

itself in flowers, where it captures various insects including large butterflies and even bees." However, the more recent text of Borror & DeLong (1954, An Introduction to the Study of Insects. 3rd ed., Holt, Rinehart, & Winston, New York) did not list butterflies as prey of Phymatidae.

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JOHN H. FALES, *Ridge Road, Neeld Estate, Huntingtown, Maryland 20639.*

PAPILIO XUTHUS (PAPILIONIDAE) IN HAWAII

The Hawaiian Islands have a very limited butterfly fauna—the only large butterfly is the monarch (*Danaus plexippus* (L.)), and medium-size species are limited to several species of *Cynthia* and *Pieris rapae* L. (Zimmerman, 1958, Insects of Hawaii. Vol. 7: Macrolepidoptera, Univ. of Hawaii, Honolulu). I was very surprised, therefore, on 6 February 1975 to observe a cream and white swallowtail fluttering around hibiscus bushes planted in the lawn of a condominium two miles north of Kaanapali on the island of Maui.

Although an attempt at hand capture failed, in the process of achieving a "near miss" I was able to tentatively identify the butterfly as *Papilio xuthus* L., a native of Japan and East Asia. Numerous other individuals were observed in the next few days, and the identification was confirmed when I obtained a net and captured a short series of specimens. Since *P. xuthus* is a member of the Rutaceae-feeding group of Papilios, an immediate search was made of local *Citrus*. Eggs, young larvae and pupal skins were found, and two individuals were reared on young citrus leaves (the larvae showed no interest in the tough older leaves).

Because of the potential importance of *P. xuthus* as a citrus pest, I notified the Hawaiian Department of Agriculture in Honolulu by telephone and was informed that they were aware of the introduction. In a subsequent letter, Ronald Mau, Survey Entomologist for the Department, kindly sent me the following information. *Papilio xuthus* was first discovered on Oahu in April 1971 and has now reached all the major Hawaiian Islands. It was first observed on Maui in May 1974 (I would guess that there was only a single introduction there since 10 months later the generations still appeared to be synchronized).

A chalcid wasp egg parasite, *Trichogramma* spp., according to Mau appeared to be giving good control, and a tachinid fly, *Exorista sorbillans* (Wiedmann), parasitic on the larvae has been introduced to supplement *Trichogramma*. Its successful establishment is not certain at present. Mau also reports that *P. xuthus* pupae underwent some type of obligate diapause in 1971 and 1972, although adult and larval activity did not cease entirely.

More observations on the behavior of this newly introduced species would be most interesting. In March 1975 on Maui, *P. xuthus* adults were abundant and large numbers of eggs and larvae were present on cultivated citrus, showing every sign that the population was in the "log phase" of growth. There are native Rutaceae in the Hawaiian flora of the genera *Ptelea*, *Platydesma* and *Zanthoxylum*, and the impact of *P. xuthus* on these should be carefully observed.

It is interesting to speculate on the source of the introduction. One possibility that has been suggested is the accidental importation of a gravid female or two, but it is difficult to visualize such an "accident" with a large and attractive insect like *P. xuthus*. There is a more intriguing possibility. *Papilio xuthus* is known from the Bonin and Marianna Islands (Shirôzu, 1960, Butterflies of Formosa in Colour.

Hoikusha, Osaka). The only native Hawaiian lycaenid, *Vaga blackburni* (Tuely), has its nearest relative *V. ogasawaraensis* (Pryer) on the Bonin Islands. Zimmerman (op. cit., p. 494) suggests the possibility that "*blackburni* is a derivative of *ogasawaraensis*, or that they are descended from a common stock, and the original ancestors which populated Hawaii may have come from the Bonin Islands." So it is just possible that this beautiful addition to the Hawaiian fauna arrived by natural dispersal, carried more than 3000 miles by the westerly winds of the North Pacific.

PAUL R. EHRLICH, *Professor of Biology, Stanford University, Stanford, California 94305.*

CHARAXINAE (NYMPHALIDAE): OLD WORLD VERSUS NEW

The life history of *Anaea euryppyle confusa* Hall (Muysshondt 1974, J. Lepid. Soc. 28: 306-314) reveals some interesting differences between this species and the Old World Charaxinae. First, concerning the adults, is it quite certain that both sexes are attracted to dung and carrion? In the Old World species, only the male is so attracted, although both sexes are attracted to fermenting fruit and sap. It has been suggested that the male's attraction to dung and carrion may have some connection with the male metabolism with regard to courtship and mating. This is comparable, perhaps, to the requirements of certain male danaids for the juices of withered plants of the Boraginaceae as a precursor of the male pheromones used in courtship.

With regard to the larvae, I know of no Old World species in which the young larva constructs a perch of frass and silk on which it rests between feeds, and, as can be seen from Dr. van Someren's list of foodplants (1974, J. Lepid. Soc. 28: 315-331), the East African Charaxinae have been bred extensively. The Old World larvae usually spin a carpet of silk, without frass, on which they rest between feeding. I also know of no Old World species that makes a retreat by rolling or folding a leaf. Strangely enough, the young larvae of the genus *Asterope* (Eunicinae) and *Cyrestis camillus* F. (Marpesiinae) do have this habit of constructing a perch of silk and frass on which to rest, but none of these rolls or folds a leaf when larger.

Generally, the pupae of the Old World Charaxinae are green and monomorphic, but those of *Charaxes protoctea* Feisth. and *C. lasti* Gr. Sm. are dimorphic, having a green and a brown form. It seems highly probable that the pupae of the closely allied *C. boueti* Feisth. and *C. cynthia* Btlr. are dimorphic also.

D. G. SEVASTOPULO, *P.O. Box 95026, Mombasa, Kenya.*