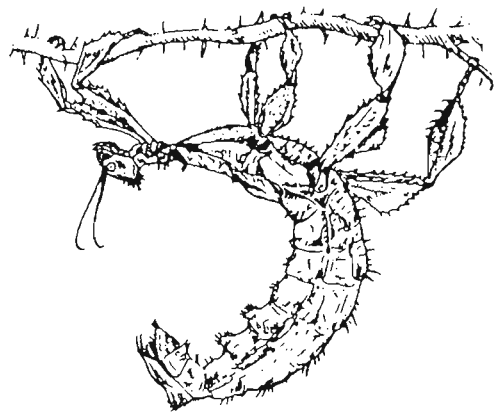
The Phasmid Study Group



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NEXT PSG MEETING

29th July 1989 in the British Museum (Natural History), Demonstration Room; about 10.30 a.m. - 5 p.m., with a Committee meeting first. You may not get free entry to the Museum without proof of PSG membership - perhaps this Newsletter will do. For further information try the Chair or Secretary (both as above). Please bring food for yourselves and your sticks.

Paul Brock (No. 26) will show a ½-hour video including new stick insect species, and will also briefly talk on video techniques.

FORTHCOMING EXHIBITIONS

Wigan Insect Show - 17th June, 1 p.m., Wigan Pier. Paul Jennings has not yet had any offers to run a stand.

Amateur Entomologists' Society Exhibition - 7th October, 11 a.m. - 5 p.m., Kempton Park Racecourse, Staines Road, Sunbury, Surrey.

ELEVENTH MIDLANDS ENTOMOLOGICAL FAIR Report by Paul Jennings (No. 80)

The PSG had three tables at this year's event. The exhibit consisted of several large displays containing a total of 20 live species, several boxes of dead specimens, and the Group's copy of Westwood. The Livestock Co-ordinator had about 20 species on offer. Thanks to everyone who brought livestock on the day.

The many people who visited the exhibit included at least 10 members. Sadly only four new members were recruited. The tables were set up by Phil Bragg (No. 445), Austin Crompton (No. 366) and Neil Hubbard (No. 187). The exhibit was run by the above three, along with Angela Parwani (No. 419) and myself. Many thanks to all who helped and visited the exhibit.

SPECIES STUDY SHEETS by Paul Jennings (No. 80)

To date I have received six completed study sheets, as follows:

Carausius morosus (PSG 1) by Lucas Partridge (No. 315)
Extatosoma tiaratum (PSG 9) by James Davis (No. 455) and by Robert Lind (No. 514)
Acrophylla wuelfingi (PSG 13) by Pierre-Emmanuel Roubaud (No. 415)
Clonopsis gallica (PSG 45) by Philippe Lelong (No. 474)
Dyme rarospinosa (PSG 86) by Fiona McKinna (No. 503)

Copies are available from me of any of the above, along with spare blank sheets. Please enclose an SSAE. Thanks to all those listed above, but further completed sheets would be greatly appreciated.

SPECIES CENSUS RESULTS 1989 Analysis by Mel Herbert (No. 232)

Thanks to the many members who completed and returned the census forms with their membership renewal.

The following is a breakdown of the results, which I have kept as simple as possible but which I hope will contain enough information to be of some use to members. It is important to note that not all members returned census forms, so for example the census returns show PSG 11 (Phibalosoma phyllinum) as lost but this is not the case.

If we look first at the results for established cultures, then we find that PSG 1 (Carausius morosus) is the most common species with 44 established cultures reported - surprise, surprise! It is followed closely by PSG 4 (Sipyloidea sipylus) with 36 and PSG 9 (Extatosoma tiaratum) with 34. At the other extreme it is particularly worrying that PSG 11 (Phibalosoma phyllinum), PSG 28 (Eurycnema herculeana) and PSG 36 (Lonchodes haematomus) all had no established cultures reported.

The results for non-established cultures echo those for established cultures, with many members apparently trying to start cultures of PSG 9 (Extatosoma tiaratum), PSG 18 (Heteropteryx dilatata), PSG 23 (Eurycantha calcarata) and PSG 13 (Acrophylla wuelfingi), all of which are large and impressive species.

Established cultures

Number of cultures reported	PSG species numbers
0	7, 8, 11, 14, 21, 28, 33, 34, 36, 40, 42, 43, 46, 47, 49, 50, 54, 55, 56, 59, 62, 63, 64, 65, 67, 68, 70, 71, 72, 75, 76, 77, 78, 79, 83, 87, 91, 95
1	39, 41, 53, 57, 60, 88, 92, 93, 96
2-5	6, 10, 12, 15, 16, 19, 20, 26, 27, 29, 30, 45, 51, 58, 61, 74, 80, 81, 85, 89
6-10	3, 17, 24, 25, 35, 37, 38, 48, 52, 66, 82, 84, 86, 90, 94
11-20	2, 13, 18, 31, 32, 44, 69, 73
21-30	5, 22, 23
>30	1, 4, 9

Non-established cultures

Number of cultures reported	PSG species numbers
0	8, 11, 14, 21, 24, 26, 27, 33, 34, 39, 40, 42, 43, 46, 49, 50, 53, 54, 55, 56, 62, 63, 64, 65, 67, 68, 70, 71, 76, 77, 78, 79, 83, 87, 88, 89, 91, 95
1	41, 47, 51, 59, 75, 81
2-5	7, 15, 16, 17, 19, 20, 28, 29, 30, 35, 36, 37, 38, 45, 48, 57, 60, 61, 66, 69, 72, 74, 80, 86, 90, 92, 93, 96
6-10	3, 5, 10, 12, 22, 25, 32, 44, 52, 58, 82, 84, 85, 94
11-20	1, 2, 4, 6, 13, 31, 73
21-30	23
>30	9, 18

JUNE 1988 SPECIES LIST REVISION by Paul Brock (No. 26)

It is intended to update the Species List - probably with the next Newsletter. Please refer to my notes in Newsletter 35 (pages 5-6) for fuller information on how the List is compiled. If members consider any species they are rearing fully satisfy the "New stocks imported" criteria, please let me know by 15th July 1989.

Research continues into some of the existing species, but if members wish to update the June 1988 List the following amendments apply:

PSG No.	New details	Comments
35	Culture stock also from Canada	Advised by Stephane Letirant
47	Bacteria Latreille species	A few eggs recently collected in Costa Rica
70	Haaniella echinata scabra Gunther	Suggested by Phil Bragg (No. 445)
75	Same as PSG 25	Advised by Eric van Gorkom (No. 250) - wrongly entered as new species by Peter Curry (ex No. 91)
78	Same as PSG 30	
83	Rhaphiderus alliaceus Stal	Determined by myself after comparison with museum specimens

THE CLASSIFICATION OF STICK INSECTS by D. Keith McE. Kevan (No. 441)

Paul Brock (No. 26), in Newsletter 35, page 6, gave a synopsis of the classification of stick insects according to Bradley and Galil (1977). That paper was, indeed, a very useful contribution to the subject, but Dr Bradley died before the work was really completed, and there are one or two inaccuracies in nomenclature. The paper too, in my opinion at least, still remains too conservative in its ranking of the suprageneric taxa. Paul Brock did not refer to my more recent and widely available contribution (Kevan, 1982) which, though it does not differ greatly from Bradley and Galil's general arrangement, upgrades certain groups and uses a different division into suborders, in effect downgrading the old-established groups Areolatae and Anareolatae.

The question of upgrading groups (from, say, family to superfamily) is usually opposed by the same conservative forces as prevent the downgrading of others. It was, indeed, a long time before it became generally fashionable to regard the stick insects as constituting a separate order of insects - although there seems to have been little attempt to put the group "Aves" in proper perspective (not a "Class" with about 40 "Orders", but a single order of reptiles comprising perhaps three families!). Classification systems in zoology are, in fact, still quite illogical and inconsistent, particularly in respect of the hierarchical arrangement, so it is not proposed here to attempt to put the world to rights, but merely to draw attention to what I believe to be a more acceptable ranking of the groups of stick insects than is given by Bradley and Galil. The names above the level of superfamily are not governed by the International Code of Zoological Nomenclature (the Botanical Code is superior in the comparable situation); those used here are those preferred, for one reason or another, by my colleagues and myself. The names in parentheses are alternatives that are invalid according to the International Code. The name of the order has been avoided in this note because it is discussed elsewhere by the present author. In Kevan (1982), however, it my be noted that the ordinal name was given as Phasmatoptera - by way of compromise - by the editors, not by the author! Here is the arrangement:

Suborder TIMEMATODEA

A single living Infraorder Timematidea

A single Superfamily Timematoidea

A single Family Timematidae

A single Subfamily Timematinae with a single genus Timema

This genus has about ten known species limited to south west USA and north west Mexico. These are distinguishable from all other stick insects by the tarsi of the legs being comprised of three articles only (instead of the usual five) and the segments of the thorax being all short and quite separate from each other and from the first segment of the abdomen (there is some fusion in other stick insects). These are also unusually small and short stick insects, and there are other significant differences besides.

