HAWK-MOTHS IN HONG KONG, APRIL 1993, WITH ECOLOGICAL NOTES

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Hong Kong and the New Territories have been much in the news recently because they are due to revert to Chinese rule in 1997 and preparations for this are now underway. The city skyscrapers in Hong Kong are famous. The large tracts of native vegetation, though mostly secondary and greatly affected by man, hold much of interest entomologically, but the existence of these areas is so little known outside the country that it comes as a surprise to many that they exist at all. Some areas have been set aside for nature conservation and it is to be hoped that these will not be adversely affected by the change in administration. During annual leave in Hong Kong in April 1993, we were able to visit some of these areas and see the wildlife they support, including the moths. From 5 to 18 April 1993, we were able to operate a Robinson pattern 125-W mercury vapour light trap on a total of ten nights at five sites within Hong Kong Island and the New Territories. We recorded a great many species of moths and representative specimens were collected, most of which will need to be set and even dissected before they can be identified. Anticipating that this will take some time, this paper concentrates on the hawk-moths (Sphingidae) that we encountered.

The hawk-moths of Hong Kong were reviewed recently by Tennent (1992) who light-trapped in Hong Kong over a period of 18 months from June 1989 to November 1990, recording 63 species. We are able to contribute the following additional records. In addition to light-trapping, we made brief searches for eggs and larvae. A total of 16 species of hawk-moths was recorded during our visit and one new species is added to the list published by Tennent. Hawk-moths were recorded from sites additional to those covered by Tennent, including the mangrove swamps at Mai Po and coastal scrub-land at Long Harbour in the New Territories. During our visit we met up with Mr Kent Li who joined us for visits to Mai Po and the woodland at Tai Po Kau. Kent has a mercury vapour light but no light trap. Since 1986 he has paid a number of visits to outdoor lights in various locations in the New Territories and has found and reared the early stages of a number of species. Drawing on this experience he has kindly provided background material on the species we encountered and this is included here.

REPULSE BAY, HONG KONG ISLAND

Our initial base on arrival in Hong Kong was a thirteenth-storey apartment in a tower block overlooking Repulse Bay and backing on to a hill-side covered in native scrub. The hill-side rose above the tower block and the vegetation was within 100 m horizontally from the balcony of our apartment. The Robinson light trap was operated on the balcony all night on the nights of 8 and 9 April. A number of different moth species were seen amongst the scrub during day-time walks but only four moths reached the light trap. These included a noctuid and a pyralid on 8 April and a geometrid and a pyralid on 9 April. No hawk-moths were seen and no moths at all on 7 April which was cool, wet and windy.

