

Review of the Subfamily Bryocorinae (Heteroptera: Miridae) of Sri Lanka

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ABSTRACT. Status of subfamily Bryocorinae (Heteroptera: Miridae) in Sri Lanka was reviewed in this paper because it is the most agriculturally important and morphologically diverse subfamily of Miridae. Twenty Bryocorinae species belongs to 12 genera in three tribes have already been recorded from Sri Lanka in the past. In a study that started in 1998, Sri Lankan Bryocorines have been collected to establish a reference collection and to prepare identification keys.

As a result, fifteen species belonging to 9 genera have been re-described including one unidentified species and one new record, *Nesidiocoris tenuis* Reuter. *Felisacus glabratus* Motschulsky is identified under subtribe Monaloniina, which was previously treated under subtribe Dicyphina. An identification key for the subfamily Bryocorinae was prepared up to the generic level.

INTRODUCTION

Miridae is the largest family of the suborder Heteroptera. Mirids are very delicate in nature and are predominantly plant feeders and few are predacious on other insects. Usually they do not possess ocelli. More often their colouration blends well with the foliage, flowers or bark on which they rest or feed. Most distinct characters are the presence of cuneus on the posterior part of the corium and one or two closed cells on the membrane. Carvalho (1955) compiled the first catalogue of Miridae.

Of the mirids described in Sri Lanka, more than 87% have been described before 1914 by foreign authors (Wijesekara and Henry, 1999). After 1914 there had been no comprehensive studies on mirids until the systematic collection initiated in 1998 at Horticulture Crop Research and Development Institute (HORDI), Gannoruwa.

Bryocorinae is by far the most agriculturally important and morphologically diverse subfamily of Miridae. They can be identified using claw characters. All recorded species are plant feeders including serious pests in the genus *Helopeltis*. Throughout the world, 1556 species of Bryocorines have been recorded which includes 20 species from Sri Lanka (Distant, 1911; Schuh, 1995).

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This study was carried out to review the taxonomic status of Bryocorinae and to prepare a key for the identification of the collected and described genera for Sri Lanka. The study also aimed to describe the economically important Bryocorinae spp. with their hosts and distributions.

MATERIALS AND METHODS

The study was carried out at the Division of Entomology, Horticulture Crop Research and Development Institute (HORDI), Gannoruwa.

Specimens were collected from various locations in different agro-ecological zones in Sri Lanka, except North-Eastern Provinces from May 1999 to August 2001. Sweep net, Beating net, Malaise trap, Light trap and an Aspirator were used to collect mirids.

In addition, mirid collections in the National Museums, Colombo and entomology museum of the HORDI were also used for this study. Collected species were compared using the original description of the Bryocorines recorded from Sri Lanka when available and compared with the other available specimens. Illustrations of each species were made using a Camera Lucida mounted on an Olympus® stereomicroscope. Measurements were made with the help of a calibrated ocular micrometer.

RESULTS AND DISCUSSION

During this study 9 species of Bryocorines belonging to 7 genera were collected. Six species belongs to 6 genera were re-described using the museum collections. This includes an unidentified species and a new record for Sri Lanka.

Tribe: Dicyphini Schuh, 1976

Helopeltis antonii Signoret, 1858

Helopeltis antonii Signoret, 1858 - Sri Lanka.

Helopeltis Helopeltis antonii: Stonedahl, 1991 - India; Sri Lanka; Andaman Is.

Male: 6.03-6.71 mm (Fig. 1), thorax reddish orange or dark brown; Female: 7.11-7.63 mm; Distribution: Kandy and Puttalam districts; Host: Cashew (*Anacardium occidentale* L.)

Specimens examined: ♂ point mounted, Peradeniya, 14.V.1998, Coll: R. Gunathilake. 1 ♀ with unknown data, 1♀ Collected at Puttalam, 10.VII.2000, 5♀ and 7♂ Puttalam, 9.IV.2001, on Cashew, Coll: A. Wijetunge. (Deposited at HORDI).

