QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES
DIVISION OF PLANT INDUSTRY BULLETIN No. 576

DISTINCTION BETWEEN EGGS AND PUPAE OF ONCOPERA BRACHYPHYLLA TURNER AND ONCOPERA MITOCERA (TURNER)

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SUMMARY

The eggs and pupae of **Oncopera brachyphylla** Turner and **O. mitocera** (Turner) are described and criteria are provided for the separation of the eggs and pupae of the two species.

Pupal sex differences are described for each species.

I. INTRODUCTION

The important features of the larvae, prepupae and adults of both *Oncopera brachyphylla* Turner and *O. mitocera* (Turner) have been detailed and criteria for distinguishing them in field studies have been given (Elder 1970*a*, *b*). The eggs and pupae of these two species are now treated in a similar manner.

The eggs of *O. mitocera* were first mentioned by Dodd (1921), who stated they were creamy-yellow in colour and laid in strings when a female is held tightly between the fingers. The eggs of *O. brachyphylla* have never been described.

Pupae of both *O. mitocera* and *O. brachyphylla* have been briefly described as brown to yellow in colour, cylindrical in shape with a darker and harder roughened head, approximately 2·5 cm long and each abdominal segment with two hardened transverse ridges of saw-like teeth (Dodd 1921; Elder 1965).

II. COLLECTION AND EXAMINATION OF MATERIAL

Eggs.—For these studies eggs of each species were obtained from moths collected in the field or reared from field-collected pupae. They were held in a suitably moist atmosphere on wet filter paper in petri dishes (Elder 1970*c*). Detailed examinations were made with a stereoscopic microscope and measurements were made with an eyepiece micrometer.

Pupae.—Field-collected pupae of each species were provisionally separated as sexes on morphological differences on the last four abdominal segments. The pupae were then placed singly in vertical holes in a bedding of moist fine wood shavings in trays, and covered with about 1 cm of the moist bedding material. They were held at room temperature, and the emerging adults were immediately recorded as species and the sexes confirmed.

Additional pupal material from a number of locations on the Northern Tablelands was fixed in Carnoy's fluid and stored in 70% alcohol. Each pupa later was surface-dried, weighed and measured immediately after being taken from the alcohol. The adecticous obtect pupae were examined in detail and measured by means of the stereoscopic microscope.

III. DESCRIPTIONS

(a) Eggs

The eggs of both *O. brachyphylla* and *O. mitocera* are laid singly; only rarely are two adhering together.

Each egg of *O. brachyphylla* is spheroidal in shape, creamy-yellow in colour, turning black within 3-4 hr after oviposition. The surface is ribbed, the ribs extending for the complete length of the egg (Figure 1). Measurements are given in Table 1.

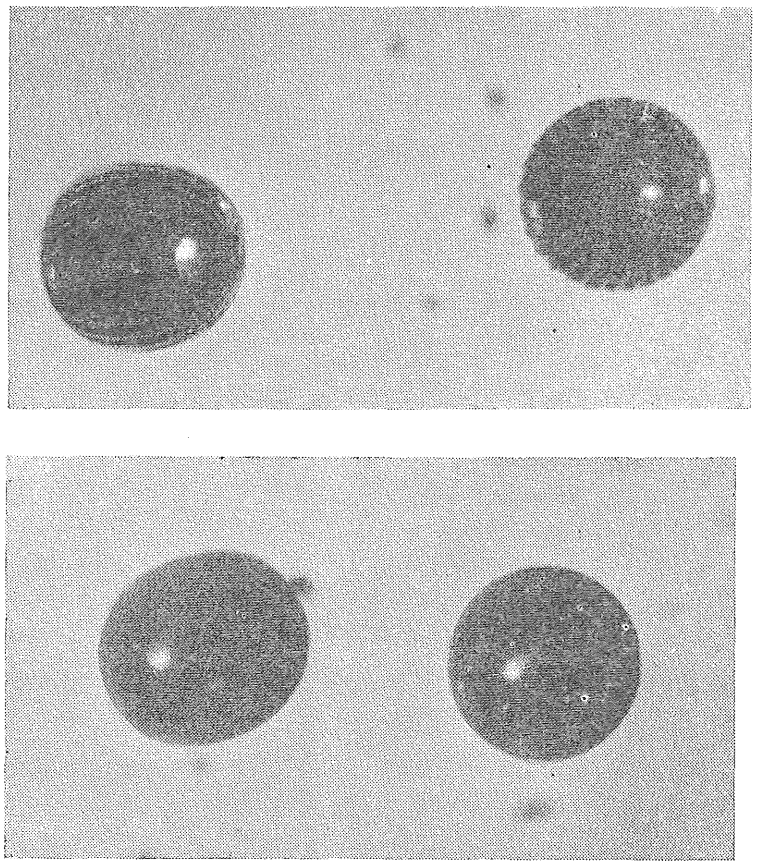

Fig. 1.—Eggs of *Oncopera* species. Top, *O. brachyphylla*. Lower, *O. mitocera*.

