RANGE EXTENSION OF DOLESCHALLIA TONGANA (NYMPHALIDAE) TO THE SAMOAN ARCHIPELAGO, WITH NOTES ON ITS LIFE HISTORY AND ECOLOGY

ROBERT P. COOK
U.S. National Park Service, National Park of American Samoa, Pago Pago, AMERICAN SAMOA 96799

AND

DON VARGO
American Samoa Community College, Land Grant Program, Pago Pago, AMERICAN SAMOA 96799

ABSTRACT. Adults and larvae of the nymphalid butterfly Doleschallia tongana vomana Fruhst. were recently documented for the first time in the Samoan archipelago, on the island of Tutuila, American Samoa. Distributed from Melanesia to western Polynesia, this species consists of several sub-species, with D. t. vomana endemic to Fiji. The establishment of this species on Tutuila is likely the result of natural dispersal by adult(s) blown from Fiji, although the success of this colonization was made possible only as the result of human introduction of the host plants Graptophyllum pictum and Pseuderanthemum carruthersii (Acanthaceae).

The nymphalid butterfly Doleschallia tongana Hopk. is distributed throughout Melanesia eastward to western Polynesia. Formerly considered a subspecies of D. bisaltide, D. tongana was elevated to full species status by Parsons (1999). Based on a review of Doleschallia specimens, Parsons (1999) determined that D. bisaltide extended from India eastward to New Guinea, and that further eastward, specimens considered to be subspecies of D. bisaltide were in fact, D. tongana. D. tongana consists of about six sub-species, and is reported from the Bismarck Archipelago; the Solomons; New Caledonia; the New Hebrides; Tonga; Fiji; and Samoa (Parsons 1999). At the eastern end of the species’ range, D. t. vomana Fruhst. is endemic to Fiji. The establishment of this species on Tutuila is likely the result of natural dispersal by adult(s) blown from Fiji, though the success of this colonization was made possible only as the result of human introduction of the host plants Graptophyllum pictum and Pseuderanthemum carruthersii (Acanthaceae).

Assignment to the sub-species vomana was subsequently made by Dr. Jacqueline Miller, Allyn Museum of Entomology, Florida Museum of Natural History. Based on the revised taxonomy (Parsons 1999) these specimens would now be assigned to D. tongana vomana.

Since these initial records, the occurrence of larvae on the host plants or observations of adults in flight has now become more frequent. Two additional adult specimens were collected in the Tafuna section of Tutuila (12 February 1998, 23 May 1998; Fig. 2) and Doleschallia larvae can now be found throughout the inhabited areas of Tutuila. Three adults have been deposited at the Allyn Museum of Entomology, Florida Museum of Natural History (Accession Number 1998-12). Considering that the records are distributed temporally and spatially (from Tula on the east end to Fagamalo on the west end, a distance of 30 km) and include both adult and larval forms, it appears that a breeding population has become established on Tutu-
FIG. 1. Mature larvae of Doleschallia tongana vomana Fruhst. feeding on Pseuderanthemum carruthersii, Mapusaga, Tutuila, American Samoa. Photo by Don Vargo.

ilu. This seems to be a recent occurrence, as this is a large, conspicuous species, readily observed and identified on the wing (once initially identified in hand).

Prior to the observations reported here, neither one of us had observed the species on Tutuila. While one of us (RPC) had only been making observations on Tutuila since 1996, the other (DV) has been observing and collecting butterflies on Tutuila since 1988. Hopkins (1927) spent two years in Samoa and Comstock (1966) spent four months (June to October) collecting on Tutuila without encountering this species. In the Samoan Archipelago, Doleschallia presently is only known from Tutuila. We have spent many days afield in the Manu'a islands of American Samoa without observing it. We have not observed it on Upolu or Savaii either, but time spent afield on these islands has been very limited.

