment and annulets black.

Dorsum of thorax dull black with light lines. Prescutal lobe reddish. Pleurae, sternum, and coxae gray with whitish hairs. Femora largely gray; tibiae and tarsi brown to black. Wings hyaline with brown veins and small spot at furcations.

Dorsum of abdomen black with white median triangles. Sublateral spots orange, occurring singly on tergites 1 through 4. Venter largely dark with light sublateral areas.

Male. — Colored as the female. Legs darker; hairs of pleurae dark gray.

Michigan distribution. — U.P.: Alger,¹ Gogebic,^{1,3} Houghton,³ and Iron³ counties and Isle Royale.⁴ L.P.: Antrim,⁴ Bay,² Calhoun,⁴ Cheboygan,⁴ Clare,⁴ Clinton,⁴ Gladwin,⁴ Kent,² Lake,² Livingston,^{1*} Newaygo,¹ Oakland,¹ Otsego,¹ Roscommon,⁴ and Washtenaw⁴ counties.

Specimens examined. — 10 females and 16 males UMMZ; 3 females MSU; 82 females KLH.

Hybomitra tetrica hirtula (Bigot)

- Therioplectes hirtulus* Bigot, *Mem. Soc. Zool. France*, 5(1892):641.
Tabanus hirtulus. Hadwen, *Proc. Brit. Col. Ent. Soc.*, N.S., 4(1914):48.
Tabanus frenchii Hine (not Marten), *Ohio Nat.*, 5(1904):237.
Tabanus opacus Hine, *Ohio Nat.*, 5(1904):240.
Hybomitra tetrica hirtula. Philip, *Can. Ent.*, 73(1941):151.

Female. — Length 13-16 mm. Frons gray; about three and one-half times as high as basal width; slightly widened above. Median callus black, rectangular; connected to the basal callus by a thin line. Basal callus rectangular, wider than high; brown, shining. Subcallus, genae, and clypeus light gray with white hairs. Second palpal segment cream-colored; swollen basally, tapering to a fine point; mixed black and white hairs. First and second antennal segments orange, produced dorsad; with black hairs; third segment orange basally, apex and annulets black.

Dorsum of thorax black with lines of gray pollen. Prescutal lobe reddish. Pleurae, sternum, coxae, and femora gray tinged with red; hairs white. Legs reddish except apices of the tibiae and entire tarsi which are darker. Wings hyaline; base of R_4 with a long stump vein.

Dorsum of abdomen black with a median row of pale triangles. Large sublateral oblique pale areas originating in the median area of each tergite. Venter orange, darkened laterally and posteriorly.

Michigan distribution. — L.P.: Cheboygan⁴ County.
 Specimens examined. — 43 females UMMZ.

Hybomitra frontalis frontalis (Walker)

- Tabanus frontalis* Walker, *List*, I(1848):172.
Tabanus incisus Walker, *Ins. Saund. Dipt.*, 1(1850):26.
Hybomitra septentrionalis frontalis. Philip, *Can. Ent.*, 73(1941):151 and *Amer. Midl. Nat.*, 37(1941):299.

Female. — Differs from the typical *Hybomitra frontalis septentrionalis* in having the frons divergent above and the sublateral abdominal spots large, contiguous, and yellowish.

Michigan distribution. — U.P.: Alger² and Schoolcraft¹ counties. L.P.: Cheboygan,¹ Jefferson,² and Livingston^{1*} counties.

Specimens examined. — 10 females UMMZ; 2 females MSU.

Hybomitra frontalis septentrionalis (Loew)

- Tabanus septentrionalis* Loew, *Verh. Zool. Bot. Ges. Wien.*, 8(1858):592.
Therioplectes septentrionalis. Osten Sacken, *Smithsonian Misc. Coll.*, No. 270(1878):56.

- Tylostypia septentrionalis*. Enderlein (not Loew?), *Mitt. Zool. Mus. Berlin*, 11(1925):363.
Tabanus canadensis Curran, *Can. Ent.*, 59(1927):82.
Stypommia septentrionalis. Enderlein, *Sitzber. Gesell. Naturf. Freunde Berlin*, 1934, p. 185.
Hybomitra septentrionalis. Philip, *Amer. Midl. Nat.*, 37(1947):297.

Female. — Length 11-15 mm. Frons grayish yellow; about three and one-half times as high as basal width; slightly widened above. Ocellar tubercle reddish brown. Median callus black, oblong; not joined to basal callus. Basal callus dark brown, shining; almost square; touching eyes. Subcallus, genae, and clypeus yellowish gray pollinose. Genae with both black and yellow hairs. Second palpal segment creamy orange; swollen basally; with mixed black and yellow hairs. First two antennal segments grayish, both with a distinct dorsal process; third segment orange basally, black apically; annulets black.

Dorsum of thorax black with faint gray lines; with mixed black and yellow hairs. Pleurae, sternum, and coxae gray tinged with red; with mixed pale and dark hairs. Femora dark gray to black; tibiae brownish, apices of fore tibiae darkened; tarsi brown to black, fore tarsi darkest. Wings faintly brownish.

Dorsum of abdomen dark brown to black with a median row of yellow triangles and gray sublateral spots. Sublateral spots usually not large or confluent. Venter darker with yellowish hairs.

Michigan distribution. — U.P.: Houghton^{2,3} County. L.P.: Cheboygan,¹ Grand Traverse,¹ Huron,¹ Kent,² Livingston,¹ and Oceana^{1,2} counties.

Specimens examined. — 16 females UMMZ; 4 females MSU; 2 females KLH.

Genus TABANUS Linnaeus

Tabanus Linnaeus, *Syst. Nat.*, ed. 10, I(1758):601.

(genotype *Tabanus bovinus* Linnaeus.)

Tabamus Rondani, *Dipt. exot. Modena*, 1864, p. 78 (lapsus).

Neotabanus Lutz, *Inst. Oswaldo Cruz em Manquinhos*, 1909, p. 29.

Tanabus Mosier and Snyder, *Proc. Ent. Soc. Wash.*, 20(1918):125 (lapsus).

Straba Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 545.

Hybostraba Enderlein, *Deutsche Ent. Zeitschr.*, 1923, p. 545.

Taeniotabanus Kröber, *Dipt. of Patagonia and S. Chile*, Pt. 5, 1930, p. 140 (nomen nudum).

Generic characteristics. — Small to large compact flies, with smooth vertex (in males which possess tubercle it is pollinose); eye bare or very sparsely pilose, turning black when dried; flagellum of antennae with five divisions. Frons various with basal callus of almost equal width.