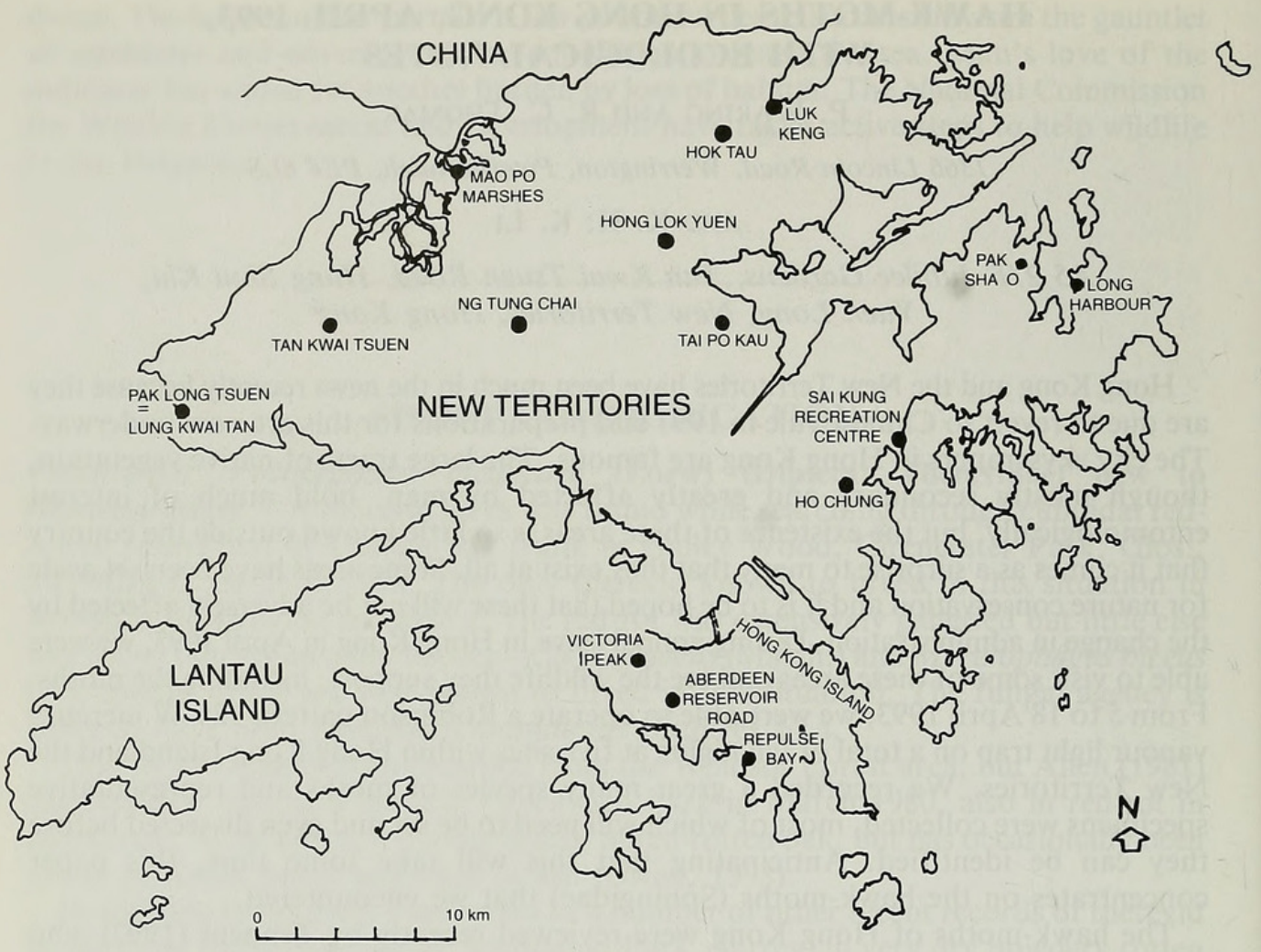

Fig. 1. Map of Hong Kong and the New Territories.

Tai Po Kau Special Area, New Territories

On the nights of 10 and 18 April the light trap was operated from dusk onwards in the woodland at Tai Po Kau (Fig. 2). This is widely considered the most well-developed and species-rich woodland in Hong Kong in terms of native trees and shrubs (Thrower, 1984) and is designated a Special Conservation Area by the Government of Hong Kong. Even this woodland is not primary forest however. The woodland has a long history of management and large areas of the original tropical broad-leaved woodland, dominated by oaks and laurels, were cleared and planted with crops of South China pine, *Pinus massoniana* Lam., *Eucalyptus* and other introduced species in the 1940s and 1950s. The conifers have largely failed and native broad-leaved trees have grown up in their shelter in the meantime, some reaching in excess of 10 m in height. On both visits the light trap was operated in an area cleared as a picnic site among the trees, about 100 m from the guard post at the entrance to the reserve. The weather was mild and calm on both nights and moths began to arrive as soon as darkness fell—about 19.15 hrs. There was greatest moth activity between dusk and 21.00 hrs after which there was a noticeable decrease in the rate at which new individuals arrived at the trap. On the first night we packed up at 22.00 hrs, by which time activity had dropped to a low ebb. On the second night we continued until 22.30 hrs, at which time few moths were arriving, although new species were still being added. A total of 33 individuals of five species of hawk-moths were recorded at the trap. The numbers of each species are shown in the accompanying Table.