Suborder PHASMATODEA

Infraorder Bacillidea (=Suborder Areolatae except Timematodea)

Superfamily Bacilloidea

Family Bacillidae

3 Subfamilies: Bacillinae, Pygirhynchinae and Obriminae (=Heteropteryginae)

Family Bacunculidae (=Pseudophasmatidae)

3 Subfamilies: Aschiphasmatinae, Korinninae and Bacunculinae (=Pseudophasmatinae)

Superfamily Phyllioidea

A single Family Phylliidae [sensu stricto]

A single Subfamily Phylliinae

Infraorder Phasmatidea (=Suborder Anareolatae)

Superfamily Necroscioidea

Family Necrosciidae

A single Subfamily Necrosciinae

Family Heteronemiidae

2 Subfamilies: Heteronemiinae and Libethrinae

Family Lonchodidae

2 Subfamilies: Lonchodinae and Menexinae

Family Pachymorphidae

2 Subfamilies: Ramulinae (=Clitumninae, in error; includes Tribe Hemipachymorphini) and Pachymorphinae

Family Palophidae

A single Subfamily Palophinae

Superfamily Phasmatoidea

Family Bacteriidae (=Cladomorphidae)

2 Subfamilies: Cladoxerinae and Bacteriinae [sensu stricto] (=Cladomorphinae = Phibalosomatinae; these names are not valid even at the tribe level, as Cladomorphini and Phibalosomatini are synonymous with Bacteriini; there are 3 other tribes)

Family Phasmatidae [sensu stricto]

5 Subfamilies: Platycraninae, Xeroderinae, Eurycanthinae, Tropidoderinae (=Podacanthinae) and Phasmatinae [sensu stricto]

The use of single subfamilies within families is to provide for the eventuality of recognising additional subfamilies in the future, or which may already be discernible in the fossil record. The various tribes within the different subfamilies are not listed above as they may be determined from Bradley and Galil (1977).

It may be of interest to note that there is also at least one additional extinct suborder that is associated with the stick insects, the Chresmodea, and possibly another, the very large Xiphopterodea, though some authors regard the latter as constituting a separate Order, Aeroplanoptera.

In conclusion, it should also be noted that it has been suggested that the Necrosciidae sensu stricto may be more closely related to the Phyllioidea than is currently accepted (despite their very different appearance). If this were to prove correct, the name of the superfamily that included only the Families Heteronemiidae to Palophidae would, by the Rule of Priority, become "Lonchodoidea". (Bradley and Galil, 1977, incorrectly gave Heteronemiidae priority over both Necrosciidae and Lonchodidae.)

The widely used name "Phasmidae" is, of course, invalid as a scientific name, as it is incorrectly formed. It has, in fact, been officially rejected by the International Commission on Zoological Nomenclature in favour of the more correct "Phasmatidae".

References

Bradley, J.C., and Galil, B.S., The taxonomic arrangement of the Phasmatodea with keys to the families, subfamilies and tribes, Proc. ent. Soc. Washington, 79 (2) (1977) 176-208.

Kevan, D.K.McE., Phasmatoptera, in Parker, S.F. (Ed.), Synopsis and Classification of Living Organisms, Vol. 2, McGraw Hill, New York et al., (1982), pp.379-82, pl. 116. (This contains references to certain other works treating the classification of stick insects.)

MORE MALE MOROSUS by Saul Springett (No. 341)

I have discovered that I have two male Carausius morosus out of only about 100-200! I also now have about 15 males with female characteristics, a lot more than my usual ratio. These are all kept at normal room temperature with no heating at night. This suggest the eggs have not been affected by heat. I have also noticed that I have always had a male C. morosus at this time of year (spring) although I have never had two before. Perhaps it could be seasonable? On the other hand, my C. morosus usually hatch at much the same time of the year.

The larger of the two males is at fifth instar, the other being at fourth instar. My culture is all descended from 12 nymphs I got over three years ago from Michael Outred (No. 290), who had a male in his culture. My initial stock included a male which mated with a female, actually producing a spermatophore.

MALE OF CARAUSIUS MOROSUS by Eleanor and Hazel Bagshaw (No. 685)

Our male of this species hatched in August 1988 and has therefore enjoyed several months of adult life so far.

No mating has been seen, and in fact he is usually observed to be apart from our 42 females when moving about or feeding.

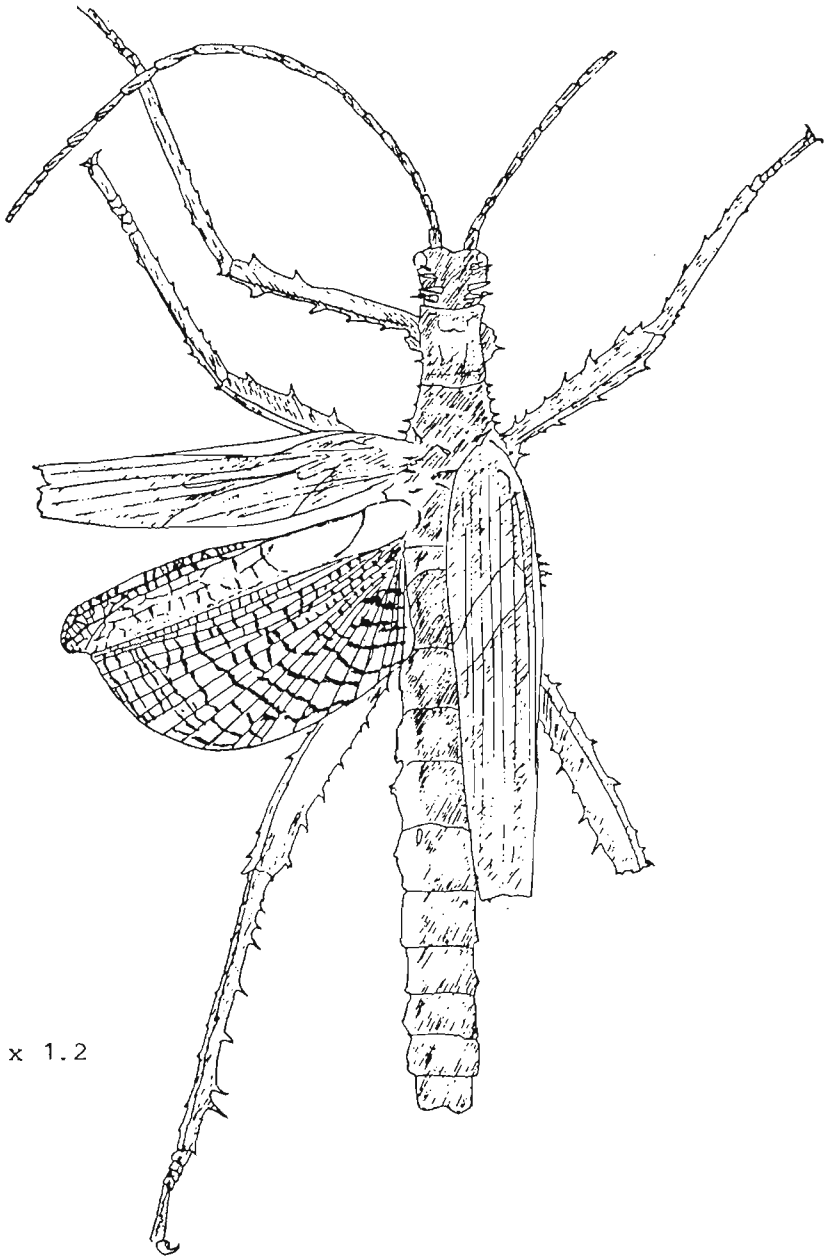
He has never been observed to hang by his front feet when resting, and usually sleeps slantwise along the foodplant. We have never seen him on the cage floor.

He moves more quickly than the females. He also responds quickly to stimuli: a knock on the cage will cause him to change position immediately, with much antennae waving, while the females remain immobile.

His excreta resemble those of a large nymph, being smaller and thinner than those of the females.

TWO HETEROPTERYX DILATATA GYNANDROMORPHS Drawings by Paul Brock (No. 26) of the insects described in Newsletter 36, page 5.

But the female left/male right gynandromorph is shown two instars larger, as adult; sadly it failed its final shed.



