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【Research report】

臺灣三種天蛾(鱗翅目：天蛾科)幼蟲之形態與生活史【研究報告】

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Abstract

The biology, morphology, and host plants are reported for larvae of three sphingid moths: Pentateucha inouei Owada et Brechlin, Parum colligata (Walker), and Marumba sperchius Menentries. The position of Pentateucha Swinhoe in the Sphingidae is also postulated according to the larval host plant.

摘要

本文描述臺灣三種天蛾包括絨毛天蛾 (Pentateucha inouei Owada et Brechlin)，構月天蛾 (Parum colligata (Walker))，及粟六點天蛾 (Marumba sperchius Menentries.) 等幼蟲之形態與生活史。並依據幼蟲取食之寄主植物提出絨毛天蛾屬 (Pentateucha Swinhoe) 在天蛾科之分類位置。

Key words: Sphingidae, larva, biology, host plant.
關鍵詞: 天蛾、幼蟲、生活史、寄主植物

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Larval Morphology and Life History of Three Sphingid Moths (Lepidoptera: Sphingidae) of Taiwan

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ABSTRACT

The biology, morphology, and host plants are reported for larvae of three sphingid moths: *Pentateucha inouei* Owada et Brechlin, *Parum colligata* (Walker), and *Marumba sperchius* Menentries. The position of *Pentateucha* Swinhoe in the Sphingidae is also postulated according to the larval host plant.

Key words: Sphingidae, larva, biology, host plant.

Introduction

Five species of sphingid moths including *Oxyambulyx ochracea* (Butler), *O. liturata* (Butler), *O. schauffelbergeri* (Bremer et Grey), *Marumba sperchius* Menentries, and *Phyllosphonigia dissimilis dissimilis* Bremer, injurious to walnut trees were reported from China by Wang (1991). Larva of *Hyloicus crassistriga* Rothschild & Jordan was reported by Torikura (1994). Zhu and Wang (1997) reported 187 species belonging to 54 genera of sphigid moths in China, with 21 species in the egg stage, 45 species in the larval stage, 41 species of pupal stage, and 187 species in the adult stage being described. Larvae and host plants of eight species of sphingid moths, including *Langia zenzeroides formaosana* Clark, *Phyllosphingia dissimilis hoenei* Clark, *Dolbina inexacta* Staudinger, *Daphnis nerii* L., *Pergesa actea* (Cramer), *Acherontia lachesis* (Fabricius), *Theretra oldenlandiae* (Fabricius), and *Theretra latrelleri lucasii* (Walker) in Taiwan were reported by Lin (1997). The host plant of *Macroglossum heliophila* Boisduval was reported by Tominaga (1998). Larvae and host plants of eight species of sphingid moths, including *Macroglossum passalus* (Drury), *M. troglodytus* Boisduval, *M. corythus* Walker, *M. heliophila* Boisduval, *M. poecilum* Rothschild & Jordan, *M. mediovitta* Rothschild & Jordan, *Hippotion celerio* (L.), and *Cephonodes xanthus* Rothschild & Jordan from Okinawa were reported by Tanahara (1998a, b, c) and Tanahara & Tanahara (1999).

The sphingid genus *Pentateucha* Swinhoe was revised by Kitching *et al*. (1997). *P. curiosa* Swinhoe is distributed from eastern Nepal, northeastern India, northern Thailand and northern Vietnam. *P. stueningi* Owada et Kitching is found in southeastern China, and *P. inouei* Owada et Brechlin is distributed in Taiwan. The immature stages of this genus and its

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position in the Sphingidae are not known. In this paper, the biology, morphology, and host plants of larvae of 4 species of sphingid moths are reported, and the position of *Pentateucha* in the Sphingidae is also postulated.

Materials and Methods

Females of *Pentateucha inouei* Owada et Brechlin were collected from Sungkong, Nantou County on 11 March 1999 with UV light. Females of *Parum colligata* (Walker) were collected in Nansanchi, Nantou on 17 Arpil 1999 with mercury light. Females of *Marumba sperchius* Menentries were collected at Chunyang Nantou on 10 March 1999, and at Nansanchi, Nantou 16 on April 1999. Methods for the study of the morphology and biology of the insects are described by Lin (1997). All rearing was carried out in the laboratory (room temperature about 20-26℃).

Results

Pentateucha inouei Owada et Brechlin (Figs. 1 A- D, 2 A, B, 3 A)

Egg: Laid singly; oval, 2× 1.1 mm, green, turning blackish green before hatching; hatching in 11-12 days.

