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# Mantis Study Group Newsletter 14

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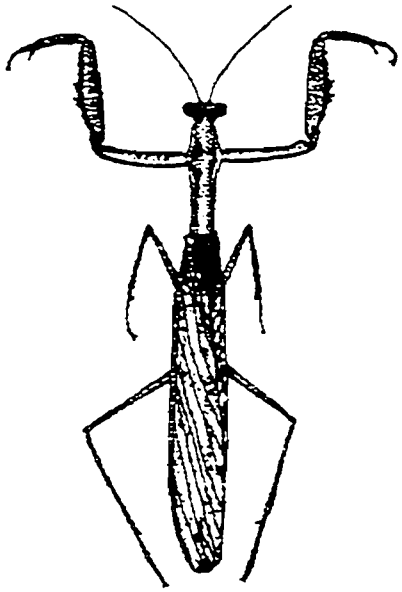

## Editorial

I would like to remind members that your membership subscriptions are due at the end of December. A renewal form should be enclosed with this newsletter. Prompt payment of subscriptions makes the work a lot easier for the membership secretary, so please pay as soon as possible.

Once again can I ask people to write something for the newsletter!!! Drawings would also be welcome.

## Exhibitions

Dates to note are:

**Sunday, 21st November 1999.**

West of England Creepy Crawly Show, Newton Abbot racecourse, Devon.

**Sunday, 5th December 1999.**

Midlands Entomological Fair. At Kettering Leisure Village. Open 1030-1630. Admission: £2.00 adults, £1.00 children and OAPs. The venue is just off junction 8 of the A14 and is usually well signposted.

**Sunday 16th April 2000.**

Midlands Entomological Fair. At Kettering Leisure Village.

## Food supplements — Alan Stubbs.

I have been experimenting with "Royal Jelly and Honey" capsules (available from health food shops), which I can confirm as being beneficial to the development of nymphs of *Phyllocrania paradoxa*, as the specimens given gut-loaded crickets and blow flies develop faster and slightly larger than those fed without gut-loaded food. I am still trying with this food as I have not given it to nymphs regularly as I do not want them to grow too fast in case it is detrimental in any way. It does, however, make females prone to laying larger oothecae so it may be helpful if other people give it a go and write in to the *Newsletter* with their findings.

## Colour of mantids — Alan Stubbs.

The question about colour change in green/brown mantids is almost certainly due to humidity. The wetter it is the more greenery there is, so more cover for green mantids. If the weather is hot and dry then mantids will find it more beneficial to blend in with more desiccated vegetation. If kept at a medium humidity then some will be green and some brown. But there are always a few stupid ones that like to stand out like a sore thumb!

## Notes on the green flower mantis *Creobroter* sp. — Alan Stubbs.

Species: *Creobroter* sp. (purchased as *C. meleagris*). Three females and one male were purchased on 28th April 1998 at a cost of £6.00 each. The country of origin uncertain. They were 5th instar when purchased; all four were adult by 25th May 1998. They were kept at 20-26°C at quite high humidity (sprayed twice daily). They were mated on 12th June 1998.

The laying and hatching dates of ootheca were as follows:

| Laid | Hatched |
|---|---|
| 18th June 1998 | 18th July 1998 |
| 28th June 1998 | 5th August 1998 |
| 10th July 1998 | 17th August 1998 |
| 22nd July 1998 | 23rd August 1998 |
| 1st August 1998 | 9th September 1998 |

This is a small green mantis (2.5-3cm long) with eyes set in such a way as to give the head a V-shape from the front. The abdomen of the nymph has a large eye-spot on the top. It is very stocky for a mantis and not at all perturbed by large prey. It is very active and aggressive, but not to its own species. The strike of this mantis is the fastest I have seen and for its small size is phenomenally strong. Hind wings are red and black but these fade quickly with age. The eye-spots on the abdomen of the nymph are also reproduced as a main feature of the forewings in the adult.