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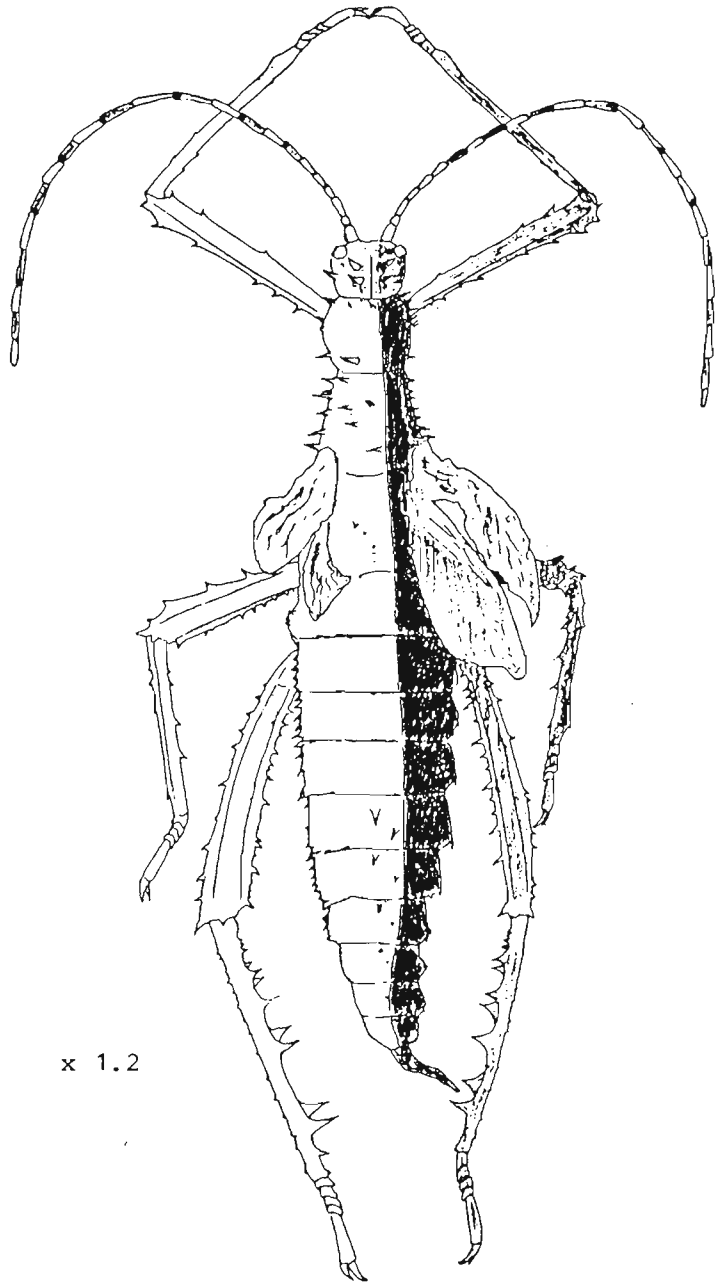

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ARTIFICIAL DIETS Part 1: FOOD SUPPLEMENTS AND STIMULANTS
by Charlye Woolman (No. 2)

The term "artificial diet" covers a wide range of possibilities, from food supplements that can be used to enhance the nutritional value of foodplants, through to a chemically defined diet composed of pure amino acids, salts, vitamins, etc. The former goes back to a Russian experiment, reported in Nature in 1944, while the latter was first achieved for a multicellular organism (good old Drosophila) in 1946 by Schultz et al. I'll deal with food supplements first as they may be easier for PSG members to experiment with.

Building on the Russian experience, W. R. Smith carried out a series of experiments which led to his recommending the following mixture for increasing the size of larvae, the yield of silk and improving the fertility of the resultant adult Bombyx mori silkmoths:

Smith's Elixir

Dextrose	2	tablespoons
Potassium nitrate	1.5	teaspoons
Brewer's yeast	2	tablets
Water	1	pint

This mixture, which came to be known in silkmoth rearers' circles as Smith's Elixir, could be sprayed or painted on to the foodplant, or the plant could be stood in it for 24 hours.

PSG readers may be thinking "Fine, that works for silkmoths, but what about phasmids?". The answer to this question is "Find out for yourself!". The stimulus for developing artificial diets has come from the need for research on economically important insects. Over 750 species of insects have had diets developed for them, mostly in the last 10 years, but stick insects do not get a look in. In some ways, though, this is what makes the whole area of artificial diets so exciting for us PSG members. The field is wide open; everything we find out will be an original contribution to the growing body of knowledge and the sort of thing which works for other phytophagous (plant-eating) insects is likely to work for phasmids.

Smith's Elixir might work either because it adds nutrients that the silkmoths are short of and/or because it stimulates them to eat more of a plant which is not wholly palatable to them. Rearers of silkmoths have the same problem that we have in that they are generally rearing exotic insects on a substitute foodplant available locally, rather than on the natural foodplant. To find out if Smith's Elixir works for phasmids you will have to raise two batches of phasmids, one batch with the food supplement and one batch without it as a control.

It would also be worth looking for simple feeding stimulants, i.e. substances which would induce the phasmids to eat more of their usual food. The most important feeding stimulants in the literature are simple sugars, e.g. glucose, fructose and sucrose, all of which are easily available from the chemist or even supermarket. Lecithin (which you can often get at "health food" shops) is reported to evoke a strong feeding response in grasshoppers. The mustard oil glyoside, sinigrin, stimulates the feeding of a large number of insects whose natural foodplants are members of the family Cruciferae. In small doses it may also be attractive to other insects (try a little mustard powder). Certainly, C. morosus will eat a cabbage-based diet. The list of possibilities to try out could go on and on.

To establish whether any of them work will require patient, carefully controlled observation. You need to be able to establish how much food has been eaten and to compare this with the amount of food eaten by a similar batch of insects not given the stimulant. Different established ways of achieving this are: seeing if the insect will attempt to eat what would normally be unattractive to it, e.g. blotting paper; measuring the leaf area consumed by batches of insects with and without the stimulant; measuring the weight of frass produced; recording the time spent actually feeding; and measuring the weight loss of leaves due to feeding. In each case the experiment has to be carried out with and without the potential stimulant in order

to make a comparison. Such experiments have the advantage that they can be performed relatively quickly. A few hours' feeding should be sufficient to reveal whether the stuff you are trying out "really hits the spot"! There is also the advantage that the phasmids are not exposed to what may be an unsuitable diet for any great length of time. If a stick insect does not like what you are offering, it can easily tighten its belt one notch and ignore it for one night. It goes without saying that one would avoid trying out substances which are likely to be injurious to the insects.

In Part 2 I will deal with complete diets.

UNUSUAL STICK INSECT FOOD by Austin Crompton (No. 366)

Whilst clearing out my cage of adult Acanthoxyla prasina, I let them wander freely on my other cages. On one of my cages I have a plastic sheet stuck to the front by sticky tape, but some of this tape had come loose and was not sticky any more. After a few minutes I noticed one of the Acanthoxyla feeding on the tape: in fact she had eaten a good square centimetre of it! I took her off the tape in case it did her some harm (but she lived out her normal life).

A few days later I noticed a few of my adults nibbling at the edges of a cut piece of the plastic sides of their large sweet jar cage: the plastic though was hard and I couldn't see any bite marks. Could this plastic jar and the sticky tape contain some plant material: I gather that Cellophane is made from plant cellulose - anybody any ideas?? (Note that the adults had fresh food at the times of these observations.)

[We once had a Lonchodes hosei adult female that died soon after eating plastic string. Possibly sticks will nibble at anything with a thin edge. - Eds]

STICKS ARE FUSSY ABOUT EVERGREEN OAK! by Frances Holloway (No. 3)

Mel Herbert (No. 232) mentioned to me that he always tried to collect evergreen oak for his Phyllium sp. not only from the same tree but even from the same part of the tree. Tim Branney (ex No. 239) also remarked that his Heteropteryx dilatata would not eat the evergreen oak he offered them.

We have been feeding evergreen oak to our bulky species for some years now and, although it is a very useful foodplant, particularly in the winter, the sticks are indeed fussy about it. There are many old, large, apparently identical trees in the cemetery where I collect, but the sticks will happily eat some yet reject others. They are also reluctant to eat sprigs from a sapling which appears to have sprung from the tree they most like, and even sprigs from the opposite side of this giant tree!

CORK OAK FOODPLANT by Robert Lind (No. 513)

Early in the year bramble is not in very good condition so I hunted around my local woods and found a large patch of Cork Oak. Extatosoma tiaratum along with Acrophylla wuelfingi ate it. Sipyloidea sipylus and a Baculum species did not take to it and ate only the bramble I provided as well in case they didn't like the Cork Oak. Young nymphs were not too keen on it and only E. tiaratum touched it.