Fig. 2. Light trap in woodlands at Tai Po Kau, New Territories.

Mike Bascombe's garden, Hong Lok Yuen, New Territories

The light trap was only operated here on the night of 10 April. We set the trap up at 22.15 hrs after returning from our first trapping session at nearby Tai Po Kau. The trap was operated till dawn and in the morning contained about 30 moths, mostly pyralids, but including two hawk-moths. The garden was one of a large number on a compound laid out much like a western housing estate. The gardens contain a mixture of grass lawns, herbaceous plants, shrubs and trees of a range of native and introduced species. The gardens were predominantly open and heavily managed. Mike's garden contained a large specimen of the white orchid tree *Michelia alba* de Candolle which probably originates from Malaysia but is now widely cultivated in private gardens in Hong Kong.

Wardhaven Bungalow, East Arm, Long Harbour, Sai Kung Country Park, New Territories

From 13 April to the morning of 16 April we stayed at Wardhaven, a private bay with a single bungalow and boat house on the coast, at the foot of a hillside largely denuded of trees and shrubs but with a selection of both in the compound around the bungalow. The light trap was operated all night on each of the three nights.

Mai Po Marshes WWF Nature Reserve, New Territories

The light trap was operated on this nature reserve from before dusk until dawn on the night of 16 April and from 20.45 hrs (2 hours after dusk) until dawn on 17 April. Mai Po is a nature reserve of the World Wide Fund for Nature (WWF Hong Kong) and is internationally important as a feeding ground for migrant birds on

passage between Siberia and Australasia. It consists of coastal mangrove swamp and a system of man-made shrimp ponds or 'geiwais' and fishponds that have been managed for several decades but are now largely abandoned (Irving & Morton, 1988). It is the most extensive area of wetland in Hong Kong and the only substantial area of mangroves remaining. The light trap was operated on a 50 m cable from outbuildings at the education centre adjacent both to reed beds of *Phragmites australis* (Cav.) Steudel and a large block of mangrove trees, principally *Kandelia candel* (L.) Druce.

Results

The species, numbers of individuals recorded and their sites and dates are given in the accompanying Table.

Table of results.

Date: April Site	7–9 RB	10 TPK	10 HLY	13 LH	14 LH	15 LH	16 MP	17 MP	18 TPK
Cechenena aegrota	—	12	1	—	—	—	—	—	15
Acosmeryx shervillii	—	1	—	—	—	—	—	—	2
Marumba dyras	—	—	1	1	3	4	—	—	—
Theretra suffusa	—	—	—	1	—	—	—	—	—
Hippotion rosetta	—	—	—	1	—	—	—	—	—
Leucophlebia lineata	—	—	—	1	—	—	—	—	—
Theretra pallicosta	—	—	—	—	1	—	—	—	—
Macroglossum fritzei	—	—	—	—	1	—	—	—	1
Clanis bilineata	—	—	—	—	—	1	—	—	—
Agrius convolvuli	—	—	—	—	—	—	—	1	—
Theretra clotho	—	—	—	—	—	—	—	1	—
Theretra latreillii	—	—	—	—	—	—	—	—	1
Pergesa acteus	—	—	—	—	—	—	—	—	1
Eupanacra mydon (larva)	—	—	—	—	—	—	—	—	1
Sataspes infernalis (ova)	—	—	—	—	—	—	—	—	12+

Macroglossum corythus luteata—one at light on Victoria Peak 23 April (A. Galsworthy)

Site codes: RB = Repulse Bay; TPK = Tai Po Kau; HLY = Hong Lok Yuen; LH = Long Harbour; MP = Mai Po.

Observations

The moths were all in generally good condition and appeared to be freshly emerged. Early April in Hong Kong is usually the beginning of the early summer rains. January and February are normally dry, rainfall is light in March but increases through the months from April to October, in any of which from May to October there may be typhoons and heavy rain. In 1993 the weather had been drier than usual, little rain in March, a few showers in early April and we did not encounter heavy rain until the last week of our stay.