Existing data on the host plants of Doleschallia indicate the genus feeds primarily on members of the Family Acanthaceae, with Moraceae of minor importance to some species (Parsons 1999). Doleschallia in New Guinea feed principally on Graptophyllum pictum T. (Parsons 1991), and Pseuderanthemum variable is the principal host plant of D. bisaltide in Australia (McCubbin 1971, D'Abreira 1978, Common & Waterhouse 1972). Host plants recorded for D. tongana include Graptophyllum pictum on Manus and New Britain (Parsons 1999), Pseuderanthemum sp. on New Caledonia (Holloway & Peters 1976), and, in Fiji, Graptophyllum insularum (A. Gray) A.C. Smith, G. pictum, Pseuderanthemum laxifolium A. Gray, Artocarpus altilis Parkinson, A. integra Thunb., and Eryth-

rinsa sp. (Robinson 1975). While there are no accounts of host plants of D. tongana from Tonga, G. insularum is a native species of Acanthaceae there (as well as in Fiji) (Whistler pers. comm.), and presumably serves as the host plant. On Tutuila, larvae of D. t. comana have been observed feeding on Pseuderanthemum carruthersii (syn. P. reticulatum) and Graptophyllum pictum. These two plant species are native to Melanesia and Asia-Malaysia respectively.

With the exception of Dicliptera samoensis Seem, endemic to Upolu and Savaii (in the independent nation of Samoa) there are no native Acanthaceae in the Samoan archipelago. All are European introductions (primarily in the 20th century) and arrived either as weeds (7 species) or ornamentals (21 species) (Whistler 1992, 1994, 1995, pers. comm.). On Tutuila, P. carruthersii and G. pictum are widespread ornamental plantings.

Doleschallia occurs in primary and secondary forest, although accounts suggest it prefers forest edge or clearings rather than deep forest. D. bisaltide is reported from rain forest (Common and Waterhouse 1972) and “open spaces on the outskirts of jungle patches” (McCubbin 1971). In New Guinea, D. tongana occurs in marginal secondary forest, especially along creeks (Parsons 1999) and in New Caledonia it prefers rich primary forest but is often seen on low vegetation in the sun (Holloway & Peters 1976). However, its occurrence on ornamental hedges of G. pic-
phyllum. Decades after the importation of its host plants sug­gests it did not arrive in association with that activity.

While it is impossible to be certain of the mecha­nism by which D. b. vomana on Tutuila appears linked to the distribution of the ornamental plantings that serve as their larval host, though the extent of plantation and forest on Tutuila provide a habitat structure that is probably not unlike that in which it occurs elsewhere.

A second and more likely scenario is one of colo­nization from Fiji. Though not without exception for some species, there is consensus that most of the Samoan macro-lepidoptera arrived via Fiji (Hopkins 1927, Swezey 1948, Robinson 1975, Holloway 1979, 1983). Given this species’ vagility, and the fact that larvae, in a shipment of Pseuderanthemum or Cryptophyllum. However, importation of these plant species to Samoa occurred early in the 20th century. Our report of the first occurrence of D. t. vomana in Samoa, decades after the importation of its host plants suggests it did not arrive in association with that activity.

A second and more likely scenario is one of colo­nization from Fiji. Though not without exception for some species, there is consensus that most of the Samoan macro-lepidoptera arrived via Fiji (Hopkins 1927, Swezey 1948, Robinson 1975, Holloway 1979, 1983). Given this species’ vagility, and the fact that tropical storms and cyclones in this region often pass from west to east, it seems inevitable that individuals of D. t. vomana would arrive in Samoa from time to time. However, until fairly recently (the 20th century), its ability to successfully colonize Samoa would have been limited by a lack of host plants. The modern intro­duction of several species of Acanthaceae, which serve as larval hosts on Tutuila, has apparently allowed a more recent colonization event to meet with some success. Whether this will result in a more permanent establishment is unknown, as is the extent of this species’ present distribution among the other islands of the Samoan Archipelago.

ACKNOWLEDGMENTS

We would like to thank W. Arthur Whistler for assistance in plant identification, clarifying the distribution of Acanthaceae, and for critical review of this note. Special thanks are extended to Jacqueline Y. Miller for confirming the specific identification of our specimens, for providing identification to sub-species, and for her critical review of this note.

LITERATURE CITED


