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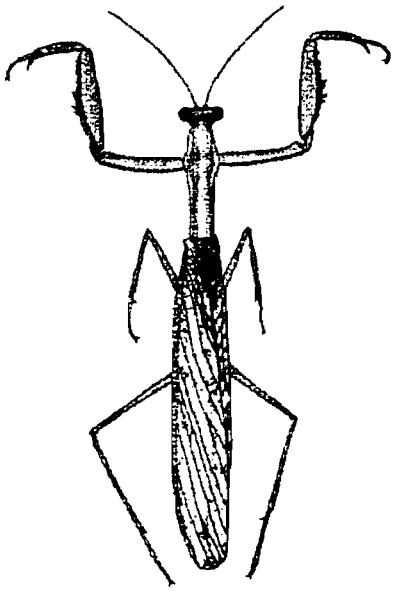
Mantis Study Group Newsletter 1

August 1996



Editorial

Welcome to the first MSG Newsletter. Some of you will be aware of how the group was formed; others may not, so here is a bit of the background. My main interest is in phasmids but I also collect a few mantids and cockroaches on my visits to Borneo, and I rear a few other species at home. Over the past few years I have been getting an increasing number of letters and phone calls from people requesting advice or information about mantids. Requests varied from basic care information to detailed questions on identification and natural history. Eventually I decided that there was sufficient interest to make it worthwhile forming a group to try to make information more widely available. Several people I have spoken to have said they had also been thinking about forming a group, so there seemed to be sufficient interest!

The MSG was founded on 18th May 1996 at a meeting at Dudley Zoo, the meeting was held in conjunction with the Blattodea Culture Group. At the meeting people were appointed to take responsibility for four areas:

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David Yager (Maryland, USA) supplied a long list of people that he knew to had an interest in mantids so, combining this with my own list, over 100 membership forms were sent out with in the first two weeks of the group being formed. Forms are continually being sent out as we are getting fresh enquiries almost daily. Membership has reached 50 already. Notice of the formation of the MSG in other entomological publications over the next few months should boost numbers.

At the May meeting I decided to wait until late July or August before producing the first *Newsletter*. This was largely to give people a chance to return their membership forms so that I could produce a reasonably accurate list of species which are in culture. I also hoped that other people would write something for the *Newsletter*. The number of species is almost the same as the number of members at present!

Address list

Please check the address list carefully to make sure the spelling of your name, and your address are correct. If there are any mistakes please tell Paul Taylor as soon as possible so that it can be corrected. The address list must not be given to anyone outside the MSG.

Species in culture

The following 50 species have been reported as in culture by MSG members, in addition some people listed "unknown" species. The right hand column indicates where they are in culture: A = U.S.A., U = U.K., E = Europe (excluding UK). It is quite possible that not all of the species are correctly identified. Some mantids are being sold in the UK as *Sphodromantis centralis* and *S. gastrica*, but all those I have checked have been *S. lineola*. However, at least one member elsewhere in Europe has both *S. gastrica* and *S. lineola* on their list of species so *S. gastrica* may be in culture; I have omitted *S. centralis* Rehn, 1895 from the list. I know that some of the species on the list are new imports, not established cultures.

Ameles heldreichi Brunner von Wattenwyl, 1882	E
Auromantis limbata (Hahn, 1835)	A
Blepharopsis mendica (Fabricius, 1765)	E, U
Creoboter pictipennis Wood-Mason, 1878	E, U
Deroplatys desiccata Westwood, 1839	E, U
Deroplatys lobata (Guérin-Méneville, 1838)	E, U
Deroplatys truncata (Guérin-Méneville, 1843)	U
Empusa (Empusa) pennata (Thunberg, 1815)	E
Eremiaphila cerisy Lefebvre, 1835	E
Eremiaphila sp. [same as above??]	U
Heterochaeta strachani (Kirby, 1904)	E
Hierodula (Hierodula) membranacea (Burmeister, 1838)	E
Hierodula (Hierodula) parviceps Stål, 1875	E
Hierodula (Hierodula) patellifera (Serville, 1838)	E, U
Hierodula (Rhombodera) stalii Giglio-Tos, 1877	U
Hierodula (Hierodula) unimaculata (Olivier, 1792) ["1 male only"]	E
Hierodula sp. - "New Guinea"	E
Hoplocorypha sp. - "Africa"	E
Hymenopus coronatus (Olivier, 1792)	U
Iris oratoria (Linnaeus, 1758)	A
Macrodanuria elongata (Borre, 1883)	E
Mantis religiosa religiosa (Linnaeus, 1758)	E
Miomantis paykullii Stål, 1870	E
Miomantis sp. - "Egypt" [same as above??]	U
Neodanuria bolauana (Saussure, 1869)	E