Agrius convolvuli (L., 1758)

Norman Tong, a friend of Kent Li, has reared this species from larvae collected on an *Ipomoea* sp. and has reared them in captivity on morning glory *Ipomoea* spp.

PLATE III

3

4

1

2

(K. L. comm.). One member of this plant genus was common and flowering in profusion at Mai Po where we recorded our only sighting of this hawk-moth. The moth was in very good condition, probably freshly emerged, and sitting within the trap in the morning. Tennent (1992, 1993) found the moth fairly widespread but sporadic in Hong Kong, with emergences also noted in October, and reports that both Mike Bascombe and James Young have reared it from *Jacquemontia paniculata* (Burm. f.) Hall. f. (Convolvulaceae).

Clanis bilineata bilineata (Walk., 1866)

Tennent made the interesting observation that this species generally comes to light rather late in the night, mainly after midnight (some six hours after dusk in Hong Kong) and that the moth was regularly seen flying between 04.00 hrs and dawn. Our specimen from Long Harbour, Sai Kung, was taken in a light trap that was operated all night. K. L. found a mating pair in copulation on *Pueraria lobata* (Willd.) Ohwi (Leguminosae), a common climber, on 19 April 1991 on an open slope covered extensively with the larval foodplant, near the Outdoor Recreation Centre, Sai Kung. Previously K. L. had found an adult on 5 May 1988 at the lights of the toilet building at Hok Tau in woodland. K. L. was given a larva found by Professor Shigerue A. Ae on 19 June 1993 on *P. lobata* at Ng Tung Chai. The larva was feeding on a leaf when found and was 75 mm in length. It pupated on 1 July after a pre-pupation period of seven days and the adult emerged at 20.00 hrs on 15 July 1993.

Leucophlebia lineata Westw., 1847

The singleton we recorded, in the light trap at Long Harbour, was extremely worn. Tennent (1992) found the moth not at all common in Hong Kong, with adults in April, May and August.

Marumba dyras dyras (Walk., 1856)

One of the commonest hawk-moths in Hong Kong (Plate III, Fig. 1), according to Tennent, who reports it being found as an adult in every month from March to October. K. L. found six larvae on the undersides of leaves on several trees of *Hibiscus mutabilis* L. (Malvaceae) on 8 October 1988 on the Aberdeen Reservoir Road and a larva 25 mm in length on *Microcos paniculata* L. (Tiliaceae) on 1 May 1991 at Pak Long Tsuen. The latter formed a pupa on 1 June and the adult emerged on 24 June 1991. Young (in Tennent, 1992) has also reared larvae on both these foodplants in Hong Kong. The moth turned up every night at Wardhaven, in fresh condition, and was probably breeding nearby. We did not see it at Tai Po Kau, even though Tennent (1992) had 61 individuals there and we had one at nearby Hong Lok Yuen, so possibly it flies fairly late and is less likely to be recorded unless the trap is operated most of the night.

Plate III.

Fig. 1. *Marumba dyras*, one of the commonest hawk-moths in Hong Kong. Fig. 2. Larva of *Eupanacra mydon*. Fig. 3. *Theretra pallicosta* at Long Harbour light trap, Sai Kung. Fig. 4. *Pergesa acteus* from light of public lavatory at Tai Po Kau woodlands.

