

**NOTES ON THE CACAO TUSSOCK MOTH,  
ORGYIA AUSTRALIS POSTICA WALKER  
(LYMANTRIDAE, LEPIDOPTERA)<sup>1</sup>**

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The cacao tussock moth, *Orygia australis postica* Walker is a serious leaf feeder of cacao in nurseries and in the field. The eggs are 0.67 mm in diameter and hatch from 5 to 6 days. There are five larval instars, the larva measures from 2.37 mm when newly hatched to 22.68 mm when full grown. The larval period is 17.27 days for males and 20.68 days for females. The pupal period lasts about 5 days, after which the wingless females and winged males emerge. Wing span of adult male is 20.42 mm. Egg laying to emergence is from 21 to 32 ( $\bar{x} = 22.94 \pm 1.69$ ) days for the males and from 21 to 34 ( $\bar{x} = 26.48 \pm 1.99$ ) days for the females. Females lay an average of 228.5 eggs each; hatchability of these eggs is 59.48 per cent.

The cacao tussock moth, *Orygia australis postica* Walker is a serious pest of cacao both in the nursery and in the field. The larvae are leaf feeders particularly on new leaves and when numerous, total defoliation results. Such damage retards growth and in extreme cases causes death of the plant. The recurrent presence of the pest particularly from September to February and the seriousness of the damage they inflict necessitated this study.

#### DESCRIPTION OF STAGES AND HABITS

The measurement of the different stages of *O. australis postica* is given in table 1. The duration of the developmental stages is given in table 2.

##### *The Egg*

The eggs are cream-colored, laid by the wingless females sometimes within but oftentimes out of the confines of the pupal silk strands (Fig. 1). The number of eggs laid per female ranges from 100 to 400 eggs ( $\bar{x} = 229.48 \pm 63.55$ ). Individual egg with a mean diameter of  $0.67 \pm 0.03$  mm; hatch 5.7 days after egg-laying.

**First-instar larva:** Length of newly-hatched larva ranges from 2.0 to 2.7 mm with a mean of  $2.37 \pm 0.23$  mm. General body with creamy to light brown setae. Head at this stage generally brown; labrum with a lighter hue; mandibles reddish brown. First thoracic segment with a brownish cervical shield. Abdomen with brownish verrucae in 1st and 4th then at 6th to 9th segments. Average duration of first stadium 4.90 days.

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TABLE 1. Measurements (mm) of the different developmental stages of *Orgyia australis postica* Walker.

Stage	Range (mm)	Mean (mm)
Eggs (diameter)	0.65 — 0.72	0.67 $\pm$ 0.03
First-instar larva (length)	2.0 — 2.7	2.37 $\pm$ 0.23
Second " "	7.9 — 9.7	8.50 $\pm$ 0.65
Third-instar " "	9.9 — 12.3	11.24 $\pm$ 0.90
Fourth-instar " "	11.3 — 15.1	13.16 $\pm$ 1.19
Fifth-instar " "	17.3 — 27.8	22.68 $\pm$ 3.62
Pupae (width)	3.0 — 4.0	3.80 $\pm$ 0.41
(length)	7.0 — 11.0	8.32 $\pm$ 0.94
Female adult (width)	4.0 — 6.0	4.92 $\pm$ 0.53
(length)	9.8 — 14.2	11.38 $\pm$ 1.25
Male adult (wing span)	17.0 — 22.0	20.42 $\pm$ 1.46

**Second-instar larva:** General body turning yellowish; setae brown. Cervical shield dark brown and verrucae on dorsum and dorso-lateral lines dark brown. Lateral hues gradually attaining darker colors. Mean length of this larva  $8.50 \pm 0.65$  mm and mean duration of this stage in days  $3.12 \pm 0.41$  days for males and  $3.23 \pm 0.13$  days for females.

**Third-instar larva:** General appearance almost similar to 5th larval instar except for size. Duration of stadium about  $3.42 \pm 0.19$  days for females. Mean body length  $11.24 \pm 0.90$  mm.

**Fourth-instar larva:** Similar in appearance to 3rd-instar and last (5th) instar larva. Mean body length  $13.16 \pm 1.19$  mm and stadial duration  $3.91 \pm 0.94$  days for males and  $3.82 \pm 0.26$  for females.

**Fifth-instar larva:** Mean body length  $22.68 \pm 3.62$  mm. Duration of stadium  $6.00 \pm 2.23$  days for males;  $6.00 \pm 0.93$  days for females.

Head generally orange; eyes slightly mottled with lighter yellowish orange areas provided with sparsely arranged fine setae. Antennae 3 segmented with 1 sensillum trichodaeum and several small sensilla basiconica.

Lateral side of prothorax just behind head provided with two long and black plumose setal tufts projecting cephalad.

Abdominal segments I-IV with verricules (yellow) on dorsomeson; 6th and 7th abdominal segments with red eversible; gland on dorsomeson. Prolegs on abdominal segments III to VI and X with uniordinal crochets arranged in homoidious mesoserries. Tenth abdominal segment with four groups of brown and lone plumose anal setal tufts projecting backwards. Abdominal segments I and II with white plumose setal tufts on each side projecting lateroventrad; dorsal area brown to dark brown; subdorsal area cream-colored; supraspiracular area dark brown in color with area surrounding verrucae cream-colored; subspiracular and ventral areas cream to reddish in color.