Orthodera novazealandiae (Colenso, 1882)	A, E
Parhierodula (Parhierodula) venosa (Olivier, 1792)	E
Parasphendale affinis Giglio-Tos, 1915	A, E
Phyllocrania paradoxa Burmeister, 1838	E
Popa batesi Saussure & Zehntner, 1863	E
Popa undata (Fabricius, 1793)	A, E, U
Pseudocreobotra wahlbergi Stål, 1871	E
Pseudogalepsus modestus (Gerstäcker, 1869)	E
Pseudoharpax ugandanus Giglio-Tos, 1915	E, U
Sibylla pretiosa Stål, 1856	E, U
Sibylla sp. [Same as above ??]	E
Sphodromantis (Sphodromantis) bacettii La Greca & Lombardo, 1987	E
Sphodromantis (Sphodromantis) balachowskyi La Greca, 1967	E
Sphodromantis (Sphodromantis) gastrica (Stål, 1858)	E, U?
Sphodromantis (Sphodromantis) kersteni (Gerstäcker, 1869)	E
Sphodromantis (Sphodromantis) lineola (Burmeister, 1838)	A, E, U
Sphodromantis (Sphodromantis) viridis viridis (Forskåle, 1775)	E
Stagomantis carolina (Linnaeus, 1763)	A
Stagmantoptera biocellata Saussure, 1869	E
Stagmantoptera sp. - "French Guiana"	E
Taumantis ehrmannii Lombardo, 1990	E
Tenodera aridifolia sinensis Saussure, 1842	A, U
Tenodera fasciata (Olivier, 1792)	U
Tenodera superstisiosa (Fabricius, 1781)	E
Theopropus elegans (Westwood, 1832)	U

Appeal for information about spare mantids - Steven Clark.

As many of you will know, I am the livestock coordinator. I have already started to receive requests for livestock but so far have not had many offers of spare livestock. If there is any out there please let me know (address & phone above).

We would particularly like to encourage people to exchange oothecae with members in other countries to try to spread the species.

Newsletter items

My experience of mantids is limited. Unless other people write articles for the Newsletters they are going to become both thin and boring - so get writing!

I hope that the Newsletter will have something to appeal to everyone but it does depend on members writing articles. Inevitably this first one is mostly my own work (the major exception being David Oliveira's key) and I have concentrated on some aspects of basic rearing because I know this is of interest to many members.

Many of the rearing suggestions below are based on either recent telephone conversations or my own experience. There are undoubtably many other ideas and methods around so lets hear them. One of the questions I am often asked is the best way to collect mantids in the wild. Could someone with experience please write something for the Newsletter! It would also be nice to have some illustrations.

The next Newsletter should be out in November. Articles should be sent to me as soon as possible - October will be too late!

Amateur Entomologists' Society Exhibition

The MSG will be sharing a stand with the Blattodea Culture Group at this exhibition. The exhibition is on Saturday 5th October 1996 at Kempton Park Racecourse, Staines Road, Sunbury, Middlesex. Doors open at 1100 and the exhibition closes at 1700. Entry is £1.00 (AES members free). Anyone wishing to help with the display, or to man the stand, please contact Phil Bragg. Offers of livestock for display would be particularly helpful.

Derby Entomology Society Exhibition

This takes place at Elvaston Castle and Country Park, Derbyshire on 2nd November from 1130 to 1630. The MSG will have a small display. Anyone wishing to help please contact Phil Bragg.

Mantis, Mantid, Mantids, Mantises - Phil Bragg.

Praying mantids may be treated as a distinct order, Mantodea, or as a family in the order Dictyoptera. Dictyoptera contains two families: Mantidae (mantids) and Blattidae (cockroaches). The majority opinion appears to favour Mantodea as a distinct order.

There is occasionally uncertainty over whether the insect is preying or praying. Although they are all predatory insects, they should be seen as praying because the name Mantodea is derived from the Greek word *mantis*, meaning diviner, seer, soothsayer or prophet.

There is considerable confusion with the singular and pleural of the vulgar (common) name used for Mantodea. Mantis and Mantid are both used as the singular form; Mantids and Mantises are both used as the pleural. Mantis is the singular form in most common usage and, with the name of the order being derived from the Greek *mantis*, this could be considered the correct form. The use of the rather clumsy Mantises appears to be largely confined to the USA. In order to standardise in the MSG Newsletter, only mantis and mantids will be used.

Scientific names - Phil Bragg.

The scientific name of any animal is controlled by a set of rules, the International Code of Zoological Nomenclature; there are similar rules governing the names of plants. All species of animals have a unique name known as the *binomial name* because it consists of two words, the *genus name* and the *species name*. To make it clear which is which, the genus name is always written with a capital letter at the beginning, the species name never has a capital letter (and, to avoid confusion, should never be used at the beginning of a sentence). The binomial name should be written in italics or, if this is not possible, it should be underlined. If a subgenus is used it appears in brackets between the genus and species names; it is printed in italics with a capital letter at the beginning. Sometimes a subspecies name is used, this appears after the species name and is also printed in lower case italics. If the genus of an insect is known but the species has not been identified then the name of the genus is followed by the abbreviation "sp." but only the genus is written in italics e.g. *Miomantis* sp. The abbreviation "spp." is used if more than one species is involved.

The binomial system used for naming animals is based on the system used by Linnaeus in 1758. He described 59 species in the genus *Gryllus* which contained the insects we now group as three orders: Orthoptera, Phasmida and Mantodea. Ten of these were in his subgenus *Mantis*, three of these are phasmids, the rest are mantids. Since these original seven species were described about 1800 more species have been described, clearly they

could not all be in the same genus so new genera were created. Because Linnaeus had very different species in his original genus, some of the species have had to be moved into a new genus.