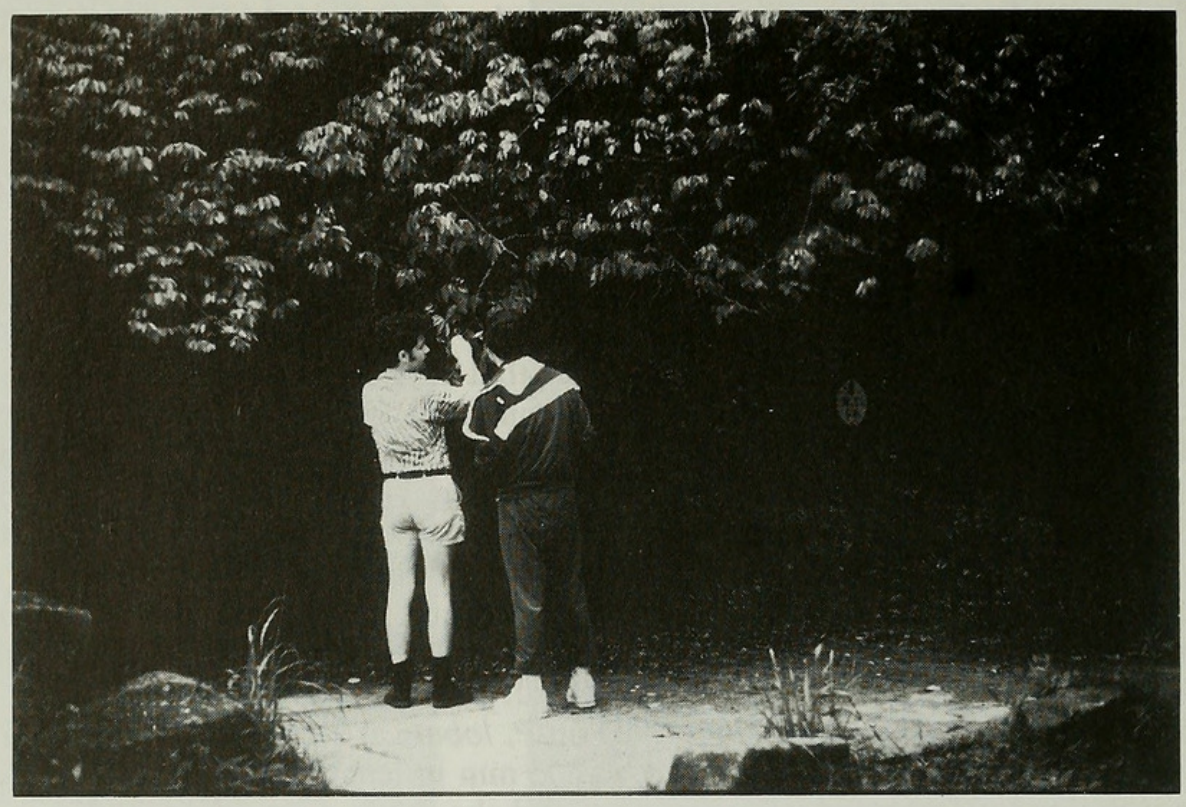

Fig. 3. Paul Waring and Kent Li examining bush of *Dalbergia benthami* and finding the eggs of the carpenter bee mimic *Sataspes infernalis*.

Sataspes infernalis Westw., 1848

Seven eggs which proved to be this species were collected by K. L. on our visit together to the woodland at Tak Po Kau on 17 April 1993. We found about a dozen in a short search and could undoubtedly have found others. Those not needed by K. L. were left in situ. We had persuaded K. L. to deviate from his usual route through the wood and climb further up the slopes. When we came upon a large bush of *Dalbergia benthami* Prain (Leguminosae) growing on the edge of a surfaced forest road (Fig. 3) K. L. showed us the technique he has used successfully to find the eggs and larvae of *S. tagalica* which he had found in eleven separate locations up to that point. He simply turns the leaves over one by one much as one would do for larvae of the broad-bordered bee hawk-moth *Hemaris fuciformis* (L., 1758) in Britain, and the preferred situation of the larval foodplant growing in full sun is evidently much the same. The large green eggs were found and assumed to be those of *S. tagalica*, but on rearing by K. L. proved to be *S. infernalis*, the first time the species has been recorded in Hong Kong. The first two larvae hatched on 21 April and the rest on 22 April, pupation dates ranged from 26 May to 3 June, and the adults emerged between 3 and 20 June 1993. K. L. has a series of photographs and notes of his experience with this species and intends to publish the material in due course (Li, in prep.).

