

# Introduction

The lepidopteran fauna of Australia is characterised by the enormous diversity of gelechioid moths. This superfamily, containing over 3500 described and many more undescribed species in 16 families, forms a third of the total Lepidoptera fauna of the continent (Nielsen 1996). While the largest group – the mallee moths, the Oecophorinae of the family Oecophoridae – has recently been extensively studied and monographed at the generic level by Common (1994, 1996, 2000), a majority of gelechioid families are still poorly understood in Australia. No up-to-date literature exists on thousands of species belonging to this group, and the information on them is only available in collections, most notably in those of the Australian National Insect Collection (ANIC) in Canberra and the Natural History Museum (BMNH) in London.

This volume outlines the information available for the Australian representatives of the gelechioid moth subfamily Elachistinae (family Elachistidae). The Elachistinae are a group of small or very small moths with their larvae invariably leaf- or stem-miners. The wingspan of the species ranges from 4 mm to ~20 mm, the largest Australian species reaching a wingspan of 15 mm. Their usual forewing colour varies from white to grey or black, usually with an irroration caused by basally paler and distally more pigmented scales, with the wings sometimes showing bronzy reflections. The forewings are often marked with three or four paler spots or fasciae, which may be white, sometimes yellowish, silvery or golden. The members of the Elachistinae share the typical external characteristics of the Gelechioidea, the usually long and ascending sickle-shaped labial palpi and a basally scaled haustellum.

A great majority of the Elachistinae worldwide have monocotyledonous plants as their hosts; less than 10% of the species with host plant records feed on dicotyledonous plants (Parenti and Varalda 1994; Powell *et al.* 1998). The Elachistinae are known to comprise over 700 species worldwide (Kaila unpub.), and more species are constantly discovered wherever focused surveys are performed at suitable habitats. The majority of the known species occur in boreal and temperate zones of the northern hemisphere. However, as this

volume shows, the indigenous Australian elachistine fauna is by no means inferior to that found on the northern continents. This is particularly intriguing when reconstructing the evolutionary history – the phylogeny – of the subfamily. Indeed, the known number of species in Australia presently exceeds that of North America. It may even rival that of the Palaearctic region, when more systematic collecting is undertaken in Australia. The Palaearctic region, Europe in particular, has a unique history of passionate amateur lepidopterology that has contributed enormously to knowledge of even the smallest moths, the Elachistinae among others. In contrast, the number of amateur lepidopterists, other than those concentrating on butterflies, has always been scanty in Australia. Basic knowledge on the smaller moths is largely based on the efforts of a few professional researchers.

## Historical review of the classification

As with many other small Lepidoptera, the Elachistinae were earlier associated with the large tineoid complex ('Tineina'). Treitschke (1833) introduced the generic name *Elachista* (Greek, meaning 'the smallest') for a group of moths, all of which were very small yet not closely related in today's classification. This heterogeneity in the original association of species in the genus caused inconsistent use of the generic name for some time. Attempts to resolve the confusion were made by Boisduval (1836), Duponchel (1838, 1845) and Meyrick (1915) with several different proposals for type species designation for the genus. The early type designations by Boisduval and Duponchel were not followed by other authors (Stainton 1849, 1854, 1858a, b; Frey 1885) who, following Frey (1859), restricted *Elachista* to comprise a genus of moths with their larvae living as leaf-miners in monocotyledons. Finally, in 1989 the ICZN suppressed type designations prior to that of Meyrick (1915). His designation of *Elachista bifasciella* Treitschke as the type species of *Elachista* was confirmed, and the prevailing concept of *Elachista* and the family Elachistidae s. str. preserved (ICZN 1989).