Key to Michigan Females of *Tabanus*

1. Abdomen with median and/or sublateral pale spots 2
 Abdomen otherwise colored 21
2. Abdomen with three middorsal white triangles on segments 3 through 5; rest

- of abdomen uniformly dark *trimaculatus* (p. 57)
 Abdomen with more than three mid-abdominal triangles; usually sublateral
 pale spots or lighter borders on the margins of the tergites 3
3. Mid-abdominal triangles contiguous, forming a parallel-sided line 4
 Mid-abdominal triangles not contiguous or not forming a parallel-sided
 line 8
4. Third antennal segment narrow basally; mid-abdominal line slightly serrate
 in appearance 5
 Third antennal segment wider basally; mid-abdominal line not serrate 6
5. Frons narrow, distinctly widened above *sackeni* (p. 58)
 Frons wide, parallel-sided *sagax* (p. 58)
6. Thoracic pleurae and genae of head with light yellow pile and pollen
 *quinquevittatus* (p. 59)
 Thoracic pleurae and genae of head with white pile and pollen 7
7. Scutellum black; median callus narrow; hind femur dark basally
 *lineola lineola* (p. 59)
 Scutellum with reddish tip; median callus shorter and wider; hind femur
 reddish *lineola scutellaris* (p. 60)
- 8(3). Infuscation at furcation of vein 3 sometimes extending into nearby cells;
 infuscation along cross veins 9
 No infuscation at furcation of vein 3 or along cross veins 11
9. With sublateral gray spots on abdomen *reinwardtii* (p. 60)
 Abdomen without sublateral gray spots 12
10. First posterior cell narrowed apically but not closed; wing subhyaline except
 for spots; middle femur brownish *sulcifrons* (p. 61)
 First posterior cell closed; wing light brown with spots; all femora black
 *abdominalis* (p. 61)
- 11(8). Abdomen without sublateral pale spots; but tergites may have white posterior
 borders 12
 Abdomen with sublateral pale spots 15
12. Subcallus denuded *nigripes* (p. 62)
 Subcallus pollinose 13
13. Abdomen dark dull reddish gray; pattern indistinct *calens* (p. 63)
 Abdomen reddish orange laterally; pattern distinct 14
14. Fore leg uniformly light in color *catenatus* (p. 63)
 Fore femur and tarsus darker; tibia bicolored *actaeon* (p. 64)
- 15(11). Abdominal sublateral pale spots contiguous, forming large pale areas
 *nivosus* (p. 64)
 Abdominal sublateral spots not contiguous, or not forming large sublateral
 pale areas 16
16. Basal part of third antennal segment black except at the extreme base 17
 Basal part of third antennal segment with more orange than black 19
17. Vertex depressed, triangle on third tergite reaching its anterior margin;
 apex of antennae yellowish *fulvicallus* (p. 65)
 Vertex not depressed; triangle on third tergite not reaching the anterior
 margin; apex of antennae dark 18
18. First antennal segment distinctly dorsally produced; frons widened above
 *fairchildi* (p. 65)
 First antennal segment not produced dorsally; frons with parallel sides
 *vivax* (p. 66)

19. Median callus broad; eye in life with two or more purple bands; palpus not strongly swollen basally; tarsi lighter beneath *pumilus* (p. 67)
Median callus linear; eye in life unicolorous or with one purple band; palps strongly swollen basally; tarsi uniformly dark 20
20. Eye unicolorous *sparus sparus* (p. 67)
Eye with a single diagonal purple band *sparus milleri* (p. 68)
- 21(1). Wings darkened or hyaline, no spot at furcation 22
Wings with a spot at the furcation 24
22. Wings heavily infuscated, dark; dorsum of thorax black *atratus* (p. 68)
Wings uniformly light or hyaline; dorsum of thorax reddish 23
23. Pubescence of genae bright yellow; abdomen dark red with transverse gray bands; wing hyaline (costal cell dark brown) *americanus* (p. 69)
Pubescence of genae light to white; abdomen dark gray-brown, wing light brown *calens* (p. 63)
- 24(21). Mesonotum dark *nigrescens* (p. 69)
Mesonotum with white pollen and pubescence giving it a mottled white appearance 25
25. Frons wide, gray; genae lighter *subniger* (p. 70)
Frons narrow, dark; genae dark *stygius* (p. 70)

Tabanus trimaculatus Palisot de Beauvois

Tabanus trimaculatus Palisot de Beauvois, *Ins. rec. en. Afr. et en Amer.*, 1807, p. 56.

Tabanus aestuum Bosc (MS) by Macquart, *Dipt. exot. nouv. peu connus*, I(1838):142.

Tabanus quiquelineatus Macquart, *Hist. nat. des ins., dipt.*, 1(1834):200.

Female. — Length 15-18 mm. Frons brownish gray; about five times as high as basal width; widened above. Median callus reddish brown, elongate; broadly joined to basal callus. Basal callus reddish to almost black; higher than wide, narrowed above; not touching eyes. Subcallus and upper genae yellow pollinose. Lower genae and clypeus light gray to white with white hairs. Second palpal segment yellow; with scattered black and white hairs, slightly swollen basally. Antenna almost black, joints reddish; first two segments with short black hairs.

Dorsum of thorax reddish brown with lines of gray pollen and grayish white and dark brown hairs. Pleurae, sternum, and coxae reddish brown with light gray pollen and gray hairs. Legs dark brown to black, bases of tibiae lighter. Wings almost hyaline; costal cells infuscated; furcations and cross veins margined with brown.

Dorsum of abdomen reddish brown with prominent median white triangles on tergites 3 through 5. Venter gray with a broad brown median stripe.

Male. — Antenna and legs paler than those of female. Otherwise coloration the same.

Michigan distribution. — L.P.: Allegan,² Berrien,¹ Calhoun,⁴ Charlevoix,⁴ Cheboygan,⁴ Eaton,² Ingham,² Jackson,¹ Kalamazoo,² Kent,² Livingston,^{1*} Oakland,⁴ St. Joseph,⁴ Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 22 females UMMZ; 14 females and 3 males MSU.

Tabanus sackeni Fairchild

Tabanus sackeni Fairchild, *Boston Soc. Nat. Hist. Occ. Papers*, 8(1934):141.

Tabanus longus Osten Sacken (partim), *Mem. Boston Soc. Nat. Hist.*, 2(1878):452.

Female. — Length 11-14 mm. Frons yellowish, with mixed black and yellow hairs; about five times as high as basal width; widened above. Median callus black; elongate; separated from basal callus. Basal callus black; higher than wide; rounded above. Subcallus brownish. Genae and clypeus light gray with white hairs. Second palpal segment slightly swollen basally; white with black hairs. First two antennal segments tannish, with black hairs; third segment orange-brown; extreme apex of third segment and annulets black.