Helopeltis bradyi Waterhouse, 1886

Helopeltis bradyi Waterhouse, 1886 - Malaya

Male: 7.43-7.91 mm, Dark brown colour with reddish to dark brown pronotum; Female: 8.45-8.78 mm; Distribution: Kandy district; Hosts: Cashew (*Anacardium occidentale* L.).

Specimens examined: 1♀ point mounted, Gannoruwa (ISTI) on Cashew, 21.VII.1999, Coll: S. Basnagala; 1♂ and 3♀ data unknown, mounted on larger cardboard points. (Deposited at HORDI).

Helopeltis theivora Waterhouse, 1886

Helopeltis theivora Waterhouse, 1886 - Assam

No male specimen observed; Female: 7.72 mm, dark brownish-black; Distribution: Kandy district; Hosts: not recorded.

Specimens examined: 1♀ Kandy, Ceylon, 4-07, direct mounted on a piece of a cardboard. Ref no.1644 (Deposited at NM, Colombo).

Pachypeltis humerale Walker, 1873

Monalonion humerale Walker, 1873

Male: 6.12-6.43 mm, dark brownish-orange, pilose body (Fig. 2); Female: 7.31-9.14 mm; Distribution: Nuwara-eliya, Kurunegala and Kandy districts; Hosts: Bougainvillea (*Bougainvillea* spp.), Wathupalu (*Mikania cordata* Burm. f.), Avocado (*Persea americana* Miller), Chillie (*Capsicum* spp.).

Specimens examined: 1♂ point mounted, Peradeniya 25.XI.1999, *Bougainvillea* sp., Coll: S. Basnagala; 4♀ Nawalapitiya, 22.II.1999, 14.I.1999, 26.II.1999, 21.II.1999, Coll: C. Samarasinghe (deposited at HORDI). 1♂ Kandy, Ceylon, 8-13.V.33. No. 6916; 2♀ and 2♂ Labugama, Ceylon, 17.VI.32, 6923; ♂ Kandy, Ceylon, 15-18.VIII.31. (Deposited at NM, Colombo).

Pachypeltis politum Walker, 1873

Monalonion politum Walker, 1873 - Sarawak

Male: 5.92-6.01 mm, dark brown with pilose body; Female: 7.12-8.87 mm; Distribution: Colombo, Monaragala, Kandy districts; Hosts: unknown.

Specimens examined: All specimens examined are in NM, Colombo. 1♀ Kandy, Ceylon, 8-13.V.33, 6923; ♀ Wellawaya, Ceylon, 10.I.28, 5671; ♀ Labugama, Ceylon, 15.IX.31, 6925 (Hand Written); ♂ Woodside, Urugalla, Ceylon, 28.IV.24, 5283 (Hand Written).

Pachypeltis maesarum Kirkaldy, 1902

Disphinctus maesarum Kirkaldy, 1902 - Sri Lanka.

Size: 6.5-8.5 mm; Head: black dorsally; Locality: Nuwara-eliya district (Distant, 1903). Remarks: Few collected specimens of *P. maesarum* are present at the HORDI museum but damaged. No labels available.

Nesidiocoris tenius Reuter, 1895

Gallobellicus crassicornis Distant, 1904 - India and Burma.

A new record (Fig. 3); Male: 3.33-3.82 mm, pale greenish with dark green pronotum; Female: 2.93-3.55 mm; Distribution: Kandy, Matale, Monaragala, Badulla, Polonnaruwa and Hambantota districts; Hosts: Tomato (*Lycopersicon esculentum* Miller), Tobacco (*Nicotiana tabacum* L.), Banana (*Musa paradisiaca* L.), Brinjal (*Solanum melongena* L.).