S. infernalis was recorded by Mell (1922: 203), uncommonly, from the area around Guangzhou, China, adjacent to Hong Kong, and there are specimens in the Natural History Museum, London, from there. Although it was not seen in Hong Kong during Tennent's study, Tennent (1992) could see no reason why it should not occur there.

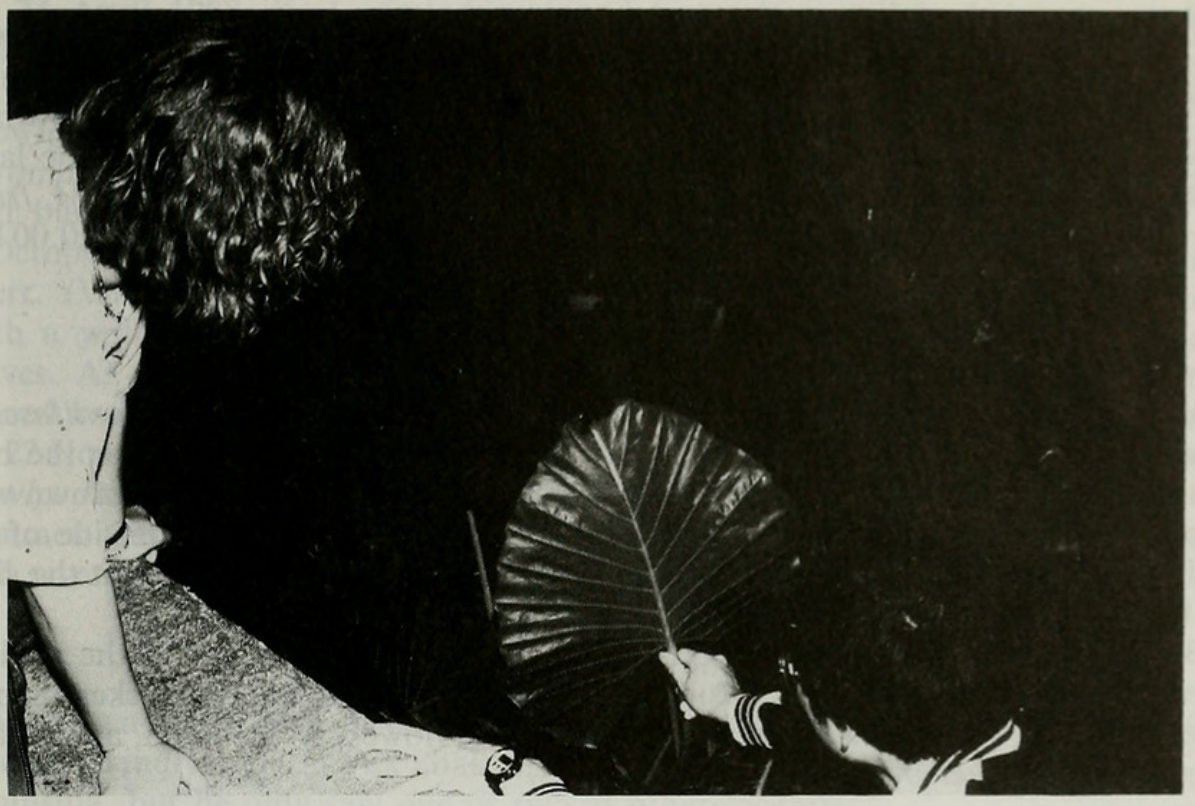

Fig. 4. Rachel Thomas and Kent Li finding larva of *Eupanacra mydon* on underside of leaf of *Alocasia odora*, Tai Po Kau woodlands.