Although the rules say that the same binomial name cannot be used for two species at the same time, mistakes occur. It is possible (and permissable) that two species may **at different times** have had the same name, for example if a species was described as *Mantis viridis* but was later moved to a more appropriate genus then a new species could be described as *Mantis viridis*. Clearly this is potentially confusing and to reduce the chance of confusion it is usual to give the name of the author who described the species and the year of the description with the binomial name, e.g. *Deroplatys desiccata* Westwood, 1839. If the genus has been changed since the original description of the species this is indicated by placing the author's name and the date in brackets e.g. *Popa undata* (Fabricius, 1793). In this example *Popa undata* was originally described as *Mantis undata* by Fabricius in 1793, the genus *Popa* was not created until 1856.

Parthenogenesis in mantids - Steven Dickie.

In January (1996) I received a pair of *Miomantis* nymphs. As time progressed I realised that they were both female. I tried to purchase some males but nobody seemed to have any. One mantis died while moulting as it fell off its perch and crippled itself. The other became an adult and laid two oothecae. I kept these oothecae for about one month and surprisingly ten nymphs emerged from them. Six of these nymphs have survived and they are all female, four are now adults. I an now waiting for them to lay oothecae to see if the parthenogenesis is repeated.

Has anyone else observed this or could this be unique?

Parthenogenesis again - Phil Bragg.

Three weeks after receiving the above note from Steven Dickie I had a phone call from Jason Church reporting parthenogenesis in the same species and a few weeks after that I had another report of parthenogenesis, again in the same species.

I recorded a case of parthenogenesis which occurred in a mantis in 1986 (*Bull. Amat. ent. Soc.*, 46: 160); it was later identified as *Sphodromantis viridis*. At the time I commented that I had not been able to find any records of parthenogenesis in mantids, so I was very interested to receive Stephen Dickie's report. As mantids are relatively rarely bred it is quite possible that this phenomenon is not uncommon but has not received much attention before. However as my search for other examples was very limited, it is quite possible that it has been documented before. I would be pleased to hear from anyone who knows of any other cases.

Books about mantids

Finding information about mantids is not easy. There are few books available which deal specifically with mantids. Generally the most you can expect is a few pages in a general insect book. Below I have listed the main publications which deal exclusively or in a large part with mantids. They include publications aimed at the general reader and more technical publications.

Rearing and studying praying mantids by George Heath (1980) is the only book on rearing mantids that I have seen. 22 pages with 9 black and white photographs. Price £2.85 (U.K.),

£3.20 (elsewhere - by surface mail), £3.85 (elsewhere - air mail); available from AES Publications, The Hawthorns, Fratning Road, Great Bromley, Colchester, CO7 7JN, U.K.

Grasshoppers and mantids of the world by Ken Preston-Mafham (1990). Aimed at the general reader, this book deals with all aspects of Orthoptera, mantids, cockroaches and phasmids, and includes many colour photographs. Published by Blanford, ISBN 0-7137-2148-0. Price about £20.

Praying mantids and stick insects by A.S. Schoeman (year not known). A general introduction. One of the publisher's "Insight Series. 40 pages with colour photographs and line drawings. Published by De Jager-Haum, ISBN 0-7985-1368-8. Price not known.

Orthoptera, Mantidae by E. Giglio-Tos (1927) published as volume 50 of *Tierreich*. With 707 pages, in French, this is the standard work for identification of mantids. It gives keys to all known species. Out of print.

Mantodea (Fangheuschreken) by M. Beier (1968) volume 4 part 2 section 12 of *Handbuch der Zoologie*. 47 pages, in German, this gives keys to subfamilies. It is particularly useful for the long list of references. Out of print but widely held by university libraries.

Posting mantids - Phil Bragg

Post oothecae in preference to live insects. When posting live insects use small containers so that they do not have far to fall when they are knocked about in the post. Use an unbreakable container, avoid brittle plastics such as acrylic. Film tubes are suitable for small nymphs but be sure to tape the lid on, otherwise the lid may pop off if pressure is applied to the envelope. Make sure they have something secure to hold onto: tissue paper is OK for newly hatched nymphs, netting for adults; in either case fix the material to the lid of the container. An alternative is to wedge a stick diagonally across the box but make certain it cannot move and squash the insect. If possible do not post adult females, if this cannot be avoided then be sure to post them when they are at their lightest, when first adult, or immediately after laying an ootheca.

Few people seem to have much experience with posting live mantids so it will be interesting to hear suggestions from different people.

Sexing mantids

Sexing mantids is generally quite easy, even with nymphs. If you look at the underside of the abdomen, the male has more segments clearly visible than the female. Usually 8 are easily seen in the adult male, and 6 in the female.

Mating mantids

Mating mantids is always potentially disastrous because of the tendency for females to eat the males. This is not too serious if mating occurs first but occasionally the female eats the male before he has time to mate. There are various ways to reduce the risk. Some of the following ideas may be helpful but none are foolproof!

The usual method is to ensure that the female is well fed before introducing the male, offering different food can help. Often this fattening of the female will avoid the problem, but with some species a significant risk remains. Giving the female a large insect to eat while

she is mating has been suggested but I would take this as a sign that she is hungry and therefore likely to eat the male when she has finished the other insect!