The males flash their wings at the females prior to mating unless they approach from behind when they make the more undignified "frantic leap and hope for the best" approach.

The females can attain a body shape so round as to stretch the imagination when well fed and it is worth bearing this in mind when trying to mate this species. I have found that they will stop taking food and when mating will tuck in again quite happily to any hapless victim offered, even though you would bet your mortgage that there was absolutely no possible room left.

The males seem eager to mate and do not show the trepidation apparent in other species that I have kept. Females remain calm and at no time did I observe any sign of aggression towards the male. Copulation lasted 3 hours.

The ootheca was laid on a twig. This species lays a long, slender oothecae and lays down the twig. This was seen all of the times eggs were laid. The ootheca was smooth to the eye and to touch (unlike *Sphodromantis* oothecae which tend to be a rough, dry foam texture), with the exit points clearly visible. These have absolutely no bearing on the number of hatchlings whatsoever as I had 42 nymphs hatch from all 5 of the oothecae produced (Yes, I did count every one!!).

To hatch the nymphs I broke the twig to the right length to put across a plastic cricket tub and fastened it to the sides with a couple of bits of Blue Tack. Then I got a clean bit of sponge (used for washing up) and cut that to the right size and put a couple of layers on the bottom to keep the humidity up (This has the benefit over Vermiculite of not going all over the place when transferring new nymphs to a net cylinder). Keep the temperature at 20-26°C and spray lightly with rain water twice a day and within 4-5 weeks you should have a cricket tub alive with prawn-pink nymphs with black eyes. Stunning!

I have found that a 30cm by 45cm fine mesh cylinder is ideal for rearing mantis nymphs. You will need to put a few long twigs in it and again spray twice a day and preferably start feeding with small fruit flies, going on to larger ones after the second shed. I have kept nymphs in the same cage up to the fourth instar without any predation as they use the eye-spot on their abdomen to signal to each other. I have witnessed no cannibalism at all.

When the nymphs were big enough I moved them into cricket tubs initially and then on to sweet jars. They were fed a mixture of blow flies (these were fed on honey and this seemed to make the nymphs more lively) and crickets (which were gut-loaded with Cricket Diet Plus).

If anybody has any more information to offer with regard to husbandry, taxonomy, distribution or wild collection of any species then please write to either me or the newsletter and we may be able to put together a definitive guide to some of the more popular species of mantids. My own favourites are mimics of twigs, leaves, flowers, stones etc, so lots of notes about these if possible please.

# Mantis abstracts

The following are abstracts from papers published recently, or in some cases details of the paper but without an abstract. 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.

**Bullaro, M. & Prete, F.** (1999) Thoracic and prothoracic leg neuromuscular system of the praying mantid, *Sphodromantis lineola* (Burmeister). *Journal of Comparative Neurology*, **409**(2): 325-338.

Historically, praying mantids have attracted attention because of their dramatic prey capture behaviour, loosely termed the strike. However, little is known about the neuromuscular organization that underpins the behaviour. Although once thought to be quite stereotyped, recent data indicate that the strike is quite plastic and can be aimed accurately within a relatively large three-dimensional space. Hence, successful prey capture requires the integration of (1) visual information, indicating prey has been recognized; and (2) proprioceptive information, indicating head and prothorax (i.e., visual field) position and initial leg positions. This study was undertaken as part of a larger program examining how such sensory information is integrated with the appropriate motor systems. Our goals were (1) to describe the gross thoracic and foreleg neuromuscular system of *Sphodromantis lineola* and (2) to identify the soma locations of the motor neurons associated with the largest leg nerve, N4,which travels the length of each leg. We found that the thoracic and foreleg neuromusculature of *S. lineola* are similar but not identical to what is known about just three other species of mantis, and that motor neuron somata associated with N4 are arranged in stereotypical, bilaterally symmetrical groups as they are in other orthopteroids, suggesting that this is a general organizational feature of the insect CNS.

