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A Review of the Genus *Harmalia* Fennah 1969 (Hemiptera: Delphacidae) recorded from Sri Lanka with the description of *Harmalia heitensis otho* Fennah 1975

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The genus *Harmalia* Fennah, 1969, (Delphacidae: Delphacini) is known with 15 species from Indo-malayan, Pacific and Australian regions. Five out of those species ; *Harmalia thoracica* (Distant, 1916) *Harmalia anacharsis* Fennah 1969; *Harmalia tiphys* Fennah 1971, *Harmalia tarso* Fennah 1975 and *Harmalia heitensis otho* Fennah 1975 were recorded from Sri Lanka. But only two species has been collected after their original description. *H. anacharsis* is commonly found in paddy ecosystem throughout the island but not identified as pest. Second, an outbreak of *H. heitensis otho* was recorded as pest on *Alternanthera sessilis* (L.) from Northern part of Sri Lanka, after the cyclone and flooding, in 2009. A compiled list of species of *Harmalia* known from Sri Lanka with the description of *H. heitensis otho* from the results of the author's field work is presented in this paper.

Key words: *Harmalia*, *Harmalia heitensis otho*, Hemiptera, *Alternanthera sessilis* (L.)

INTRODUCTION

Members of family Delphacidae are widespread and of economically important. More than 55 species of 26 genera are recorded as pests of monocot plants (Wilson and O'Brien, 1987). The genus *Harmalia* Fennah, 1969, (Delphacidae: Delphacini) one of those 26, is known with 15 species from Indo-malayan, Pacific and Australian regions. One species, *H. anacharsis* Fennah, 1969, was introduced to new world and found to breed on Amazon sword plant in Southern Florida (Wooten, *et. al.*, 1993).

In Sri Lanka, five species were recorded from temporary wet lands. They are *H. anacharsis* Fennah, 1969 *H. heitensis* otho Fennah, 1975 and *H. thoracica* (Distant) , *Harmalia tarasco* Fennah, 1975; *H. tiphys*, Fennah, 1971 (Bambaradeniya *et al.*, 2004; Fennah, 1975; Gnaneswaran & Viraktamath, 2009).

METHODOLOGY

A field survey was conducted in Jaffna, Sri Lanka in 2010 to find out the habitat and host plants of the species of *Harmalia*. Planthopper samples collected by sweep netting from various wetland ecosystems such as temporary ponds, paddy fields and mangroves in Jaffna Peninsula, were sorted out at the Research Laboratory of the Department of Zoology, University of Jaffna. The morphological structures were examined and analyzed as suggested by Knight (1965). Based on this information, the species of *Harmalia* were identified (Fennah, 1975; Wilson, 2005; Dupo & Barraion 2009) and confirmed by checking with the voucher specimens kept in the National Museum of Sri Lanka and the Zoological Museum of the Department of Zoology. Information on bionomics of *Harmalia* species were obtained by consulting research papers from libraries in Sri Lanka and from online articles. The present paper provides the list of species of *Harmalia* recorded in Sri Lanka with its bionomic data and distribution within the island.

This can be a record of species diversity and are of a great value to systematists, ecologist and economic entomologist to alert them about the possibilities of this genus becoming an important pest species in the future.

RESULTS AND DISCUSSION

Two species of *Harmalia*, such as *H. anacharsis* and *H. heitensis otho* were found in the field collected sample from Jaffna Peninsula as previously recorded by Piranavamar & Gnaneswaran 2006 and Gnaneswaran & Viraktamath, 2009.

