

Notes on the Australian ladybird beetle  
*Micraspis frenata* (Erichson) (Coleoptera: Coccinellidae)  
feeding on nectar from *Asclepias* and *Gomphocarpus* flowers  
(Asclepiadaceae)

by

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*Abstract* - Brief observations are presented of adults of the Australian ladybird beetle *Micraspis frenata* (Erichson) feeding on nectar from flowers of the introduced weeds *Asclepias curassavica* L. and *Gomphocarpus physocarpus* E. Mey (Asclepiadaceae) in the Toowoomba area, south-eastern Queensland. These observations are discussed and a brief review is provided on the previously published feeding records of *M. frenata*.

*Riassunto* - I Coccinellidi (Col., Coccinellidae), larve ed adulti, sono noti quali carnivori, predando afidi, coccidi ed altri piccoli insetti ed acari. In Australia, specie del genere *Epilachna* risultano cibarsi di vegetali, mentre recenti studi hanno mostrato come *Micraspis frenata* sia polifaga ed in grado di condurre a termine il proprio ciclo larvale e riprodursi sia utilizzando afidi che polline. L'autore segnala come la specie possa utilizzare in natura anche il nettare (di due Asclepiadaceae: *Asclepias curassavica* e *Gomphocarpus physocarpus*).

#### INTRODUCTION

The genus *Micraspis* Dejean (Coleoptera: Coccinellidae) is distributed within the Palearctic, Oriental and Australasian regions (i.e. from Japan and China, west to India and Africa and east to Melanesia and Australia). The genus contains at least 30 species and is represented in the Australian region by at least six species (POPE, 1988). The most common and best known species of the genus in Australia is *Micraspis frenata* (Erichson), previously known as *Verania frenata* Erichson, which is distributed from New Caledonia to Australia (i.e. Queensland, New South Wales, Victoria, Tasmania, South Australia and the Northern Territory) (POPE, 1988). The adults of *M. frenata* are bright orange in colour (figs. 1 and 2), have distinctive black longitudinal marks on the elytra and measure 3.8-5.0 mm in total body length (POPE, 1988). The adult beetles are often found during summer days on a number of plant species where they are purported to feed on aphids (i.e. THOMPSON, 1893; KOEBELE, 1893; FROGGATT, 1902, 1907; SWEZEY, 1905; POPE, 1988).

During November 1985 I observed many adults crawling over the open flowers of the introduced weeds, *Asclepias curassavica* L. and *Gomphocarpus physocarpus* E. Mey (Asclepiadaceae) in the Toowoomba area, south-eastern Queensland. These data are discussed below and previously published biological data on this species of Coccinellidae are briefly reviewed.

#### OBSERVATIONS

During the sunny afternoon of 16 November 1985, I observed many adults of *Micraspis frenata* feeding from the flowers of the introduced weeds, *Asclepias curassavica* L. and *Gomphocarpus physocarpus* E. Mey (Asclepiadaceae), growing in a semi-cleared paddock in a shallow valley on a hobby farm situated about 5 km south-east of Toowoomba, south-eastern Queensland. The beetles were very active, crawling over all of the floral structures but were mainly attempting to feed on the nectar that had been produced from secretory tissue at the base of the corolla adjacent

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Fig. 1. *Micraspis frenata* (Erichson) on the flowers of *Gomphocarpus physocarpus* E. Mey (Asclepiadaceae) near Toowoomba, south-eastern Queensland, 16 November 1985. At least two beetles are attempting to feed on the nectar at the base of the corona (Photo: T. J. Hawkeswood).

to the staminal column. Photographs of beetles either feeding or crawling over the floral structures of both weed species were able to be taken in the field using a flash attached to the camera producing a darkened background (figs. 1 and 2). *Gomphocarpus physocarpus* was the more common of the two asclepiads in the area and smaller numbers of *M. frenata* were attracted to *Aclepias curassavica*. No aphids were observed on the plants upon which the beetles were feeding, although at other times during visits to the same area, I have observed *M. frenata* feeding on green aphids on the seed pods of *G. physocarpus*.

#### DISCUSSION

The larvae and adults of most Australian species of *Coccinellidae* are carnivorous, preying upon aphids, coccids or other small insects and mites (BRITTON, 1970; HAWKESWOOD, 1987). All of the earlier main references dealing with Australian insects, i.e. FROGGATT (1907), TILLYARD (1926) and MCKEOWN (1942), mention that ladybird beetles usually feed on scale-insects, aphids and mites, while a few other species such as *Epilachna*, feed on vegetation, usually crop plants. None of these authors mentioned that *Coccinellidae* are known to feed on nectar or pollen in the adult stage.

