THE JAMAICAN 'ORANGE DOG', *PAPILIO ANDRAEMON* (LEPIDOPTERA: PAPILIONIDAE)

PAULINE O. LAWRENCE[1]

Department of Zoology, University of the West Indies,
Kingston 7, Jamaica, W.I.[2]

ABSTRACT

Papilio andraemon Hübner is a pest of citrus in Jamaica. The larvae cause extensive damage to young citrus seedlings. Eggs are laid singly on the abaxial surfaces of young leaves.

The life cycle is usually completed in 5-6 weeks at 28°C and 75± 2% RH. There are 5 larval instars. Young larvae eat leaves of prickly ash if this is the first and only food provided. If they are subsequently fed with *Citrus* leaves, larvae avoid the prickly ash.

Unmated females live longer than males and mated females. The butterfly may be found at elevations exceeding 2,000 ft but is more numerous in coastal areas of the island.

In a general review of the American papilios, Rothschild and Jordan (1906) referred to *Papilio andraemon* Hübner as being one of the 'fluted' swallowtail butterflies originally described from specimens caught in Cuba. Gundlach (1881) gave a detailed description of the immature stages of *P. andraemon.*

The first record of the occurrence of this insect in Jamaica were by Lewis (1945) but no description of either adults or immature stages was given. Only 1 subspecies, *P. andraemon andraemon,* has been reported from the island. This species is known in the Bahamas as *P. andraemon bonhotei* Sharpe and in Great Cayman Island as *P. andraemon tailori* (Bates 1935).

The most accepted theory that has been put forward to explain the sudden presence of the insect in Jamaica was by Farr (1967) who suggested that the butterfly might have been transported here from Cuba by the winds of a hurricane which occurred in 1944.

Before the arrival of *P. andraemon, P. thoas L.* and possibly *P. cresphontes* Cramer were the only citrus feeders. In Cuba, *Zanthoxylum caribaenum* Lam. (prickly ash) and *Piper peltatum* (L.) constitute the major food for the latter 2 species and *Citrus* is eaten only occasionally (Bates 1935). Since *Citrus* was the only recorded food source for *P. thoas* in Jamaica, it is possible that competition by the introduced *P. andraemon* may have resulted in extreme reduction, if not extinction of *P. thoas.* This theory is by no means adequately substantiated.

Species of *Papilio* have been dubbed 'orange dog' as a result of their great attraction to *Citrus* ('Valencia' orange in particular), and the re-

---

[1]Presently with the Laboratory of Aquatic Entomology, Florida Agricultural and Mechanical University, Tallahassee, Florida 32307, in a cooperative program with the University of Florida.

[2]This paper was part of a thesis presented to the Board of Examiners, Department of Zoology, University of the West Indies, Jamaica in partial fulfillment of the requirements for the Bachelor of Science Degree.

semblance between the characteristic white cephalic shield of the larvae and the ears of a dog. This term is not indicative of a particular species of *Papilio* because the gregarious *P. anshisiades* Esper is the 'orange dog' of Trinidad (Kirkpatrick 1957) and British Honduras, while *P. cresphontes* is the 'orange dog' of Florida. *P. andraemon* is a major pest of young citrus plants in Jamaica. The lack of biological information on this species and its possible economic importance prompted this investigation.

Materials and Methods

Eggs and larvae were collected from citrus trees on the campus of the University of the West Indies, Jamaica. The position of the eggs and larvae on the leaves, and the species of citrus were recorded, as well as the collection dates. In the laboratory, young shoots with eggs on them were put in small vials with tap water until hatching was complete.

The larvae were reared in glass dishes 8 in. wide and 4 in. deep. First and second instar larvae were fed young citrus leaves, while older larvae were provided with less tender leaves. The stems of the shoots were wrapped with wet paper towels or put in vials of water to retain freshness. The shoots were replaced on alternate mornings.

Observations were made every morning and evening for 3 months. Moulted head capsules and larval skins were collected, labeled, and stored in glass vials at room temperature to prevent shrinkage. The dates of hatching, moulting, pupation, and emergence were recorded. Rearing was done at 28°C and 75±2% RH. One hundred ninety-two individuals were reared throughout the study. Newly-emerged adults were kept in a wire screen field cage 10 × 4 ft.

Results

Bionomics:

Life Cycle: Oviposition occurred between 10:30 AM and noon. Eggs were laid singly on the abaxial leaf surface. As many as 26 eggs were laid within 1 hr by a single female.