Acosmeryx shervillii Boisd., 1875 form *pseudonaga* Butler, 1881

We only saw this moth at Tai Po Kau, where it turned up on both visits, but not elsewhere on the dates in between. Tennent (1992) found it at three additional localities and considered it common and widespread. It is shown in D'Abrera (1987) as *A. socrates* form *socrates* Boisd. from which it is easily distinguished by the median dark grey triangles on the underside of the abdomen (Kitching in Tennent, 1992). Like those of Tennent, ours are of the dark form *pseudonaga*.

Eupanacra mydon mydon (Walk., 1856)

This species was not seen in numbers during Tennent's light trapping but was noted nectaring in the evening and after dawn, so it may well be under-represented at light. K. L. considers the species common on the edges of densely wooded places, the borders of the reservoirs and on abandoned farmland that has been encroached by woody plants. Bascombe, Young and K. L. have found and reared the larva on *Alocasia odora* Koch (Araceae). K. L. finds that the eggs occur mainly on plants by roadsides and other edges of woodland but not on plants within dense stands of trees or amongst thick undergrowth. We found a larva in the woodland at Tai Po Kau by turning over the large leaves of the known foodplant, which was growing on the bank of a stream by a bridge, shaded overhead by mature trees. The larva was at rest along the midrib near the tip of the leaf with its head just below the tip. We photographed the larva and left it in situ (Plate III, Fig. 2 and Fig. 4). K. L. found four eggs and a larva (19 mm in length) the previous year, on 4 July 1992, in woodland by the Aberdeen Reservoir Road. One larva pupated on 15 July and the adult emerged on 28 July 1992.

Macroglossum fritzei Rothschild and Jordan, 1903

Tennent (1992) found that some *Macroglossum* species, such as *M. fritzei*, were more frequently seen at light traps than nectaring at flowers. Others are seen in numbers at dusk and dawn visiting flowers such as the golden tear-drop, *Duranta repens* L., and the introduced *Lantana camara* L. (both Verbenaceae), the latter of which was flowering in profusion during our visit. Both our specimens of *M. fritzei* were recorded at light after dark, the one at Tai Po Kau flying in at 20.00 hrs, but we saw none at *Lantana*.

Macroglossum corythus luteata (Butler, 1875)

M. corythus can be confused with *M. sylvia* (Boisd.) and *M. semifasciata* (Hampson). However *semifasciata* has a rather obvious black spot near the base of the forewing. The underside of the abdomen in *M. corythus* is light brown with small white flecks at the side of the segments. In *M. sylvia* the underside of the abdomen is dark chocolate brown with broad whitish or cream patches at the sides (I. Kitching, pers. comm.).

Both Bascombe (in Tennent, 1992) and K. L. have found larvae in the wild on *Paederia scandens* (Lour.) Merr. (Rubiaceae), commonly known as the chicken-manure creeper, a vine with a distinctive purple and mauve flower, a foul smell, and a habit of growing up over bushes in many habitats.

Hippotion rosetta (Swinhoe, 1892)

H. rosetta is shown in D'Abrera (1987) as *H. depictum* Dupont, 1941, which was synonymized by Holloway (1987). Tennent (1992) points out that it can be difficult to distinguish *H. rosetta* from *H. boerhaviae* (F.) and *H. rafflesii* (Butler) and that the latter is more common than *H. rosetta* in Hong Kong. Our single *H. rosetta* taken at Long Harbour has been confirmed by Ian Kitching, who points out that *H. boerhaviae* has longer thinner forewings, more contrast in the patterning of the forewings, deeper red hindwings and a strong and rather obvious pinkish or white line along the mid-line on the underside of the abdomen (shown in D'Abrera, 1987). It is much less frequently found in degraded habitats than *H. rosetta* and has not been recorded for certain from Hong Kong (Tennent, 1992). *H. rafflesii* can be distinguished by the orange anal angle of its hindwing.