Early observations on *M. frenata*, i.e. THOMPSON (1893), KOEBELE (1893), FROGGATT (1902, 1907) and SWEZEY (1905), mentioned that the beetle was an aphid feeder, feeding on those species particularly frequenting grasses, including sugar-cane (*Saccharum*). SWEZEY (1905) also recorded *M. frenata* as feeding on young leaf-hoppers in an insectary and suggested that it might do so in the field, if aphids became scarce. None of these authors mentioned that *M. frenata* fed on nectar and/or pollen from flowers. POPE (1988) briefly noted that label data in museum collections indicated that



Fig. 2. *Micraspis frenata* (Erichson) on the flowers of *Asclepias curassavica* L. (Asclepiadaceae) near Toowoomba, south-eastern Queensland, 16 November 1985. Beetles were less common on this species than on *Gomphocarpus physocarpus* (Photo: T. J. Hawkeswood).

the species was associated with many other plants, including citrus, cotton, sorghum, lucerne, peach trees, maize, potatoes and paw-paw. Unfortunately, the association of *M. frenata* with all of these plants is not clear, but the beetles at the time of their capture, were most probably feeding on aphids, etc. or they may have been simply resting or perching on the leaves of these plants. POPE (1988) also noted that *M. frenata* had been reared in captivity on *Heteromyzus* aphids on *Sonchus oleracea* L. (Asteraceae). Recent studies both in the field and laboratory by ANDERSON & HALES (1983) have shown that multivoltine *M. frenata* [cited erroneously as *Micraspis lineata* (Thunberg)] is polyphagous, capable of completing larval development and reproducing in the field on either aphids or pollen, and in the laboratory, additionally on powdered, freeze-dried, honeybee brood. ANDERSON & HALES (1983) made no observations on nectar utilization by adult beetles of *M. frenata*, but stated that it was this feeding versatility (i.e. polyphagy) which enabled the species to remain reproductively active from early spring to early autumn. Thus the record of *M. frenata* feeding on nectar of *Asclepias* and *Gomphocarpus* appears to be new.

In Australia over 90 species of *Asclepiadaceae* occur, yet the insect pollinators (or visitors) of most flowers have been little documented (FORSTER, 1992a). Among Australian asclepiads, *Hoya australis* R. Br. ex Trill has been found to be pollinated by the diurnal butterfly *Ocybadistes walkeri sothis* Waterhouse (Lepidoptera: Hesperiiidae) (FORSTER, 1992a), while *Marsdenia fraseri* Benth. is pollinated by the lycid beetle *Meiriorrhynchus lateralis* Redt. (Coleoptera: Lycidae) (FORSTER, 1989). FORSTER (1992b) also investigated the insect visitors to the flowers of *Marsdenia cymulosa* Benth. and recorded five species of insects as visitors, i.e. *Sciara* sp. (Diptera: Sciaridae), *Apotropi-*

*na bispinosa* (Becker) (Diptera: Chloropidae), *Homoneura* sp. (Diptera: Lauxaniidae), *Luciola* sp. (Coleoptera: Lampyridae) and *Melanterius* sp. (Coleoptera: Curculionidae). However, only the *Sciara* sp. and *A. bispinosa* were considered by FORSTER (1992b) to be the true pollinators of *M. cymulosa*, because they were observed removing and inserting the pollinaria of the flowers; the beetles were not regarded as pollinators because their bodies were too large to enter the flowers and were thus unlikely to dislodge the pollinaria.

*Micraspis frenata* is a small beetle which is able to reach the nectar in the asclepiad flowers but at most would probably only dislodge pollinaria and not be able to insert them into other flowers, like more specialized insects such as flies (FORSTER, 1992b). It should be noted here that the flowers of *Asclepias* and *Gomphocarpus* are typical of the *Asclepiadaceae* in that the stamens are connate (fused) around the style, with the anthers adnate or adherent to the style and each with a hood-shaped appendage on the connective or filament (these appendages collectively are known as the corona). The pollen is consolidated into pollinaria by peg-like processes known as translators.

Various *Hymenoptera* and *Lepidoptera* have been documented to be highly efficient pollinators of asclepiads and are considered to be primary pollinators (e.g. MORSE & FRITZ, 1983), although *Diptera* are also regular pollinators (i.e. PANT *et al.*, 1982; FORSTER, 1992b). In addition, FORSTER (1992c) noted that a single species of bee visited the flowers of *Calotropis procera* (Ait.) Ait. near Chillagoe, Queensland. It is interesting to note that in all of Forster's studies, coccinellids were not observed on flowers of any of the asclepiads that he had studied and that beetles overall were not regarded as regular or efficient pollinators. It is likely that these beetles are usually too large and therefore not capable of entering such complex flowers and are not effective in removing and replacing pollinaria. In the case of *M. frenata*, the asclepiads in the Toowoomba area probably afford a potential energy source for these beetles when there are very few native plants or other introduced weeds in flower offering nectar to animal visitors. Further observations on the food sources and adult behaviour of *M. frenata* would be interesting.

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