Specimens examined: 1♂, Hingurakgoda, 16.X.98, Coll: R. Dissanayake; 1♀ Hingurakgoda, 10.IX.98, Coll: S. Basnagala; 3♀, Gannoruwa, 6.VIII.99, on Tomato, Coll: S. Basnagala; 1♀, Peradeniya, 25.XI.99, Coll: S. Basnagala; (All point mounted and deposited at HORDI).

Nesidiocoris tenuis Reuter is a new record from Sri Lanka. According to Schuh (1995), this species has been recorded in Asia including, Reunion, India, Burma, Java, Sumatra, Iran, Israel, China, Korea and Saudi Arabia. Wijesekara and Henry (1999) identified this species up to the generic level and reported as a new record in Sri Lanka. During this study, thorough morphological study and morphometric characterization were carried out on this species and identified it up to the species level as *N. tenuis*.

Singhalesia indica Poppius, 1913

Engytatus indicus Poppius, 1913 - Sri Lanka.

Male: 2.12-2.87 mm, pale brown, dark brown markings on sides of cuneus (Fig. 4). Female: 2.12-2.43 mm: Distribution: Kandy and Polonnaruwa districts; Hosts: unknown.

Specimens examined: 4♂ on point mounted, 14.XI.98, Host unknown; 16.X.98; 10.IX, 98, sweep net and 9.IX.98, sweep net, Hingurakgoda, Coll. R. Dissanayake (All point mounted and deposited at HORDI).

Felisacus glabratus Motschulsky, 1863

Male: 3.75-4.65 mm (Fig. 5), pale greenish-brown; Female: 7.32-7.56 mm; Distribution: Ratnapura and Badulla districts; Hosts: Ferns.

Remarks: Schuch (1995) treated this species under subtribe Dicyphina. According to tarsus and pretarsal structures this species fall under subtribe Monaloniina. Therefore in this study, species is treated under subtribe Monaloniina.

Specimens examined: 2♂, 5♀ Point mounted – Rahangala, 6.III.2001, on Ferns, Coll: S. Basnagala; 1♀ Point mounted - Ratnapura Dist. (2 km to Awissawella), 30.V.2000, on Ferns, sweep net, Coll: S. Basnagala. (Deposited at HORDI)

Unidentified species

Male: 2.93-3.11 mm, pale brown, markings on corium (Fig. 6); Female: 3.21 mm, only one female collected; Distribution: Kandy district; Hosts: Jam tree (*Muntingia calabura* L.)

Specimens examined: 2♂ Sri Lanka, Kandy Dist. Gannoruwa, at light, 1.X.1999, Coll: S. Basnagala. 2nd label in red mentioning, Bryocorinae sp. 2. 1♂ Sri Lanka, Kandy Dist., Gannoruwa, at light. 1.X.1999, Coll: S. Basnagala (deposited at HORDI).

Key to genera of tribe Dicyphini

1. Insect relatively large or small and elongate, length 3.8-7.7 mm in length; first segment of antennae much longer than length of head; membrane consist of very distinct single cell or two cells; pretarsus dilated distally, tarsi dilated distally; legs long and slender.....2
- Small insects, 2.1-3.8 mm and delicate; first segment of antennae slightly shorter than or as long as the length of the head; pretarsus not dilated distally; tarsi not dilated distally; membrane with two closed cells one among which, not prominent or not distinct.....4

