Material and methods

Material studied

The present work is based on the examination of all Elachistinae material known to the author. It consists of 3435 identified specimens, with nearly 800 genitalia preparations. All the existing holotypes have been examined and lectotypes are designated for five recognised species, one synonymised species and three non-elachistine species. A neotype is designated for *Atalopsycha melanthes* Meyrick. The label information of the holotypes antedating this publication are cited verbatim, while the label data of other material are given in a standard sequence.

The material examined is deposited in the following collections:

ANIC	Australian National Insect Collection, Canberra, Australia (M. Horak)
BMNH	Natural History Museum, London, UK (K.R. Tuck)
DAT	Department of Agriculture, Hobart, Tasmania (C. Young)
MNHB	Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (W. Mey)
MZH	Finnish Museum of Natural History, Zoological Museum, Helsinki, Finland (L. Kaila)
OPU	Osaka Prefecture University, Osaka, Japan (T. Hirowatari)
PBMcQ	Private collection of Peter McQuillan, Hobart, Tasmania
SAMA	South Australian Museum of Arthropods, Adelaide, South Australia (Jan Forrest)
WAMP	Western Australian Museum, Perth, Western Australia (T.F. Houston)
NZAC	Comparative material was borrowed from the New Zealand Arthropod Collection, Auckland (R. Hoare).

Species concept

The delimitation of species in this volume assumes that the species are 'natural' units, the underlying hypothesis being that the species are populations or clusters of populations that may interbreed in nature, i.e. they form cohesive genealogical units. This is, of course, next to impossible to observe directly. Therefore indirect information, derived from morphology and life history traits, has been used for obtaining an approximation of species delimitation. Each 'species' introduced in this volume is therefore a hypothesis that can, and should, be subjected to further testing. The most obvious methods for testing are the comparison of samples collected in 'new' localities, acquiring further biological knowledge by rearing larvae, and studying genomic traits.

Most species are readily identified, at least based on the present material, but some are not. It appears that the elachistine fauna of Australia contains several species clusters in which the species are morphologically close, sometimes extremely close; in such cases, the adults of only one sex can be identified unless life history data are available. Ultimately, the principal evidence to support the species-level distinctiveness comes from traits of the life history of the constituent taxa. The architecture of the larval gallery in the host plant, often combined with host plant selection, is particularly important. A notable example is the *Elachista paragauda* complex, where the morphological criteria used to distinguish species are minute but the larval mines permit unambiguous identification (Kaila and Ståhls 2006).

It should be noted that for a majority of taxa regarded as species in this volume, no life history data are available. This causes a somewhat uneven taxonomic treatment in different cases. *Elachista melanthes* (Meyrick) could be taken as an example. As delimited in this volume, this species is widespread, from Western Australia through the Adelaide region in South Australia to the eastern coast of New South Wales. Specimens show some variation in external appearance – in size, in coloration of wings, head and antennae and in the male genital morphology, especially the width of the valva. As no trends in variation have been detected, it is here considered intraspecific. However, the material available consists mostly of single individuals from light trap samples; there is only one longer series from one site. The species has only once been reared, resulting in one male and one female specimen (indeed, the only female