Larva: First instar larva (L1) with head and body pale yellow, 5 mm in length, body with small scoli, setae golden yellow, lateral with upper spiracular line brown. Horn 0.75 mm in length, brown with numerous golden-yellow setae, basally with yellow-brown ring. Tenth abdominal segment green. Head width 0.9 mm, thorax width 0.8 mm, and abdomen about 0.7 mm; lasting 7 days. Intermediate instar larvae (L2-L5) with head and body pale green, 6.5 -35 mm in length, body covered with black setae, upper spiracular line green, dorsal line dark green, horn 2-6 mm in length, violet. The last instar larva (L6) head dark green, face with two white lines. Dorsal line black, upper spiracular line pale green, spiracle red. Body length about 40 mm, horn 6 mm. Hatching to prepupa about 41 days, prepupa to pupa 10 days.

Pupa: Fuscous, rough and rugose, not glossy, tapering anteriorly. Overwinters as pupa, with adult eclosion the next spring from January to April.

Distribution: Forests from lowlands at about 210 m to high elevations about 2650 m in Taiwan.

Food: Leaves of *Ilex formosana* Maxin (Aguifoliaceae).

Remarks: Hampson (1910) placed *Pentateucha* as the last genus of the Indian Sphinginae after *Apocalypsis*. Bell and Scott (1937) adopted the system of Rothschild & Jordan (1903), and placed *Pentateucha* between *Apocalypsis* and *Pseudodolbina* Rothschild (1894), a position that has been followed ever since. According to Lin (1999), the larval food plants of *Pseudodolbina* are Acanthaceae, the larval food plants of *Dolba* include Sapotaceae, Myricaceae, Annoraceae, and Aquifoliaceae. The larval food plants of *Apocalypsis* include Salicaeae, Solanceae, Tilliaceae, and Salicaceae. *Pentateucha* probably evolved from the parent polyphagous stock (*Dolba*). By some isolating mechanism, it became a restricted feeder. According to larval food plants of *Pentateucha inouei,* the position of *Pentateucha* in the Sphingidae is postulated between *Dolba* and *Apocalypsis*.

Parum colligata (Walker) (Figs. 1 E-H, 2C, 3 C, D)

Egg: Laid singly in masses, oval 1.6 x 1,3 mm, milky white, turning to yellow green before hatching, chorion not eaten; hatching in 6 days.

Larva: First instar larva (L1) head pale yellow, body whitish green, body length 3.75 mm, horn black 1.2 mm, lasting 3 days. Intermediate instar larvae (L2-L5) head and body pale green to yellow green and granulated, head triangular, face with 2 whitish lines, body lateral with