FOODPLANT FOR EURYCANTHA AND HETEROPTERYX DILATATA by Phil Bragg (No. 445)

Adults of species 18, 23 and 44 all eat ivy. Species 23 also eat it as nymphs: I don't know about 18s and 44s.

TWO PAPERS (IN GERMAN) BY BURGHARD HAUSLEITHNER (No. 132)

"Zur Variabilität von Calynda brocki Hausleithner" (Ent. Zeit., 98 (1988) 22, 328-31) illustrates the variability of the head spines of adult females.

"Die Eier einiger Lonchodes-Arten" (Ent. Zeit., 99 (1989) 8, 102-12) describes and illustrates the eggs of 14 Lonchodes species, nine for the first time. Taxonomic changes are proposed.

FRENCH PSG REVUES: SUMMARIES AND HIGHLIGHTS by Michael and Frances (No. 3)

REVUE No. 1

Clonopsis gallica biology and rearing by Philippe Lelong (note)

In addition to information in Newsletter 38, this mentions that green coloured females have a white line along the sides of their abdomens. Philippe keeps his eggs in the vegetable compartment of his refrigerator throughout January. They then hatch in March and he puts the eggs in a humid box at that time. In the wild, nymphs hide from the sun.

Automatic humidification system by P.E. Roubaud (1 page)

French version of article on page 10 of Newsletter 34.

Carausius morosus by Pascal Robeyrotte (1 page)

This brief "Species Report" includes the controversial statements that this insect was introduced into Europe in 1898 by the Dutchman R.P. Pantel and that its range includes Indonesia (as well as India).

Foodplant for E. tiaratum by Pascal Robeyrotte (note)

Grapefruit leaves.

A ravishing species of phasmid - Rhaphiderus scabrosus (Audinet-Serville) by Alain Deschandol (2½ pages)

French version of the Species Report on pages 11 and 12 of Newsletter 33. The number of moults is given as 7 for the male and 8 for the female. Adults sometimes remain mated for several days.

Some notes and observations on Clonopsis gallica by Frédéric Longlois (5 pages)

Around Toulouse this species is found almost solely on wild plum trees (the sort which produce small yellow or mauve plums) which are exposed, isolated and with shaded lower branches - the tree need only be 50 cm high. This species was once found in much smaller numbers on a small blackthorn (Prunus spinosa) but never on bramble, rose, etc. The insects can be collected in a Japanese umbrella unfurled below the tree. The insects fall on to the cloth if the branches below 1 metre are beaten. These phasmids are never found above 1 metre, probably because of their need for humidity from the soil. The best time to look is during the hatching period early in May - their density diminishes rapidly after this time. In rearing, it is important that the temperature does not exceed 18°C, at least for the first days.

REVUE No. 2

The Phasmid Study Group List of Phasmids in Culture by Paul D. Brock (pages 3-4; translated into French)

In addition to information in Paul's article in Newsletter 35 (pages 5 and 6) this gives two examples of species cards (including origin, foodplants and brief biological notes).

Some precautions to take when collecting foodplants by A. Deschandol (page 5)

Don't collect near roads, to avoid pollution. Check carefully under leaves for spiders, cocoons, etc - these can be removed by a strong jet of water. Cut the ends of the stems on a slant of 1-2 cm and then immerse them immediately in water to make the plant live longer - this is an old florists' trick!

A new system of humidification by P. E. Roubaud (page 5)

In this modification of the "Economic System Gardena" for watering gardens, an electronic timer switches on and off the water from the mains. Each cage has a sprinkler to disperse the water on to the foliage in fine droplets and a dropper immersed in the foodplant water pot to keep the water level constant. Unfortunately, the timer cannot be switched on for less than a minute, so the underside of the cage must be pierced with a small hole to evacuate superfluous water. The major disadvantage of the system is its price.

Another system of humidification by G. Puaud (page 6)

Illustrates a closed circuit system using a car windscreen washer pump, two nozzles taken from old Brise aerosol deodorisers, and aquarium air tubing. Three wicks carry water up from a tank reservoir into the soil, which is suspended above the water by a Bac Riviéra grille. This system is activated by a timer switch for a quarter of an hour every day.

A universal foodplant by D. Collignon (page 7)

Pyracantha coccinea (commonly known as Firethorn) is an evergreen Rosacea unaffected by cold, which remains fresh for a long time in cages. These plants cost about 30 francs each. PSG 9, 13, 22, 32 and 73 have been reared exclusively on this plant without any problems.

Oreophoetes peruanas by D. Collignon (page 8)

A brief general description, including rearing and foodplants.

Clonopsis gallica: study of the amount of cold necessary to break the diapause by Philippe Lelong (pages 9-12)

Reports results of experiments on hatching 800 eggs placed in four dry and four humid (90%) containers in the vegetable compartment of the refrigerator (at about 10°C) on 1st January for 15 days and 1, 2 and 3 months, and then kept at 20°C. Dead eggs were also noted (by transparency). Two hundred eggs not placed in the refrigerator did not hatch at all. Other eggs all started hatching between the middle of March and early in April (in the wild they hatch at the end of March or at the beginning of April). The percentage hatching (about 30%) was greatest for those kept in the refrigerator for 2 or 3 months. Humidity had little effect on the number hatching but usually nearly doubled the number of dead eggs (but this number was never more than about 20%).

Males of Carausius morosus and Sipyloidea sipylus by A. Deschandol (page 13)

French version of article on page 3 of Newsletter 38.

Eggs of Carausius morosus by M. Vinot (page 14)

Gives Bergerard's method of producing males.

Males of Carausius morosus - some different hypotheses and a plausible solution by P. E. Roubaud (pages 15-17)

Considers the three hypotheses that the male is a female with mutated terminalia, or a gynandromorph, or a true male. The male is unlikely to be a mutation because this is not inherited. A gynandromorph can have XO or XXY heterochromosomes (Turner and Klinefelter syndromes respectively). These are briefly discussed. It is difficult to see how a Y chromosome can be produced from a female, so the Klinefelter syndrome and true male are both unlikely.

Besides the usual lists of members' species in culture, this Revue also includes lists of members' books and articles on phasmids, five sources of phasmids, and a question and answer section.

REVUE No. 3

Open letter to my friends the phasmids by Alain Deschandol (page 3)

This affectionate letter to 10 different species includes apologies, praise, questions and complaints.

Some methods for preserving phasmid specimens by F. Langlois (pages 4-5)

Gives ways of preserving the colours and shapes of phasmids with thick skins or with thin, soft skins by suitable drying or by degutting, stuffing with shaped balsa wood and/or cotton wool and subsequent drying.

Methods of collecting Clonopsis gallica by D. Morin (pages 6-7)

Gives 11 French localities, usually with the appropriate one of five foodplants. The insects can be collected at night with a light or by using a puff from a bee smoker to make them move.

To spray or not to spray? by A. Deschandol (page 8)

Briefly considers the advantages and disadvantages of spraying water on foodplants in cages. Two disadvantages are that the sprayed water is often colder than the ambient temperature (so the insects can receive sudden chills) and it also evaporates quickly. Alain sprays every evening to correspond to the natural dew and nocturnal phasmid activity.

Observation on Eurycantha calcarata by D. Parent (page 9)

More than 50% of small nymphs shed their skins when the foodplant ran short.

Leptynia hispanica by Philippe Lelong (pages 9-10)

The female is the shortest French phasmid, coloured green with a white stripe on each side of her abdomen. Principal criteria of identification are: body width less than 3 mm, pointed abdomen, very short (3.5 mm) antennae with very irregular segments, and eggs three times as long (4.1 mm) as wide. These insects can only be collected using a bee smoker.

A propos Phyllium species by V. Spreter (page 10)

Describes breeding and rearing difficulties with a parthenogenetic culture. At first, the nymphs eat only the small leaves at the end of bramble shoots. Culturing was improved by exposure to the sun through a plastic sheet, checking that the temperature did not exceed 30°C.

FEET LOSS IN EXTATOSOMA TIARATUM by Phil Bragg (No. 445)

I find that survival in PSG 9 is very good. The only losses I get are a few in the first instar, a few in the second instar and a very rare loss in later instars. Those which die in the second instar are more numerous that those in the first. The deaths in the second instar onwards are due to the insects' losing tarsi during the moult from first to second; this would result in the insect, if not humanely killed, starving to death as it cannot climb the foodplant. Hand feeding would be of no use as the insect would be unable to shed its skin next time anyway. The losses in the first instar seem to be due to the insects' not eating.