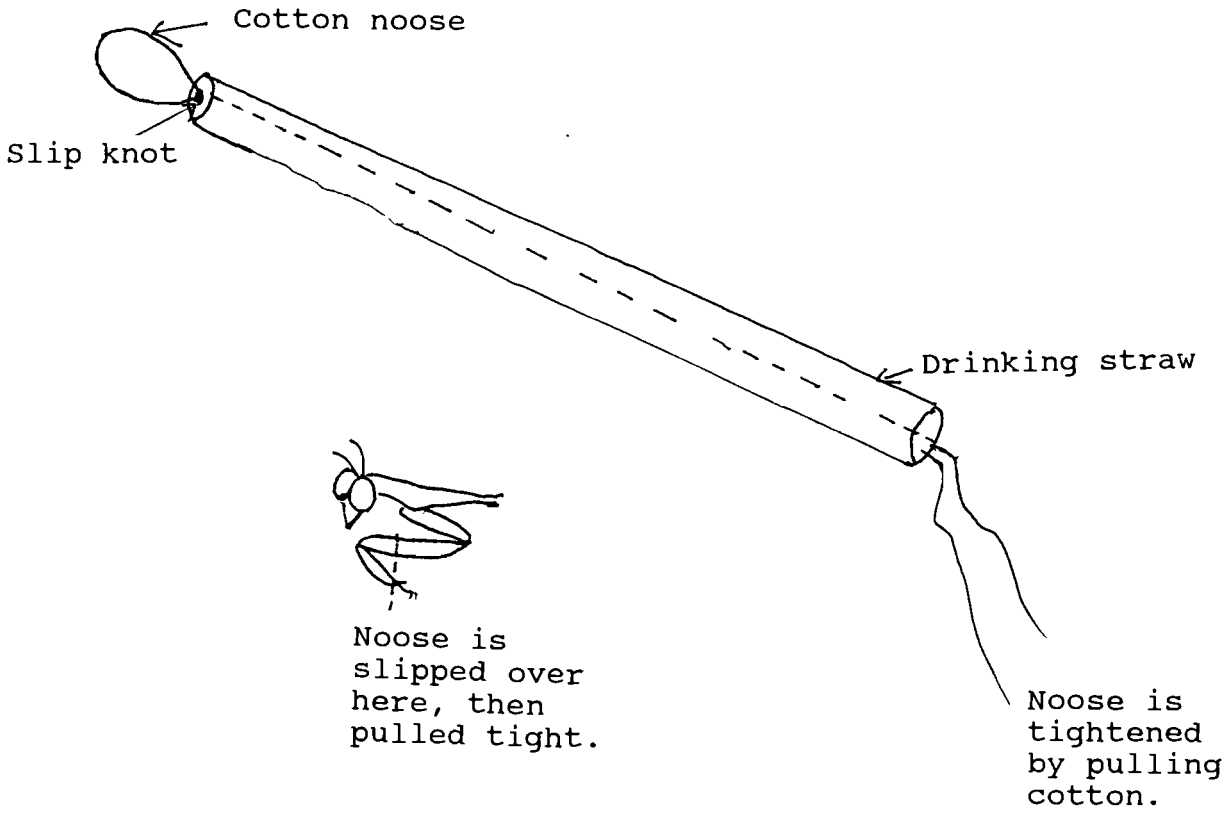
Placing the male directly on the back of the female is recommended by Steven Clark as it avoids the risk to the male as he approaches the female, but it does not stop her eating him while he is mating.

Jason Church recommends cooling the male to 15°C and heating the female to 30°C. Why this should work is not clear, perhaps it reduces the movement of the male so that he is less noticeable as he approaches. I had previously considered, but not tried, cooling the female on the assumption that this would slow her down so she would not be quick enough to catch the male.

Stephen Clark suggested immobilising the female's fore legs during mating and sent the following notes and diagram.

Immobilising female mantids for mating - Steven Clark.

In the past I have occasionally had female mantids that were too aggressive to be mated. Not even giving them food so that they were eating when the male was introduced stopped them from attacking the male. In these circumstances, and as a last resort, I have had to tether the female's front legs. I have used many methods for this and the most successful one to date is to use a noose of cotton or elastic mounted on a drinking straw (see diagram). The idea behind this is not to tie up the mantis so she cannot move but to make her movement clumsy enough for the male to be able to evade any attack. Once the mating is completed the female is cut free using a small pair of scissors, if she has not already chewed her way free.



Preserving mantids - Phil Bragg.

Identification of live mantids is quite difficult, to be certain you need to examine the dead insect. Once dead, mantids rot quickly so an efficient method of preservation is essential. Evisceration and stuffing with cotton wool is probably the best method of preservation available to most people. Another simple alternative is to inject the insect with either 100% alcohol or 40% formalin. Injecting either of these will cause discoloration of green mantids, stuffing often avoids this problem.

Positioning the legs correctly is very important as the spines on the legs are one of the main features used for identification. It is important that both the upper and lower surfaces of the legs can be examined. The best method is to spread the legs as shown in the MSG logo. It can also be helpful if one pair of wings are opened out, both wing pattern and wing venation may be useful.

Food for mantids - Phil Bragg.

