Serangga 22(1): 183-202
ISSN 1394-5130 © 2017, Centre for Insects Systematic,
Universiti Kebangsaan Malaysia

SYSTEMATICS AND DISTRIBUTION OF THE SUBFAMILY HARPACTORINAE AMYOT & SERVILLE, 1843 (HEMIPTERA: HETEROPTERA: REDUVIIDAE) IN NORTHERN SARAWAK

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ABSTRACT

Harpactorinae is the largest subfamily of Reduviidae and found distributed in all biogeographical regions. However, it is yet the most poorly studied subfamily of Reduviidae. This study records and redescribed Harpactorinae species in northern Sarawak based on morphological structures with reference to voucher specimens from UNIMAS Insect Reference Collection (UIRC), Agriculture Research Centre Semongok (ARC) and Sarawak Forest Department (SFD), as well as new field collections. A total of 99 specimens representing 11 genera and 14 species of Harpactorinae were evaluated. *Velinus nigrigenu* dominated other species with 37% representation, followed by *Cosmolestes picticeps* (35%), *Sycanus macracanthus* (11%) and *Polididus armatissimus* (4%). In northern Sarawak, Harpactorinae species can be found within two types of forests, lowland mixed dipterocarp forest and secondary forest. This paper presents a

systematic account of each species of Harpactorinae.

Keywords: Systematics, distribution, Harpactorinae, northern Sarawak

ABSTRAK

Harpactorinae adalah subfamili Reduviidae yang terbesar dan dijumpai di seluruh kawasan biogeografi. Namun begitu, ia adalah subfamili Reduviidae yang paling kurang dikaji. Kajian ini bertujuan untuk merekod spesies Harpactorinae di utara Sarawak dan diperihalkan berdasarkan struktur morfologi dengan merujuk kepada spesimen baucar dari Koleksi Rujukan Serangga UNIMAS (UIRC), Pusat Penyelidikan Pertanian Semongok (ARC) dan Jabatan Hutan Sarawak (SFD), serta spesimen daripada koleksi lapangan. Sebanyak 99 spesimen yang terdiri daripada 11 genus dan 14 spesies Harpactorinae telah dikaji. *Velinus nigrigenu* mendominasi spesies lain dengan 37%, diikuti oleh *Cosmolestes picticeps* (35%), *Sycanus macracanthus* (11%) dan *Polididus armatissimus* (4%). Di utara Sarawak, spesies Harpactorinae boleh dijumpai dari dua jenis hutan iaitu hutan tanah pamah dipterokarp campuran dan hutan sekunder. Akaun sistematik bagi setiap spesies Harpactorinae adalah dibentangkan.

Kata kunci: Sistematik, taburan, Harpactorinae, utara Sarawak

INTRODUCTION

Harpactorinae Amyot & Serville, 1843 is the largest subfamily of Reduviidae and most of their members are diurnal. Represented by approximately 320 genera with 2,800 described species, however is yet the most poorly studied subfamily of Reduviidae (Cai & Tomokuni, 2003; Melo & Coscaron, 2005; Weirauch *et al.*, 2014). They are found distributed in all biogeographical regions. Members of the Harpactorinae are easily recognized by having elongated head and variable body colour, which are usually striking. According to Weirauch *et al.* (2014), the harpactorines are characterized by the presence of corium with quadrate cell formed by cubitus, and subapical spur on the foretibia that carries the foretibial comb, and most species also have a cylindrical region on the head and elongated antennal scape.

The members of Harpactorinae are predaceous on other invertebrates. Some are zoophagous and feed on the body fluid of other invertebrates (Ambrose, 2000; Froeschner, 1985; Patterson, 2007), and in rare cases, few of them are phytophagous feeding on the fluid of plants (Berenger & Pluot-Sigwalt, 1997). Some species are valuable as biological control agents of various insect pests (Schaefer & Panizi, 2000) due to their polyphagous diet. Although some of the species have been studied as biological control agents of crop pests (e.g. Grundy, 2007; Grundy & Maelzer, 2003), however little studies have been conducted on the Harpactorinae of Sarawak. Currently, there is not much information of this group in northern Sarawak, thus the aim of this study is to review the taxonomic status and distribution of the subfamily Harpactorinae in northern Sarawak.