**Hahn, B.-S., Cho, S.Y., Wu, S.J., Chang, I.-M., Baek, K., Kim, Y.C. & Kim, Y.S.** (1999) Purification and characterization of a serine protease with fibrinolytic activity from *Tenodera sinensis* (praying mantis). *Biochimica et Biophysica Acta*, **1430**(2): 376-386.

Mantis egg fibrolase (MEF) was purified from the egg cases of *Tenodera sinensis* using ammonium sulphate fractionation, gel filtration on Bio-Gel P-60 and affinity chromatography on DEAE Affi-Gel blue gel. The protease was assessed homogeneous by SDS-polyacrylamide gel electrophoresis and has a molecular mass of 31500Da. An isoelectric point of 6.1 was determined by isoelectric focusing. Amino acid sequencing of the N-terminal region established a primary structure composed of Ala-Asp-Val-Val-Gln-Gly-Asp-Ala-Pro-Ser. MEF readily digested the Aalpha- and Bbeta-chains of fibrinogen and more slowly the gamma-chain. The nonspecific action of the enzyme results in extensive hydrolysis of fibrinogen and fibrin releasing a variety of fibrinopeptide. The enzyme is inactivated by $Cu^{2+}$ and $Zn^{2+}$ and inhibited by PMSF and chymostatin, yet elastinal, aprotinin, TLCK, TPCK, EDTA, EGTA, cysteine, beta-mercaptoethanol, iodoacetate, E64, benzamidine and soybean trypsin inhibitor do not affect activity. Antiplasmin was not sensitive to MEF but antithrombin III inhibited the enzymatic activity of MEF. Among chromogenic protease substrates, the most sensitive to MEF hydrolysis was benzoyl-Phe-Val-Arg-p-nitroanilide with maximal activity at pH 7.0 and 30°C. MEF preferentially cleaved the oxidized B-chain of insulin between Leu15 and Tyr16. D-Dimer concentrations increased on incubation of cross-linked fibrin with MEF, indicating the enzyme has a strong fibrinolytic activity.

**Iwasaki, T.** (1998) Prey menus of two praying mantises, *Tenodera aridifolia* (Stoll) and *Tenodera angustipennis* Saussure (Mantodea: Mantidae). *Entomological Science*, **1**(4): 529-532.

Prey of the two praying mantids, *Tenodera aridifolia* and *T. angustipennis*, were investigated in a grassland around copses and in or around paddy fields, respectively, where either species predominated in southern Osaka. Proportions of feeding individuals in younger nymphs (1st-3rd instar), older nymphs (4th-7th instar), and adults were 1.1, 2.0, and 1.8%, respectively in *T. aridifolia*, and 1.4, 2.2, and 2.1%, respectively in *T. angustipennis*. These proportions did not significantly differ in the corresponding stages between the two mantis species. The two mantids preyed on various groups of insects and spiders. The younger nymphs preyed on dipterous insects most frequently, while the proportion of dipterous prey in prey menu decreased in the course of development of the two mantis species. The prey menu in order level did not differ between the two mantids. The results suggest that the habitat segregation between the two mantises is not due to difference in prey menus. Another factors which may cause their habitat segregation were discussed.

**Iwasaki, T., Aoyagi, M., Dodo, Y. & Ishii, M.** (1998) Adult overwintering and oviposition of first generation of dermestid beetle, *Thaumaglossa rufocapillata*. *Japanese Journal of Applied Entomology and Zoology*, **42**(3): 170-171. [In Japanese]

Adults of the first generation of the dermestid beetle, *Thaumaglossa rufocapillata* emerging from hatched egg cases of *Tenodera* spp. mantids in autumn, were reared under semi-natural conditions. Some adults fed on 10% honey overwintered and survived until next summer. Females laid eggs in autumn, and resumed egg laying in spring. They are considered to have the potential to overwinter as adults, although no adult of this dermestid has been collected in winter in mainland Japan. In contrast, no female overwintered when reared without food and water, or when feeding was stopped in mid-November. The results indicate that adult longevity of the first generation of this dermestid is limited, not by low temperatures in winter, but by food supply.