Dorsum of thorax brown with yellowish gray hairs; stripes present, but indistinct. Pleurae, sternum, and coxae gray with white hairs. Legs yellowish brown; apices of fore tibiae and all tarsi darkened. Wings hyaline.

Dorsum of abdomen brown with a parallel-sided median row of grayish triangles; each tergite with sublateral oblique oval yellowish spots. Venter gray.

Michigan distribution. — L.P.: Ingham² County.

Specimens examined. — 3 females UMMZ; 2 females MSU.

Tabanus sagax Osten Sacken

Tabanus sagax Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):452.

Atylotus baal Townsend, *Trans. Amer. Ent. Soc.*, 22(1895):151.

Tabanus dawsoni Philip, *Minn. Agric. Exper. Sta. Tech. Bull.*, No. 80(1931):105.

Female. — Length 13-16 mm. Frons yellow; about three times as high as basal width; sides almost parallel. Median callus black, short, and oblong; joined to basal callus by a thin line. Basal callus dark brown to black; almost square; not touching eyes. Subcallus and upper gena yellowish. Lower gena and clypeus whitish with pale yellow hairs. Second palpal segment swollen basally, cream-colored, with mixed black and yellow hairs. First two antennal segments yellowish brown, with black hairs; basal part of third segment orange, apex of this segment and annulets black.

Dorsum of thorax yellowish gray with two faint yellowish lines. Pre-scutal lobe lighter. Pleurae, sternum, mid- and hind coxae gray with yellowish hairs. Legs light brown; bases of fore femora, apices of fore tibiae and fore tarsi darker. Wings hyaline; costal cells yellowish, veins brown.

Dorsum of abdomen orange-brown darkened posteriorly; with a serrate almost parallel-sided pale yellowish median line. Tergites with pale indistinct sublateral spots. Venter yellowish brown, darker posteriorly.

Male. — Colored as the female.

Michigan distribution. — U.P.: Isle Royale.² L.P.: Cheboygan⁴ County.

Specimens examined. — 4 females UMMZ; 2 males MSU.

Tabanus quinquevittatus Wiedemann

Tabanus quinquevittatus Wiedemann, *Dipt. exot.*, 1(1821):84.

Tabanus costalis Wiedemann, *Auss. Zweifl. Ins.*, 1(1828):173.

Tabanus vicarius Walker (partim), *List*, I(1848):187.

Tabanus baltimorensis Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 34.

Tabanus floridanus Szilady, *Biol. Hungarica*, 1(1926):24.

Female. — Length 11-14 mm. Frons yellow pollinose; four to four and one-half times as high as basal width; slightly widened above. Median callus dark brown to black; half as wide as basal callus. Basal callus black, somewhat wrinkled; almost square; not touching eyes. Subcallus yellow pollinose. Genae and clypeus light yellow with light yellow hairs. Second palpal segment yellow with black hairs; swollen basally and tapering to a fine tip. First two antennal segments reddish brown with black hairs, and somewhat dorsally produced; third antennal segment orange; annulets darker.

Dorsum of thorax dark brown with erect black hairs and recumbent yellow hairs. Pleurae, sternum, and coxae gray with yellow hairs. Femora black with yellowish pollen; tibiae yellow, apical two-thirds of fore tibiae and apical one-third of mid- and hind tibiae black; tarsi black. Wings hyaline.

Dorsum of abdomen varying from black to orange brown, always with a parallel-sided middorsal yellow line bordered with black, giving way to orange laterally.

Male. — Colored as female; with less black on the abdomen.

Michigan distribution. — U.P.: Alger¹ County. L.P.: Bay,² Berrien,^{1,2} Calhoun,⁴ Eaton,² Genesee,⁴ Grand Traverse,¹ Hillsdale,⁴ Huron,⁴ Ingham,^{1,2} Kent,² Lapeer,⁴ Livingston,^{1*} Midland,⁴ Monroe,⁴ Muskegon,¹ Oakland,^{1,2} Ottawa,² Saginaw,⁴ St. Clair,⁴ St. Joseph,² Shiawassee,⁴ Van Buren,⁴ Washtenaw^{1,2} and Wayne¹ counties.

Specimens examined. — 65 females and 39 males UMMZ.

Tabanus lineola lineola Fabricius

Tabanus lineola Fabricius, *Ent. Syst.*, 4(1794):369.

Tabanus vicarius Walker (partim, "Mass." specimen), *List*, I(1848):187.

Tabanus quinquemaculatus Hine, *USDA Div. Ent. Bull.*, 44(1904):58 (lapsus).

Tabanus compactus Aldrich, *Smithsonian Misc. Coll.*, No. 1444(1905):204 (lapsus).

Tabanus quinquevittatus Hine (not Wiedemann), *Ohio Nat.*, 7(1906):26.

Female. — Length 10-15 mm. Frons yellowish gray, darkened at vertex; four to five times as high as basal width; distinctly widened above. Median callus black, elongate, slender; joined to basal callus by a thin line. Basal callus black; higher than wide, rounded above; not touching eyes. Subcallus dark brown; partly denuded in most specimens; pollen grayish. Genae and clypeus white with white hairs; genae usually stained with brown above the level of the antennae. Second palpal segment white with white and black hairs; enlarged basally. Antenna orange-brown; black hairs on first and second segments; annulets black.

Dorsum of thorax dark brown with gray pollen; mixed dark and light hairs. Prescutal lobe reddish. Scutellum dark. Pleurae, sternum, and coxae gray with white hairs. Femora gray, hairs white; tibiae yellowish, with fore tibiae black apically; tarsi black. Wings hyaline, veins dark brown.

Dorsum of abdomen brownish to black with a median parallel-sided yellow to whitish stripe and oblique sublateral pale areas contiguous and forming irregular spots. Venter yellowish brown tinged with black apically.

Male. — Colored as female.

Michigan distribution. — L.P.: Berrien,¹ Cheboygan,¹ Eaton,⁴ Huron,¹ Kalamazoo,⁴ Livingston,^{1*} Shiawassee,⁴ Washtenaw,^{1,2} and Wayne¹ counties.

Specimens examined. — 115 females and 2 males UMMZ; 28 females and 1 male MSU.

Tabanus lineola scutellaris Walker

Tabanus scutellaris Walker, *Ins. Saund. Dipt.*, 1(1850):27.

Tabanus lineola scutellaris Stone, *USDA Misc. Publ.*, No. 305(1938):123.

Tabanus lineola of authors (partim).