GENUS *HARMALIA* FENNAH

Harmalia Fennah, 1969, Pacif. Ins. Monogr. 21:37

-type species *Sogata thoracica* Distant 1916, Fauna of British India. 6: 140

Fennah (1969) established the genus *Harmalia* with *Sogata thoracica* Distant as its type species. Fifteen species of this genus have been described from Pacific and Australian regions. They are *Harmalia aculeatus* (Yang 1989), *H. anacharsis* Fennah, 1969; *H. clavata* Tian & Ding, 1980; *H. commelinae* Yang, 1989; *Harmalia gayasana* (Kwon, 1982), *H. heitensis* (Matsumura & Ishihara, 1945); *H. heitensis otho* Fennah, 1975,

H. obscura Ding, 2006; *H. ostorius* (Kirkaldy, 1907), *H. sanguinalis* (Ding and Tian 1980), *H. sirokata* (Matsumura & Ishihara, 1945); *H. tarasco* Fenna 1975; *H. thoracica* (Distant) and *H. tiphys* Fennah 1971.

(<http://ag.udel.edu/enwc/research/delphacid/species/Harmalia.htm>)

Of those, presence of four species and one subspecies such as *H. thoracica*, *H. anacharsis*, *H. heitensis otho* and *H. tarasco*, *H. tiphys* has been reported from Sri Lanka (Fennah, 1975). However, the only two of them namely, *H. anacharsis* and *H. heitensis otho* have been recorded after their original description in rice field ecosystem (Bambaradeniya *et al.* 2004, Piranavamar and Gnaneswaran 2006) and vegetable ecosystem (Gnaneswaran and Viraktamath, 2009) in Sri Lanka, respectively.

1. *Harmalia anacharsis* Fennah

Harmalia anacharsis Fennah, 1969, Pacif. Ins. Monogr. 21:38

Harmalia anacharsis Fennah, Fennah, 1975 *Ent. Scand. Suppl.* 4:105

Wilson and Claridge, 1981 & 1991

Holdom *et al.*, 1989. Bambaradeniya *et al.* 2004

Lakshmi *et al.* 2005.

Discription: As given in Fennah (1969) and Dupo and Barrion (2009).

Host Plants: It has been reported from rice fields but not confirmed as primary host (Bambaradeniya *et. al.* 2004; Lakshmi *et al.*, 2005; Wilson and Claridge, 1981 & 1991). In Florida, this species was found on Amazon sword plant- *Echinodorus paniculatus* Micheli (Holdom *et al.*, 1989).

Economic Importance: *H. anacharisis* collected from rice field ecosystem. But no economic damage symptoms were noted so far, due to its presence (Bambaradeniya *et. al.* 2004 and Wilson & Claridge, 1991)

Distribution: USA: Florida (introduced); New Caledonia, Indonesia, Philippines, Sri Lanka, Vietnam, China. Sri Lanka.

Distribution in Sri Lanka: (Fig.2) Western Province, North Western Province, Central Province, Sabaragamuwa province, Uva Province, Eastern Province, Southern Province (Fennah, 1975), Northern Province (Piranavamalar and Gneswaran 2006).

2. *Harmalia heitensis* otho Fennah (Fig.1a)

Harmalia heitensis otho Fennah 1975: *Ent. Scand. Suppl.* 4:105
Gneswaran & Viraktamath, 2009.

Adult insects were small dark chocolate brown colour closed to black. No white marks on Pronotum, mesonotum or scutellum. Antenna and Legs except coxae are pale almost white (Fig. 1d). Both brachypterous (Fig: 1c) and Macropterous (Fig. 1a) forms were found in on *A. sessilis* . Vertex longer than broad at the base : Forwing chocolate brown, with concolorous veins: aedeagus tubular with four minute teeth near the apex.

Male 3.1 mm long; 1.19 mm wide across eyes. Female 3.6 mm long; 1.2 mm wide across eyes.

MATERIAL EXAMINED: SRI LANKA: 6 males, 4 females, Navaali 11.i.2009; 12 males, 14 females, Navaali 23.i.2009; 2 males, 4 females, Navaali 16.v.2009; 1 male, 1 female Navaali, 12.viii.2010.

Collector: R. Gneswaran

Host Plant: *Alternanthera sessilis* (L.) (Gneswaran & Viraktamath, 2009)

Distribution: Sri Lanka.