The loss of tarsi in this species seems to be very common in my culture. Many lose one or two at the first moult; only those which lose three or more do not survive. Even at later stages tarsi are often lost when the insects shed. I recently had a third instar nymph which had lost five tarsi!

[Such imperfect moulting could perhaps be due to the insects' being kept a little too dry. - Eds]

FAT AND THIN EXTATOSOMA TIARATUM ADULT FEMALES by Austin Crompton (No. 366)

I have found that the abdomens of dark brown specimens are often not as fat and swollen as the abdomens of lighter coloured individuals, even when of similar ages and egg laying.

EXTATOSOMA TIARATUM MATING AND FIGHTING by Robert Lind (No. 514)

In mating, the male always seeks out the female and he touches her body a lot before mating. Males sometimes interlock their back legs and pull.
[From Robert's very detailed Study Sheet -Eds]

AGGRESSION IN EXTATOSOMA TIARATUM ADULT MALES by Austin Crompton (No. 366)

An adult male E. tiaratum was resting on the side of the cage when another male approached him from behind (apparently from random movement) and ended up on the first male's back; the first male then started to walk forwards. The second male immediately started flapping his wings quickly and stabbing the first male with his hind legs. The first male started to do the same, bringing his hind legs as far over his back as possible in order to stab the male on top. Both males then fell on to the floor of the cage before separating after a few seconds.

CLICKING EXTATOSOMA TIARATUM by Nicholas Wadham (No. 358)

On carefully picking up a very spiny E. tiaratum adult female of mine to clean out her cage I received a sharp telling off from her as she lashed out with her hind legs and produced a series of very rapid clicks. The clicks took me completely by surprise so that I almost dropped her. On looking closely at the point where the hind leg joins the body, I found a row of very short spines at the edge of the underside of the metathorax. When the stick lashes out with its hind leg, these short spines catch on a spine on the underside of the base of the hind leg and so produce the clicks.

SOME MORE PAPERS BY ULF CARLBERG (No. 28) by Michael and Frances (No. 3)

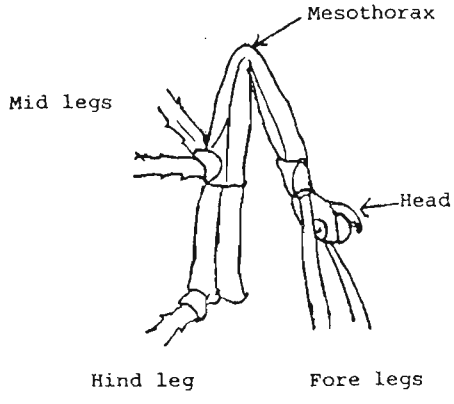
"Food consumption in Extatosoma tiaratum" (Zool. Anz., 220 (1988) 3/4, 195-202) shows that the consumption of Acer platanoides (Norway maple) and of Quercus robur (English oak) is linearly related to the body mass for nymphs and adults of both sexes. The insects eat roughly a tenth of their body mass per day.

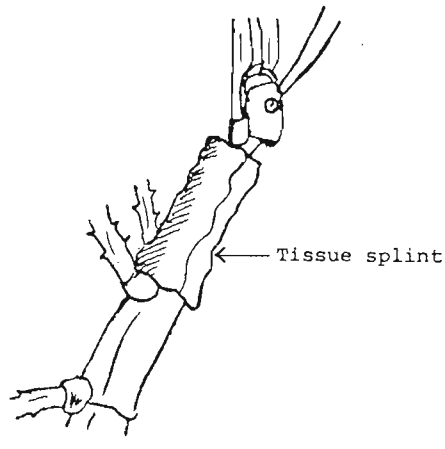
"Aspects of evolution and ecology in relation to defecation and oviposition behaviour of Extatosoma tiaratum" (Biol. Zentralbl., 107 (1988) 541-51) points out that flinging the eggs can project them outside the dry bare zone often found around the Eucalyptus trees on which the insects feed in Australia. This also moves the eggs away from the Hymenopteran parasitoids and predators often attracted by the smell of the frass and foodplant residues deposited below the trees by insects. These advantages of flinging the eggs are increased because the females tend both to congregate at the edge of the tree and to fling their eggs outwards. Theories for the evolution of this oviposition behaviour are discussed.

"Postembryonic growth in length and mass in Extatosoma tiaratum"(Zool. Anz., 220 (1988) 3/4, 203-15) gives the results of about 1600 measurements at all sizes. Exponential correlations were found between the instar number and the body length, mass and mass/length ratio except, in the last two cases, for adult males. In males there were linear and exponential relations between the instar number and the growth of the elytra and hind-wings (respectively) relative to the thoracic and abdominal segments; and in females an exponential relation between the instar number and the growth of the operculum relative to the abdominal sternum. At a particular instar the mass and length were linearly correlated, with a slope which increased exponentially with the instar number, again except for adult males. Here, and earlier, the results for adult males were little different from those of fifth instar males, except for their lengths. A key for the different instars is given based on the body length and mass, data statistical constants and ratios, the number of segments in the antennae, and the growth of the elytra and hind wings in males and of the operculum in females.

ANOTHER SPLINT FOR STICK INSECTS by Austin Crompton (No. 366)

Like Eve Bysouth's (No. 295) Ctenomorphodes briareus male in Newsletter 35 (page 9) one of my female Tirachoidea sp. (PSG 58) moulted into fourth instar without giving herself enough room. There was a very severe bend in her mesothorax: it in fact formed an angle of about 20°. Some half an hour after her moult, I took a strip of tissue paper about 5 cm x 1 cm, dampened it with water and, after carefully straightening the mesothorax, wrapped the tissue around it in order to keep it straight, while she was on the foodplant. I wrapped the tissue fairly tightly to make sure that it stayed in place, but not too tightly in case it interfered with her feeding. If in doubt, I would advise anyone to wrap such a tissue loosely rather than tightly.





Once the tissue had dried, a firm splint had formed. After a week I very carefully removed the splint with my fingers by ripping it along its length from one end to the other. With small sticks or for people with clumsy hands I would advise using tweezers to remove the splint - scissors could accidentally cut into the stick. After the splint had been removed the insect was all right except for a little indentation in the mesothorax where it was originally bent. After her next moult the insect was perfect and she is now at sixth instar and doing fine.

"OASIS" FLORIST'S MOSS BRICKS FOR EGG LAYING by Ingrid Lorrain (No. 539)

I use Oasis to put my bramble stems in and, particularly, Libethra regularis prefer to lay their eggs in this Oasis. So, when the Oasis was "filled" with eggs, I put it in a plastic box. The advantage is clear. The Oasis stays damp all the time (if you keep the box closed) and it doesn't get mouldy easily. A few days ago nymphs started to emerge from the Oasis, so I think it is a good replacement for peat, at least for Libethra regularis: I haven't tried it yet for other species.

[For the use of such moss for foodplants, see the article by Alain Deschandol (No. 238) on page 4 of Newsletter 38. - Eds]

HOW DO YOU PICK UP YOUR STICK INSECTS? by Alain Deschandol (No. 238)

Small insects and young nymphs especially are not easy to pick up. For this I use flexible tweezers in metal which is smooth (cost in France: £2 - £3). Stick insects can be picked up by the middle of the body (never by the legs!) without damage to them.

[But sticks should not be pulled off their perches. We use a fine paint brush, either to pick them up directly or to coax them on to a finger or hand. - Eds]

DARKER, BUT NOT SMALLER, EURYCANTHA 44 by Mel Herbert (No. 232)

In Newsletter 37 (page 9), Michael and Frances (No. 3) wrote about "Smaller, darker Eurycantha 44 nymphs". Well, I have a similar occurrence. The nymphs which I brought with me to Germany appeared normal at 2nd-3rd instar but at about 4th-5th instar almost all of them became very dark and about 60% of them could only be described as black. They were as black as very old Haaniella echinata females often become, with only a hint of green on the tips of one or two of the largest spines. They were much darker than adult E. calcarata (PSG 23) and really very handsome creatures!

Newsletter 37 mentions dark specimens that were smaller than normal, but this is not the case with mine as nymphs or adults. The adults are darker than is usual for PSG 44 but not as dark as PSG 23. They have the spines, slightly broader thorax and bad temper of PSG 44. They have not started laying yet so I don't know about the eggs.

One dark nymph escaped and when I recaptured him I put him in a separate cage (with Heteropteryx dilatata nymphs) and within 2 weeks he was very light coloured. I suspect that the dark colour may be a response to high population density or perhaps some other environmental factor. PSG 44 seems more plastic in this respect than PSG 23 (for example, Phil Bragg's (No. 445) "green" specimens of PSG 44 discussed in Newsletter 36, page 5).