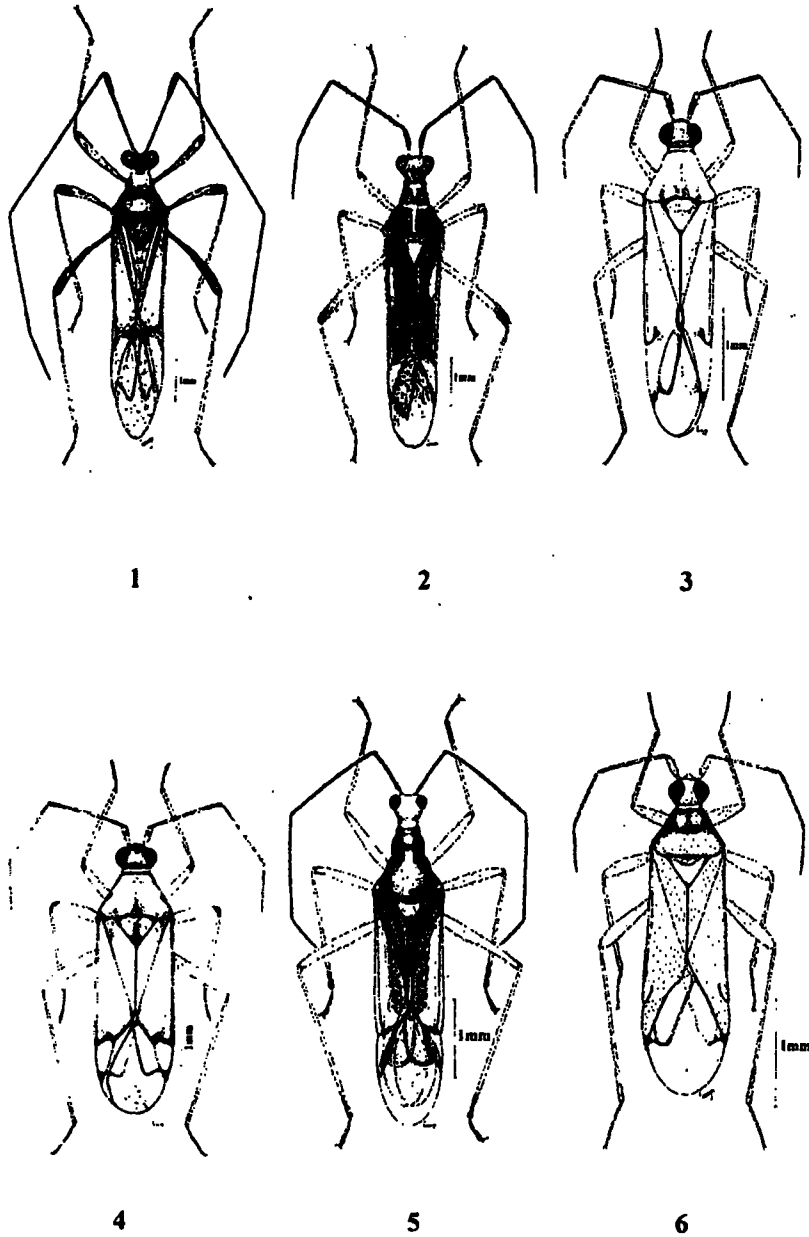


Fig. 1-6. Dorsal view of 1. *Helopeltis antonii*, 2. *Pachypeltis humeralae*, 3. *Nesidiocoris tenuis*, 4. *Singhalesia indica*, 5. *Felisacus glabratus*, 6. Unidentified species.

2. Insect is small. length 3.8-4.7 mm. First segment of antennae much longer than length of head; membrane entirely a hyaline and with two cells; oblique linear spot along the claval suture at the apex.....*Felisacus*
Insect 6.1-7.7 mm and single cell on the membrane.....3
3. Insects with erect pin like process (Fig. 7) on the scutellum with raised base; distinct swollen part epically on the first segment of antennae and first segment much longer than head length; single cell blunt at posteriorly.....*Helopeltis*
Scutellum without any kind of processes; Body highly pilose; corium brownish colouration; single cell with sharply bent posteriorly; 1st antennal seg. slightly longer than head length.....*Pachypeltis*

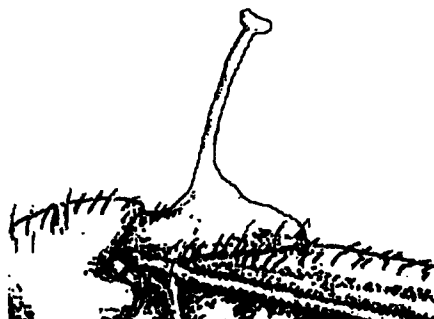


Fig. 7. Lateral view of thorax of *Helopeltis* showing erect 'pin' like structure.