Traditionally mantids are fed on fruit flies (*Drosophila* spp.) when small and on crickets when larger. Most people keeping small numbers of mantids probably buy their crickets from pet shops as they are required. There are however alternative foods available, these have various advantages and disadvantages. I generally rear the food for my mantids, the two main advantages are that the food is available whenever needed and the cost is much less.

If you intend to rear a lot of mantids you will probably need to rear food which has fast reproductive and growth rates, e.g. crickets or locusts. Locusts tend to do better if fed on fresh food, this makes them more labour intensive to rear so they are generally not suited to people interested only in mantids. Crickets are much easier to rear, they need attention no more than once per week. Two species are commonly reared, the small *Acheta domestica* and the larger *Gryllus bimaculatus*. The latter is largest, as it is a relatively poor jumper it is the better species for keeping at home as it is least likely to escape. In the UK there is also a silent species of cricket (*Gryllus assimilis*) available if the noise bothers you. Another alternative to consider is cockroaches, but these are generally less desirable in domestic situations as the faster breeding species tend to be those most likely to escape and become established in the home.

If you only keep a few mantids there are various options. Mealworm beetles (*Tenebrio molitor*) an be used, both as adults and as larvae. They are simple to rear and provide a steady supply of assorted sized larvae as well as the adults. The main disadvantage is that mantids seem to need to learn to eat the larvae, second or third instar mantids which are fed on mealworms will happily continue to feed on them, adults which have not been reared on mealworms seem to ignore them most of the time.

Stick insects tend to be slow to reproduce so they are not suitable as food for large numbers of mantids. However, the common laboratory stick insect *Carausius morosus* is particularly useful for rearing some of the medium or large mantids; newly hatched *Sphodromantis* nymphs will feed on newly hatched phasmids. *Carausius morosus* is easy to rear and it requires little attention to keep a colony. I find they are most useful as a guaranteed supply of food for newly hatched mantis nymphs; they are easier to maintain than fruit flies.

Fruit flies, *Drosophila* spp., are quite easy to rear, either on fruit or on commercially available artificial foods. The problem is that whichever food is used the containers need careful washing to reduce the incidence of mould and new cultures need to be started

regularly. The other problem is that their maximum size of 1-2mm means they are only suitable for very small mantids; if you keep a large species you could find yourself keeping *Drosophila* all the time but only using them for a very short period once or twice per year.

Aphids can be useful food for young mantids, especially if you don't normally keep a culture of *Drosophila*. Outdoors they are only available at certain times of year but as I keep a lot of phasmids which I feed on bramble (*Rubus* sp.) I can, with a little planning, have a reliable supply even in the winter. The eggs of aphids which have been laid on the bramble will hatch when brought into the warmth, they can then be bred indoors. Generally it takes 2-3 weeks from bringing the bramble indoors before you have a reasonable population density of aphids, but once you have them they can be easily maintained and bred. If you don't keep phasmids then it is probably better to breed fruit flies.

If you want to stick to buying livefood, consider visiting the local fishing shop and buying maggots. They are the cheapest form of livefood available; although I have not weighed a box of crickets, I estimate maggots cost about 10% of the equivalent weight of crickets. In the UK they are sold by the "quarter pint" (about 110cm^3), at a cost of about £0.50. Mantids will eat the maggots or adult flies. Maggots which are not eaten will pupate and emerge as flies 1-2 weeks later, depending on the temperature. Excess maggots can be stored in the fridge until needed. The major problem is that the maggots are not available outside the fishing season.

Information wanted on *Mantis religiosa*

Geoff Hancock would like to hear from anyone who is rearing, or has reared, *Mantis religiosa*. He is interested in the way they fold their wings (i.e left over right or right over left) so if you have any live or preserved specimens please contact him.

Male *Parasphendale affinis* urgently needed

Bruno Meriguet has three female *Parasphendale affinis* but no male. If you can help please contact him.

Male *Hierodula unimaculata* available

Contact David Oliveira. He has a male but no female.

Advertising in MSG Newsletter

Members may advertise their wants, and requests for information free; advertisements of surplus stock are free if the livestock is free. Advertisements from members selling livestock, or traders, are accepted at the discretion of the editor and charged at a rate of 5p per word or £5.00 per half page. All enquiries about advertising should be directed to: Phil Bragg, MSG Newsletter Editor, 51 Longfield Lane, Ilkeston, Derbyshire, DE7 4DX, U.K.

Cockroaches

Interested in cockroaches? The Blattodea Culture Group produces a newsletter for people interested in culturing cockroaches. For further information contact: The Blattodea Culture Group, c/o Adrian Durkin, 8 Foley Road, Pedmore, Stourbridge, Westmidlands, DY9 0RT, U.K.

A key to families and subfamilies of Mantodea

by David Oliveira, 62 Coombe Lane West, Kingston, KT2 7BY, U.K.

The following keys are based on translations of the works of Giglio-Tos and Beier. I have in general followed the classification used by Beier, and relied on Giglio-Tos to provide details missing from Beier. There are a number of important limitations: The key is entirely derivative, and not based on any original observations by me. I may well have introduced errors in the translation, in addition to any errors in the original sources. There are also, of course, the underlying taxonomic difficulties.

Any comments, criticisms or additions would be very welcome.