DARES SP. (PSG 69) - POSSIBLE CHEMICAL DEFENCE, VIBRATIONS AND ACROBATICS by Austin Crompton (No. 366)

Whilst handling an adult female about five days after her final moult I gently squeezed the end of her abdomen in order to make her move. She moved a step forward and at the same time a small spray of liquid appeared beneath her body. I did this several times and the spray was emitted each time. It seemed to originate on the insect's ventral surface somewhere near the abdomen/thorax junction. During the time when she gave off the spray, her abdomen was held up high. I have observed this in two adult females.

I picked up a last nymphal instar female a few days before her final moult and, when I touched her abdomen, she gave off a strong vibration lasting about a second and repeated for about the same duration. The actual movement that could be seen in her body was very slight but was very obvious in a middle leg which was held aloft at the time. After her final moult she vibrated again on being handled. I have observed vibration in several other adult females.

On many occasions I have found that, when I have picked up the twig or piece of bark they are resting on, these insects apparently push themselves off and land on the floor. Many other stick insects simply drop off, but these seem actually to push themselves using their legs. I have seen this happen in large nymphs and adults of both sexes.

It seems that Dares are not quite as passive as they appear.

[Nicholas and Jenny Wadham (No. 358) have very recently also reported vibrations in Dares sp. (PSG 69) females, always in a set pattern of three ½-second bursts and one 2-second burst, seeming to come from underneath the body. - Eds]

PHASMID TERRITORIES by Ingrid Lorrain (No. 539)

For the moment I have not enough cages, so Lonchodes brevipes nymphs and Creoxylus spinosus nymphs live together in one cage. It is fascinating to see that these two species each has its own territory. They do not fight to defend it (as far as I have noticed), but they tend to stay with their own group, on their own leaves of bramble. They do so especially in the first, second and third instars.

COMPETITION BETWEEN BACULUM IMPIGRUM (PSG 24) AND SIPYLOIDEA SIPYLUS by Patrick van der Stigchel (No. 336)

I always used to rear B. impigrum and S. sipylus together, but B. impigrum breeds much faster. S. sipylus didn't seem to tolerate this and later there were hardly any left in the cage!

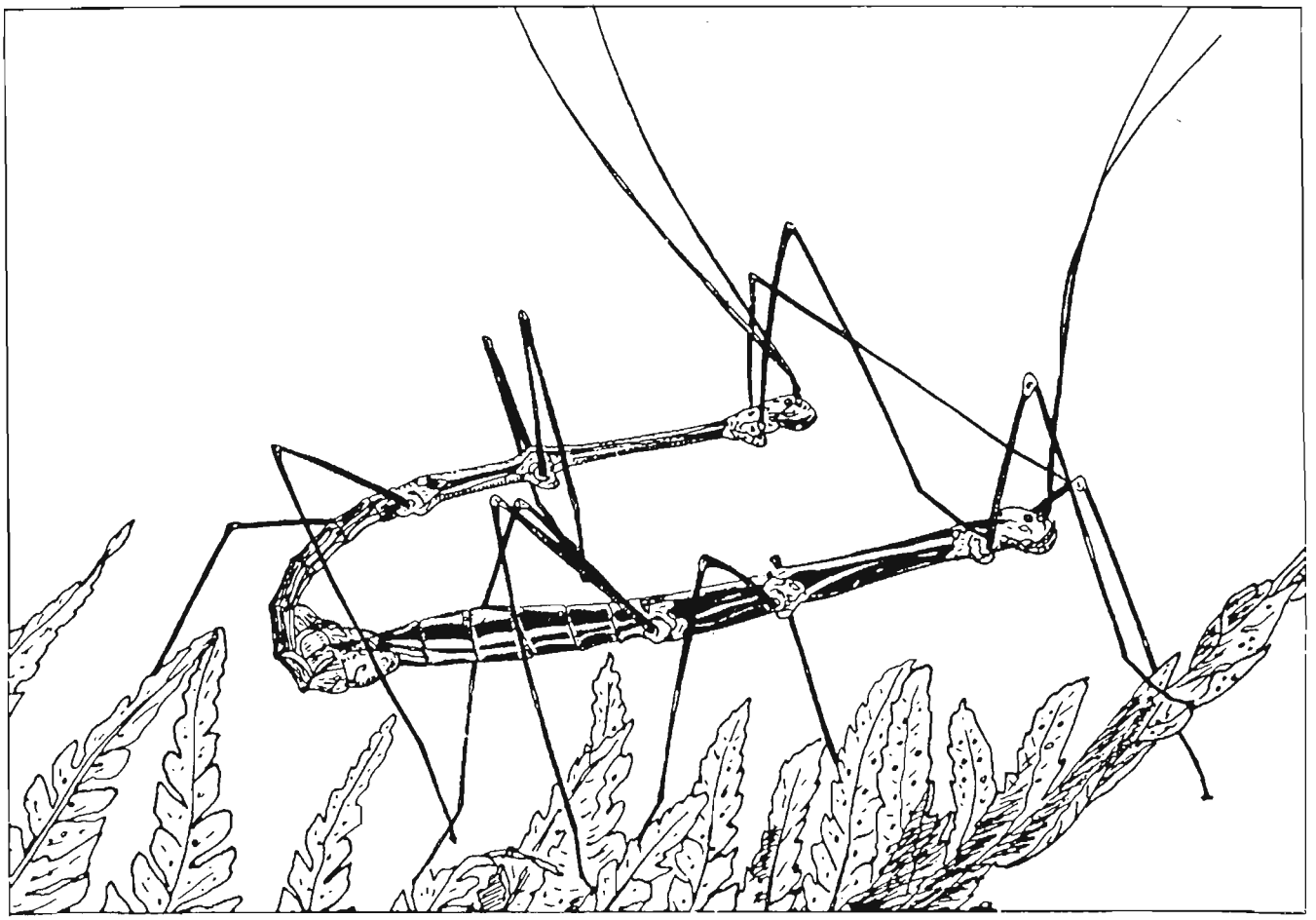
PSG No. 84: OREOPHOETES PERUANAS (SAUSSURE)

Compiled mainly from Reports by Didier Mottaz (No. 45) and Dawn Tudor (No. 363). Drawings by Didier Mottaz.

First described: As Bacteria peruana by Saussure, 1868; synonyms Bacunculus festae (Giglio-Tos, 1898:22) and Allophylus peruanus (Brunner, 1908:317). Tribe Heteronemiini.

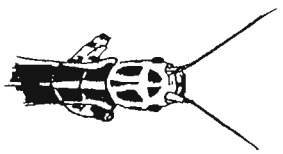
Range: Peru and Ecuador.

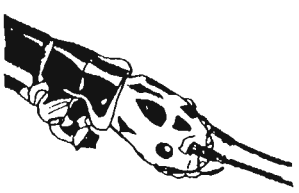
Culture history: Whilst travelling in Peru in September 1984, in the region of Tarapoto, in the valley of the Rio Shilcayo, Didier collected several adult pairs and placed them in a cage on fern, their host plant. From the bottom of the cage he collected a dozen eggs which, when brought back to Switzerland, produced a dozen nymphs, of which five females and one male reached adulthood.



Adults: Both sexes are wingless. Their antennae are some 100 mm long and black with a white mark just before the tip.

The colour of this species is really unusual. The head is red, or in some females yellow-orange. It is characterised by seven black marks (see drawings) common to both sexes but less angular in the male. There are two roughly circular marks between the eyes and behind the antennae, two larger oval marks just behind, two narrower marks further back and more towards the sides just in front of the prothorax, and one other very narrow central mark. The pronotum is mainly black bordered in red (or yellow-orange), with three small black marks (two elongated and one roughly circular) where the fore legs join.





The females are of similar body shape to Libethra regularis but much larger. They are on average 70 mm in length with a body width of about 4 mm - although the abdomen swells once egg laying commences.

The fore legs are about 50 mm in length, the mid legs about 40 mm and the hind legs about 60 mm. The legs are black except for the joints which are red (or yellow-orange) with black spots; there are also two pale yellow rings midway down the tibiae.

Overall the female's body is black but the abdomen and thorax are also patterned by a series of stripes on their dorsal, ventral and lateral aspects, as follows:

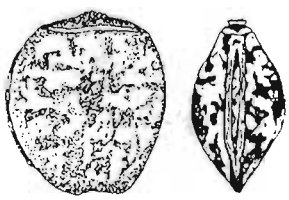
(a) A central dorsal yellowish-green stripe starts from the prothorax and continues along the length of the body to the tip of the abdomen.
(b) On each side a yellowish-orange stripe borders the dorsal plates of the mesothorax, metathorax and abdomen.
(c) A ventral pair of pale yellow stripes starts from the prothorax and runs beneath the body (along the lower part of the pleurites and the upper part of the sternites) and joins at the sixth segment of the abdomen.