4. Small insect, 2.1-2.9 mm, pale brownish-yellow; 1st segment of antennae slightly shorter than length of head, stout, middle pale; posterior lateral end of embolium and posterior end of corium red mixed dark brown, posterior end of cuneus red mixed dark brown.....*Singhalesia*
Insect larger, greenish or pale brownish-yellow, 2.9-3.8 mm; first segment of antennae as long as head and with or without broad ring at middle; very delicate..... *Nesidiocoris*

Tribe Ecritotarsini Schuh, 1976

Ernestinus mimicus Distant, 1911

Ernestinus mimicus Distant, 1911 - Sri Lanka

Male: 2.92-3.04 mm; Black pronotum, coarsely punctuated; corium with black-brown patch at middle (Fig. 8); Female: 3.0 mm; Distribution: Kandy district; Hosts: unknown. Specimens examined: 1♂, 2♀ Ceylon Haragama, V.1911 (deposited at HORDI).

Thaumastomiris sanguinalis Kirkaldy, 1902

Thaumastomiris sanguinalis Kirkaldy, 1902 – Sri Lanka

Male: 5.01-5.18 mm, entirely red except membrane, eyes, distal end of tibia, tarsi and antennal segments II, III and IV (Fig. 9); Female: 4.54 mm; Distribution: Kandy district. (Distant, 1904); Hosts: Reeds, (Kasturi Dehi) *Crinum asiaticum* L. (Distant, 1904)

Specimens examined: 1♂ Haragama, Ceylon, V.1909; 5♂ Haragama, Ceylon, V.1911; 2♀ Haragama, Ceylon, V.1911 (deposited at HORDI).

Harpedona marginata Distant, 1904

Harpedona marginata Distant, 1904 - Sri Lanka

Male: Black insect, legs and rostrum pale brownish-yellow. 3.53-3.85 mm (Fig. 10); Female: 3.34-4.07 mm. Hosts: "Val ala" (*Dioscorea alata* L.); Distribution: Kandy and Colombo districts.

Specimens examined: 2♂ and 4♀ Pilimathalawa, 8.VIII.99, on *Dioscorea*, Coll. S. Basnagala; 3♂ and 2♀ Jamburaliya, 7.VIII.99, on *Dioscorea*, Coll: A. Wijesekara. (deposited at HORDI).

Prodromus clypeatus Distant, 1904

Prodromus cuneatus Distant, 1909 - Sri Lanka

Male: 4.72-5.14 mm, pale yellow, body is broader than other species of *Prodromus* (Fig. 11); Female: 4.82-4.93 mm; Distribution: Kandy district; Hosts: *Musa* sp.

Specimens examined: 1♂ and 2♀ Peradeniya, 25.XI.99, On Banana, Coll. S. Basnagala; 2♂ and 3♀ Gannoruwa (ISTI), 9.VII.99, On Banana, Coll. A. Wijesekara. (Deposited at HORDI). Specimens at NM, Colombo: 1♂ Ceylon, Colombo, at light, 27.XI.24 (ref. no. 5278).

Prodromus subflavus Distant, 1904

Prodromus subflavus Distant, 1904 - Sri Lanka

Male: 4.78 mm, pale yellowish green with black eyes; Female: 4.65 mm; Distribution: Kandy district; Hosts: Not recorded.

Specimens examined: 1♂ Peradeniya, Ceylon, VI.05, (1606); 1♀ Peradeniya, Ceylon, VI.05, (1631). (deposited at NM, Colombo).

