PAPILIO TROILUS (PAPILIONIDAE) IN PURSUIT OF FISH CROW

On 13 August 1974 while crossing a dike of an impoundment in the Barn Island Wildlife Management Area, Stonington, Connecticut, I noticed two fish crows (*Corvus ossifragus* Wilson) flying about 200′ over the marsh. This species is uncommon in that area and was therefore of interest. As I watched, a spicebush swallowtail (*Papilio troilus* L.) climbed toward the second bird, actually circled it and darted in on the bird. Such a response, elicited by the stimulus of a flying object such as a bird passing nearby has been reported by others, monarch (*Danaus plexippus* (L.)) and red-winged blackbird (*Agelaius phoeniceus* L.) by Slansky (1971, J. Lepid. Soc. 25: 294), Lorquin's admiral (*Limenitis lorquini* (Boisduval)) and glaucous-winged gull (*Larus glaucescens* Naumann) by Pyle (1972, J. Lepid. Soc. 26: 261) and question mark (*Polygonia interrogationis* (Fabricius)) with chimney swifts (*Chaetura pelagica* L.) by Hendricks (1974, J. Lepid. Soc. 28: 236).

I was quite surprised, however, to see the crow twist in the air, grasp the butterfly in its bill and eat it! I know of no other records for this species of bird eating this type of food and certainly corvids do not normally capture prey while in flight. Therefore, not only were the swallowtail's actions of interest but also the behavior and diet of the fish crow!

Pre-courtship responses and aggressive territorial behavior have been listed as possible explanations for the butterfly's actions. One can only conjecture what the butterfly was intending.

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MORE RECORDS OF BUTTERFLIES AS PREY FOR AMBUSH BUGS (HETEROPTERA)

In a recent publication (Pyle 1973, J. Lepid. Soc. 27: 305–307) it was related that a butterfly, *Boloria selene*, (Denis & Schiffermüller), was discovered being fed on by two unidentified ambush bugs (Phymatidae) on a flower head in Washington State. It was indicated that ambush bugs were not known to capture butterflies. This writer has made numerous observations of attacks on butterflies by crab spiders and certain insects, including ambush bugs. Recorded here are observations in Maryland of ambush bugs capturing certain butterflies.

A single observation of this behavior was made in 1969. However, during extensive collecting throughout Maryland in 1973–1975, 13 additional butterflies of 10 species were seen being fed upon by ambush bugs, which evidently had captured the butterflies. In each case the prey and predator were collected and preserved. In one instance two ambush bugs were captured feeding on a single butterfly. Of the 15 ambush bugs collected, only 4 were nymphs. Each butterfly was on a flower head and probably was attacked while feeding. Except for two specimens, the butterflies were fresh or nearly fresh. The ambush bugs were identified as *Phymata fasciata* (Gray). The adults averaged 8.9 mm and the nymphs 5.5 mm in length. Data on the butterflies captured by the ambush bugs are tabulated in Table 1.

From these data it can be surmised that captures of butterflies by ambush bugs may be quite common. Although this behavior is referred to in older texts, it has been generally overlooked by collectors. Comstock, Comstock & Herrick (1895, A Manual for the Study of Insects. 19th ed., Comstock Publ. Co., Ithaca, N.Y.), in discussing ambush bugs, stated, "It overpowers and captures insects like cabbage butterflies, honey-bees and large wasps." Lutz (1918, Field Book of Insects. 2nd ed., G.P. Putnam's Sons, New York), in a similar discussion, stated, "it conceals

Table 1. Butterflies captured by *Phymata fasciata* (Gray) in Maryland.

Species and Sex		Date	Town (County)	Flower Host
		HESPERIIDAE		
Poanes viator zizaniae Shapiro	♂	29 July 73	Benedict (Charles)	*Apocynum* sp.
Atalopedes campestris (Boisduval)	♂	15 Sept. 74	Plum Point (Calvert)	*Apocynum* sp.
Atalopedes campestris (Boisduval)	♂	14 Sept. 75	Plum Point (Calvert)	*Tagetes* sp.
Pompeius verna verna (Edwards)	♀	9 July 74	Beltsville (Prince Georges)	*Asclepias* sp.
Pompeius verna verna (Edwards)	♀	21 Aug. 74	Ridge (Saint Marys)	*Solidago* sp.
Polites coras (Cramer)	♀	15 Aug. 73	Hall (Prince Georges)	*Asclepias* sp.
Epargyreus clarus clarus (Cramer)	♂	22 June 75	Benedict (Charles)	*Apocynum* sp.
		PIERIDAE		
Colias eurytheme eurytheme Boisduval	♀	29 Sept. 73	Plum Point (Calvert)	*Chysanthemum leucanthemum* L.
		LYCAENIDAE		
Strymon melinus humuli (Harris)	♂	14 Aug. 69	Beltsville (Prince Georges)	*Trifolium repens* L.
Lycaena phlaeas americana Harris	♂	9 Aug. 75	Beltsville (Prince Georges)	*Solidago* sp.
		NYMPHALIDAE		
Cynthia virginiensis (Drury) (two predators)	♂	10 July 73	Plum Point (Calvert)	*Asclepias* sp.
Phyciodes tharos tharos (Drury)	♂	4 Aug. 73	Indian Head (Charles)	unidentified
Phyciodes tharos tharos (Drury)	♀	19 Sept. 73	Huntingtown (Calvert)	*Solidago* sp.
Boloria toddi ammiralis Hemming	♂	31 Aug. 73	Hancock (Washington)	*Apocynum* sp.

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.

ACKNOWLEDGMENT

The author thanks Dr. Jon L. Herring, Systematic Entomology Laboratory, U.S.D.A., for identifying the ambush bugs.

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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 *Pieries 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 chalcoid 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.