Distribution in Sri Lanka: (Fig.2) Western Province; Eastern Province; North Western Province (Fennah, 1975) and Northern Province (Gneswaran & Viraktamath, 2009).

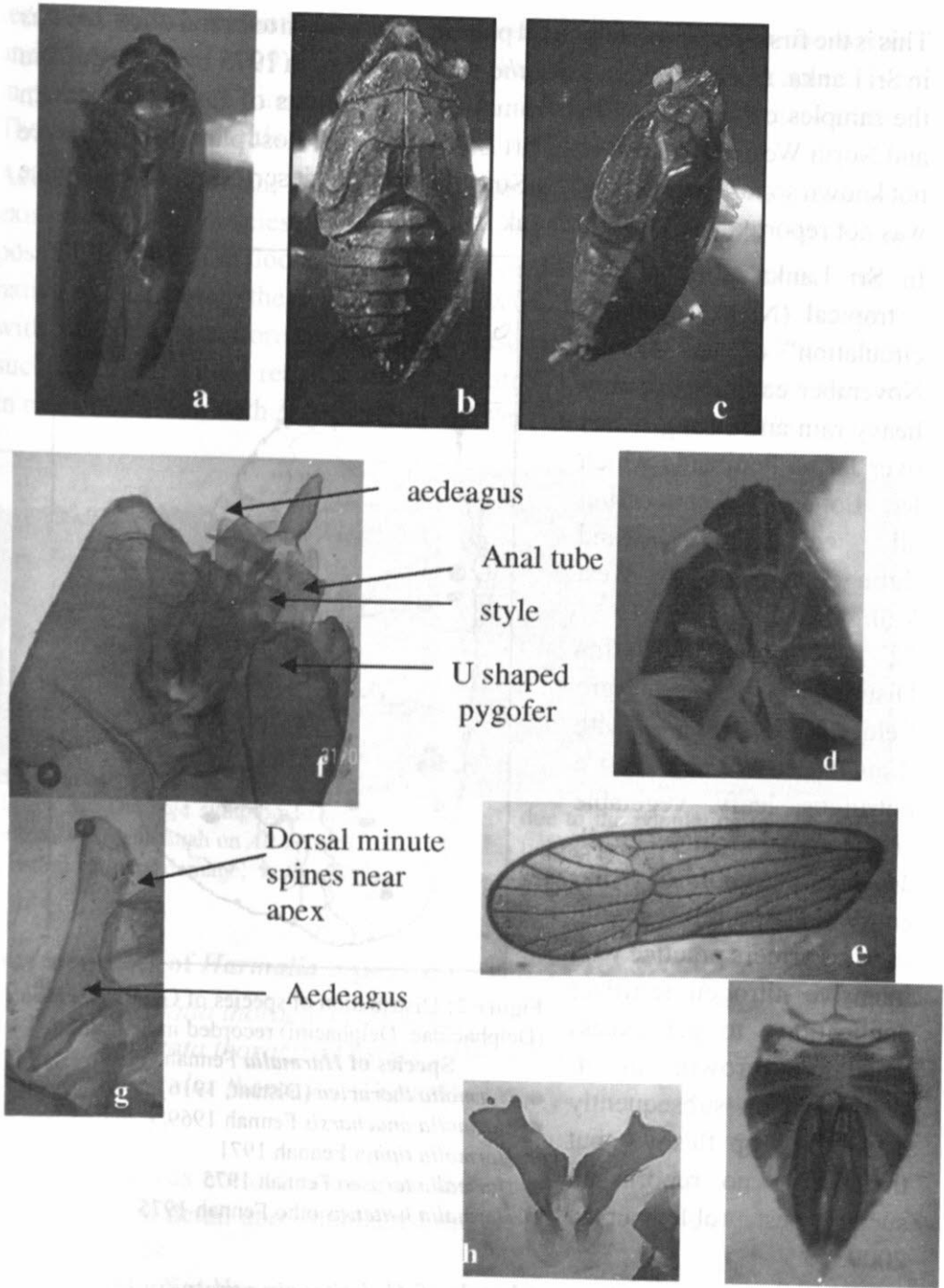


Figure: 1 *Harmalia heitensis otho* Fennah a: Habitus Male; b: Nymph; c: Brachypterous female; d: ventral view of head and thorax; e: fore wing, f: pygofer; g: Aedeagus; h: styles; i: abdomen showing female genitalia. (Photographed by author)