Female and male. — Differ from the typical *T. lineola* in having the posterior half of the scutellum reddish brown, and hind femora reddish.

Michigan distribution. — U.P.: Mackinac⁴ County. L.P.: Cheboygan,¹ Huron,¹ Iosco,¹ Ingham,² Jackson,¹ Kent,² Macomb,¹ Sanilac,¹ Shiawassee,² Van Buren,² Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 51 females and 14 males UMMZ.

Tabanus reimwardtii Wiedemann

Tabanus reimwardtii Wiedemann, *Auss. Zweifl. Ins.*, 1(1828):130.

Tabanus erythrotelus Walker, *Ins. Saund. Dipt.*, 1(1850):25.

Female. — Length 14-17 mm. Frons gray, black laterad from median callus; about two and one-half times as high as basal width. Median callus black, shining; almost square, narrowed above. Subcallus yellowish gray pollinose. Genae and clypeus white pollinose with white hairs. Second palpal segment whitish yellow, black hairs and scattered white hairs. Antenna black except base of third segment orange-brown; first and second segments with black hairs.

Dorsum of thorax blackish with reddish lines and gray pollen. Prescutal lobe reddish. Pleurae and sternum blackish tinged with red, with gray pollen and white hairs. Legs reddish brown; tibiae black apically. Wings hyaline; furcations and cross veins distinctly margined with brown; first posterior cells narrowed apically in most specimens.

Dorsum of abdomen reddish brown to almost black, with a median row of pale triangles; sublateral gray spots in an oblique pattern on all tergites. Venter gray, darkened mesiad.

Male. — Hair of genae dark gray. Pleurae darker than in female, with gray hairs. Sublateral light spots larger than in the female.

Michigan distribution. — U.P.: Chippewa,¹ Iron,³ Houghton,³ and Schoolcraft¹ counties. L.P.: Berrien,¹ Charlevoix,¹ Cheboygan,^{1,2} Eaton,² Ingham,² Jackson,¹ Manistee,² Oakland,² Presque Isle,⁴ Van Buren,⁴ Washtenaw,¹ and Wayne⁴ counties.

Specimens examined. — 12 females and 1 male UMMZ; 8 females MSU; 13 females and 9 males KLH.

Tabanus sulcifrons Macquart

Tabanus sulcifrons Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 33.

Tabanus variegatus Fabricius, *Syst. Antl.*, 1805, p. 95.

Tabanus tectus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):436.

Tabanus exul Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2 (Sup.)(1878):558.

Female. — Length 18-22 mm. Frons brownish gray; about four times as high as basal width; slightly widened above. Median callus narrow; chestnut brown; joined to basal callus. Basal callus shining, chestnut brown; higher than wide, narrowed above. Subcallus, genae, and clypeus yellowish gray with yellow hairs. Second palpal segment moderately slender; orange-brown with short black hairs. First and second antennal segments produced dorsad, dark orange-brown, with black hairs; third segment orange tinged with black on the dorsal process and apical half of segment; annulets dark brown to black.

Dorsum of thorax dark reddish brown with thin gray pollen; prescutal lobe more orange. Pleurae, sternum, and coxae reddish gray with yellowish hairs. Femora dark brown to black; fore tibiae light basally, dark brown apically; mid- and hind tibiae orange-brown; tarsi dark brown to black. Wings subhyaline; costal cells orange; first posterior cells narrowed, but not closed apically.

Dorsum of abdomen orange-brown, darker apically; with a median row of white triangles, usually margined with dark brown to black. Venter orange-brown tinged with black.

Male. — Second palpal segment black; otherwise colored as the female.

Michigan distribution. — L.P.: Ingham,² Livingston,^{1*} Midland,⁴ Oakland,⁴ St. Joseph,⁴ Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 42 females and 9 males UMMZ; 39 females and 2 males MSU.

Note. — The abdominal pattern of this species varies widely. The amount of black present and the intensity of the colorations of the mid-abdominal triangles vary with the individual specimen.

Tabanus abdominalis Fabricius

Tabanus abdominalis Fabricius, *Syst. Antl.*, 1805, p. 96.

Female. — Length 15-20 mm. Frons yellowish gray to brown; about five times as high as basal width; slightly widened above. Median callus dark brown, joined to basal callus by a thin line. Basal callus higher than wide, subtriangular; touching eyes basally. Subcallus, genae, and clypeus yellow pollinose with yellowish hair. Second palpal segment slender; orange-yellow with black hairs. First and second antennal segments orange-brown, first segment produced dorsad and forward; third segment orange; annulets darker.

Dorsum of thorax brown to nearly black with distinct light brown to yellowish lines. Pleurae, sternum, and coxae grayish brown with yellowish hairs. Femora black; tibiae brown except blackened apices of fore tibiae; tarsi dark brown to black. Wings pale brown, darker along veins, large spot at furcations; first posterior cells closed near the margin of the wing in all specimens examined (said to be open in some specimens).

Dorsum of abdomen orange to orange-brown, with a dark median spot on each tergite, and a row of median triangles posterior to the black spots. Venter orange tinged with black posteriorly.

Michigan distribution. — L.P.: Kent,⁴ Washtenaw,¹ and Wayne¹ counties. Specimens examined. — 6 females UMMZ.

Tabanus nigripes Wiedemann

Tabanus nigripes Wiedemann, *Dipt. exot.*, 1(1821):75.

Tabanus coffeatus Macquart, *Dipt. exot. nov. peu connus*, Sup. 2, 1847, p. 23.

Female. — Length 11-14 mm. Frons brownish gray; about four times as high as basal width; slightly widened above. Median callus dark, shining brown; appearing as a dorsal extension of basal callus. Basal callus dark, shining, brown; higher than wide; touching eyes. Subcallus shining, brown, denuded. Genae and clypeus gray with white hairs. Second palpal segment slightly swollen basally; yellowish brown, with mixed black and yellow hairs. First and second antennal segments dark orange-brown, with black hairs; third segment black, with basal margin orange; annulets black.

Dorsum of thorax dark reddish black with stripes of grayish pollen, mixed yellow and whitish hairs. Pleurae, sternum, and coxae grayish tinged with red, with whitish hair. Legs reddish black, with mixed black and white hairs. Wings hyaline, veins brown.

Dorsum of abdomen reddish black with a median row of white triangles extended to form white posterior borders of the tergites. Venter reddish black with white borders to the sternites.

Michigan distribution. — U.P.: Gogebic,³ Houghton,³ and Iron³ counties. L.P.: Jackson,¹ Kent,² and Livingston^{1*} counties.

Specimens examined. — 12 females UMMZ; 2 females MSU; 23 females KLH.

