
***Acherontia styx styx*: The Lesser Death's Head Hawkmoth**

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Lesser death's head hawkmoth (*Acherontia styx styx*) is a sphingid moth in the order Lepidoptera. They are considered one of the important insect pest of the genus *Clerodendrum* in the family Lamiaceae. The lesser death's head hawkmoth or bee robber occurs in the northern and central part of Thailand. The biological observation of this insect was conducted under the laboratory conditions (34 °C; 70% RH) using young leaves of *Clerodendrum* for rearing larval stages. Males and females were fed with 25% of honey solution. The eggs were laid singly on the lower surface of the host plant leaves. Egg incubation period was 3.52±0.36 days. Newly hatched larvae consume their eggshells. They go through 4 molts before pupation. The mean of head capsule width of 1st, 2nd, 3rd, 4th and 5th instar larvae were 0.76±0.04, 1.33±0.05, 2.09±0.07, 3.43±0.14 and 5.96±0.27 mm and corresponding dorsal horn lengths 2.02±0.11, 3.90±0.16, 6.01±0.28, 8.68±0.61 and 9.38±1.02 mm, respectively. The total development time for the larval phase is about 18.53±0.89 days. The length of pupal stage was 14.36±1.27 days. The lifespan of the female lesser death's head hawkmoth is slightly longer than that of the male 13.53±3.54 and 10.00±2.20 days, respectively.

Key words: *Acherontia styx styx*, *Clerodendrum*, larval host plants

Introduction

Acherontia styx styx is found primarily in India and Southeast Asia. It is easily noticeable for skull like marking on its thorax dorsum. The adult is a large moth with dark dull brown forewing and yellow hindwing (Hill, 2008). The larva is large in size and heavy leaf feeders and the outbreak can cause defoliation. *A. styx* is distributed throughout Asia, Jordan, Israel, Mesopotamia and Eastern Arabia (d'Abbrera, 1986; Müller *et al.* 2005; Rittner and Biel, 2017). Cypermethrin, deltamethrin, fenpropathrin, fenvalerate and fluvalinate had poor action against eggs but were effective against newly-hatched larvae.

They are polyphagous which feed more than 100 species of plants in various families such as Labiatae, Bignoniaceae, Verbenaceae, Cucurbitaceae,

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Solanaceae, Myrtaceae, Convolvulaceae, Oleaceae, Leguminosae, Pedaliaceae and others (Robinson *et al.* 2010).

Objective: to study on life history and the larval host plants of the lesser death's head hawkmoth

Materials and methods

Morphological and biological studies

Larvae and eggs of the hawk moths were collected from African tulip tree in Bangkok and its metropolitan area. Then, they were placed in plastic boxes (19×28.5×10 cm). Egg and larva was observed. The egg were all incubated at room temperature(27-35°C) at the entomological laboratory, King Mongkut's Institute of Technology Ladkrabang. The leaves of African tulip tree was provided as food for the caterpillars and 25% of honey solution for adults. Developmental and morphological characteristics of eggs, larvae, pupa and adults of the the lesser death's head hawkmoth were recorded, measured and photographed (n=30).

Larval host plants

Host plants of *A. styx* were investigated by observation in nature and feeding trial. Host plant species was identified and the collection date and places was recorded.

Results and Discussion

Morphological and biological studies of A. styx styx

Egg: Eggs are oval, translucent and yellowish green color usually singly on a host plant leaf (Fig 1). They hatch within one day after they are laid (Table 1).

Larva: Newly hatched larvae to eat all or part of their egg shell. There are 5 larval stages. The developmental time, body length and head capsule width is illustrated in Table 1. The larval size and head capsule width show successive increase each moults. There are 5 forms of the 5th larval instar (Fig. 2-3).

Pupa: Average length is 48.70±5.30 mm; having a dark brown cremaster at the terminal end with 2 cremastral hooks (Fig. 4). A female pupa has genital opening on the ventral side of the 8th abdominal segment and the male has one genital opening on the venter of the 9th abdominal segmen (Fig. 5).

Description of female adult: body length 44.20±2.84 mm, wingspan 98.77±11.73mm, head and compound eyes are black, smoot, filiform antenna

outer black and inner white and curve at the apex, short proboscis with brown color, outer labial palp yellow and inner yellowish brown; skull mark on thorax.



