

OCT. 2 1978

Aust. ent. Mag. 5(3), September, 1978

51

## A NOTE ON *DROSOPHILA ALBOSTRIATA* MALLOCH (DIPTERA: DROSOPHILIDAE)

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### Abstract

*Drosophila albostriata* Malloch is a rare endemic species previously known only from a few female specimens. The male genitalia are figured and additional distribution records given. The structure of the male genitalia suggests possible relationships with another endemic species, *D. fumida* Mather. *D. albostriata* has been collected in semi-arid areas, suggesting a greater resistance to heat and desiccation stresses than is usual amongst Australian *Drosophila* species.

### Introduction

*D. albostriata* Malloch, 1924 is a particularly striking out nevertheless little-known endemic species of *Drosophila* hitherto recorded from only two localities in southern Queensland. The type locality is Eidsvold (25°32'S, 151°8'E). Further specimens have also been recorded from the vicinity of Glen Elgin Homestead (24°31'S, 149°11'E). The few specimens recorded to date have not included any males, and although the species is assigned to the subgenus *Scaptodrosophila* its systematic position within that large group has been regarded as obscure (Bock, 1976).

Through the courtesy of Prof. J. S. F. Barker (University of Sydney) and Mr G. B. Monteith (University of Queensland) I have obtained further specimens of *Drosophila albostriata* including several males. The male genitalia of this species are described and figured below and some further comments are offered on the distribution and possible relationships of the fly.

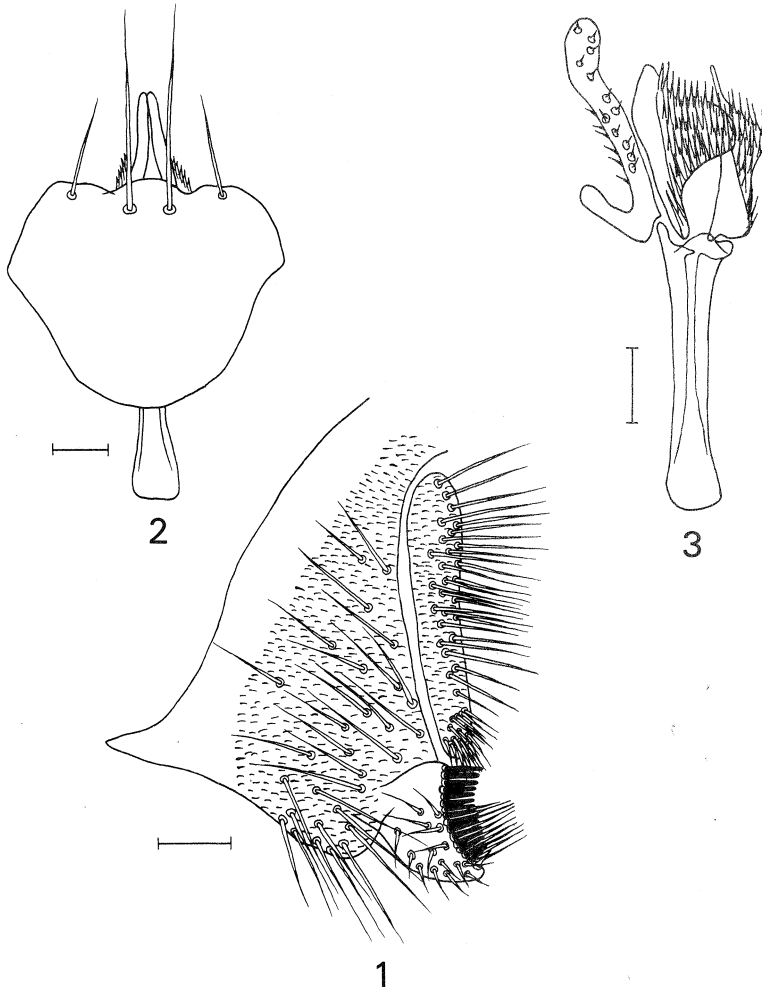
### Male genitalia

*External genitalia* (Fig. 1). Anal plate narrow and elongate, with lower cluster of bristles differentiated from upper setation, and general micropubescence. Clasper with row of close elongate rounded black teeth along medial border and additional bristles on both inner and outer faces, but without micropubescence. Genital arch with numerous large bristles and micropubescence in medial half-two thirds. Lower lateral portion of genital arch elongated.