Tabanus calens Linnaeus

Tabanus calens Linnaeus, *Syst. Nat.*, ed. 12, 1(1767):1000.

Tabanus giganteus DeGeer, *Mem. pour servir a l'hist. des ins.*, 6(1776):226.

Tabanus lineatus Fabricius, *Species Ins.*, 2(1781):455.

Tabanus pallidus Palsiot de Beauvois, *Ins. rec. en Afr. et en Amer.*, 1809, p. 100.

Tabanus bicolor Macquart, *Dipt. exot. nouv. peu connus*, Sup. II, 1847, p. 21.

Tabanus caesiofasciatus Macquart, *Dipt. exot. nouv. peu connus*, Sup. V, 1855, p. 32.

Female. — Length 22-24 mm. Frons yellowish brown; about four to five times as high as basal width; with parallel sides. Median callus elongate, brown, and broadly joined to basal callus. Basal callus dark reddish brown; rounded above; not touching eyes. Subcallus pale yellowish pollinose. Genae and clypeus yellowish white with whitish hairs. Second palpal segment yellow; bluntly pointed; with mixed white and black hairs. Antenna orange; first two segments with black hairs and dorsal processes; the third segment with an acute angle and prominent dorsal projection.

Dorsum of thorax dark brown with indistinct lighter lines; patches of white hairs above wing base; other dorsal hairs black. Pleurae, sternum, and coxae reddish with gray pollen and white hairs. Legs reddish brown; tarsi and hind tibiae darker. Wings brownish; first posterior cells narrowed apically.

Male. — Colored as female except redder.

Michigan distribution. — L.P.: Cheboygan,² Ingham,^{1,2} Jackson,⁴ Kent,² Lenawee,⁴ Montmorency,⁴ Oakland,¹ Saginaw,⁴ Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 9 females and 1 male UMMZ; 7 females MSU.

Tabanus catenatus Walker

Tabanus catenatus Walker, *List*, I(1848):148.

Tabanus orion Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):442.

Female. — Length 22 mm. Frons yellowish gray; about four and one-half times as high as basal width. Median callus reddish chestnut brown; elongate; joined to basal callus. Basal callus reddish chestnut brown; subtriangular; higher than wide; touching eyes basally. Subcallus yellowish pollinose. Genae and clypeus gray with white hairs. Second palpal segment yellowish brown; black and white hairs; elongate, tapering to a blunt apex. First and second antennal segments brown with short black hair; third segment orange-brown basally, black beyond dorsal angle.

Dorsum of thorax reddish brown with mixed black and white hairs. Pleurae, sternum, and coxae reddish brown with gray pollen; hairs yellowish white. Legs reddish brown with pale hairs. Wings light brown, veins brown.

Dorsum of abdomen dark reddish brown with light median triangles on tergites 2 through 6. Venter light reddish brown with light hairs on the posterior edge of sternites.

Michigan distribution. — Unknown. Reported from state by Philip, 1947, *Amer. Midl. Nat.*, 37:304.

Specimens examined. — 1 female UMMZ.

Tabanus actaeon Osten Sacken

Tabanus actaeon Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):443.

Tabanus novae-scotiae Macquart, *Dipt. exot. nouv. peu connus*, Sup. II, 1847, p. 24.

Female. — Length 18-21 mm. Frons gray; about four times as high as basal width. Median callus dark brown, connected to basal callus. Basal callus chestnut brown; higher than wide; not touching eyes. Subcallus, genae, and clypeus light yellow pollinose; hairs whitish. Palps orange with black hairs. First and second antennal segments orange with dense black hairs, second segment produced dorsad and forward; third segment orange, tinged with black apically; annulets nearly black.

Dorsum of thorax dark brown with lighter reddish lines. Prescutal lobe reddish brown. Pleurae, sternum, and coxae gray tinged with red; hairs yellowish. Femora reddish to black; tibiae yellowish brown; apices of fore tibiae and tarsi blackened. Wings nearly hyaline; first posterior cells narrowed apically in some specimens.

Dorsum of abdomen dark orange-brown, with a median black stripe widening apically. A median row of white triangles present in all specimens except one with brown triangles. Venter reddish brown tinged with black apically.

Michigan distribution. — U.P.: Alger,² Keweenaw,⁴ Luce,¹ and Menominee² counties. L.P.: Cheboygan,¹ Crawford,¹ Jackson,¹ Kalamazoo,² and Washtenaw¹ counties.

Specimens examined. — 7 females UMMZ; 3 females MSU.

Tabanus nivosus Osten Sacken

Tabanus nivosus Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):445.

Female. — Length 11-15 mm. Frons brownish gray, darker at the level of the median callus; three to three and one-half times as high as basal width. Median callus dark brown, appearing as a projection from the basal callus. Basal callus dark brown; roughened; almost square; not touching eyes. Subcallus light brown pollinose. Genae and clypeus gray with white hair. Second palpal segment slender, light yellowish brown with black hair. First two antennal segments dark brown with black hairs; third segment black, dark brown basally; annulets black.

Dorsum of thorax dark brown with grayish lines and mixed gray and black hairs. Prescutal lobe reddish. Pleurae, sternum, and coxae gray with white hairs. Legs light to dark brown with white hairs and scattered black hairs. Wings hyaline; veins brown.

Dorsum of abdomen dark brown to black with a median row of small

white triangles; sublateral rows of large oblique light spots, sublateral spot on the second tergite touching both anterior and posterior borders. Venter brownish gray.

Male. — Colored as female.

Michigan distribution. — U.P.: Alger,¹ Chippewa,⁴ Gogebic,² Mackinac,¹ Marquette,¹ and Schoolcraft¹ counties and Isle Royale.^{1,2} L.P.: Charlevoix,¹ Cheboygan,¹ Grand Traverse,¹ Huron,¹ Kalamazoo,² Kent,² Lenawee,¹ Livingston,⁴ and Van Buren⁴ counties.

Specimens examined. — 23 females and 1 male UMMZ; 4 females MSU.

Tabanus fulvicallus Philip

Tabanus fulvicallus Philip, *Minn. Agric. Exper. Sta. Tech. Bull.*, No. 80(1931):106.

Female (characteristics after Stone, 1938). — Length 11.5-16 mm. Eye bare. Frons gray tinged with yellow; slightly more than four times as high as wide, with parallel sides; vertex notched, slightly swollen, and sometimes denuded in front of notch, but with no ocellar tubercle; basal callus rather small, narrowly separated from eyes, and tapering to the slender, raised, median callus; subcallus pale yellowish brown, rather flat. Antenna with first two segments, extreme base of third, and last annulus orange-brown, the remainder blackish; first segment rather large but not strongly swollen above; basal part of third with a slight obtuse angle above and scarcely any dorsal excision. Clypeus and genae nearly white, with white hair. Second palpal segment creamy yellow-brown, with black hair on apical two-thirds, moderately long, slightly swollen basally, and tapering to a blunt apex.