Key to Families

1. Front tibia without true apical hook, tarsus articulating at tip of tibia. Hind wing with two simple veins in crease between anal lobe and anterior part. Front tibia and femur with bristles, thickened at base; no pronounced spines. . . . . Chaeteessidae

\- Front tibia with true apical hook, tarsus articulating laterally at the base. Hind wing with one simple vein in crease between anal lobe and anterior part. Femur (at least) has spines ventrodistally. 2

2. Body and elytra metallic green or blue/green. Proximal external spine of anterior femur very long and stout. . . . . Metallyticidae

\- Body and elytra not metallically coloured. Proximal external spine of anterior femur not significantly larger than the others. 3

3. Prothorax square, or only a little longer than broad. 4

\- Prothorax several times longer than broad (disregarding any lateral lobes/processes). 6

4. Front tibia without spines, or only with delicate spines ventromedially. . . . . Amorphoscelididae

\- Front tibia with two rows of spines. 5

5. Small and delicate, both sexes usually with normal wings (female rarely brachypterous). Anterior femur much expanded inferiorly: inferior face much wider than exterior face. . . . . Mantoididae

\- Squat robust insects, both sexes brachypterous. Inferior face of anterior femur narrower than external face. 7th abdominal sternite of female with two long spines. . . . . Eremiaphilidae

6. Ventromedial spines of anterior femur arranged with long spines separated by 3 or 4 short spines. Antennae of male pectinate. Vertex prolonged into a more or less conical protuberance, divided at the apex. . . . . Empusidae

- Ventromedial spines of anterior femur arranged with long spines alternating with short spines (or equal in length). Antennae of male never pectinate. 7

7. Ventrolateral spines of anterior tibia more or less decumbent, close together and overlapping. Tegmina often with bicoloured transverse band or spiral marking. . . . . Hymenopodidae

- Ventrolateral spines of anterior tibia erect or oblique, more or less separated from one another. Tegmina never with bicoloured markings. . . . . Mantidae

Keys to subfamilies

Four of the families contain only one or two genera and are not divided into subfamilies. The keys to each family are in alphabetical order.

Family Amorphoscelididae

1. Anterior tibia completely without spines apart from apical hook. Distal segment of cerci spread out and enlarged like a leaf. Anterior femur with 1 discoidal spine. . . . . Amorphoscelidinae

- Anterior tibia with delicate spines ventromedially, at least distally. Distal segment of cerci not modified. Anterior femur with 2-3 discoidal spines. . . . . Paraoxypilinae

Family Chaeteessidae

Contains only a single genus, *Chaeteessa*.

Family Empusidae

1. Pronotum slim, always much longer than anterior coxa. The lobe on the posterior aspect of the distal anterior coxa prolonged into a sharp spine. . . . . Empusinae

- Pronotum about the same length as anterior coxa, or only a little longer. The lobe on the posterior aspect of the distal anterior coxa does not form a spine. . . . . Blepharodinae

Family Eremiaphilidae

Contains only two genera, *Eremiaphila* and *Heteronutarsus*.

Family Hymenopodidae

There is some disagreement as to whether Oxypilinae belongs in this family.

1. Pronotum with a markedly toothed edge. 3rd discoidal spine of anterior femur markedly lengthened. . . . . Oxypilinae

- Pronotum with a smooth or at most slightly beaded edge. 3rd discoidal spine of anterior femur of normal length.
. 2

2. Frontal sclerite may have lateral tubercles, or slightly raised lateral strips, but does not have raised lateral wing-shaped keels; the central portion is not depressed; the dorsal edge never with two small teeth. Eyes within outline of head. Acromantinae

- Frontal sclerite with raised lateral wing-shaped keels; the central portion depressed; the dorsal edge with two small teeth. Eyes separated from vertex by a deep ridge; bulging outside circumference of head.
. . . . . Hymenopodinae

Family Mantidae

1. Pronotum scalloped anteriorly, partly or completely overlapping the rear of the head. Uniformly green coloured insects. 2

- Pronotum rounded anteriorly, never overlapping the rear of the head. 3

2. Pronotal margins almost parallel, not laterally expanded.
. . . . . Orthoderinae

- Pronotum markedly dilated into a rhomboidal or pentagonal shape. Choeradodinae

3. Anterior femora with deep pit between first and second external spines, into which tibial claw fits. 4

- Anterior femora without such a pit between first and second external spines. . . 5

4. Eyes markedly bulging, with their dorsal edges reaching at least as far and often beyond the crown of the vertex. Uniformly brown coloured, living on bark.
. . . . . Liturgusinae

- Eyes nearly flat, their dorsal edges never reaching as far as the crown of the vertex. Uniformly green coloured.
. . . . . Caliridinae

5. Pronotum depressed, the sides nearly parallel, or gradually widening from posterior to anterior, the anterior edge therefore at least as broad as the posterior edge; no, or only a weak, supra-coxal bulge. Anterior tibia more or less compressed.
. . . . . Tarachodinae

- Pronotum more or less arched, the anterior edge not broader than the posterior edge, the supra-coxal bulge more or less marked, occasionally spread out in lobes, the sides therefore not parallel. Anterior tibia not compressed. 6