*Internal genitalia* (Figs 2, 3). Hypandrium with pair of large submedian spines and additional pair of smaller bristles lateral to these. Aedeagus bifid, laterally compressed, apically rounded and expanded, with numerous spine-like protuberances. Aedeagal apodeme straight. Parandrites large, articulated to aedeagus, strongly sclerotized, elongate, with numerous very fine sensilla.

### Further records

QUEENSLAND: 1♂, Caloundra (26°8'S, 153°10'E), 28.viii.1929, F. A. Perkins (University of Queensland, Entomology Department collection). 2♂, 5♀, Glen Elgin HS, 18.xi.1977, attracted to banana bait in vicinity of *Opuntia* stands J. S. F. Barker; 1♀, Planet Downs HS (24°32'S, 148°53'E), 18.xi.1977, J. S. F. Barker; 5♀, Theodore (24°57'S, 150°05'E), 26.xi.1977, J. S. F. Barker (La Trobe University, Department of Genetics & Human Variation collection).



Figs 1-3. *D. albostrata*, male genitalia: (1) external genitalia; (2) hypandrium; (3) aedeagus and parandrite. Scales 50  $\mu$ .

#### Discussion

The Australian *Drosophila* fauna is now known to comprise almost 100 species, or about 7% of the described world total. The four major subgenera of *Drosophila* (*Drosophila*, *Sophophora*, *Hirtodrosophila* and *Scaptodrosophila*) are represented amongst the fauna; ancestral forms of the subgenus *Scaptodrosophila*, which has speciated most widely and contains the majority of the Australian species, were presumably amongst the earliest drosophilid invaders of Australia.

Several clearly defined species groups are recognizable amongst the Australian *Scaptodrosophila* fauna (Bock and Parsons, 1978), while other species are too poorly known, or appear to be too aberrant, to permit recognition of their closest affinities. *D. albostriata* is unique amongst the Australian species in its coloration, black with two conspicuous longitudinal white stripes along the mesonotum, continued on the head along the orbital borders. Although the species is included in *Scaptodrosophila*, it is unusual in possessing very small prescutellar bristles and a minute middle sternopleural bristle (large prescutellars and large middle sternopleurals are present in most members of the subgenus). *D. albostriata* may thus not be related to any other species by coloration, but in the bristle reductions it is similar to *D. fumida* Mather. The latter species is widespread in southern Australia and occurs in both the eastern and western parts of the continent; it is distinguished, apart from its unusually small prescutellars and middle sternopleurals, by possession of patterned wings.

Superficially, *D. albostriata* and *D. fumida* thus appear to be quite dissimilar, but apart from the bristle reductions mentioned above, the male genitalia of *D. albostriata* are rather similar to those of *D. fumida* (Figs 79 and 80 in Bock, 1976). The most striking resemblances are in the external genitalia: the anal plates and the claspers are very similar, and the same unusual narrow extension in the lower lateral part of the genital arch is evident in both species. In the internal genitalia, the hypandrium of both species possesses more than the usual two large bristles and the parandrites of both species are very large, although the aedeagi of the two species are dissimilar. It is thus possible that, colour and pattern notwithstanding, *D. albostriata* and *D. fumida* share relatively recent ancestry, although both species are so unlike any others that further comments on their possible relationships would be highly speculative.

*D. albostriata* is quite unusual in a further respect. Endemic (and, in most cases, introduced) species of *Drosophila* in Australia are very rarely found under conditions of high temperature/desiccation stress. Some species have adapted to open forests, but on hot dry days the latter species are almost invariably only found in the immediate vicinity of creeks where desiccation stress is demonstrably lower (Parsons, 1975). Eidsvold, Theodore, and Glen Elgin and Planet Downs Homesteads both lie in a region of dry sclerophyll forest where summer temperatures are extreme, and indeed few native drosophilids are found (Barker, pers. comm.). It appears that *D. albostriata* may have adapted physiologically to climatic conditions beyond the tolerance range of that of most other Australian Drosophilidae. However, as for most other species of the latter, the natural history of *D. albostriata*, particularly the resources exploited by the larvae, remains unknown.