MATERIALS AND METHODS

In this study, a total of 99 specimens were examined from the collections of three institutions: UNIMAS Insect Reference Collection (UIRC), Agriculture Research Centre Semongok (ARC) and Sarawak Forest Department (FRC), as well as new field collections.

RESULTS AND DISCUSSION

A total of 99 specimens from northern Sarawak, comprising 11 genera and 14 species were evaluated. *Velinus nigrigenu* dominated other species with 37% followed by *Cosmolestes picticeps* (35%), *Sycanus macracanthus* (11%), *Polididus armatissimus* (4%), *Epidaus* sp. 2 (3%) and *Yolinus fuliginosus* (2%). The rest of the Harpactorinae species, *Astinus m-album*, *A. pustulatus*, *Biasticus* sp., *Campsolomus* sp., *Epidaus* sp. 1, *Eulyes amonea*, *Panthous* sp. and *Sycanus maculatus* were each represented by one individual (Table 1).

Table 1. List of species of the subfamily Harpactorinae (Reduviidae) evaluated.

Genus	Species	No. of individuals	Percentage (%)
Astinus (Stål, 1859)	*A. m-album* (Amyot & Serville, 1843)	1	1
	A. pustulatus (Stål, 1863)	1	1
Biasticus (Stål, 1866)	*Biasticus* sp.	1	1
Campsolomus (Stål, 1870)	*Campsolomus* sp.	1	1
Cosmolestes (Stål, 1859)	*C. picticeps* (Stål, 1859)	35	35
Epidaus (Stål, 1859)	*Epidaus* sp. 1	1	1
	Epidaus sp. 2	3	3

Eulyes (Amyot & Serville, 1843)	*E. amoena* (Guérin, 1838)	1	1
Panthous (Stål, 1863)	*Panthous* sp.	1	1
Polididus (Stål, 1859)	*P. armatissimus* (Stål, 1859)	4	4
Sycanus (Amyot & Serville, 1843)	*S. macracanthus* (Stål, 1866)	11	11
	S. maculatus	1	1
Velinus (Amyot & Serville, 1843)	*V. nigrigenu* (Amyot & Serville, 1843)	36	37
Yolinus (Amyot & Serville, 1843)	*Y. fuliginosus* (Amyot & Serville, 1867)	2	2
	Total	**99**	**100**

The Harpactorinae prey on different types of invertebrates and due to their variety of habits and diet, they can be found distributed in all biogeographical regions. The species of this subfamily were found distributed in four types of vegetations in northern Sarawak, namely: 1) Oil palm plantations in Miri PPB Oil Palm Plantation and Samling; 2) Fragmented forest in Miri PPB Oil Palm Plantation; 3) Mixed dipterocarp forest in Mulu National Park; and 3) Peat swamp forest in Limbang. A total of 44 specimens were recorded at the oil palm plantation and fragmented forest, six specimens at mixed dipterocarp forest and five specimens at peat swamp forest (Table 2).

Table 2. List of the subfamily Harpactorinae (Reduviidae) from different types of vegetation in northern Sarawak.

Species	**Types of Vegetation**			
	Oil palm plantation	**Fragmented forest**	**Mixed dipterocarp forest**	**Peat swamp forest**
Astinus m-album	-	-	1	-
Astinus pustulatus	-	1	-	-
Biasticus sp.	-	-	-	1
Campsolomus sp.	1	-	-	-
Cosmolestes picticeps	10	20	-	4
Epidaus sp. 1	-	-	1	-

Epidaus sp. 2	-	3	-	-
Eulyes amoena	1	-	-	-
Panthous sp.	-	-	1	-
Polididus armatissimus	2	1	1	-
Sycanus macracanthus	3	8	-	-
Sycanus maculatus	-	1	-	-
Velinus nigrigenu	27	10	-	-
Yolinus fuliginosus	-	-	2	-
Total	**44**	**44**	**6**	**5**

Subfamily Harpactorinae (Amyot & Serville, 1843)

Description: Small to large size: variable body colour, usually striking colour; head usually elongate, postocular head region longer than anteocular head region; labium with three segments visible; scape of antennae short; variable structure of humeral angle, thorn-like structure, rounded; transverse sulcus in front of pronotum; apex of scutellum pointed except genus *Sycanus*, scutellum with a long spine projected upward; cubitus formed a quadrate cell on the corium; and forefemur claw with basal tooth.