The red (or yellow-orange) colour also occurs where the legs join the body and on the sub-genital plate, the latter being also speckled with black.

The males are very thin and stick-like with an average body length of 60 mm and a body width of 3 mm. The fore legs are about 55 mm long, the mid legs about 45 mm and the hind legs about 65 mm. All are black except for two rather indistinct pale yellow rings on the tibiae. The basic body colour is a splendid dark red - the stripes are pink and less pronounced than in the female. The male's body is broadened by the insertion of the middle and back legs into inverted "V" shapes. The end of the abdomen swells from the sixth segment onwards in the shape of a lozenge.

Mating occurs very infrequently, but when it does occur, pairing lasts for several hours, sometimes until the next day.

Ova:

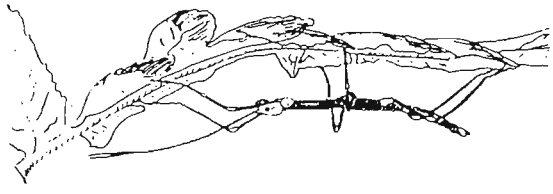


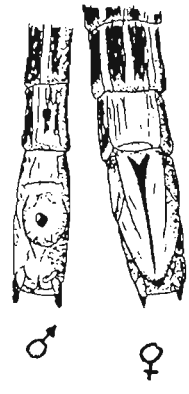
These are 3.5 mm high and 2 mm thick, coloured brown with black spots, and discoid in shape. On the narrower surface, where the micropylar plate is situated, they are grey in colour. One end is flattened and it is here that the operculum is located; this is also flat. During the incubation period the eggs become darker. The eggs hatch after an incubation period of 9 weeks: the hatching percentage is high.

The eggs are laid at a rate of one a day and the females can often be seen resting with the egg still in the ovipositor several hours before it is released by being dropped indiscriminately to the floor.

Nymphs:

Hatching needs a high humidity: nymphs are sometimes hatched with deformed legs through lack of moisture. The number of deaths is high at first instar and during the first and second moults especially. Nymphs take about 4 months to reach adulthood (at 20°C).





Newly hatched nymphs have a body length of 12-15 mm and leg lengths of 10 mm. The 15 mm long antennae are, as in the adults, entirely black except for a white mark just before the tip. Overall the nymphs are dark brown, later turning black except for the head, tip of the abdomen and where the legs join the body, which are all yellow-orange. Later the nymphs gain the same stripe patterns as the adults but in the nymphs all are pale yellow in colour. Their legs are mainly black.

The most noticeable sexual distinction is that the sub-genital plate is more conspicuous in the male from the third instar onwards and possesses a small black spot in the middle as opposed to the fine black line on the female (see drawings).

The coloration of the future adult male can be seen through the translucent skin a few days before the last moult, but he does not gain his final deep red colour until 24-48 hours after his last moult. The female's coloration is produced some days after her last moult, but sometimes the red coloration does not appear and parts of the insect stay yellow-orange throughout her adult stage. This would appear to happen only in culture, because Didier never observed it in nature. During the first weeks in the life of the adults their red colour is very vivid, but it fades somewhat a little later on. After the insect has moulted, the exuvia remains dark on the black parts (as in Anisomorpha buprestoides).

Foodplants: At all stages this species feeds exclusively on ferns (Polypodiaceae), particularly Pteris, Nephrolepsis and Asplenum species according to Collignon in Revue No. 2 (page 8). It is therefore necessary for breeding purposes to cultivate this type of plant, as in winter the stalks wither rapidly. Care should be taken that, when purchased commercially, the plants have not been sprayed with insecticides.

Defence: Both sexes have glands situated at the front of the prothorax which in the event of danger secrete a sticky milky liquid giving off an odour variously described as pleasant and unpleasant. In Peru this smell spreads several metres in the air where these insects live. This liquid would seem to be toxic - Bruno Kneubühler (No. 440) has seen Orxines macklottii succumb when bred in the same cage as O. peruanas and Dawn reports that, if this fluid comes into contact with broken skin, it stings until washed off and the smell persists even after several washes. They must certainly use this as protection against predators.

Dawn has read somewhere that very few insects are able to feed on ferns because they contain cyanide compounds which act as natural insecticides for the plants. She suggest that O. peruanas is able to ingest and store these compounds and the the insects are brightly coloured as a warning signal to potential predators. Perhaps their defensive spray also includes these compounds.

Comments: This species needs a temperature of about 20-25°C and a daily moisturising spray of water to keep the humidity high (70-80%). At all stages, including eggs, they should not be exposed directly to the sun, according to Noel Mal (No. 395). Collignon states that this species is often active in the daytime.

Didier says it is the most fascinating of the species he has bred and is surprised to find in this perfectly camouflaged family an example of such conspicuous coloration.

Acknowledgements: The following should be thanked for help in drawing up Didier's Report: Peter Heusi (No. 283), Burghard Hausleithner (No. 132) and Bruno Kneubühler (No. 440) for their comments, Barbara Pillevuit for the translation, and Michel von Gunten for guiding Didier during his travels in Peru. Thanks are also due to Kim D'Hulster (No. 372) for his comments.

PSG No. 94: BACULUM INSIGNIS (WOOD-MASON) by Bruno Kneubühler (No. 440)

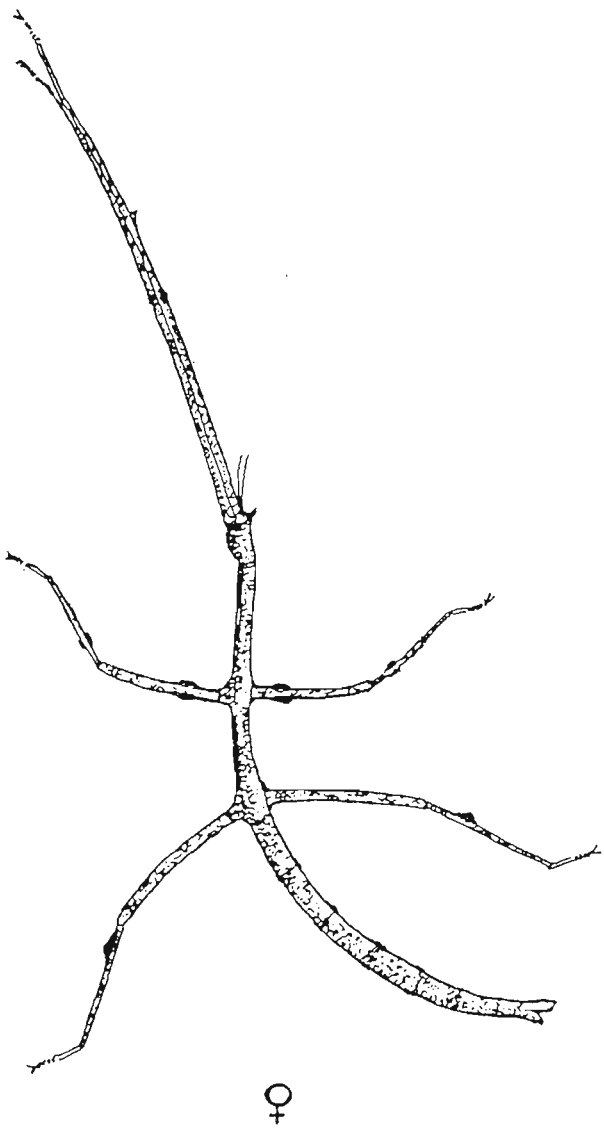
Drawings by Alain Deschandol (No. 238)

First described: J. Wood-Mason described this species as Bacillus insignis in his paper "On new or little known species of Phasmidae, Part 1 - Genus Bacillus" in Journal of the Asiatic Society of Bengal, Vol. 42, part 2, pages 45-6 (1873), which includes two figures of the female (the only sex described). W. F. Kirby put this species into the genus Baculum (Saussure) in "A synonymic catalogue of Orthoptera", page 329 (1904).

Range: Assam (north east India). Localities mentioned by Wood-Mason are Sanagooting, Naga Hills (Captain Butler), Sikkim (Mr Mandelli) and the valleys around Cherra Punji in the Khasi Hills (Lieut. Bowne).

Culture history: Prem and Purnendu Roy (No. 328) caught two adult pairs at Kohima, Nagaland, Assam in September 1986 (see Newsletter 30, pages 5-6; also Addendum by Paul Brock (No. 26) on page 7).