**Kaltenbach, A.P.** (1998) Data on a monograph of Mantodea (Insecta) from the south of Africa: 2. Taxonomic keys for higher taxa, addition to the species inventory. *Annalen des Naturhistorischen Museums in Wien Serie B Botanik und Zoologie*, **100**: 19-59. [In German]

Part 2 of the material for a monograph on the Mantodea of Southern Africa includes keys to the families and subfamilies, to the genera and subgenera. These keys were based on detailed studies of comprehensive material (see Kaltenbach, 1996). A large number of figures support the descriptions of distinctive characters and facilitates identification of African Mantodea, particularly with regard to the more difficult taxa. Supplementary notes on some species of Southern Africa Mantodea will complete the articles and also the checklist in part 1 of this paper. *Hapalomantis minima* (Werner), recorded from Angola (in Kaltenbach, 1996) must be deleted from the list of the Mantodea known from Angola. *Paramantis nyassana* (Giglio-Tos), ascertained in the present paper from Zimbabwe, was hitherto unknown in Africa south of the Zambezi-River. A significant eidonomic character for distinguishing *Antistia vicina* Kaltenbach and *A. maculipennis* Stål is described and figured. *Chloromantis* nom.n. is given for *Chiromantis* Giglio-Tos, 1915 (*Chiromantis* Peters, 1854, Anura - Rhacophoridae).

**Leitinger, G., Pabst, M.A. & Kral, K.** (1999) Serotonin-immunoreactive neurones in the visual system of the praying mantis: An immunohistochemical, confocal laser scanning and electron microscopic study. *Brain Research*, **823**(1-2): 11-23.

The distribution, number, and morphology of serotonin-immunoreactive (5-HTi) neurones in the optic lobe of the praying mantis *Tenodera sinensis* were studied using conventional microscopy and confocal laser scanning microscopy. Five or six 5-HTi neurones connect the lobula complex with the medulla, and at least 50 5-HTi neurones appear to be confined to the medulla. In addition, a few large 5-HTi processes from the protocerebrum supply the lobula complex, and two large 5-HTi processes from the protocerebrum ramify in the medulla and lamina, where they show wide field arborisations. In order to provide a basis for understanding the action of serotonin in the lamina, the ultrastructure of its 5-HTi terminals was examined by conventional and immunohistochemical electron microscopy. The 5-HTi profiles were filled with dense core vesicles and made synapses. Output synapses from 5-HTi profiles outnumbered inputs by about 3 to 1. The terminals of the 5-HTi neurones were in close contact with cells of various types, including large monopolar cells, but close apposition to photoreceptor terminals was rare, and no synapses were found between 5-HTi terminals and photoreceptor terminals.

**Lombardo, F.** (1999) Remarks on the genus *Metriomantis* Saussure & Zehntner and descriptions of two new species and a new genus: *Rehniella* gen. n. (Insecta Mantodea). *Revue Suisse de Zoologie*, **106**(2): 393-405.

The constitutive members of *Metriomantis* Saussure & Zehntner are re-examined. The genus includes six species: *M. cupido* Saussure, *M. ovata* Saussure & Zehntner, *M. paraensis* Giglio-Tos, *M. pilosella* Giglio-Tos, *M. occidentalis* n.sp. and *M. boliviana* n.sp. A new genus, *Rehniella*, is proposed for *Metriomantis planicephala* Rehn. *Metriomantis amplipennis* (Stål) is re-assigned to *Photina*. *Metriomantis pilosa* Chopard is a junior subjective synonym of *M. ovata*.

**Maekawa, K., Kitade, O. & Matsumoto, T.** (1999) Molecular phylogeny of orthopteroid insects based on the mitochondrial cytochrome oxidase II gene. *Zoological Science (Tokyo)*, **16**(1): 175-184.