Key to the genera of the subfamily Harpactorinae

1. Small body size, <15.00 mm……*Biasticus*
   Medium to large body size…….....……...…....2
2. Body covered with small to medium spines…….....*Polididus*
   Body smooth, without spines……..…...……...3
3. Connexivum enlarged……4
   Connexivum slightly enlarged……..……5
4. Connexivum with four semi-sphere structures.....*Yolinus*
   Connexivum with wave-like structure with black spots……...*Eulyes*
5. Scutellum covered by pronotum……..……..….*Panthous*
   Scutellum not covered with pronotum…….....6

6. Apex of scutellum with plate or spine……...7
   Apex of scutellum without plate or spine……..8
7. Light yellow on scutellum's plate and posterior margin of corium…….....*Cosmolestes*
   Scutellum with spine vertically and extremely elongated head……..*Sycanus*
8. Posteriorly pronotal lobe with thorn-like structures projected upward…….....9
   Posteriorly pronotal lobe smooth…..……..10
9. Dull thorn-like structures projected outward on posterior humeral angle……..…….*Astinus*
   Sharp thorn-like structures projected outward on posterior humeral angle….....*Epidaus*
10. Yellow line between compound eyes, connexivum yellow with black spots, and antennae with dark brown colours……..*Campsolomus*
    Head black, connexivum formed semi-sphere structures with yellow and black, and antennae alternate black and yellow colours…..……..*Velinus*

Genus *Astinus* Stål, 1859

Astinus m-album (Amyot & Serville, 1843)

Materials examined. Male: SARAWAK: Kuching: Bako National Park [110.4667º E; 1.7167º N], 129 m, 4 May 1979, Mercer & Yeo Eng Teck. SARAWAK: Sibu [111.8308º E; 2.3000º N], 10 m, 14 April 1981, Haidir Nusi, 1♀. SARAWAK: Kuching, Bako National Park [110.4667º E; 1.7167º N], 129 m, 3 May 1979, Mercer & Yeo Eng Teck, 1♂. SARAWAK: Niah [113.7309º E; 3.8665º N], 8 m, 21 May 1980, Mercer & Suhaili, 1♂. SARAWAK: Niah, Niah National Park [113.7869º E; 3.7981º N], 331 m, 18 May 1980, Mercer & Suhaili, 1♀. SARAWAK: Kuching: Bako National Park [110.4667º E; 1.7167º N], 129 m, 16 May 1980, Yeo Eng Teck, 1♂.

SARAWAK: Niah [113.7309º E; 3.8665º N], 8 m, 26 April 1981, Lippa Apeng, 1♀.

Diagnosis. Male: medium body size, length 18.28 mm, width 6.07 mm; Female: medium body size, length 20.76 mm, width 7.82 mm; posterior humeral angle with two medium and two small dull thorn-like structures; fawn colour on head, pronotum, scutellum, and legs; connexivum and basal hemelytra with dark brown; and connexivum enlarged and rounded.

Local distribution. Bako National Park, Sibu, Niah National Park and Mulu National Park.

Remarks. *Astinus m-album* shared the same posterior disk with *A. pustulatus* by having two medium and two small dull thorn-like structures on posterior humeral angle.

Astinus pustulatus (Stål, 1863)

Materials examined. Male: SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N] 12 m, 21 April 1983, Hamid & Yeo Eng Teck. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 16 December 1982, Ento Team, 2♂. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 17 December 1982, Ento Team, 1♂. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 18 December 1982, Ento Team, 1♂. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 19 December 1982, Ento Team, 1♀. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 2 October 1981, Ento Team, 1♀. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 6 February 2015, Ento team, 1♀.

Diagnosis. Male: medium body size, length 17.87 mm, width 5.68 mm; Female: medium body size, length 19.92 mm, width 6.45 mm; two medium and two small dull thorn-like structures on posterior humeral angle; brown to dark brown colours on head, pronotum, scutellum, connexivum, forefemur, and

foretibiae; red line at transverse sulcus of corium; white markings on pronotum; yellow colours on apex of abdomen and basal connexivum; and connexivum enlarged.
Local distribution. Sibu, Miri and Semenggoh, Kuching.
Remarks. See remarks of *A. m-album*.

Genus *Biasticus* Stål, 1866

Biasticus sp.