#### References

- Bock, I. R., 1976. Drosophilidae of Australia. I. *Drosophila* (Insecta: Diptera). *Aust. J. Zool. Suppl. Ser.* No. 40: 1-105.
- Bock, I. R., and Parsons, P. A., 1978. The subgenus *Scaptodrosophila* (Diptera: Drosophilidae). *Syst. Ent.* 3: 91-102.
- Parsons, P. A., 1975. The effect of temperature and humidity on the distribution patterns of *Drosophila inornata* in Victoria, Australia. *Environ. Ent.* 4: 961-964.

## BOOK REVIEW

*The Lepidoptera of Norfolk Island, their biogeography and ecology* by J. D. Holloway. W. Junk, The Hague. Series Entomologica, Vol. 13. 8vo. 291 pp., 140 text-figs, 21 pls. 1977. Price about \$40.00

This book is made up of twelve chapters, an appendix and two indices, one to subject and one taxonomic, in addition to an introductory section and a list of references.

The introduction is mainly an acknowledgement of help and the first two chapters cover the main features of climate, geology and soils of Norfolk Island. Chapter III puts the book into historical perspective and gives some essential background on the flora. Chapter IV prepares the reader for what is to follow by discussing the sampling technique, programme and areas sampled. Chapter V gives a systematic treatment of the Lepidoptera. Chapters VI to XI form the more generally interesting part of the book and deal with such topics as the vagrancy of the Norfolk species, their biogeography, seasonal patterns and the ecological diversity of the moth fauna.

The book is full of new information on the moths of this island and several new species are described. Many taxonomists would prefer to see new species described elsewhere rather than in a book of this nature. One remarkable suggestion is that "perhaps half the species recorded are wholly or partially vagrant". This is concluded from comparison of number of species recorded compared with a theoretical expected number derived from data on size of islands. Criteria are given for determining which species are probably vagrant. I am not certain of the validity of some of the criteria but I leave the reader to consider these for himself. The ecological diversity of the island is considerable despite its small size and stems from interference and subsequent partial regeneration of native flora. This could, undoubtedly, lead to a higher than expected number of species. There is little doubt that there has been much inadvertent introduction by man and evidence for a fairly high rate of natural introduction is given in Chapter VI (p. 150 *et seq.*). Introduction of potential host plants has been high. It is not clearly stated what the author considers the difference to be between vagrants and partial vagrants; if the latter refers to reinforcement of an established population by periodic introduction then the number of vagrant species is, of course, much reduced and "partial vagrants" are seen to be resident, as species.

The conclusions reached on the relationships of the moth fauna and the data on local distribution patterns are interesting. The remarkable amount of work done in collecting and sorting material must surely make the moth fauna of Norfolk Island one of the best known of any island of comparable size; most of the larger forms must now be recorded.

The information in this book will form a sound base line for measuring the actual rate of colonization of the island by the larger species and this will permit future testing of the hypothesis that vagrancy rate is high.

As a study of a discrete faunal group, over a small isolated area, the work is outstanding. The overall review of the insect fauna of the island given in the Appendix is a useful summary for anyone interested in the general composition of the fauna, although, of course, few groups have been collected to the same degree as the Lepidoptera and the lists are derived from literature and collections which have not been fully studied.

The book is appropriately dedicated to Marge and Freddie Jowett and it is a record of their remarkable enthusiasm and dedication. Through their efforts we now know a great deal about the Norfolk Island moth fauna and the basis has been provided to develop and test techniques which have much wider implications for zoogeographers and ecologists.

One major importance of this book lies in its example, which extends well beyond the restricted audience of Lepidopterists. It is unfortunate that the high price will probably result in most readers using a lending library copy rather than keeping a copy on their own shelves.

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