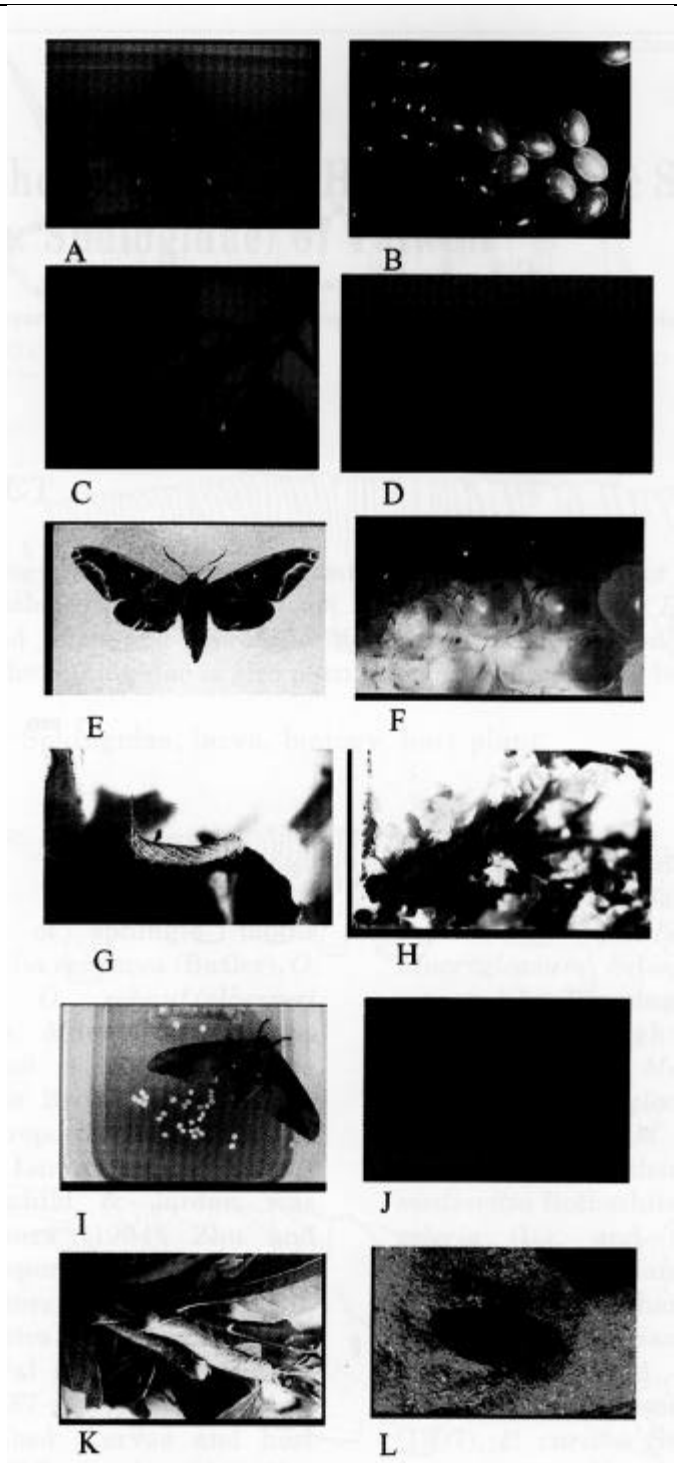

Fig. 1. A. Adult of *Pentateucha inouei* Owada et Brechlin; B. Eggs of *Pentateucha inouei* Owada et Brechlin; C. Larva of *Pentateucha inouei* Owada et Brechlin; D. Pupa of *Pentateucha inouei* Owada et Brechlin; E. Adult of *Parum colligata* (Walker); F. Eggs of *Parum colligata* (Walker).