Materials examined. Male: SARAWAK: Bintulu: Sungai Sibiyu: Res. Station [113.0901 º E; 3.1906 º N], 8m, 10 January 1985, Haidir Nusi. SARAWAK: Limbang [115.0081 º E; 4.7550 º N], 7 m, 15 October 1985, Lippa Akeng, 1♀. SARAWAK: Kuching: Semenggoh [110.2951 º E; 1.3811 º N], 47 m, 23 January 1979, A. A. Hamid, 1♀.
Diagnosis. Male: small body size, length 10.16 mm, width 2.57 mm; Female: small body size, length 10.38 mm, width 3.12 mm; brown posterior pronotal lobe disk; yellow connexivum with brown colour at the middle; and femur light brown to dark brown.
Local distribution. Semenggoh, Santubong, Bintulu and Limbang.
Remarks. *Biasticus* sp. recorded and collected from Forest Research Centre and Santubong National Park, Sarawak.

Genus *Campsolomus* Stål, 1870

Campsolomus sp.

Materials examined. Male: SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 28 February 2011, Muhammad Syafiq Bin Ahmad Zahari. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak

[110.4324º E; 1.4598º N], 8 m, 3 February 1995, 1st Year Student, 1♂. SARAWAK: Unknown, 1♂. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 11 May 2013, Hazirah Hanun, 1♀. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 22 April 2012, Ummi Norhanifah Abdullah, 1♀.

Diagnosis. Male: medium body size, length 14.32 mm, width 3.36 mm; Female: medium body size, length 14.37 mm, width 3.10 mm; dark yellow between eyes; black transverse sulcus on pronotum; black to dark brown on antennae; and connexivum dark yellow with small black spots.

Local distribution. Kota Samarahan and Miri.

Remarks. *Campsolomus* sp. can easily be confused with *Cosmolestes picticeps* by having yellow and black body colours. However, *Campsolomus* sp. is distinguished from *C. picticpes* by having dark yellow between eyes, black transverse sulcus on pronotum, black to dark brown antennae, and connexivum dark yellow with small black spots; whereas in *C. picticpes*, yellow lines in front eyes and at the middle between eyes to collar, antennae yellow, fawn and black, connexivum yellow with black lines, transverse sulcus on corium light yellow, and scutellum with yellow flat-plate.

Genus *Cosmolestes* Stål, 1859

Cosmolestes picticeps (Stål, 1859)

Materials examined. Male: SARAWAK: Niah [113.7309º E; 3.8665º N], 8 m, 24 September 1981, Ento Team. SARAWAK: Kuching: Semengoh [110.2951º E; 1.3811º N], 47 m, 8 December 1981, A. Rahman Osman, 2♀. SARAWAK: Sibu: Oya: Road Nursery [111.9212º E; 2.2960º N], 12 m, 14 December 1982, Ento Team, 2♀. SARAWAK: Niah [113. 7309º E; 3.8665º N], 8 m, 20 May 1980, Mercer & Suhaili, 1♂. SARAWAK: Sibu [111.8308º E; 2.3000º N], 10 m, 2 October

1981, Ento Team, 1♀. SARAWAK: Niah [113.7309° E; 3.8665° N], 8 m, 26 May 1981, Alex & Yeo, 2♀.

Diagnosis. Male: small body size, length from 11.92 mm, width from 2.25 mm; Female: medium body size; length 12.07 mm, width 2.80 mm; light yellow flat-plate on the apex of scutellum; light yellow line at the transverse sulcus on corium; and yellow line at the middle of head.

Local distribution. Limbang, Kuching, Sibu, Serian, Sri Aman, Mukah, Engkilili, Kota Samarahan, Bako National Park, Bau, Sarikei, Betong, Kapit, Tarat, Miri, Semenggoh, Sematan and Niah.

Remarks. See remarks of *Campsolomus* sp.

Genus *Epidaus* Stål, 1859

Epidaus sp. 1

Materials examined. Female: SARAWAK: Mulu: Mulu National Park [114.7833° E; 3.9500° N], 224 m, 19 May 1986, Lippa Apeng. SARAWAK: Kuching: Santubong National Park: Permai [110.3344° E; 1.7626° N], 439 m, 8 August 2015, 1♀.