Figure 1. An egg laid singly on a host plant

Table 1. Growth and development of the lesser death's head hawkmoth

Growth stage	Duration time	Body length (mm)	Head capsule width(mm)
egg	0.52±0.36	1.49±0.10	
1 st larval instar	2.26±1.19	8.11±1.82	0.76±0.04
2 nd larval instar	1.99±0.13	13.18±2.41	1.33±0.05
3 rd larval instar	2.08±0.07	21.30±3.62	2.09±0.07
4 th larval instar	2.62±0.04	32.77±7.05	3.43±0.14
5 th larval instar	9.56±0.72	70.27±12.84	5.96±0.27
pupa	14.36±1.27	48.70±5.30	
male	10.00±2.20	42.43±1.98	
female	13.53±3.54	44.20±2.84	



Figure 2 The 5th larval instar(Form A, B, C and D)



Figure 3. Form E of the 5th larval instar



Figure 4. A pupa with dark brown cremaster



Figure 5. Male and female pupa

The forewing color is black, a black spot marking on the middle to the edge; forewing 47.67 ± 4.02 long and 18.73 ± 1.45 mm wide, hindwing 30.70 ± 3.13 mm long and 17.85 ± 1.88 mm wide (Fig.5).

Description of male adult: The male is smaller than the female. In general, the male characteristics is quite similar to the female. Body length is 42.43 ± 1.98 mm, wingspan 90.77 ± 2.67 mm, forewing 41.53 ± 1.31 long and 16.22 ± 0.63 mm wide, hindwing 26.83 ± 0.79 mm long and 14.97 ± 0.96 mm wide (Fig.6).

Larval host plants

There are 18 species in 5 family of larval host plants observed in Thailand which 7 species is in Bigroniaceae, 5 species in family Lamiaceae, 1 species in family Oleaceae, 1 species in family Pedaliaceae and 4 species in family Solanaceae (Table 2). They are polyphagous which feed more than 100 species of plants in various families such as Labiatae, Bignoniaceae, Verbenaceae, Cucurbitaceae, Solanaceae, Myrtaceae, Convolvulaceae, Oleaceae, Leguminosae, Pedaliaceae and others (Robinson *et al.* 2010). Kanaburgi (2011) reared *A. styx* on *Sesamum indicum* and *Clerodendrum phlomidis*. In addition, coexistence between *A. styx* and *Psilogramma increta* was observed due to they both have the same host plants.



Figure 6. An female adult



Figure 7. A male adult

Table 2 Larval host plants of the hawk moth (*A. styx*)

Family/Host plant species	Common name	Vernacular name
Bigroniaceae		
<i>Spathodim campanulata</i>	African tulip tree	Khæ saed
<i>Tabebuia rosea</i>	Rosy trumpet tree	Chomphu phantip
<i>Tecoma stans</i> (L.)	Yellow bells	Thong urai
<i>Millingtonia hortensis</i> L.f.	Indian cork tree	Pip
<i>Dolichandrone serrulata</i> (DC)	-	Khæ na
<i>Pyrostegia venusta</i>	Flame vine	Phuang saet
<i>Podraria ricasoliana</i> (Tanf)	Pink trumpet vine	Happiness
Lamiaceae(=Labiatae)		
<i>Clerodendrum calamitosum</i> L.	-	Ratri sawan
<i>C. chinensi</i> (Osbeck)	-	Nang yaem
<i>C. thomsoniae</i> Balf.f.	Bag flower	Mangkon khap keaw
<i>C. bungei</i> Steud.	Rose Glory bower	Nang yam jin
<i>C. paniculatum</i> L.	Pagoda flower	Phanom sawan
Oleaceae		
<i>Jasminum samabe</i> (L.)	-	Mali la
Pedaliaceae		
<i>Sesamum orientale</i> L.	Sesame	Nga
Solanaceae		
<i>Solanum aculeatissimum</i> Jacq	Cockroach berry	Ma khuea pro
<i>S. melongena</i>	Egg plant	Ma khuae yao
<i>S. torvum</i> Sw	-	Ma khuae phuang
<i>Nicotina tabacum</i> L	-	Ya sup

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