Key to Genera of Tribe Ecritotarsini

1. Bulging out eyes, not touch the anterior margin of pronotal collar ; posterior lobe of pronotum coarsely punctate; scutellum relatively small; 1st segment of antennae as long as length of head; membrane with small or long sickle shaped cuneus with longer single cell.....*Prodromus*
Eyes touches the anterior margin of pronotal collar; posterior lobe of pronotum fully concave without posteriolateral margins or partly concave with slightly convex posterolateral margins; scutellum relatively smaller or large; pronotal collar well separated from posterior margin or not; insect subovate in shape or become narrower posteriorly; cuneus either long or short2

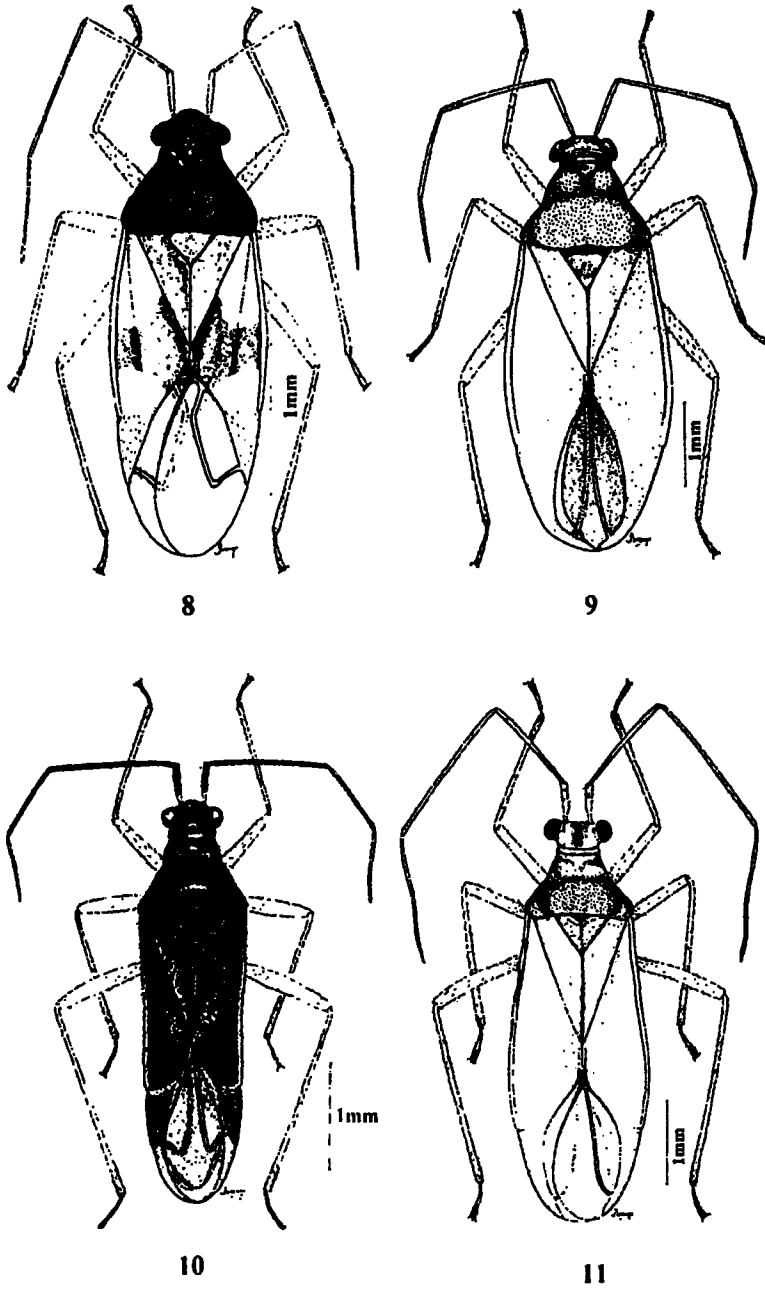


Fig. 8-11. Dorsal view of 8. *Ernestinus mimicus*, 9. *Thaumastomiris sanguinalis*, 10. *Harpedona marginata*, 11. *Prodromus cuneatus*.

