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BOOK REVIEW

THE LEPIDOPTERA OF BERMUDA: THEIR FOODPLANTS, BIOGEOGRAPHY, AND MEANS OF DISPERSAL,

by D. C. Ferguson, D. J. Hilburn, and B. Wright.

1991. Memoirs of the Entomological Society of Canada, No. 158. 105 pp., 201 b & w illustr., color frontispiece, 3 pls. of line drawings, one map, softcover (16.4 x 25.4 cm). No ISBN number. Price: $10.00 (available from both the Entomological Society of Canada and the senior author at Systematic Entomology Laboratory, USDA, U. S. National Museum of Natural History, Washington, D.C. 20560).

This important publication discusses the 183 species of Lepidoptera recorded from Bermuda, including 59 species reported for the first time. It is only the fourth publication to deal exclusively with the Lepidoptera of this isolated Atlantic island. The most comprehensive previous list was published by Ogilvie in 1928 (listing about 129 species, including 20 that turned out to be synonyms of others already listed or that represented doubtful and unverifiable records). Collectively, the three present authors have put in years of work on the moths and butterflies of this group of islands almost directly east of Charleston, South Carolina, and the excellence of this publication reflects that effort.

Bermuda is a small cluster of oceanic islands some 1,040km to the west-northwest of the nearest land at Cape Hatteras, North Carolina. With the total land area being only about 54km, and a maximum altitude of 79m, it is perhaps surprising to find so many species here. But the climate is subtropical, with warm humid summer weather from about May to October, and cooler winters that are nearly frost-free, and thus Bermuda forms a happy landing ground for many waifs and long-distance migrants. The present islands emerged as coral reef formations built on top of an extinct volcano rising 4,000 meters from the ocean floor. As recently as about 120,000 years ago, higher sea levels greatly reduced the area of dry land so it is not particularly surprising that Bermuda has so few *endemic* Lepidoptera, with most of them closely related to the relatively nearby American species.

Of the total of 183 species of Lepidoptera recorded from Bermuda, 16 are butterflies. One endemic subspecies is known: *Junonia coenia bergi* Avinoff. Eleven butterfly species are irregular visitors from the American mainland and probably not established, while one (*Danaus plexippus*) has apparently become established naturally from migratory immigrants following changes in the habitat caused by man. Another species, *Pieris rapae*, was accidentally introduced by man. Two species of butterflies have their resident or immigrant status uncertain (*Agraulis vanillae nigrior* Michener and *Calpodes ethlius* (Stoll)).

Following a review of the work of earlier authors and their contributions, a comprehensive checklist of the Lepidoptera of Bermuda is given. This is followed by a detailed annotated list of the Lepidoptera there. For each species, the currently accepted scientific name is followed by synonyms, and a common name is given if generally accepted in the literature. Reference is made to the accompanying illustrations of the species, and then locality records and dates, world distribution, origin, notes on possible long-range dispersal capability, host plants, and descriptive notes on the adults are given.

In additon to their fascinating discussion of the geography, climate, origin, geology and vegetation of Bermuda, the authors also mention the effects of settlement by man. The most recent devastating impact noted is the mercury vapor lamp, which is currently being used heavily for outdoor lighting in urban as well as countryside areas and is impacting flight activity and reproduction of moth populations.

Douglas Ferguson has added a very interesting, separately authored Appendix, aptly entitled "An Essay on the Long-range Dispersal and Biogeography of Lepidoptera, with Special Reference to the Lepidoptera of Bermuda" (pp. 67-79). This discussion alone is worth the price of the book. While the impoverished state of the Bermudian fauna relative to that of the mainland has been emphasized in the main body of this monograph, Ferguson aptly notes that the 183 species for only 52 square km represent a surprising diversity compared with that of other oceanic islands that have been investigated. Bermuda apparently has been mostly colonized by long-range migrant moths and butterflies. The genera involved, often even the same species, are found on other islands such as the Galapagos, Ascension, Tristan da Cunha, Fiji, Rapa, Hawaii, Norfolk Island, and New Zealand. Species found on Bermuda represent these same genera in the southeastern United States and the West Indies. Thus, Ferguson has identified certain Lepidoptera that have become "specialized" in their capacity for long-range dispersal, and can reach and colonize even the most remote tropical and subtropical habitats over vast expanses of ocean worldwide. Ferguson hypothesizes that Bermuda's Lepidoptera fauna is currently saturated with as many resident species as its small land area and disturbed habitats can sustain.

Lepidopterists with an interest in tropical and subtropical island faunas of the world, as well as ecology, evolution, and biodiversity questions dealing with the Lepidoptera, will want to obtain a copy of this important publication at the earliest possible date. Only a few reprint copies of the Memoirs are available in either Canada or Washington. The authors are to be congratulated on the great amount of careful work reflected in this excellent publication, which now represents the definitive contribution to our knowledge of the Lepidoptera of Bermuda.

THOMAS C. EMMEL
Division of Lepidoptera Research, Department of Zoology
University of Florida, Gainesville, Florida 32611