
Biology and Host Plants of *Hippotion celerio* (L.) (Lepidoptera: Sphingidae)

R. Jeenkoed, S. Bumroongsook* and S. Tigvattananont

Department of Plant Production Technology, Faculty of Agricultural Technology, King Mongkut 's Institute of Technology Ladkrabang, Bangkok 10520, Thailand

R. Jeenkoed, S. Bumroongsook, and S. Tigvattananont. (2016). Biology and host plants of *Hippotion celerio* (L.)(Lepidoptera: Sphingidae). International Journal of Agricultural Technology 12(7.2):2089-2094.

Hippotion celerio(L.) were collected and reared with *Pisonia grandis* under laboratory conditions. Mating occurred at night and each female laid egg singly with an average of 144-155 eggs underneath the leaves of host plants. The egg incubation period lasted for 3.12 ± 0.16 days. The caterpillar hatched after that. They went through the complete metamorphosis with 5 larval instars and 5 moults. The developmental time for the 1st to the 5th larval instar was 3.46 ± 0.48 , 2.94 ± 0.41 , 2.90 ± 0.50 , 3.96 ± 0.66 and 6.92 ± 1.19 days, respectively. The mean head capsule width for instar 1-5 was 0.62 ± 0.02 , 1.03 ± 0.05 , 1.58 ± 0.08 , 2.40 ± 0.11 and 3.50 ± 0.16 mm, respectively. The larval caudal horn length in mm was 2.27 ± 0.20 , 3.77 ± 0.45 , 5.80 ± 0.65 , 8.19 ± 0.88 and 8.80 ± 0.72 , respectively. The larvae are voracious leaf feeder. This hawk moth species is a polyphagus insects. Their host plants were *Pisonia grandis*, *Boerhavia diffusa*, *Mirabilis jalapa* and one unknown species belonged to Araceae.

Keywords: *Hippotion celerio* (L.), host plant, *Pisonia grandis*, Sphingidae

Introduction

The taro hawkmoth is a moth in the family Sphingidae subfamily Macroglossinae. of Lepidoptera. The scientific name of this moth is *Hippotion celerio* (L.) and was formerly called the *Sphinx celerio*. This species was set up in 1758 by Carl Linnaeus. Moth's larvae mostly eat leaves of ornamental plant such as Fancy leaved caladium, Taro, spread hog weed, four o'clock, lettuce tree and ect. The larvae are very destructive like *H. velox* (F.) on lettuce tree. The taro moth was found less common than *H. velox*. The documentary research was found little knowledge on this hawk moth especially the biology and ecology. Therefore, this research will provide information to conduct management of the hawk moth.

* **Coressponding Author:** S. Bumroongsook **E-mail:** suvarin.bu@kmitl.ac.th

Objectives: to study external morphology, life history and host plants of *H.celerio*

Materials and methods

Silver-striped hawk moth population were collected from spread hog weed and other host plants in Bangkok metropolitan areas. The larval host plants was identified and recorded. The hawk moth larvae were placed in plastic boxes for further studies under the laboratory conditions. Both newly emerged male and female of these hawk moths were led to mate in the plexiglass box(40x60x40 cm) with a 3% solution of honey in a glass dish 9 cm in diameter. A young seedling of host plant was placed inside the cage for female egg deposition. These eggs were collected daily and placed in a petri dish singly. Color change of eggs was observed and recorded. When the egg hatched, the larva was fed with spread hog weed leaves till it underwent a pupa stage. Body length and head capsule width of different larval instars were measured. Morphological features of these larva were observed and recorded. As it turned to an adult, the length and width of wings was measured and photographed including frenulum and fantail character to separate male and female of this insect species.

Results

Larval host Plants

From the survey of larval host plant in Saraburi, Nonthaburi, Chaiyaphum, Ranong and Bangkok, the results showed that their host plant belonged to 12 species in 3 families(Table1)

Growth and development of silver-striped hawk moth

Hippotion celerio was known as the taro hawkmoth, vine hawk-moth or silver-striped hawk-moth. The detail of developmental time for the caterpillar including body length and head capsule width was described in Table 2. An adult female laid eggs singly on its host plants. Eggs are small, light green and smooth surface(Fig. 1). General characteristics of 5 larval stages of the hawk moths showed a pair of prominent eyespots and a dorsal horn at the top of the 8th abdominal segment(Fig. 2).

Description of males and females

Description of males: The body is 26.40 mm long with big compound eyes and ciliate antenna(Fig 3). The labial palp covered with green and dark hairs. The proboscis length is 27.90 mm with tibial spur formula 0 – 2 – 4 and tarsal formula 5 – 5 – 5. It has a frenulum on hindwing. It has an opened fantail.