The egg of *O. mitocera* is also spheroidal, creamy-yellow in colour and turning black within 3-4 hr after oviposition. Ribs, however, are absent and the surface is smooth (Figure 1). Measurements are given in Table 1.

At hatching, the eggs of both species fracture along irregular lines lengthwise on the egg.

(b) Pupae

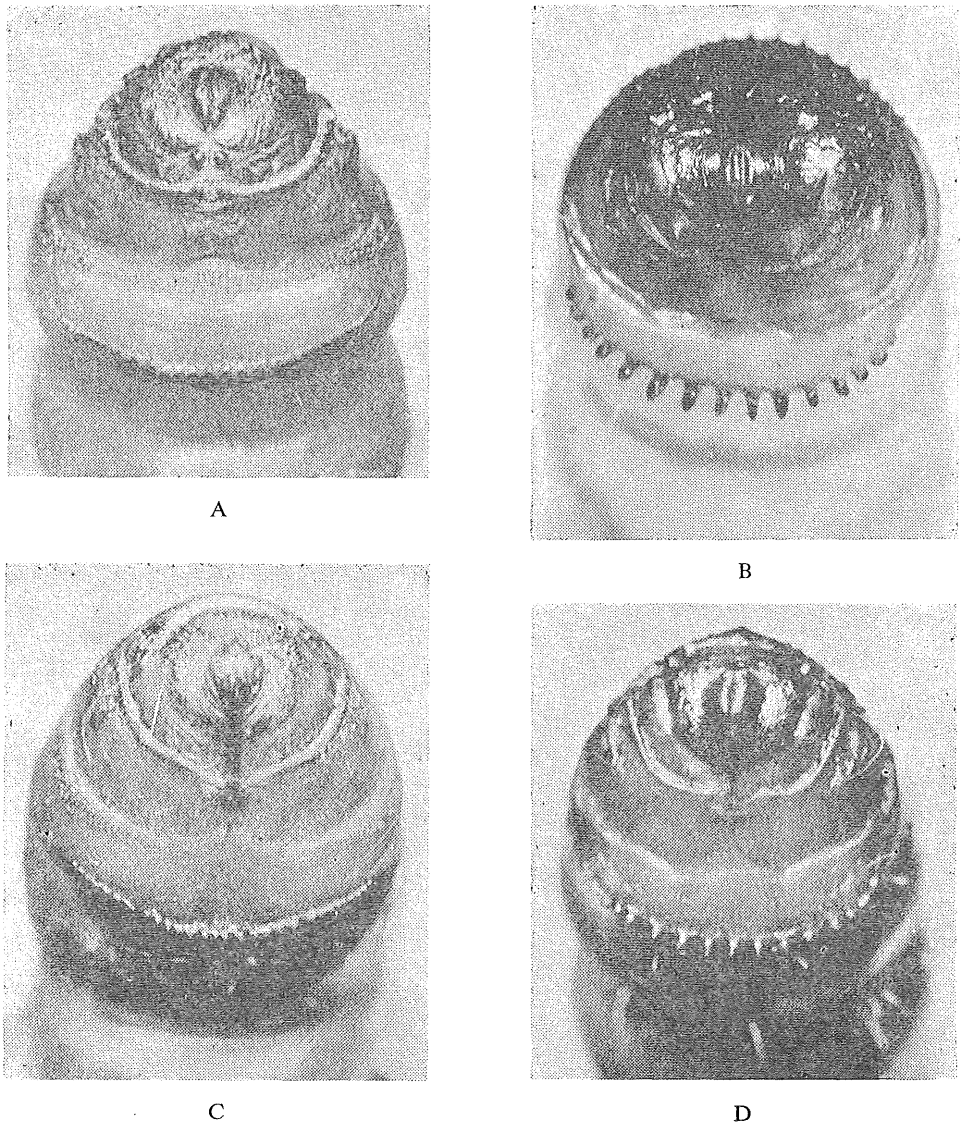

Fig. 2.—Pupae of *Oncopera* species, showing spines on the ventral ridge of the seventb abdominal segment, and genital aperture. A, *O. mitocera,* male. B, *O. brachyphylla,* male. C, *O. mitocera,* female. D, *O. brachyphylla,* female.

O. brachyphylla—Female (Fig. 2D)

Pupa incomplete, adecticous obtect with abdominal segments 2 to 6 movable and 7 to 10 fused but movable as a unit. A large ventral transverse spined ridge on segment 7 with paired semicircular ridges on segments 4 and 5, poorly developed on segment 6. A dorsal row of small spines on segment 2 with two rows on segments 3 to 9. A large longitudinal armed projection anteriorly on the head with another relatively large projection ventrally midway between the eyes. The anal slit-like "scar" ventrally on segment 10 almost continuous with the genital slit on segment 9 and extends partially on segment 8. A cremaster is not present.

O. brachyphylla—Male (Fig. 2B)

Pupa similar to that of the female except that the genital slit is confined to segment 9, with two small hemispherical protuberances separated by the slit.