This is the first species of delphacid planthopper known to breed on *A. sessilis* in Sri Lanka. *Harmalia heitensis otho* was described in 1975 by Fennah from the samples collected in 1962 from wet land habitats of Eastern, Western and North Western Provinces of Sri Lanka. But the host plant records were not known so far (Fennah, 1975). Since its original description, its existence was not reported until this outbreak in 2009.

In Sri Lanka, the “ 2008 – tropical (Nisha) cyclonic circulation” on the 25th of November, caused extremely heavy rain and strong winds over Jaffna Peninsula which led floods () connecting all temporary wetland throughout. In South West Valligamam region (9 ° 72’ N, 79 ° 99’ E) of Jaffna District, 1/3 of the agro fields are occupied with *Altenanthera sessilis* (L.) a nutritious leafy vegetable (*Ponnangarni* in Tamil; *Mukkunuwanna* in Sinhala) cultivation and the rest with paddy. Farmers practice with intensive nitrogen fertilizer application to get excess vegetative growth in *A. sessilis* which subsequently cause the crop fleshy but there were no reports on sucking pest problem up to 2009.

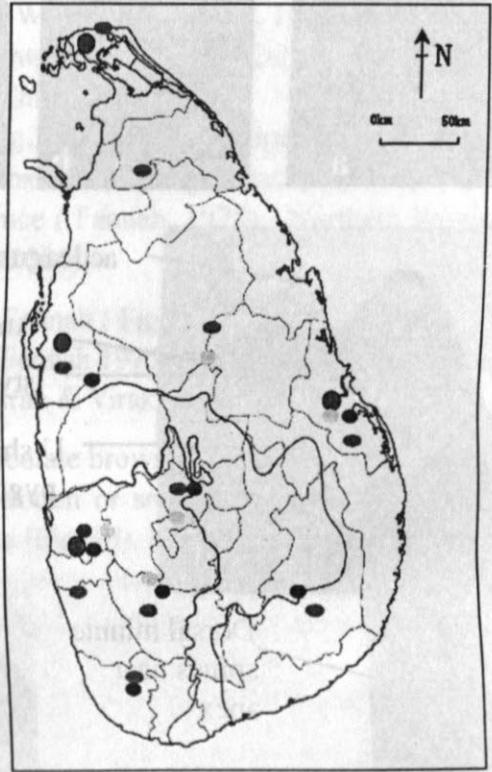


Figure 2: Distribution of species of Genus *Harmalia* (Delphacidae: Delphacini) recorded in Sri Lanka.

Species of *Harmalia* Fennah, 1969

- *Harmalia thoracica* (Distant, 1916)
- *Harmalia anacharsis* Fennah 1969
- *Harmalia tiphys* Fennah 1971
- *Harmalia tarasco* Fennah 1975
- *Harmalia heitensis otho* Fennah 1975

In January, 2009, a sudden outbreak of *H. heitensis otho* population was recorded on *A. sessilis* from cultivated fields particularly in Navali (Jaffna District). This was the first time such a complete crop loss (95-100%)

recorded within a month from the appearance of this insect (Gnaneswaran and Viraktamath, 2009). The damage (Fig.3) was similar to hopper burn in paddy due to the direct effect of the feeding of *Nilapavata lugens* (Stal). The adjacent rice fields had not been affected by this species.