6. Posterior tibia with dorsal keels.
. . . . . Vatinae

- Posterior tibia smooth, rounded. 7

7. Anterior femora with 5-7 external spines. Supra-anal plate never markedly prolonged. 8

- Anterior femora with 4 external spines, exceptionally with 5, and then either the supra-anal plate markedly prolonged, lanceolate or the hind wings vividly coloured and the legs without lobes. 9

8. Ventral surface of anterior femora between external and internal rows of spines flat. Pronotum not compressed, rounded dorsally. Legs never lobed. Mostly green insects. . . . . Photininae

- Ventral surface of anterior femora between external and internal rows of spines keeled. Pronotum compressed, keeled. Legs often lobed. Brown insects. . . . . Toxoderinae

9. Anterior tibia with 1 or 2 dorsal spines distally. 10

- Anterior tibia without spines on dorsal surface. 11

10. Pronotum without, or with only a delicate longitudinal keel. Female with fully developed wings. New world species. . . . . Oligonychinae

- Pronotum with a markedly raised, toothed longitudinal keel. Female brachypterous. Oriental species. . . . . Haaniinae

11. Medial apical lobe of anterior coxa more or less expanded, lamelliform; larger than lateral lobe. Delicate and often very slender insects. . . . . Thespinae

- Medial apical lobe of anterior coxa not expanded. 12

12. Anterior femora with 1 to 3 discoidal spines. Antennae mostly ciliated or thickened. 13

- Anterior femora with 4 discoidal spines, exceptionally with 3 and then anterior tibia robustly armed and antennae neither ciliated nor thickened. 15

13. Anterior tibia without spines, apart from tibial claw. . . . . Compsothespinae
- Anterior tibia with spines in addition to tibial claw. 14

14. Small insects with thin antennae and round or bluntly conical eyes. Iridopteryginae

- Large rod-shaped insects, with strongly thickened antennae and sharply pointed conical eyes, directed anteriorly and superiorly. . . . . Schizocephalinae

15. Brown, leaf-like insects. Pronotum with various foliaceous lateral expansions. Legs always lobed. Head without projections. . . . . Deroplatinae

- Green or brown, but never leaf-like insects. Pronotum simple or with regular but never foliaceous lateral expansions. Legs simple or lobed. Head mostly with projection. 16

16. Middle and hind femora with large lobes, extending almost the length of the limb. Head with projection on vertex.
. . . . . Phyllotheliinae

- Middle and hind femora simple, or at most with a small preapical lobe. 17

17. Eyes sharply conical with terminal spike, directed laterally. . . . . Oxyothespinae

- Eyes rounded or at most bluntly conical, directed superiorly. 18

18. Antennae and costal margin of elytra of male ciliated. Small or at most medium sized insects.
. . . . . Amelinae

- Antennae and costal margin of elytra of male not ciliated. Mostly large insects. 19

19. Anterior tibia shortened with few spines, the claw groove in the distal half of the femur. Rod-shaped insects.
. . . . . Angelinae

- Anterior tibia not shortened, the claw groove in the proximal half of the femur. 20

20. Head with projection on forehead or vertex. Legs always with lobes. . . Sibyllinae

- Head without projection, or at most with a hump near the eye. Legs only rarely with small preapical lobes.
. . . . . Mantinae

Family Mantoididae
Contains only a single genus *Mantoida*.

Family Metallyticidae
Contains only a single genus *Metalyticus*.

Mantis abstracts

The following are abstracts from papers published during 1995. The papers are in English unless otherwise indicated. The editor would be grateful for copies of any recently published papers so that abstracts may be included in this section of the newsletters.

Hurd, L.E., Eisenberg, R.M., Moran, M.D., Ronney, T.P., Gangloff, W.J. & Case, V.M. (1995) Time, temperature, and food as determinants of population persistence in the temperate mantid *Tenodera sinensis* (Mantodea: Mantidae). *Environmental Entomology*, **24**(2): 348-353.

Characteristics of a well-established population of the mantid, *Tenodera sinensis* (Saussure), were examined during the adult portion of its life cycle, for three consecutive years (1990-1992). During the fall of 1992, changes in body mass of females in well-fed and starved experimental cohorts were compared with those in the open field, as a measure of food limitation in this population. The open field cohort maintained mean body mass at a level intermediate to the experimental cohorts. However, some individuals in the field did as well as those in the well-fed cohort, whereas none did as poorly as in the starved cohort. Ootheca production was greatly reduced in 1992 compared with the previous 2 years. This could not be attributed to food limitation, because even well-fed experimental animals failed to oviposit. Lower temperatures in 1992 slowed development rate, reducing the number of females that reached imago in time to oviposit before killing frost. Thus, even when food limitation is not severe, stochastic reduction in degree-days could cause local or even regional extinction, especially in temperate univoltine species of low vagility such as *T. sinensis*.

Lombardo, F. (1995) *Parahestiasula obscura*, gen.nov., spec.nov. from Nepal (Insecta, Mantodea, Hymenopodidae). *Spixiana*, **18**(1): 11-14.

Parahestiasula obscura, a new species of a new genus belonging to the family Hymenopodidae is described. It is characterized by the presence of three strong processes on the fastigium of the vertex and has markedly lobed median and especially posterior femurs.

Moran, M.D. (1995) Intraguild predation between sympatric species of mantids (Mantodea: Mantidae). *Proceedings of the Entomological Society of Washington*, **97**(3): 634-638.