Theretra clotho clotho (Drury, 1773)

Tennent found this a common and widespread species with adults from April to October and reports that the larva has been found and reared by Mike and Freida Bascombe on *Saurauia tristyla* de Candolle (Actinidiaceae) in Hong Kong. K. L. has also found the species commonly, with adults from April to November. K. L. informs that Norman Tong found eggs on common grape *Vitis vinifera* L. at Luk Keng and more recently on *S. tristyla* on 23 August 1992 at Ho Chung and reared these to adult. Mr Tong also found a full-grown larva on *S. tristyla* on 1 August 1992 at Jubilee Reservoir. This was reared to adult, pupating on 7 August and emerging on 21 August 1992. We only saw one individual, in good condition, at Mai Po on our penultimate night of trapping, and suspect the emergence period was just beginning.

Theretra latreillii lucasii (Walk., 1856)

Tennent found this species to be common and widespread but does not give the dates of appearance. K. L. has encountered singletons under lights at Tan Kwai Tsuen,

near Yuen Long in September 1987 and October 1988 and a third at Hok Tau on 24 April 1988. K. L. found a second instar larva on *Ludwigia caryophylla* (Lam.) Merr. & Metc. (Onagraceae) (plant det. confirmed by the herbalist Mr Lee Ning Hong) on 2 May 1992 at Ho Chung in Sai Kung. The plants were growing as weeds in wet muddy fields among rows of ginger-lily *Hedychium coronarium* J. Koenig cultivated for its fragrant flowers. This larva was reared and burrowed to pupate on 18 May, the adult emerging on 1 June 1992. On 5 October 1992 some eggs were found by K. L. on *Columella corniculata* (Benth.) Merr. (Vitaceae) (plant det. confirmed by the Hong Kong herbarium) together with a yellowish first instar larva 9 mm in length found on the young reddish leaves. As the larva grew it turned at first reddish and matched the leaves, then turned brown in the third instar. The larva pupated on 7 November and emerged on 22 November 1992. In addition larvae have been found and reared on *Ampelopsis brevipedunculata* Koehne (Vitaceae) by Norman Tong. The latter plant is a very common species. Bascombe (in Tennent, 1992) has also reared larvae on this plant and several others.

Theretra suffusa (Walk., 1856)

We saw a single fresh specimen of this species, at Long Harbour. Tennent (1992) records 58 individuals at Pak Shak O, which, like Long Harbour, is on the Sai Kung peninsula, but he only saw one or two at other localities.

Theretra pallicosta (Walk., 1856)

Tennent found this species to be widespread throughout Hong Kong, with adults from April to September but never saw the insect in any numbers. K. L. has only seen the adult once during several years of inspecting outdoor lights in a variety of locations. His specimen was taken in Tan Kwai Tusen, Yuen Long, on 1 June 1987 at a fluorescent light in a garage. K. L. found a single larva on *Aporusa chinensis* (Champ.) Merr. (Euphorbiaceae) in mid-May in the Fung Shui woodland of Pak Long Tsuen, Lung Kwu Tan, and fourteen eggs on a small stand of the same species of plant on 3 July 1993 on the Aberdeen Reservoir Road. These were reared and the adults emerged in August. We saw only one adult (Plate III, Fig. 3) and on only one of the three consecutive nights of trapping at Long Harbour. The specimen is in good but not fresh condition although some of the wear may have been due to activity within the confines of the trap.

Pergesa acteus (Cramer, 1779)

Tennent encountered only nine adults during his 18 month survey but found it in a variety of habitats and sites including to the light of a block of flats. K. L. considers the species widespread and has noted it at lights in habitats ranging from woodland to abandoned agricultural land, including Tan Kwai Tsuen, near Yuen Long where the moth has been noted at fluorescent lights in April, June and October. Both M. Bascombe and K. L. have found and reared the larvae on *Alocasia odora* (Araceae) which is a fairly common plant that is often found by forest paths and the concreted paths that run between villages, preferring shady, moist situations by trees. K. L. found four larvae under leaves of a single plant by one such village path. The single adult (Plate III, Fig. 4) that we saw was encountered not at the light trap but on the lighted wall of the public lavatory by the roadside on the edge of the woodland at Tai Po Kau (Fig. 5).