According to Fennah, *H.h.otho* is inhabiting in wetlands. Though the existence of this species was not known from Northern Province, there are possibilities that the floods might have brought the plant hoppers from their native wet lands into the cultivated land. When they found new environment with crops that are more succulent and susceptible to insect attack specially sucking pests, would reached the pest status. This condition was observed in rice cultivation with *N.lugens* population (Lu and Heong, 2009).

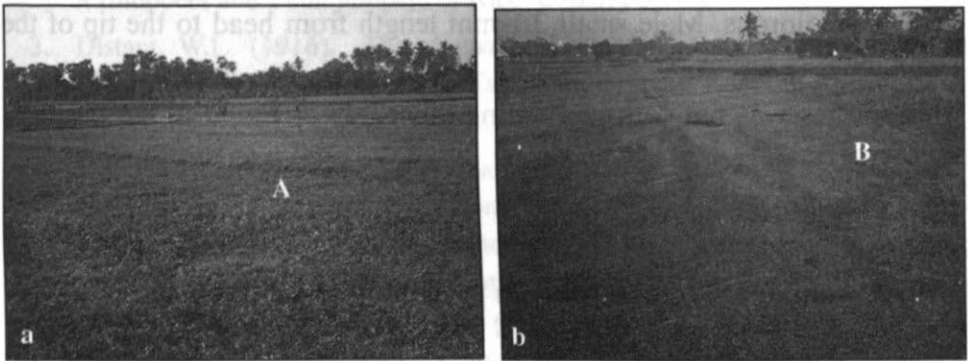


Figure 3: Damage symptoms (hopper burn A, B) due to the population of *Harmalia heitensis otho* Fennah on *Alternanthera sessilis* (L.) field in Jaffna, Sri Lanka.
a. Initial stage of damage; b. Complete burn. (Photograph: by author in 2009)

Other species of *Harmalia* reported from Sri Lanka:

3. *Harmalia thoracica* (Distant)
Sogatata thoracica Distant 1916, 6:140
Harmalia thoracica (Distant) Fennah, 1969, Pacific Ins. Mono. 21: 37

This species was not collected from this survey. Fennah (1969) described this species in detail and established the genus *Harmalia* with this species as type species.

Host Plants: Not known

Distribution: India, Sri Lanka.

Distribution in Sri Lanka: (Fig.2) Western Province, North Central Province, Sabaragama Province, Eastern Province and Central Province (Fennah, 1975).

4. *Harmalia tarasco* Fennah

Harmalia tarasco Fennah, 1975: *Ent. Scand. Suppl.*4:107

This species was known by Fennah with the male specimen from Yakkala and Labugama regions in Sri Lanka. Fennah(1975) described this species as follows “ Light yellowish brown; carinae of head rostrum, antennae, posterior half of pronotum and hind margin of mesonotum, whitish; legs and underside of thorax pale yellowish brown, mesonotum light orange brown: abdomen and male genitalia, reddish brown, Tegmina hyaline, veins concolorous. Male small 2.1 mm length from head to the tip of the abdomen.”

This species was not collected during this study or found in the National museum.

Host Plants: Not known

Distribution: Sri Lanka.

Distribution in Sri Lanka: Western Province (Fennah, 1975)

5. *Harmalia tiphys* Fennah

Harmalia tiphys Fennah 1971, *Ins. Micronesia*, 6(8):583

- type species *Delphacodes albicollis*: Fennah, 1956. *Ins. Micronesia* 6(3):123

Harmalia tiphys Fennah 1975 *Ent. Scand. Suppl.*4:105

This species known to exist all over the island from the collections made during 1962 but not in Northern Province (Fennah, 1975). No specimen was collected during this survey from Jaffna.

Description as given by Fennah, 1971.

Host Plants: Not known

Distribution: Micronesia, Caroline Is., Palau Island, Sri Lanka.

Distribution in Sri Lanka: (Fig.2) Western Province, Central Province, Sabaragamuwa Province, North Western Province, Southern Province and Eastern Province. (Fennah, 1975)

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