

STUDIES ON THE BIOLOGY AND SEASONAL HISTORY OF
POLYDORUS ARISTOLOCHIAE (PAPILIONIDAE)

G. H. MUNSHI AND S. A. MOIZ

Agric. College & Agric. Research Institute, Tandojam, West Pakistan

Polydorus aristolochiae (Fabricius) is the commonest large tailed, black butterfly of Indo-Pakistan Subcontinent. At Tandojam, West Pakistan the larvae have been found in large numbers on *Aristolochia bracteata*. The biology of this insect has been studied only by Ghosh (1914). The observations recorded by us concerning this species are given in the present paper. The work was under taken during 1962-63 at Tandojam.

EGG

Description

The eggs of *Polydorus aristolochiae* are laid on the underside, very rarely on the upper surface, of host leaves. A high oviposition rate was observed in the months of August and September and again during March and April. Up to five eggs were collected from each leaf.

The chorion is covered with a reddish brown, soft gum like substance, in minute granular masses. The latter are arranged somewhat in undulating ridges meeting at a point. These give the egg the appearance of a citron with the long axis slightly shorter and a little inclined towards one side and never perpendicular to the leaf surface.

Incubation Period

Since the butterflies did not lay eggs in captivity, the incubation period was determined by recording the maximum period required for hatching of eggs collected in the field. The time taken for hatching of the eggs is given in Table 1.

Ghosh (1914) recorded that the incubation period is four to five days from June to September. The results obtained here are in general agreement with his observations. Between the months of October and March the incubation period is longer due to lower temperatures.

LARVA

The larva is dark brown, and passes through four instars. The duration of larval stages was studied in the laboratory. The results are presented in Table 2.

It can be seen from table 2 that the duration of larval life varies from 14 to 62 days. The minimum duration was for larvae which hatched in September, 1962. Those hatching in the early part of January, 1963,

TABLE 1. INCUBATION PERIOD OF EGGS OF *Polydorus aristolochiae*
COLLECTED IN THE FIELD

Month	Days re- quired for hatching of eggs	Estimated incubation period in days	Average monthly Temperature (Fahrenheit)
September	2-5	5 Days	75.91
October	3-9	9 Days	69.64
November	2-9	9 Days	73.78
December	2-9	13 Days	60.88
January	8-13	13 Days	60.92
February	4-10	10 Days	69.92
March	3-10	10 Days	75.65
April	2-6	6 Days	83.75

passed their development during the two coldest months and, hence, their development required 62 days.

Ghosh (1914) has described the prolongation of larval life as hibernation. During our studies at Tandojam, however, larvae continued to feed during this period.

PUPA

The length of the pupal period varied from 10 to 230 days as is shown in Table 3.

The duration of the pupal stage is not correlated with atmospheric temperature (Table 1). Ghosh (1914) observed the pupal period to last from 10 to 303 days, and the present observations are in general agreement. However, Ghosh mentions that the insect undergoes a hibernation followed by an aestivation. This deduction does not seem to be correct since adult emergence took place in the coldest period as well as in hot months. Further, pupae from the same batch required widely varying

TABLE 2. LENGTH OF LARVAL LIFE OF *P. aristolochiae*

Month in which egg hatched	Larval life (in days)
September	14-15
October	22-25
November	24-31
December	31-43
January	50-62
February	26-35
March	26-35
April	28-34

TABLE 3. PUPAL PERIOD OF *P. aristolochiae*

Month in which larva pupated	Pupal period (in days)
August	10
September	13-230
October	13-228
November	19-150
December	36-141
January	44-143
February	14-179
March	13-172
April	12-38

periods before emergence of the adult, and its emergence by later pupating individuals sometimes occurred while from pupae of an earlier batch emergence of butterflies had not taken place. Thus, there is great range of individual variation in the pupal period, without apparent effect of temperature.

The above conclusion is corroborated by observations on pupae collected in the field. One hundred forty pupae were collected on November 5 and 25, 1962, from a small area at Tandojam which was under constant observation. Pupation had taken place on 5th and 25th November respectively.

LIFE CYCLE

According to the observations made on the length of incubation, larval and pupal periods (Tables 1-3), it is seen that the butterfly

TABLE 4. EMERGENCE OF ADULTS FROM FIELD COLLECTED PUPAE

Date of collection	Month of adult emergence	Pupal period (in days)
5 Nov. 1962	February	88-115
	March	127-146
	April	153-176
	May	184-207
	June	215-224
	July	246-258
	August	275
	25 Nov. 1962	December
January		51
February		72
March		120
April		146
May		166-176

requires from one to about 9 months to complete its life cycle (exclusive of adult).

It may, therefore be concluded that the insect may have up to about 7 overlapping generations in a year. Normally, in the field it probably has fewer.

Field surveys revealed the presence of all the stages on the host plants throughout the year.

NATURAL ENEMIES

Thompson (1946) reported *Apanteles aristolochiae* Wlkn. as a parasite of this butterfly. No parasites of eggs or larvae were found during this study.

ACKNOWLEDGMENT

To Jerry A. Powell, University of California, Berkeley, we wish to express our sincere appreciation for correcting and improving the manuscript.

LITERATURE CITED

- GHOSH, C. C., 1914. Life histories of Indian Insects. V. Lepidoptera. Mem. Dept. Agric. India, Ent. Ser. 5, 1: 53-58. Agric. Res. Inst., Delhi, Pusa.
- THOMPSON, W. R., 1946. Parasites of Lepidoptera (N-P). A catalogue of parasites and predators, Sec. 1. Pt. 3. Imperial parasite service. Belleville, Ontario, Canada.

A NEW *CALLITHOMIA* (ITHOMIIDAE) FROM BOLIVIA

JOHN H. MASTERS¹

P.O. Box 7511, Saint Paul, Minnesota

During 1962-1965 I received several large consignments of Bolivian Ithomiidae from Franz Steinbach of Cochabamba, Bolivia. Perhaps the most interesting specimen among these is an unique and previously undescribed *Callithomia*. The late Dr. Richard M. Fox, acknowledged expert in the Ithomiidae, examined this specimen, recognized it as a new species and intended eventually to describe it himself. With the death of Dr. Fox on April 28th, 1968, I have assumed the task of describing the insect and take pleasure in naming it after him.

¹ Research Associate, Carnegie Museum, Pittsburgh, Pennsylvania.