- 2 Subovate in shape; pronotum fully concave and collar lacking its posterior margin; 1st segment of antennae usually quite longer than length of head; small scutellum.....3
 Posterior lobe of pronotum not fully concave, posterolateral margins slightly convex; middle of anterior section of pronotum with small incision; body become narrower posteriorly; cuneus smaller and broad; males having longitudinal incision on the frons*Harpedona*

3. Insects with long sickle shaped cuneus where posterior end meets the median line of body; membrane with a long single cell*Thaumastomoris*
 Cuneus small and broad; membrane with single cell with blunt edge posteriorly.....*Ernestinus*

Characters of taxonomic importance which are used to describe the key are shown in Fig. 12.

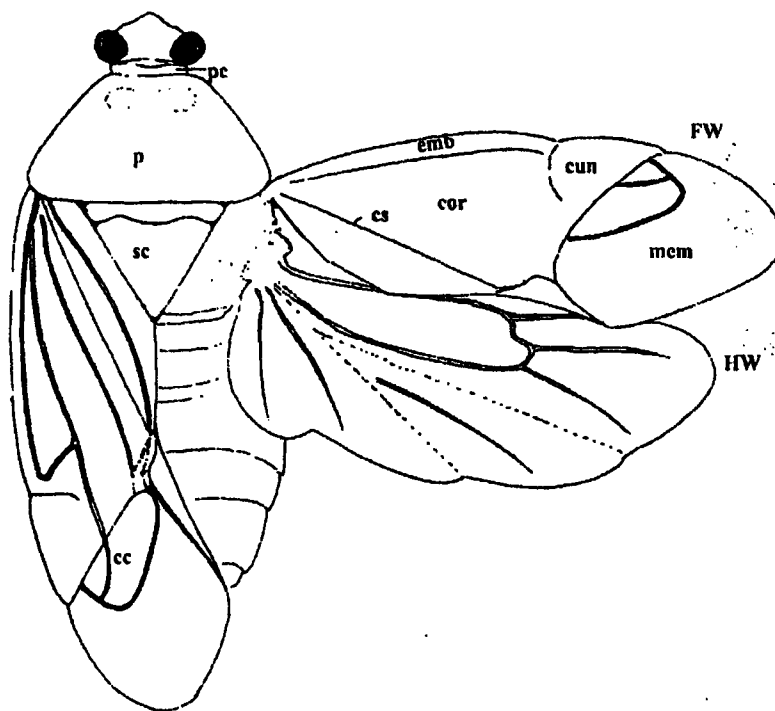


Fig. 12. Taxonomically important external features of a mirid (Torre-Bueno, 1985).

[Note: cc - closed cell, cor - corium, cs - claval suture, cun - cuneus, emb - embolium, FW - fore wing, HW - hind wing, mem - membrane, p - pronotum, pc - pronotal collar, sc - scutellum].

CONCLUSIONS

Fifteen Bryocorine species were identified from 1999-2001 collections. This includes *Helopeltis antonii*, *H. bradyi*, *H. theivora*, *Pachypeltis humerale*, *P. politum*, *P. maesarum*, *Nesidiocoris tenuis*, *Singhalesia indica*, *Felisacus glabratus*, *Thaumastomiris sanguinalis*, *Prodromus subflavus*, *P. clypeatus*, *Ernestinus mimicus* and *Harpedona marginata* and unidentified species *Helopeltis antonii*, *H. bradyi* and *Pachypeltis politum* were re-described in this study to include additional morphological and morphometric information. Since the collection included an unrecorded and an unidentified species, possibility of that more unrecorded and new Bryocorine species new to science may exist in Sri Lanka.

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