FAUNA

MALLEE MOTHS

by Ian Common

MOTHS and butterflies constitute the large insect order Lepidoptera (insects with scaled wings) which, next to the beetles (Coleoptera), is the largest order in Australia. With about 400 species Australia has a poor butterfly fauna, whereas the moth fauna is richly diverse, with more than 10,000 named species and an estimated fauna of some 22,000 species. As in other insects adult moths have a tough external frame or exoskeleton enclosing the softer internal organs of the body, which are bathed in haemolymph (blood), They have six jointed legs and two pairs of wings. The body, wings and legs are covered with minute overlapping scales, which contain the pigments responsible for their patterns and colours. The head is equipped with two antennae and compound eyes, paired mouthparts bearing complex sensory organs and, usually, a coiled proboscis for sucking up water or other fluids.

The mallee moths of the family Oecophoridae number more than 3000 known species and represent about a quarter of the Australian moth fauna; a total of some 5000 species is estimated. Most are fairly small, with cryptic colours and markings, but many are among the most beautiful moths. Their larvae have very diverse, often complex behaviour patterns, but for food most depend on the live or dead foliage of the hard-fruit genera of Myrtaceae. Nearly all of the known species feed on dead *Eucalyptus* leaves, which are tough and leathery and very resistant to breakdown, especially in a dry climate. They are rich in phenolic compounds and tannins that normally act as feeding deterrents for most organisms. Thus mallee moths have a significant role in breaking down dead eucalypt leaves to humus, thus returning nitrogen and other nutrients to the poor soils characteristic of Australian forests. Except for clear-felling or large-scale wild fire, I believe that extensive control burning at short intervals poses the greatest threat to the survival of these insects and the long-term health of our native forests. The relationship between control burning and mallee moth diversity deserves scientific study.

It is thought that the Australian mallee moths evolved from Gondwanan stock and, after the Australian continent split off from Antarctica, their extensive radiation probably parallelled that of the large

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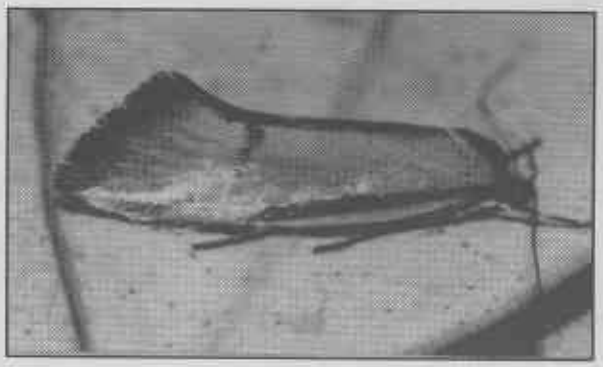

Fig. 1. Philobota *sp., wingspan 20 mm, forewings orange, outer one-third and leading edge dark brown, hindwings dark brown.*

Fig. 2. Eulechria atmospila *(Turner), wingspan 18 mm, forewings light grey, spots blackish, hindwings light grey.*

Fig. 3. Oxythecta acceptella *(Walker), wingspan 15 mm, forewings white, markings orange, hindwings grey, fringe yellowish.*

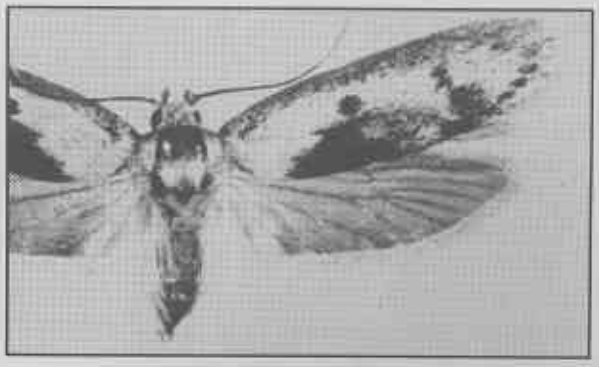

Fig. 4. Conobrosis acervata *(Meyrick), wingspan 18 mm, forewings whitish, leading edge grey, markings dark brown, hindwings grey-brown, fringe pale yellow.*

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genus *Eucalyptus* and other hard-fruited Myrtaceae. Nearly all of the 271 named genera are endemic to Australia, and several are endemic to the south-west. The greatest concentration of both genera and species occurs in New South Wales and south-east Queensland, where more than 1000 species are known in nearly 200 genera. Only 356 named species in 98 genera are known from southern Western Australia. However, the relatively low number of species recorded from the south-west may simply reflect the absence of resident collectors with an interest in small moths.

Myrascia larvae feed on live foliage of *Melaleuca*, *Leptospermum* and *Kunzea*. *Myrascia megalocentra* larvae, from the Geraldton area, live in portable cases on *Melaleuca uncinata*. The larvae are unique in having a diverticular sac of the foregut in which they secrete pure pungent oil from the foliage, gaining protection by regurging it on to any potential predator. The secreted oil is discarded when moulting occurs but, at pupation in the larval case, the whole sac is shed along with the lining of the foregut and other larval cuticle. The sac of oil thus provides a deterrent should a bird or other predator attempt to open the case.

Wingia has larvae using live eucalypt leaves as food, and includes some of the larger and most beautiful mallee moths. *W. lambertella*, which has a wingspan of about 4 cm, has rich pink fore wings and hind wings which are light yellow in Western Australia, but pink in south Queensland. The slightly smaller *W. aurata* has hook-tipped fore wings which vary in shade from yellow to orange-red.

It seems likely that the dead-leaf feeding behaviour of Australian mallee moths is more specialised than live-leaf feeding. This suggestion is based on the behaviour patterns of several unrelated genera of larvae that use live eucalypt foliage when young, but complete their development using dead eucalypt leaves. In *Heliocausta*, for example, the eggs are apparently laid in the eucalypt tree canopy and