Phylogenetic relationships among 18 species of orthopteroid insects (Blattaria: cockroaches, Isoptera: termites, Mantodea: mantids, Grylloblattodea: grylloblattids, Phasmatodea: stick-insects, Orthoptera-Caerifera: locusts, Orthoptera-Ensifera: crickets, and Dermaptera: earwigs), were estimated based on DNA sequencing of the mitochondrial cytochrome oxidase II gene. Our results drew attention to the need for caution in using third codon positions for tree construction, since it was likely that base pair substitutions of third codon positions in the COII gene were saturated among taxa used in the present study. We also detected that there were many phylogenetically informative sites in first codon positions. Phylogenetic trees using first and second codon positions based on both the neighbour-joining method and parsimony analysis indicated that the topology was nearly identical to each other. The phylogenetic relationships among these taxa differ from the current classification based on morphological characters. The inferred trees showed that grylloblattids were not a primitive group, but closely related to the Dictyoptera. Stick-insects were closely related to the Dictyoptera and grylloblattids, not to crickets. Locusts and crickets formed a monophyletic group. Earwigs were only distantly related to the Dictyoptera. Within the Dictyoptera, cockroaches and termites constituted a monophyletic group, with mantids as a sister group to that complex.

**Maxwell, M.R.** (1999) The risk of cannibalism and male mating behaviour in the Mediterranean praying mantid, *Iris oratoria*. *Behaviour*, **136**(2): 205-219.

This study examined male behaviour in response to the risk of cannibalism in the Mediterranean praying mantis, *Iris oratoria* (Mantodea: Mantidae). The risk of cannibalism was manipulated by placing males in one of two positions at the start of a mating trial: Frontal, where the males faced the females' fronts (high risk of cannibalism), or Rear, where the males were behind the females, facing their posteriors (lower risk). Three male behaviours were examined in terms of risk-reduction: whether the male attempted to mount the female, the direction of his first mount attempt, and the time taken for him to attempt to mount. Initial position did not have a significant effect on whether males attempted to mount the females. Males showed a preference for non-frontal mount attempts, and males placed Frontally were less likely to mount from their initial direction than were males placed in the Rear. Males placed in the Rear attempted to mount sooner than males placed Frontally, especially if the males could approach and mount while remaining behind the females. While the males approached the females, movements by both sexes resulted in changes in how the males faced the females, which might explain why the males' initial positions did not strongly predict attacks by the females. Interestingly, attacks by the females did not result in cannibalism; these attacks might reflect the females' state of sexual receptivity or they might indicate female choice. Female phenotype and the time of year influenced male behaviour. Males were more likely to attempt to mount females of high feeding condition. In this study, this result is more compatible with male choice for fecund females than with male choice for non-cannibalistic females. Males became less likely to attempt mounts as the year progressed, possibly a result of the onset of cold weather.

**De Villalobos, L.C. & Camino, N.** (1999) Two new species of *Gordiacea* (Nematomorpha) parasites of *Stagmatoptera hyaloptera* (Mantidae) from Argentina. *Iheringia*, Serie Zoologia 86: 71-76. [In Spanish]

*Chordodes cornuta* sp.n. and *Neochordodes semiluna* sp.n. are described and illustrated. They were found parasitizing on the mantis *Stagmatoptera hyaloptera* (Perty, 1832), Salta, Argentina.

## The following papers have been noted but abstracts are not available.

**Badih, A. & Ruiz, J.L.** (1998) About the specific validity of *Ameles maroccana* Uvarov, 1930 (Mantodea, Amelinae). *Nouvelle Revue d'Entomologie*, **15**(4): 301-302. [In French]

**Paoletti, M.G., Hu D., Marc, P., Huang N., Wu W., Han C., He J. & Cai L.** (1999) Arthropods as bioindicators in agroecosystems of Jiang Han Plain, Qianjiang City, Hubei China. *Critical Reviews in Plant Sciences*, **18**(3): 457-465.

[The paper includes mention of Mantodea].