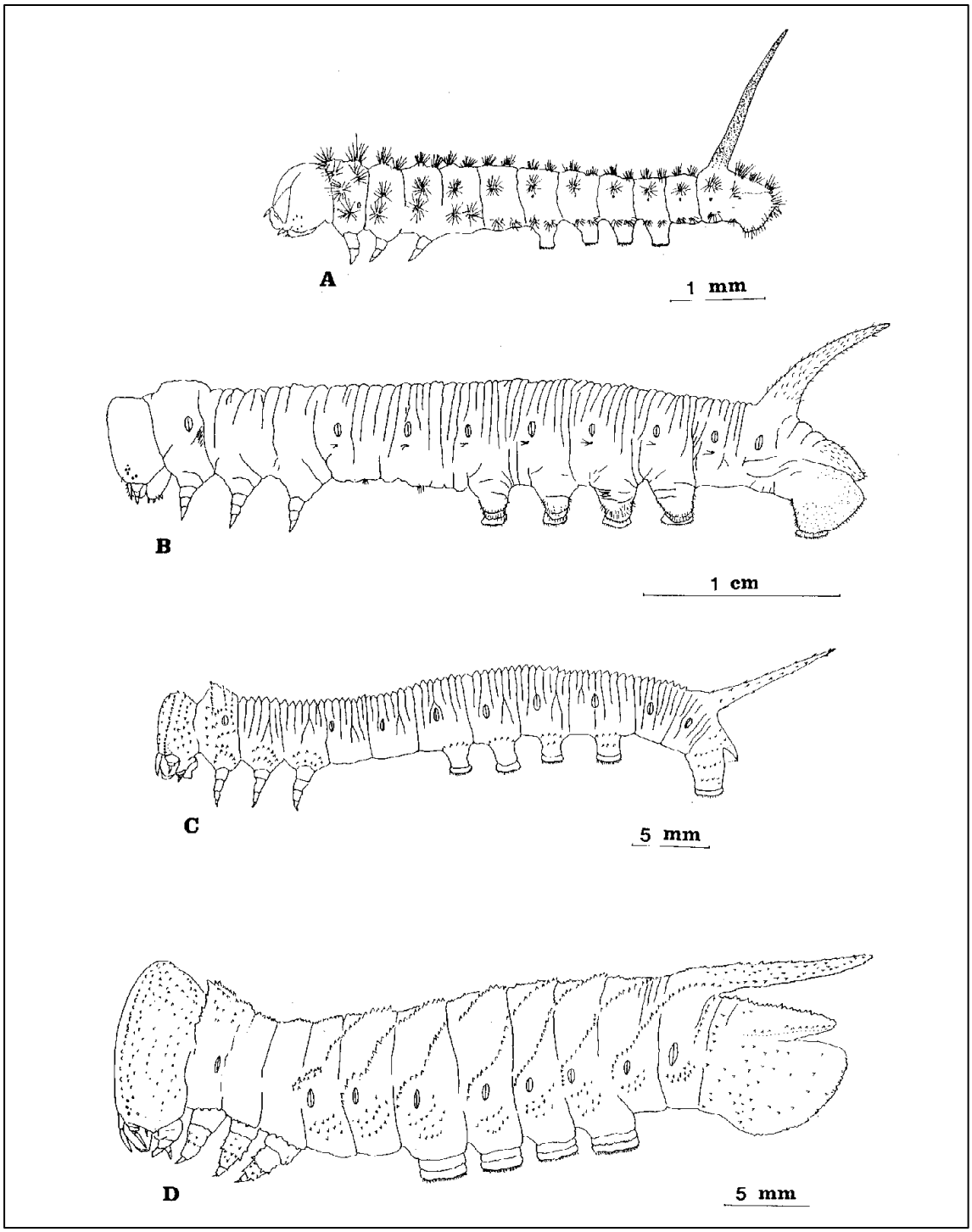

Fig. 2. A. Lateral view of first instar larva of *Pentateucha inouei* Owada et Brechlin; B. Lateral view of last instar larva of *Pentateucha inouei* Owada et Brechlin; C. Lateral view of larva of *Parum colligata* (Walker); D. Lateral view of larva of *Marumba sperchius* Menentries