Newly laid eggs were light green but became black in 5 days, when hatching occurred. The larva ate its way out of the chorion, the remainder of which was eaten after hatching. Hatching usually took place between 11 PM and 1 AM. Within 1 hr the first instar larva commenced feeding on the young citrus leaves.

In 4 days, the first instar larva spun a silken mat on the leaf surface where it moulted. The second, third, and fourth stadia lasted 2, 3, and 4 days respectively. The new larvae ate their exuviae after each moult. The fifth instar fed for 6 days, after which feeding ceased in preparation for the pupal stage, which usually lasted 2 weeks but, in some cases, was as long as 3 months. The entire life cycle, from egg to adult was usually 5-6 weeks.

Distribution: *P. andraemon* has been observed in coastal regions of Jamaica. The species is numerous in areas with moderate average yearly temperatures like Kingston (28.8°C) and Half Way Tree (27.7°C). Bengry (1950) has observed *P. andraemon* in the Cockpit Country which is at an elevation of 2,453 ft.

Food: The author observed that male and female papilios fed frequently on flowers of the red *Pentas*. Observations made over a 1 week period in a garden of red, white, and purple *Pentas* and zinnias, showed that adults visited flowers of red *Pentas* 83.3% of the times. White and purple varieties were visited occasionally. The immature stages feed on citrus and prickly ash. First instar larvae were fed young leaves of prickly ash which is a plant host of *P. thoas* and *P. cresphontes* in Cuba (Bates 1935).

Young larvae ate leaves of prickly ash if this was the first and only food provided but if they were subsequently fed with citrus leaves, they avoided the former. In the laboratory, no preference for any species of citrus was observed. In the field however, the decreasing order of attraction appeared to be: orange (*Citrus sinensis* Osbeck. 'Valencia' variety), grapefruit (*C. paradise* Macf.), and lemon (*C. limon* Burm.). Egg laying seemed to be influenced by availability of young shoots more than by the species of citrus.

Life Span: Unmated females generally lived longer than males: the mean life span of 20 unmated females was 11.4 days while that of 25 males was 6.8 days. Mated females appeared to die earlier than unmated females: 8 unmated females released in a field cage 10 × 4 ft had a mean life span of 13.8 days, while 4 other females lived for an average of 4 days after mating. Two of this latter group died within 4, and 1 1/2 hr respectively, of egg laying. As many as 50 eggs were laid by a female within 1 1/2 hr.

Natural Enemies: No egg parasites were found. Larvae were attacked by solitary wasps (*Polistes* sp.), spiders, and birds. Fourth and fifth instar larvae rarely fell prey to these enemies. Ants have been found in pupal cases but there was no proof of predation. Young larvae resemble lizard and bird droppings and this resemblance may reduce predation by birds.

Discussion

The frequent occurrence of this species along the coast of the island indicates that citrus in these areas are most likely to suffer damage by the foliage feeding larvae. Because adults feed on *Pentas*, these plants should be cleared from the vicinity of newly-planted citrus nurseries or even from older trees with new growth flushes, as the succulent leaves attract egg laying females.

The length of the life cycle indicates that at least 4 generations may be expected each year.

Acknowledgements

I am indebted to Dr. John Parnell for his guidance and advice throughout this study. I am also grateful to Messers Walter Van Whervin, and Tom Turner for their interest and technical assistance in the identification of specimens. Thanks are also due Dr. Thomas H. Farr of the Institute of Jamaica for the loan of documents which were otherwise unavailable. I am grateful to Dr. William L. Peters and Mr. Manuel Pescador of the Laboratory of Aquatic Entomology, Florida Agricultural and Mechanical Uni-

versity and Mr. Edward Farnworth of the University of Florida for their constructive criticism of this manuscript. Thanks are also due Dr. Stratton Kerr who encouraged and advised me on the preparation of this manuscript.

Literature Cited

Avinoff, A., and N. Shoumatoff. 1951. Report of the Natural History Society of Jamaica.

Bates, M. 1935. The butterflies of Cuba. Bull. Mus. Comp. Zool. 78(2): 65-258.

Bengry, J. 1950. Report of the Natural History Society of Jamaica.

Farr, T. 1967. Jamaica Journal. 1:20.

Gundlach, J. 1881. Contribución á la Entomologiá Cubana. Habana 445 p.

Kirkpatrick, T. W. 1957. Insect life in the tropics. Longmans, London, 130 p.

Lewis, B. 1945. Report of the Natural History Society of Jamaica.

Rothschild, W., and K. Jordan. 1906. A revision of the American Papilios. Novit. Zool. 13: 411-752.