Diagnosis. Male: medium body size, length 15.73 mm, width 4.15 mm; Female: medium body size, length 23.22 mm, width 7.63 mm; two medium and two small sharp thorn-like structures on posterior humeral angle; brown to dark brown body colour; bi-coloured connexivum, dark brown and yellow; sharp thorn-like structure gently curved and projected outward on posterior humeral angle; and connexivum smooth with nodule-like structure at the middle.

Local distribution. Mulu National Park and Santubong National Park.

Remarks. *Epidaus* sp. 1 shared the same posterior disk with *Epidaus* sp. 1 by having two medium and two small sharp thorn-like structures on posterior humeral angle.

Epidaus sp. 2

Materials examined. Male: SARAWAK: Kuching: Bako National Park [110.4667º E; 1.7167º N], 129 m, 17 August 1978, Mercer. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 10 February 2015, Ento team, 1♂. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 11 February 2015, Ento team, 1♂1♀.
Diagnosis. Male: medium body size, length 20.38 mm, width 4.74 mm; Female: medium body size, length 24.20 mm, width 7.82 mm; two medium and two small sharp thorn-like structures on posterior humeral angle; fawn to dark fawn body colour; two medium white spots and two medium white spots below medium spot at both side of corium; and connexivum enlarged and pointed downward at the middle before narrowed to the basal.
Local distribution. Miri and Bako National Park.
Remarks. See remarks of *Epidaus* sp. 1.

Genus *Eulyes* Amyot & Serville, 1843

Eulyes amoena (Guérin, 1838)

Materials examined. Female: SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 9 March 1997, Justine Payoh. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 23 February 2000, Kelvin, 1♀. SARAWAK: Lundu: Matang [110.1591º E; 1.6105º N], 21 m, 4 May 2013, Fatin, Amirah, & Elly, 1♀. SARAWAK: Kuching: Semengoh [110.2951º E; 1.3811º N], 47 m, 18 December 1980, Mercer & Lippa, 1♀. SARAWAK: Niah [113.7309º E; 3.8665º N], 8 m, 25 January 1977, T. Yeo, 2♀.
Diagnosis. Male: large body size, length 29.54 mm, width 11.88 mm; Female: large body size, length 30.10 mm, width 11.53

mm; extremely enlarged connexivum; light yellow, orange and black body colours; and three colours on femur, orange, black, and light yellow.
Local distribution. Kota Samarahan, Semonggok, Niah and Matang.
Remarks. *Eulyes amoena* is known specimens from UNIMAS Insect Reference Collection, Forest Research Centre and Agriculture Research Centre Semongok.

Genus *Panthous* Stål, 1863

Panthous sp. 1

Materials examined. Male: SARAWAK: Limbang [115.0081º E; 4.7550º N], 7 m, 16 October 1985, Mahmud & Mardek.
Diagnosis. Male: medium body size, length 24.68 mm, width 7.04 mm; enlarged pronotum until covered scutellum; anterior pronotal lobe red with black spots at the middle; posterior pronotal lobe fawn; fade white spots at corium; three colours patterning on femur, red, fawn, and black; antennae with alternate colours; and slightly enlarged connexivum.
Local distribution. Limbang.
Remarks. *Panthous* sp. 1 is known only from a single female specimen from Forest Research Centre, Sarawak.

Genus *Polididus* Stål, 1858

Polididus armatissimus (Stål, 1859)

Materials examined. Male: SARAWAK: Julau: Ng. Ju [111.9166º E; 2.0243º N], 23 m, 12 October 1988, Ento Team. SARAWAK: Julau: Ng. Ju [111.9166º E; 2.0243º N], 23 m, 12 October 1988, Ento Team, 2♂1♀. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak: Allamanda College

[110.4324º E; 1.4598º N], 8 m, 30 March 2012, Asmaa Bt. Che Mohd Rosli, 1♀.

Diagnosis. Male: medium body size, length 10.55 mm, width 2.36 mm; Female: medium body size, length 11.14 mm, width 2.78 mm; small to medium spines covered the whole body, including head, pronotum, scutellum, abdominal side, and legs; scapus side with medium size spines; scutellum with three spine; transverse sulcus of pronotum with six spines; and anterior angle of pronotum with medium spines.

Local distribution. Kota Samarahan, Lawas, Limbang, Kuching, Miri, and Julau.

Remarks. *Polididus armatissimus* is known specimens from UNIMAS Insect Reference Collection, Forest Research Centre and Agriculture Research Centre Semonggok.