The importance of predation versus competition was tested in two congeneric sympatric species of mantids, *Tenodera aridifolia sinensis* (Saussure) and *T. angustipennis* (Saussure), during the late portion of the juvenile stage of their life cycle. *Tenodera angustipennis* abundance was reduced through predation by the larger *T. a. sinensis*, but no evidence of competition for resources was demonstrated for either species. *Tenodera a. sinensis* gained more body mass in the presence of *T. angustipennis* indicating that the benefit of consuming smaller predators may outweigh the cost of competing for resources.

Mukherjee, T.K., Hazra, A.K. & Ghosh, A.K. (1995) The mantid fauna of India (Insecta: Mantodea). *Oriental Insects* **29**: 185-358.

A comprehensive review of mantid taxonomy is attempted, including descriptions of taxa, various developmental stages, notes on habitat preference in relation to temperature, altitude, vegetation and other factors, and observations on offensive, defensive, prey capture and copulatory behaviour. Biological observations on mortality, colour pattern of various instars and their significance, oxygen consumption and data on morphometrics of some species are provided. The patterns of distribution within India and in relation to the Oriental Region and other zoogeographic regions is also discussed. A total of 162 species under 68 genera of mantids from India are listed, of which 118 species are studied and others reviewed from literature. Two new genera (*Pseudothespis*, *Parananomantis*) and ten new species (*Acromantis nicobarica, Axaxarcha intermedia, Leptomantis nigrocoxata, Pseudothespis meghalayensis, Nanomantis lactea, Parananomantis brevis, Hierodula (H.) assamensis, H. (H.) beieri, H. (H.) nicobarica*, and *Mantis indica*) are described. *Haldwania liliputana* is synonymized under *Gonypetyllis semuncialis* (n.syn.).

Poteser, M. & Kral, K. (1995) Visual distance discrimination between stationary targets in praying mantis: An index of the use of motion parallax. *Journal of Experimental Biology*, **198**(10): 2127-2137.

When larvae of the praying mantis *Polyspilota* sp. and Tenodera sinensis want to leave an exposed position and can choose to move between stationary objects at different distances, they usually choose the nearest. Their ability to select the nearest object is greatest when the background has horizontal stripes and is least when it has vertical stripes. Object preference is based on a successive distance comparison, which may involve content-related memory processes. Mantid larvae can determine the absolute distance to a stationary object. Vertical contrasting borders play an important role in this process. Side-to-side head movements (peering) are directly involved in the distance measurement, as shown (i) by the peering behaviour itself and (ii) by the fact that mantids can be deceived in distance measurement by arbitrary movements of target objects during the peering movement. It is supposed that the distance measurement involves the larger and faster retinal image shifts that near, as opposed to more distant, objects evoke. Mantid larvae can distinguish a black-and-white rectangle in the foreground from a black-and-white striped background, even when both are similar with respect to luminance, contrast and texture. The ability to distinguish between figures and background could be explained by motion parallaxes, i.e. by the fact that during peering movements the nearer object moves faster and by a larger angle than the background structure. From birth onwards, even when the eyes have yet to develop foveal specialization, mantids are capable of this visually controlled behaviour.

Roy, R. (1995) Contribution to the knowledge of the genus *Macracanthopus* Uvarov, with the distinction of new species, *M. seydeli* (Mantodea, Mantidae, Amelinae). *Journal of African Zoology*, **109**(3): 239-246. [in French]

The genus *Macracanthopus* Uvarov, 1940, was formerly described as *Megacanthopus* by Chopard in 1929, a name rejected for preoccupation. This genus actually comprises three species from Central Africa, but in the past they were either misidentified or even synonymized, so that one remained nameless. A new diagnosis is given for the genus, a comparative study (including male genitalia) is done to distinguish the three species; then the new one is fully described. At last a list of all examined specimens representing the three species is given with their locations in collections.

Roy, R. (1995) A review of the genus *Tismomorpha* Roy, 1973 (Dictyoptera, Mantodea, Mantidae). *Revue Francaise d'Entomologie*, (N.S.)17(1): 23-26. [in French]

Since the creation in 1973 of the genus *Tismomorpha*, several new specimens were found, among them a mate belonging to a new species, so that it is an opportunity to sum up the knowledge for this genus.

Wang, T. (1995) Research on the Chinese *Tenodera* (Mantodea: Mantidae). *Acta Entomologica Sinica*, **38**(2): 191-195. [in Chinese]

Having compared the pronotum, the male genitalia and the subgenital plate characteristics of the *Tenodera* species, the author gives a thorough review of the 7 species, i.e. *T. attenuata, T. angustipennis, T. stotzneri, T. aridifolia, T. sinensis, T. brevicollis* Beier, stat.nov., *T. caudafissilis*, sp.nov., which can be checked out from the key at the beginning of this paper. The types and other materials are deposited in Shanghai Institute of Entomology, Academia Sinica.

Stick insects

Interested in stick insects? The Phasmid Study Group produces a newsletter and a journal for people interested in phasmids. The group has a livestock co-ordinator and regular meetings. There are about 500 members worldwide. For further details contact the Membership secretary: Paul Brock, 40 Thorndike Road, Slough, Berks, SL2 1SR, U.K.