The larvae at this stage are very mobile, especially at the approach of pupation. It has been observed that this particular stage accounts for most of the dispersal activities, which more than augments the feeble movement of the wingless females.

TABLE 2: Duration (days) of the different developmental stages of *Orgyia australis postica* Walker.

Development Stage	FEMALES (44 individuals)		MALES (33 individuals)	
	Range (days)	Mean (days)	Range (days)	Mean (days)
Incubation	5—6	5.82 ± .36	5—6	5.67 ± .44
First stadium	4—8	4.89 ± .99	4—6	4.91 ± .76
Second stadium	3—4	3.23 ± .13	2—4	3.12 ± .41
Third stadium	2—4	3.02 ± .19	3—4	3.42 ± .50
Fourth stadium	3—6	3.82 ± .26	3—6	3.91 ± .94
Fifth stadium	5—10	6.00 ± .93	5—10	6.00 ± 2.23
Total larval period	15—28	20.68 ± 2.34	15—26	17.27 ± 1.82
Pupal stage	4—5	4.04 ± .22	6—7	6.21 ± .42
Egg laying to emergence	21—34	26.48 ± 1.99	21—32	22.94 ± 1.69

*The Pupa*

Pupation takes place on the leaves and stems of cacao.

The fully grown larva constructs a cocoon (Fig. 1) made of setal hairs and silken material secreted by the insect prior to pupation. The exuviae of the last molt is left inside the cocoon. The pupa is light yellowish green just after pupation; the male pupa gradually turns dark in the area of the wing pads whereas the female pupa changes to dull yellowish brown.

Pupae have a mean width of  $3.80 \pm 0.41$  mm and a mean length of  $8.32 \pm 0.94$  mm. This stage lasts from 6-7 days for males ( $\bar{x} = 6.21 \pm 0.42$  days) and 4.5 days for females ( $\bar{x} = 4.04 \pm 0.22$  days).

*The Adults*

The emergence of adults takes place in the early evening, usually between 8:00 to 9:00 p.m. Mating takes place soon after emergence.

The general body color of the adult males (Fig. 3) is brown to dark brown and the antennae pectinate. The wing expanse is from 17 to 22 mm with a mean of  $20.42 \pm 1.40$  mm. The adult male has been fittingly described by Hampson (1892) thus:

"Fore wing brown, with and indistinct oblique subbasal line; waved antemedial and postmedial line which approach each other at lower angle of cell; the area between them slightly finged with bluish gray and with a waved dark line edged with white on each side of the discocellulars; two indistinct waved marginal lines; the apex slightly tinged with grey and with some subapical streaks. Hind wing dark brown."

The adult female (Fig. 1) is dull brownish to yellow, wingless, and has a mean body length of  $11.38 \pm 1.25$  mm and a width of  $4.92 \pm 0.53$  mm. Evolutionarily, the female is merely converted into an egg laying machine. The gravid female with an enlarged abdomen generally clings throughout her life to the cocoon from which she emerged. Egg laying for mated females commences 12 hours after emergence. There were 5,737 eggs counted from 25 egg masses, or an average of 229.48 eggs per female. Of these eggs, 3,570 eggs hatched, or a 59.48% hatchability.



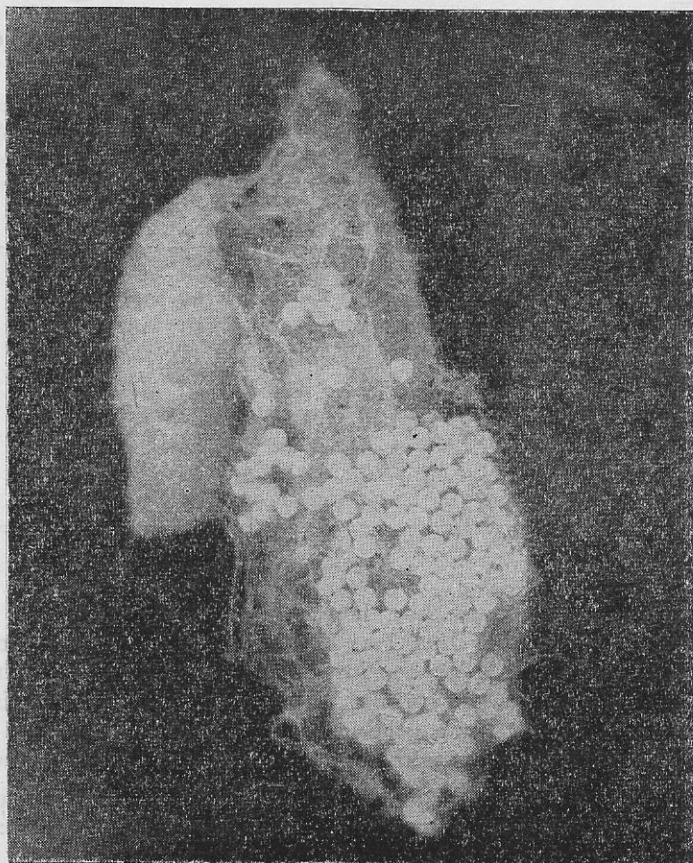


Fig 1. A wingless female of *Orgyia australis postica*, clinging to its cocoon after ovipositing a number of eggs.