Natural habitat: This species was found in the gardens and hedgerows in and around the Kohima tourist lodge. The adults were almost invariably on their foodplants of cultivated rose and wild bramble, but some males were found in the lights of the tourist lodge. The habitat is in a region of very high rainfall, hence the humidity is always high. Temperatures though tend to be mild, around 20-25°C in summer and 10°C in winter. The winters are short and at this altitude (5000 ft) almost frost-free. All specimens were seen in August and September and were adults.



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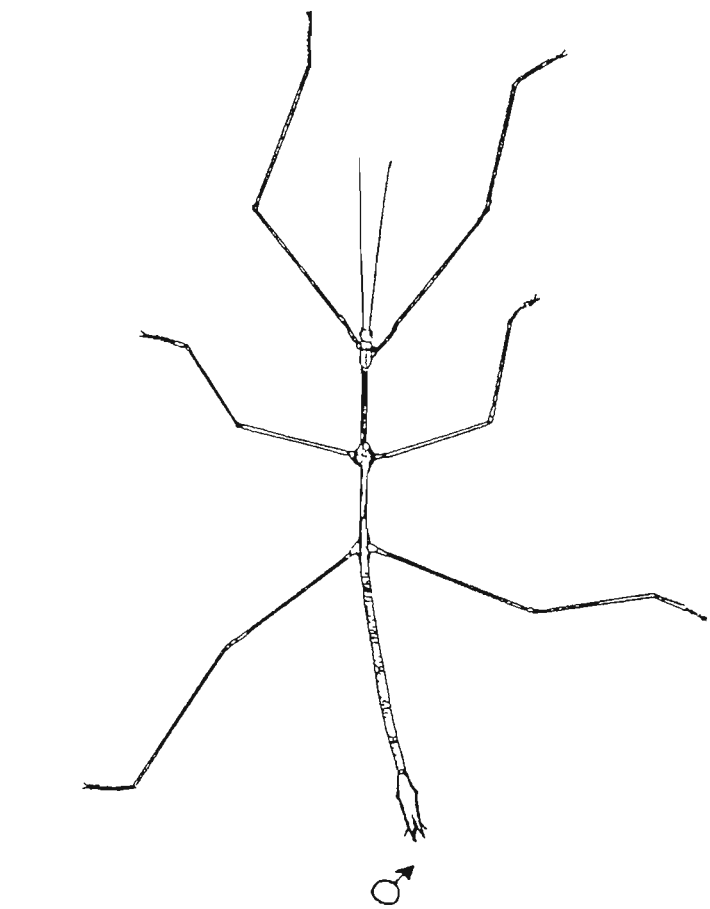

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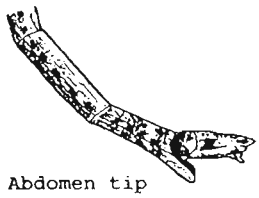
♀ Detail of mid leg

Adults: Both sexes are large, wingless, very typical stick insects. The female's ground colour is light to mid brown, with various faint mottlings (on the body) and faint bandings (on the legs) of a darker brown, grey and black. Some females may be a uniform light brown and a few are greenish. The first six segments of the abdomen have a dark brown spot on each side at the joint of the segment. The body length is 170-210 mm and the overall length 270-300 mm; the abdomen is 6-8 mm wide The leg lengths are: fore 105-120 mm, mid 70-77 mm and hind 85-90 mm. Her antennae are very short (18 mm) and, as in other Baculum species, the first segment is large, flat and broad. On her head there are two forward-pointing dark brown horns above the eyes and a dark brown spot on each cheek. The inside of the base of the fore femur is light violet or reddish, and the coxae of the other legs are slightly reddened on their undersides. On the mid femur and the mid and hind tibiae are 1-3 variable foliose expansions. On the fore legs there are many small spines, with two large spines on each side of the knees. The genital operculum reaches as far as the end of the cerci (not in nymphs - see drawing).

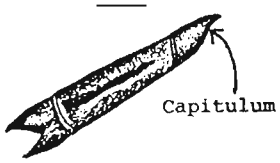


Abdomen tip (sub-adult ♀)

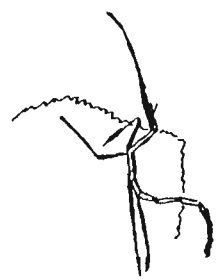
The male's ground colour is a light coffee brown, with hazel legs. There are 7 longitudinal black stripes on the meso- and metathorax and 5 on the abdomen: the mesothorax looks almost black because of the stripes. On each side of the thorax is a white (sometimes greenish) stripe and a dark brown stripe reaches from the eyes to the beginning of the prothorax. The knees, tip of the abdomen and antennae (30-35 mm) are also black/dark brown. The head and body are smooth. Males seem to vary more in size. The body length is 110-140 mm, and the overall length 200-235 mm; the abdomen is 3 mm wide. Leg lengths are: fore 90-115 mm, mid 58-72 mm and hind 72-85 mm.

The life-span is about 7 months for females and about 8 months for males. Mating is short, a few hours at most, although this species is often found mating in the wild, where males appear more common.

Ova: These are 8-9 mm long, 2 mm wide and 1 mm thick, light brown in colour, and smooth. They are very curiously shaped, like cut straw. Hatching takes 2½-3 months when the eggs are kept on damp peat at 20-25°C (68-77°F). I had no problems with mould under these conditions and the hatching ratio was about 70%. Females lay on average 40-50 eggs each per week, although I had one which laid up to 70 eggs. They just let them drop to the ground. Females begin to lay some 3 weeks after they mature.



Nymphs: Newly hatched nymphs are light brown in colour and have a body length of 22 mm. In later instars males and females develop a wide range of shadings. Female nymphs may be distinguished by the presence of spines on the head and expansions on the legs: these are easy to see from the third instar onwards. Females mature in 6-7 months, males in 6-6½ months. The nymphs grow up equally well in humid (85% or more r.h.) or drier (65-80% r.h.) atmospheres. Few nymphs die and I had problems only during the final skin change of sub-adult females (see later under "Comments"). A surprising nymphal behaviour is that they are mostly found on the upper side of their foodplant leaves. Paul Jennings (No. 80) comments on the unusual shapes they take up at rest (see his sketches below).



Defence: Some nymphs may curl their body and drop to the ground if you try to catch them. Other nymphs and the adults have no special defence, just relying on their twig-like appearance. They try to crawl away if caught.

In nature adult females are invariably found resting against the medium-sized stems of rose and bramble, their mottled body colour matching the lichen-covered stems. Adult males, being different in appearance and size, perch haphazardly in the foodplant, where they appear to resemble thin twigs caught in the bush.

Foodplants: They eat bramble and cultivated rose readily, and will accept beech too. Wild rose does not seem to be eaten. (No other foodplants were tried.)

Comments: This is an easy species but, because they are large, they need a tall cage, especially because some specimens moult by hanging from lower places. I keep my adults in a humid atmosphere, because it was the rainy season in India in September when Prem and Purnendu caught them.

To return to the problem mentioned above, in my first generation I lost all my females except one. During their final skin change all were unable to free their legs although their feet were anchored very well: some of them lost all their legs. This was regardless of whether the atmosphere was dry or very humid. Probably their bodies were not in the correct position. I think it is very important that in the cage there are different "slopes" formed by foodplant stems or twigs, so that the sticks may choose. I now have more "slopes" in my cages and in the present generation have lost only two females in this particular way.

Acknowledgements: Thanks are due to Purnendu Roy for his comments on natural habitat and behaviour and to Paul Jennings for his notes.

WANTS AND SURPLUSES

Paul Jennings (No. 80) expects to have eggs of species 94, providing an SSAE and uncrushable container are sent.

Bruno Kneubühler (No. 440) wants 36 and 88.

Michael Lazenby (No. 3, address below) needs strong tubes for posting large eggs, to replace those not returned despite requests.

Jean-Claude Lelong (No. 613) wants 6, 15 and 75.

Nicholas Wadham (No. 358) wants a male of 27 and 96 for his lone females and has surplus eggs and nymphs of 1, 9, 22, 23, 69 and eggs of 18.

FORTHCOMING SPECIES REPORTS

Antillophilus brevitarsus (?) - from Guadeloupe,
Paramyronides perakensis (ex "red mouth") (PSG 37),
PSG 89 - from the Philippines, and
Libethra sp. (PSG 51).

Please send all your information on all these species to the Editors (address below) to reach us by 1st August 1989, or preferably earlier.

NEXT NEWSLETTER

Please send all other contributions to the Editors: Michael Lazenby and Frances Holloway, at 9 Oaklands Court, Nicoll Road, London NW10 9AU, to reach us by 1st August 1989, or preferably earlier. Up-to-the-minute items may be accepted up to 15th August.

All articles for the Newsletter will be deemed to be submitted also to the French PSG Revue for translation.