Mesonotum brown, with faint paler lines in usual pattern. Pleura, sternum, and coxae paler. Wing hyaline with brown veins, the venation normal. Legs light orange-brown, with pale yellowish hair, the fore femur, fore tibia apically, and tarsi darker; hind tibial fringe sparse, with few black hairs.

Abdomen above, orange-brown, darker apically, with three rows of pale spots; the median spots on tergites 3 through 5 triangular, with somewhat concave sides and reaching length of tergites, sublateral oblique spots present, but faint, on tergites 1 through 6; venter orange-brown, somewhat darker medianly and apically.

Michigan distribution. — Isle Royale.⁴

Specimens examined. — None available.

Tabanus fairchildi Stone

Tabanus fairchildi Stone, *USDA Misc. Publ.*, No. 305(1938):63.
(not Osten Sacken).

Tabanus vivax of authors

Female. — Length 12-16 mm. Frons gray; about four and one-half times as high as basal width; slightly widened above. Median callus wide; black;

joined to basal callus by a thin line. Basal callus dark brown to black, shining; almost square. Basal callus and upper genae yellow-brown pollinose. Lower genae and clypeus white with white hairs. Second palpal segment somewhat swollen basally; yellow, with a mixture of white and black hairs. Antenna black; first segment produced dorsad.

Dorsum of thorax black with lines of white pollen; prescutal lobe reddish. Entire dorsum with a mixture of white and yellow hairs. Pleurae, sternum, and coxae gray tinged with red, with white hairs. Femora and tarsi black, femora with gray pollen; tibiae reddish except darkened apices of fore tibiae. Wings hyaline.

Dorsum of abdomen black with gray pollen; median triangles laterally extended to form posterior borders of tergites; sublateral light spots present, largest on second tergite. Venter gray, posterior borders of tergites lighter.

Michigan distribution. — U.P.: Iron,³ Houghton,³ and Ontonagon² counties. L.P.: Oakland⁴ County.

Specimens examined. — 4 females UMMZ; 1 female MSU; 19 females KLH.

Tabanus vivax Osten Sacken

Tabanus vivax Osten Sacken, *Mem. Boston Soc. Nat. Hist.*, 2(1876):446.
Tabanus arborealis Stone, *Proc. Ent. Soc. Wash.*, 37(1935):14.

Female (characteristics after Stone, 1935). — Length 14-15 mm. Eye bare. Frons yellowish brown, with black hair; about three and one-half times as high as wide, the sides parallel; vertex flat, pollinose, with no ocellar tubercle; basal callus orange-brown, rather small, distinctly separated from eyes, slightly higher than wide and narrowed above; median callus nearly black, broadly joined to basal callus and tapering to a point at upper third of frons; subcallus slightly swollen, yellowish brown. First two antennal segments dark reddish brown, with black hair; first not strongly swollen above; third black, with an inconspicuous dorsal angle and very shallow dorsal excision, the annulate part longer than the width, but shorter than the length, of the basal part. Clypeus and genae light gray, with white hair. Second palpal segment reddish brown, with black hair, the length and width moderate.

Mesonotum dark brown, with lines in the usual pattern; humeral and prescutal lobes paler. Pleura, sternum, and coxae gray. Wing hyaline, with brown veins, the venation normal. Legs dark reddish brown, with grayish pollen, the fore femur, apices of tibiae, and tarsi nearly black; hind tibial fringe sparse, entirely black.

Abdomen dark brown above, with three rows of nearly white spots, the median spots on tergites 2 through 4 triangular, not quite reaching the length of tergites, sublateral spots oblique, faint on tergites 1 and 3, lacking or extremely faint on 4 through 7, venter dark brown, with white hair, the sutures narrowly whitish.

Male. — Body coloration essentially as in the female.

Michigan distribution. — Unknown. Reported from the state by Philip, 1953, *Amer. Midl. Nat.*, 43:436.

Specimens examined. — 1 male UMMZ.

Tabanus pumilus Macquart

Tabanus pumilus Macquart, *Dipt. exot. nouv. peu connus*, I, Pt. 1(1838):146.

Female. — Length 8-10 mm. Frons gray, tinged with black at the vertex and laterad from median callus; four times as high as wide; strongly divergent above. Median callus black, wrinkled; almost as large as basal callus; connected to basal callus by a thin line. Basal callus black, shining, rectangular, higher than wide; not touching eyes. Subcallus and upper genae black with yellow pollen. Lower genae and clypeus light gray with white hairs. Second palpal segment yellow; swollen basally, with black hairs. Antenna orange, first segment and annulets darker; first two segments produced dorsad, with black hair.

Dorsum of thorax brownish black with gray stripes. Prescutal lobe light. Pleurae, sternum, and coxae gray with white hairs. Legs orange-brown; femora sometimes grayish, with white hairs. Wings hyaline; veins brown.

Dorsum of abdomen brownish black with a median row of small triangles which extend laterad to form white posterior borders to the tergites. Each tergite with a small pale lateral spot. Venter gray with reddish tinge.

Michigan distribution. — L.P.: Berrien,¹ Eaton,² Ingham,² Jackson,⁴ Kalamazoo,² Kent,⁴ Lapeer,¹ Livingston,^{1*} Mason,⁴ Oakland,⁴ Shiawassee,² and Van Buren⁴ counties.

Specimens examined. — 12 females UMMZ; 4 females MSU.

Tabanus sparus sparus Whitney

Tabanus sparus Whitney, *Can. Ent.*, 11(1879):38.

Female. — Length 9-11 mm. Frons grayish brown; about five times as high as basal width, widened above. Median callus black, elongate; narrowly joined to basal callus. Basal callus brown to black, shining; almost square; not touching eyes. Subcallus and upper genae brown. Lower genae and clypeus white with white hairs. Second palpal segment cream-colored with mixed black and white hairs; strongly swollen basally; tapering to a point apically. Antenna orange-brown, first two segments with black hairs.

Dorsum of thorax blackish with indistinct gray lines; with mixed black and orange-yellow hairs. Prescutal lobe brownish. Pleurae, sternum, and coxae gray with whitish hair. Femora reddish brown with gray pollen; tibiae reddish brown with their apices and tarsi darkened. Wings hyaline.

Dorsum of abdomen brownish black with indistinct median triangles; posterior borders of the tergites light, encroaching upon each tergite to form sublateral pale spots. Venter gray.