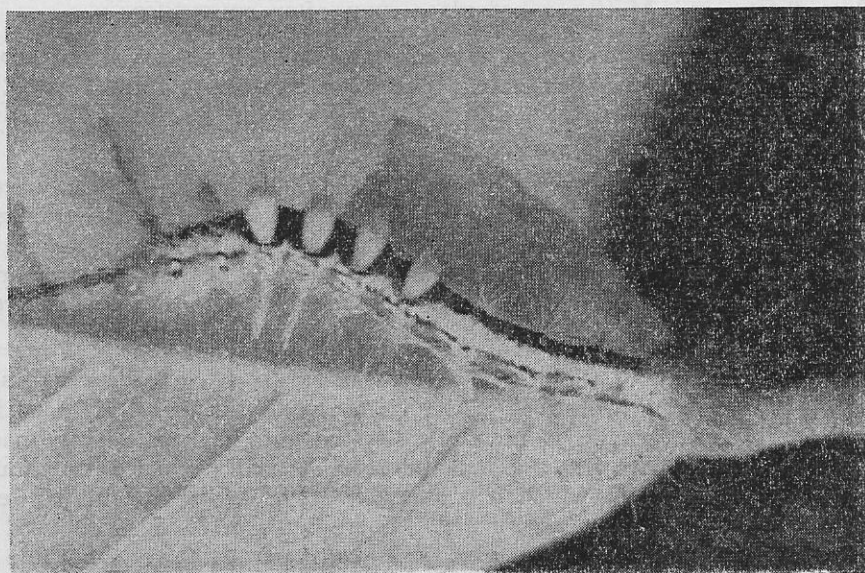


Fig. 2. A fifth-instar larva feeding on a cacao leaf.

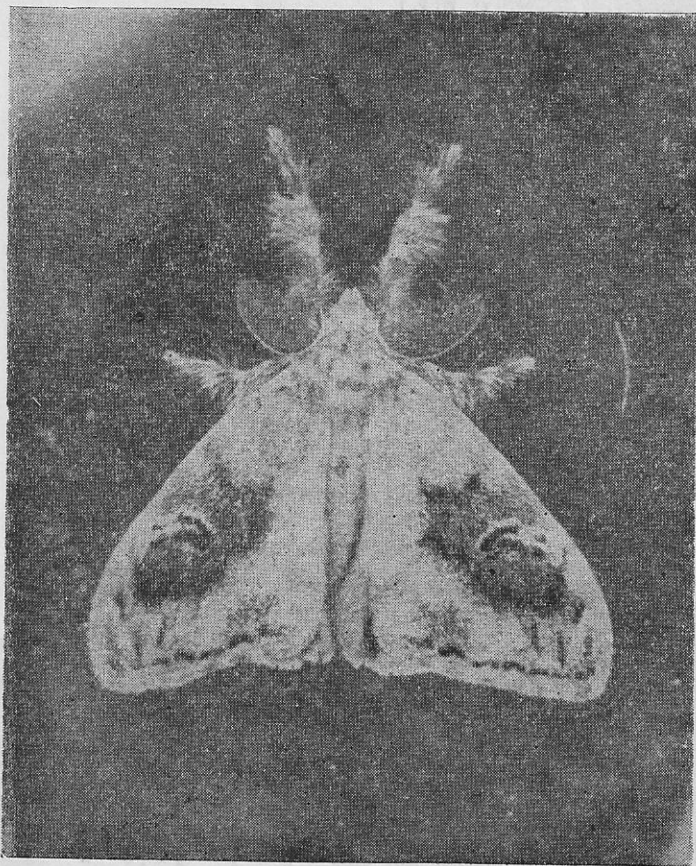


Fig. 3. A winged male of *Orgyia australis postica*.

#### DISTRIBUTION

In addition to the Philippines, *O. australis postica* was noted to occur in the following areas: Sikkim, Nepal, Ceylon, Burma, Borneo, Java, New Guinea, and Formosa. The insect may be more widely distributed than is presently known.

#### HOST PLANTS

The cacao tussock moth is polyphagous and has been recorded as feeding on the following plants: cacao, *Theobroma cacao*; coffee, *Coffea* spp.; castor bean, *Ricinus communis*; citrus, *Citrus* spp.; cashew, *Anacardium occidentale*; rubber, *Hevea brasiliensis*; mango, *Mangifera indica*; chico, *Sapodilla*; ground nut (peanut), *Arachis hypogaeae*.

#### NATURAL ENEMIES

This phase of the study is presently being conducted. Nevertheless a virus disease of the nuclear polyhedrosis type definitely affects the insect and causes great reduction in the population.

#### REFERENCE

Hampson G.F. 1892. Moths. Fauna of British India including Ceylon and Burma, 436 p.