Description of females: The body is 29.73 mm long with a crescent shaped fantail and filiform antenna(Fig.4). The wingspan is 50.80 mm wide, forewing length 25.33 mm and hingwing length 14.45 mm. In general the female is rather larger than the male(Table 3).

Table 1 Larval host plants of *H. celerio* in Thailand

| Plant family | Host plant species | Common name | Vernacular name |
|---------------|---|--------------------------|-----------------|
| Araceae | <i>Caladium bicolor</i> Vent. | Fancy leaved caladium | Bon si |
| | <i>Colocasia esculenta</i> (L.) | Taro | Pheak |
| | <i>Cyrtosperma johnstoni</i> N.E. Br. | - | Wan singhamora |
| | Unidentified sp | - | - |
| Nyctaginaceae | <i>Boerhavia diffusa</i> L. | Spread hog weed | Puk beahin |
| | <i>Mirabilis jalapa</i> L. | Four o'clock | Ban yen |
| | <i>Pisonia grandis</i> R. Br. | Lettuce tree | Saeng chan |
| | <i>Cayratia trifolia</i> (L.) | True verginia creeper | Thao Khan |
| Vitaceae | <i>Cissus quadrangular</i> L. | - | Phet sungkhat |
| | <i>Cissus nodosa</i> Blume | Grape ivy or Javanise | Man Bali |
| | <i>Vitis vinifera</i> L. | Grape vine | Angun |

Table 2. Developmental stages of *H. celerio*

| Growth stage | Duration time (days) | Head capsule width (mm) | Caudal horn length (mm) |
|--------------|----------------------|-------------------------|-------------------------|
| Egg | 3.12±0.16 | | |
| 1st instar | 3.46±0.48 | 0.62±0.02 | 2.27±0.20 |
| 2nd instar | 2.94±0.41 | 1.03±0.05 | 3.77±0.45 |
| 3rd instar | 2.90±0.50 | 1.58±0.08 | 5.80±0.65 |
| 4th instar | 3.96±0.66 | 2.40±0.11 | 8.19±0.88 |
| 5th instar | 6.92±1.19 | 3.50±0.16 | 8.80±0.72 |
| pupa | 10.98±0.62 | | |
| male | 7.60±0.61 | | |
| female | 6.80±0.65 | | |



Figure 1 A spherical egg of silver-striped hawk moth



Figure 2 The dorsal horn on the 8th abdominal segment and a pair of prominent eyespots



Figure 3 A male silver-striped hawk moth



Figure 4 A female silver-striped hawk moth

Table 3 Sizes in mm of both male and female of *H. celerio*

| Length of insect parts | male | female |
|------------------------|-------------|-------------|
| Body | 34.84 ±2.48 | 37.32 ±2.66 |
| Wingspan | 60.92 ±9.65 | 66.04 ±4.56 |
| Forewing | 28.68 ±1.57 | 31.00 ±1.98 |
| Hindwing | 17.44 ±1.10 | 19.12 ±1.05 |
| Antenna | 12.16 ±0.99 | 10.64 ±0.57 |
| Proboscis | 31.28 ±2.28 | 32.48 ±1.53 |

Discussions

There are six species of genus *Hippotion* in Thailand: *Hippotion celerio*, *H.echeclus*, *H. boerhaviae*, *H. rosetta*, *H.rafflesii* and *H. velox* (Inoue *et al.* 1997). They are nocturnal hawk moth and their host plants are in the genus *Caladium*, *Convolvulus*, *Fuchsia*, *Galium*, *Impatien*, *Parthenocissus*, *Boerhavia*, *Rumex* and *Vitis* (Barlow, 1982 ; Inoue, 1997) Besides, they are found to consume plants in the family Leguminosae and Convolvulaceae (Sood *et al.* , 2006). The information indicated that this insect species are the polyphagous insect. The host plant survey on lettuce tree, Four o'clock and spread hog weed and found taro hawk moths and *H. velox* on the same plants. Both of them look very much alike. The morphological difference is found on adults as the pink band on the hind wings of the taro hawk moth and the disguise eyespot of the *H. velox*.

Acknowledgement

The author would like to offer particular thanks to Ms.King Saengsaiko who was responsible for insect rearing and data collection.

References

- Barlow, HS. (1982). An introduction to the moths of South East Asia. Kuala Lumpur.
Inoue, H., Kennett, RD. and Kitching, IJ. (1997). Moths of Thailand, Volume Two – sphingidae. Chok Chai Press, Bangkok.
Sood, R. , Rose, HS. and Pathania, P.C. (2006). Genitalia morphology of some hawk moths (Lepidoptera : Sphingidae : Sphinginae) from northwestern India. Zoos' Print Journal 21(11) : 2447 – 2453.