Michigan distribution. — L.P.: Allegan,² Berrien,¹ Cheboygan,¹ Grand Traverse,⁴ Genessee,¹ Gratiot,⁴ Ingham,⁴ Lake,¹ Kent,² Kalamazoo,² Midland,² Newaygo,⁴ Oceana,¹ Roscommon,⁴ Saginaw,¹ St. Joseph,² and Van Buren⁴ counties.

Specimens examined. — 7 females UMMZ; 7 females MSU.

Tabanus sparus milleri Whitney

Tabanus milleri Whitney, *Can. Ent.*, 46(1914):344.

Tabanus sparus milleri. Stone, *USDA Misc. Publ.*, No. 305(1938):78.

Female. — Can be distinguished from typical *T. sparus* only in fresh or relaxed specimens by the single broad purple band on greenish eye. The typical *T. sparus* has a unicolorous eye.

Michigan distribution. — L.P.: Berrien,⁴ Ionia,⁴ Kalamazoo,² and Kent⁴ counties.

Specimens examined. — 13 females and 1 male UMMZ; 1 female MSU.

Tabanus atratus Fabricius

Tabanus atratus Fabricius, *Syst. Ent.*, 1775, p. 789.

Tabanus americanus Drury, *Illus. Nat. Hist.*, in Index to Pt. 1, publ. with Pt. II, 1773.

Tabanus niger Palsoit de Beauvois, *Ins. rec. en Afr. et en Amer.*, 1897, p. 54.

Tabanus validus Wiedemann, *Auss. zweifl. Ins.*, 1(1828):113.

Stigmatophthalmus atratus. Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):387.

Straba atrata. Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):355.

Female. — Length 20-24 mm. Frons brownish to blackish purple with gray pollen; about two times as high as basal width. Median callus appearing as a shiny, blackish purple extension of the basal callus. Basal callus shining, blackish purple; wider than high; not touching the eyes. Subcallus denuded, blackish to brownish purple. Genae and clypeus blackish purple to brownish, with a thin layer of gray pollen and black hairs. Second palpal segment slightly swollen basally; brownish purple; with black hairs. First and second antennal segments blackish purple with black hairs, second segment with a dorsal process; third segment blackish purple with basal margin orange; with a distinct dorsal process; angle acute.

Dorsum of thorax blackish purple, occasionally with indistinct reddish lines. Pleurae, sternum, and legs blackish purple, hairs black. Wings almost uniformly brown; first posterior cells noticeably narrowed at the margin.

Dorsum and venter of abdomen blackish purple, occasionally with grayish pollen.

Male. — Colored as the female.

Michigan distribution. — U.P.: Alger,¹ Chippewa,¹ and Mackinac¹ counties. L.P.: Allegan,⁴ Bay,⁴ Berrien,¹ Cass,¹ Cheboygan,¹ Clare,² Huron,¹ Ingham,^{1,2} Jackson,⁴ Kalamazoo,² Kent,² Lake,^{1,2} Livingston,^{1*} Macomb,¹ Midland,⁴ Missaukee,⁴ Oakland,² Oceana,¹ Saginaw,¹ St. Joseph,² Sanilac,⁴ Shiawassee,² Washtenaw,¹ and Wexford⁴ counties.

Specimens examined. — 39 females and 26 males UMMZ; 27 females and 13 males MSU.

Tabanus americanus Forster

- Tabanus americanus* Forster, *Novae species insect.*, I(1771):100.
Tabanus plumbeus Drury, *Illus. Nat. Hist.*, in Index to Pt. 1, publ. with Pt. II, 1773.
Tabanus ruficornis Fabricius, *Syst. Ent.*, 1775, p. 789.
Tabanus limbatus Palisot de Beauvois, *Ins. rec. en Afr. et en Amer.*, 1807, p. 54.
Tabanus americanus Mosier and Snyder, *Proc. Ent. Soc. Wash.*, 20(1918):119.
Stigmatophthalmus americanus. Enderlein, *Mitt. Zool. Mus. Berlin*, 11(1925):387.

Female. — Length 23-28 mm. Frons orange-yellow with a triangular, partly denuded area at vertex; frons about four times as high as basal width, with almost parallel sides. Median callus reddish brown, oblong; broadly joined to basal callus. Basal callus reddish brown; higher than wide, rounded above; not touching eyes. Subcallus, genae, and clypeus orange-yellow; with yellow hairs. Second palpal segment orange; slender, with black hairs. First and second antennal segments orange with black hairs, the second segment with a prominent forward projecting process; the third segment uniformly orange, with an acute dorsal angle and prominent forward projecting process.

Dorsum of thorax reddish purple with faint lines of grayish pollen. Pleurae, sternum, and legs reddish purple to reddish brown, with yellow hairs; tarsi somewhat darker. Wings hyaline with costal cells dark brown and veins brown.

Dorsum and venter of abdomen reddish purple to reddish brown with wide bands of gray pollen on the posterior border of each tergite.

Male. — Colored as the female.

Michigan distribution. — L.P.: Ingham² County.

Specimens examined. — 24 females and 2 males UMMZ; 24 females MSU.

Tabanus nigrescens Palisot de Beauvois

- Tabanus nigrescens* Palisot de Beauvois, *Ins. rec. en Afr. et en Amer.*, 1809, p. 100.
Tabanus nigricans Johannsen, *Cornell Mem.*, 177(1935):15 (lapsus).

Female. — Length 18-22 mm. Frons brown; about four times as high as basal width; sides almost parallel. Median callus dark brown; wide; may or not be joined to basal callus. Basal callus dark brown; higher than wide; not touching eyes. Subcallus, genae, and clypeus brown pollinose; with brown hairs. Second palpal segment elongate, bluntly pointed, moderately stout; thickly covered with short black hairs. First two antennal segments black; dorsally produced, and covered with black hairs; third segment orange basally, darkened past the dorsal excision.

Dorsum of thorax dark brown to black. Pleurae, sternum, and legs dark brown to black with black hairs. Wings slightly infuscated; with

brown spot at furcation and brown margins to the cross veins; first posterior cells narrowed apically.

Dorsum and venter of abdomen dark brown to black.

Michigan distribution. — L.P.: Berrien¹ County.

Specimens examined. — 10 females UMMZ.

Tabanus subniger Coquillett

Tabanus subniger Coquillett, *Ent. News.*, 17(1906):48.

Female. — Length 22 mm. Frons gray; about two and one-half times as high as basal width; vertex darkened, with a median depression. Median callus reduced to a dark narrow line joined to basal callus. Basal callus dark brown, shining; slightly wider than high. Subcallus, genae, and clypeus yellowish pollinose with brown hairs. Second palpal segment stout, blunt tipped; dark brown with darker hairs. Antenna reddish brown; first two segments with black hairs.