O. mitocera—Female (Fig. 2C)

Pupa incomplete, adecticous obtect with abdominal segments 2 to 6 movable and 7 to 10 fused but movable as a unit. A large ventral transverse spined ridge on segment 7 with paired slightly curved ridges on segments 4, 5 and 6. A dorsal row of small spines on segment 2 with two rows on segments 3 to 9. A large longitudinal armed projection anteriorly on the head with an insignificant projection ventrally midway between the eyes. The anal slit-like "scar" ventrally on segment 10 almost continuous with the genital slit on segment 9 and extends partially on segment 8. A cremaster is not present.

O. mitocera—Male (Fig. 2A)

Pupa similar to that of the female except that the genital slit is on segment 9 only, with two small hemispherical protuberances separated by the slit.

The female pupae of *O. brachyphylla* can be readily distinguished from those of the male on the basis of genital aperture differences. The main difference is the presence of two small hemispherical protuberances on the ninth abdominal segment ventral to the anus in the male (Figure 2, B) and the absence of these in the female (Figure 2, D).

A sex difference also occurs in respect of pupal weight and eye shape and size. The females on mean weight are much heavier than the males. Data are given in Table 2.

The eyes of the males are much more convex than those of the females and the mean eye diameter of the males is slightly greater than that of the females. Details are given in Table 2.

As with *O. brachyphylla,* the male and female pupae of *O. mitocera* can be distinguished from each other by the presence (Figure 2, A) and absence (Figure 2, C) respectively of two small hemispherical protuberances ventrally on the ninth abdominal segment.

TABLE 1

EGG MEASUREMENTS OF *O. brachyphylla* AND *O. mitocera*

Species	Length (mm)			Width (mm)		
	Mean	SD*	SE*	Mean	SD*	SE*
O. brachyphylla	0·576	0·029	0·009	0·516	0·025	0·008
O. mitocera	0·549	0·018	0·006	0·482	0·017	0·005

* SD = Standard deviation * SE = Standard error of mean

TABLE 2

O. mitocera AND *O. brachyphylla* MALE AND FEMALE PUPAL WEIGHTS AND EYE DIAMETERS

Sex*	*O. brachyphylla*			*O. mitocera*		
	Eye Diameter (mm)			Eye Diameter (mm)		
	Mean	S.D.	S.E. of Mean	Mean	S.D.	S.E. of Mean
Female (29) (8)	2·149	0·069	0·013	2·450	0·218	0·024
Male (36) (11)	2·345	0·172	0·029	2·499	0·238	0·072
	Weight (g)			Weight (g)		
	Mean	S.D.	S.E. of Mean	Mean	S.D.	S.E. of Mean
Female (40) (8)	0·459	0·077	0·002	0·536	0·031	0·011
Male (51) (14)	0·274	0·035	0·005	0·412	0·046	0·012

* The numbers in parentheses represent the numbers of *O. brachyphylla* and *O. mitocera* specimens respectively.

With *O. mitocera* also the female pupae show a mean weight greater than that of the males. The eyes of the male are the more convex but the eye mean diameter shows little difference between the sexes. Data on weights and eye diameters are given in Table 2.

The sex difference in eye size in this species is greater in the moths than in the pupae.

IV. SEPARATION OF THE SPECIES

Eggs.—The ribbed eggs of *O. brachyphylla* are readily separated from those of *O. mitocera.*

Pupae.—For both sexes of *O. brachyphylla* the spines on the ventral ridge of the seventh abdominal segment are approximately 0·28 mm in length, whereas in both sexes of *O. mitocera* the spines are slightly less than half of this length, approximately 0·13 mm. Furthermore, these spines in *O. brachyphylla* are spaced wider apart than in *O. mitocera.*

V. COMPARISONS WITH OTHER SPECIES

The eggs of some other species of *Oncopera* have been described, namely *O. fasciculata* (Walker) in South Australia (Madge 1954), and *O. intricata* Walker and *O. rufobrunnea* Tindale in Tasmania (Martyn 1960). The eggs of each of these species, like those of *O. mitocera,* are smooth. Another species, *O. tindalei* Common, from New South Wales is also stated to have a smooth egg. *O. alboguttata* Tindale, also from New South Wales, however, like *O. brachyphylla* has a ribbed egg (R. J. Roberts, personal communication).

Eggs of *O. parva* Tindale, a species occuring on the tropical lowlands of north Queensland, are like those of the species on the Tablelands in being laid singly, spheroidal in shape, creamy-yellow in colour and turning black in 3-4 hr after

oviposition. They are, however, like those of *O. brachyphylla* in being ribbed. Measurements of eggs of *O. parva* after storage for 3 months in 70% alcohol were as follows.

Length (mm)			*Width* (mm)		
Mean	SD	SE	Mean	SD	SE
0·598	0·013	0·004	0·542	0·009	0·003

The pupae of *O. parva* are again similar to those of *O. brachyphylla* in size and spacing of the spines on the ridge of the ventral surface of the seventh abdominal segment. Pupae of the two species should not be mistaken if the collection locality is known, because they have no common areas of occurrence (Elder 1969).

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(Received for publication January 7, 1971)

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