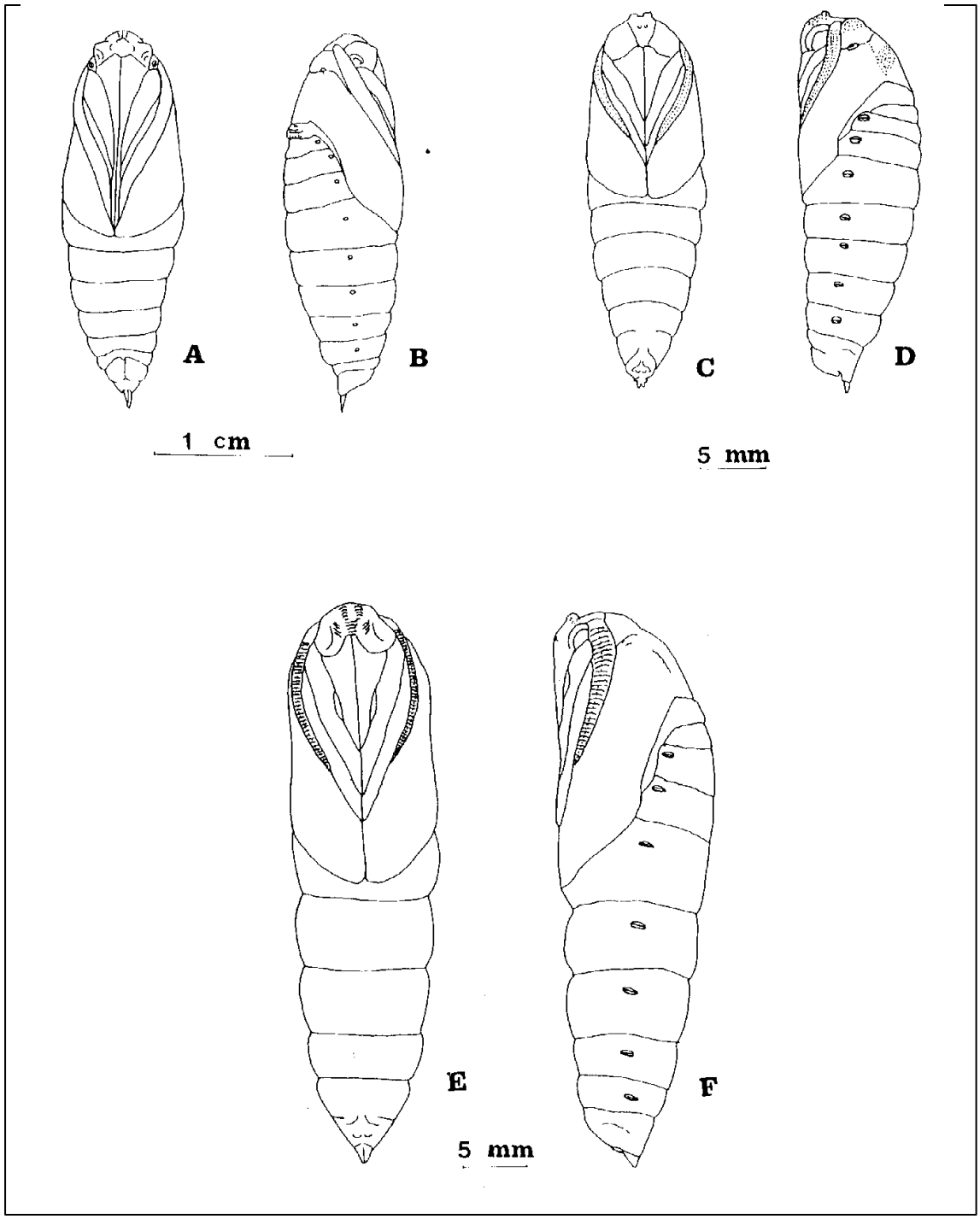

Fig. 3. A. Ventral view of pupa of *Pentateucha inouei* Owada et Brechlin; B. Lateral view of pupa of *Pentateucha inouei* Owada et Brechlin; C. Ventral view of pupa of *Parum colligata* (Walker); D. Lateral view of pupa of *Parum colligata* (Walker); E. Ventral view of pupa of *Marumba sperchius* Menentries; F. Lateral view of pupa of *Marumba sperchius* Menentries

oblique whitish line, body length 15-48 mm, horn 3-8 mm. Last instar larvae (L6) head whitish green, with 2 white lines, body whitish green with whitish granulation, lateral with white oblique line, dorso-central with violet red line, body length 50mm, horn black, 10 mm. Hatching to prepupa 27 days, prepupa to pupa 4 days.

Pupa: Brown, rough and rugose, not glossy, anterior blunt. Adult eclosion after 12 days.

Distribution: Forests from lowlands to moderate elevation in Taiwan, also mainland China, Japan, Cambodia to India and Sri Land.

Food: Leaves of *Broussonetia papyrifera* (L.) (Moraceae).

Marumba sperchius Menentries (Figs. 1 I-L, 1 D, 2 E, F)

Egg: Laid singly, oval 1.8×1.5 mm, pale yellow and turning greenish brown before hatching, chorion not eaten; hatching in 7-9 days.

Larva: First instar larvae (L1) with head and body pale yellow, 5 mm in length, horn pink, about 1 mm; lasting about 4 days. Second instar larvae (L2), head and body green with many yellowish, tiny granules, head with violet protrusion, about 1 mm long, body length 18 mm, horn about 4 mm, violet red with terminal 1/4 yellow, lasting 4 days. Third instar larvae (L3), head and body green, head with red, pointed protrusion about 2 mm, body length about 26 m, horn dark green, about 5 mm, lasting 7 days. Fourth instar larvae (L4) head and body green, head with violet red protrusion, about 2 mm, body length about 28-30 mm, horn brown, 8 mm, body lateral with oblique yellow band, lasting 5 days. Fifth instar larvae (L5) head and body green, lateral with oblique white lines, head triangular, with short blackish red horn, body length 36 mm, horn 8 mm, blackish red with terminal 1/3 yellow, lasting 7 days. Last instar larvae (L6) head and body green, head triangular with pointed protrusion; face yellow whitish. First and 5th abdominal segments lateral with oblique white line, the other abdominal segments lateral with gray line, body length 72 mm, horn 12 mm. Body dorsal pink before pupation, lasting 13 days. Hatching to pupa 47 days, prepupa to pupa 8 days.

Pupa: Fuscous, frontal area porrected, clypeal basis with pointed processes, ventral abdomen glossy, dorsal moderate rugose, tapering anteriorly. Overwinters as pupa, with adult eclosion the next spring from January to April.

Distribution: Forests from lowlands to high elevations in Taiwan, also mainland China, Japan, Korea, to India.

Food: Leaves of *Cyclobalanopsis glauca* (Thunb. Ex Murry) Oerst. (Fagaceae).

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臺灣三種天蛾(鱗翅目：天蛾科)幼蟲之形態與生活史

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摘　要

本文描述臺灣三種天蛾包括絨毛天蛾 (*Pentateucha inouei* Owada et Brechlin)**，構月天蛾** (*Parum colligata* (Walker))**，及粟六點天蛾** (*Marumba sperchius* Menentries.) **等幼蟲之形態與生活史。並依據幼蟲取食之寄主植物提出絨毛天蛾屬** (*Pentateucha* Swinhoe) **在天蛾科之分類位置。**

關鍵詞：天蛾、幼蟲、生活史、寄主植物。