Dorsum of thorax reddish brown with gray pollen and whitish lateral hairs, and a median line of brown pollen and brown hairs. Pleurae, sternum, and coxae dark brown with black hairs. Legs dark brown to black with black hairs. Wings brownish; costal cells strongly infuscated; spot at the furcations; veins and cross veins margined with brown.

Dorsum of abdomen dark brown to black with few light hairs laterally on posterior margins of posterior tergites.

Michigan distribution. — L.P.: Oakland⁴ and Washtenaw¹ counties.

Specimens examined. — 1 female UMMZ.

Tabanus stygius Say

Tabanus stygius Say, *Journ. Acad. Nat. Sci. Phila.*, 3(1823):33.

Female. — Frons dark to light brown; about four times as high as basal width; with almost parallel sides. Median callus dark brown appearing as a projection from the basal callus. Basal callus dark reddish brown; higher than wide, narrowed above. Subcallus, clypeus, and genae light brown with brownish hair. Second palpal segment elongate; dark brown with short darker hairs. First and second antennal segments brown with black hairs; third segment orange-brown with darker annulets.

Dorsum of thorax reddish brown with white pollen and white hairs. Pleurae, sternum, and coxae brown with brown hairs. Legs brownish black with black hairs. Wings pale brown; cross veins and furcations margined with brown; first posterior cells slightly narrowed apically.

Dorsum and venter of abdomen brownish black.

Male. — Dorsum of thorax chocolate brown. Coloration otherwise as in female.

Michigan distribution. — L.P.: Berrien,¹ Huron,¹ Ingham,² Kalamazoo,⁴ Livingston,^{1*} Monroe,¹ Washtenaw,¹ and Wayne¹ counties.

Specimens examined. — 11 females and 2 males UMMZ; 5 females MSU.

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KIRBY L. HAYS

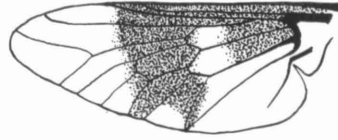
PLATE I

Wing patterns of female *Chrysops*.

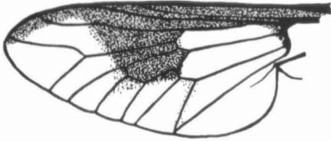
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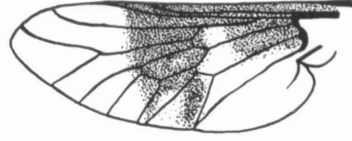
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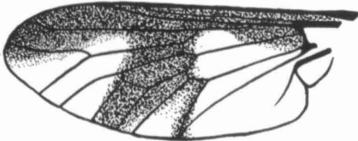
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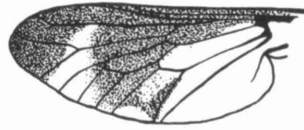
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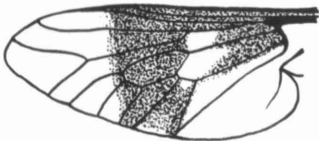
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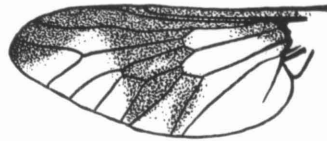
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C. DELICATULA



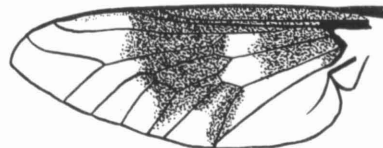
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C. CALLIDA



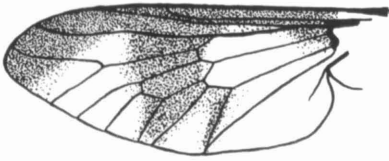
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KIRBY L. HAYS

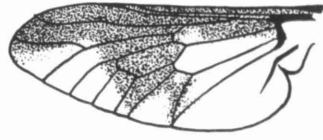
PLATE II

Wing patterns of female *Chrysops*.

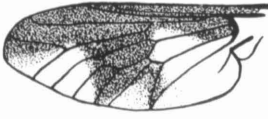
PLATE II



C. FLAVIDA



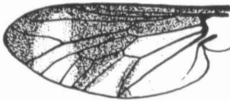
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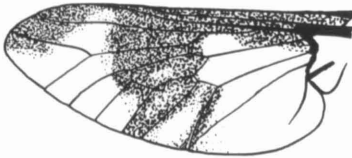
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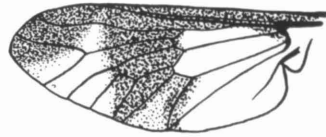
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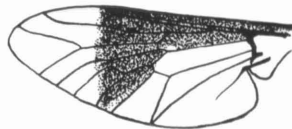
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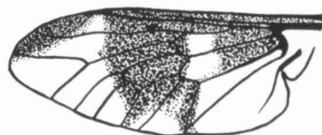
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C. NIGRA



C. GEMINATA IMPUNCTA



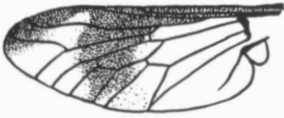
C. NOCTIFERA PERTINAX

KIRBY L. HAYS

PLATE III

Wing patterns of female *Chrysops*.

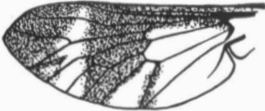
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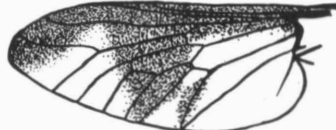
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C. SORDIDA



C. PIKEI



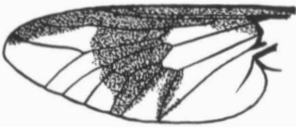
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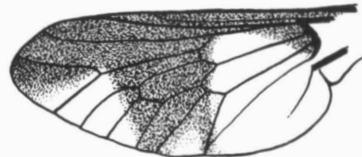
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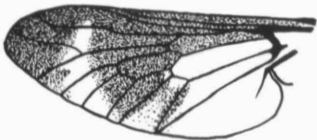
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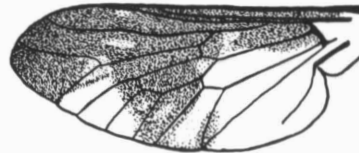
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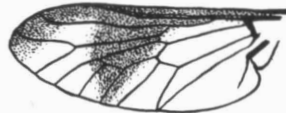
C. SEQUAX



C. VITTATA



C. SHERMANI



C. WIEDEMANNI

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