Genus *Sycanus* Amyot & Serville, 1843

Sycanus macracanthus (Stål, 1866)

Materials examined. Male: SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 7 February 2015, Hanisah Zahuri. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 7 February 2015, Hanisah Zahuri, 3♀. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 9 April 2013, Siti Hajar Ariffin, 1♀. SARAWAK: Kota Samarahan [110.4883º E; 1.4599º N], 6 m, 23 November 2003, Lizawati, R., 1♂. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 26 April 2013, Hazirah Hanun, 1♀. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 10 April 2013, Huang Jia Huei, 1♂. SARAWAK: Kota Samarahan [110.4883º E; 1.4599º N], 6 m, 21 April 2013, Aidil Zahidin, 1♂. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak

[110.4324º E; 1.4598º N], 8 m, 17 March 2014, M. Syafiq Nordin, 1♀.

Diagnosis. Male: medium body size, length 19.53 mm, width 7.21 mm; Female: medium body size, length 19.60 mm, width 7.44 mm; head extremely elongated; labium extremely slender; connexivum enlarged and slightly rounded; and strong yellow on corium.

Local distribution. Bau, Lundu, Maludam, Semonggok, Miri, Sibu, Simunjan, Gunung Serapi and Kota Samarahan.

Remarks. *Sycanus macracanthus* is mostly similar in body structures to *S. maculatus*. However, *S. macracanthus* is distinguished from *S. maculatus* by having abdomen and connexivum slightly rounded, whereas *S. maculatus* have strong orange to black body, anterior angle orange, connexivum with strong orange and black spots, orange pronotum and enlarged connexivum.

Sycanus maculatus (Miller, 1941)

Materials examined. Male: SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 7 February 2015, Hanisah Zahuri.

Diagnosis. Male: medium body size, length 16.68 mm, width 5.48 mm; body colours, strong orange to black; corium with strong yellow; head extremely elongated; labium extremely slender; anterior angle orange; connexivum with strong orange and black spots; orange pronotum; and enlarged connexivum.

Local distribution. Miri.

Remarks. *Sycanus maculatus* is known only from male specimens recorded from Miri PPB Oil Palm Plantation. See remarks of *S. macracanthus*.

Genus *Velinus* Amyot & Serville, 1843

Velinus nigrigenu (Amyot & Serville, 1843)

Materials examined. Male: SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 4 February 2015, Hanisah Zahuri. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 6 February 2015, Hanisah Zahuri, 1♀. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 29 August 2015, Anis Raffi, 2♂. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 27 August 2015, Anis Raffi, 2♂. SARAWAK: Miri: PPB Oil Palm Plantation: Saremas 2 [114.0060º E; 4.3320º N], 17 m, 27 August 2015, Anis Raffi, 1♀. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 10 February 2007, Madinah, Nur Aida & Rohayu, 1♂. SARAWAK: Kota Samarahan: Universiti Malaysia Sarawak [110.4324º E; 1.4598º N], 8 m, 30 March 2012, Ungku Mahfuzah, 1♂. SARAWAK: Serian: Ranchan Recreational Park [110.5845º E; 1.1434º N], 45 m, 1 May 2013, Siti Hajar Ariffin, 1♂.

Diagnosis. Male: medium body size, length 18.48 mm, width 3.63 mm; Female: medium body size, length 18.49 mm, width 3.35 mm; black head; alternate yellow and black on antennae; connexivum yellow alternate with black; and four semi-sphere connexivum structure.

Local distribution. Kota Samarahan, Kuching, Mukah, Serian, Sibu, Siburan, Bintulu, Miri, Baram, Niah, Semenggoh, Sematan, Sri Aman and Serian.

Remarks. *Velinus nigrigenu* is known specimens collected and recorded from all institutions and sampling collections.

Genus *Yolinus* (Amyot & Serville, 1843)

Yolinus fuliginosus (Amyot & Serville, 1867)

Materials examined. Female: SARAWAK: Limbang [115.008° E; 4.7550° N], 7 m, 20 October 1985, Lippa Apeng.

SARAWAK: Limbang [115.0081° E; 4.7550° N], 7 m, 20 October 1985, Mahmud Osman, 1♀.

Diagnosis. Female: large body size, length 23.58 mm, width 9.56 mm; black body colours except basal connexivum; four semi-sphere connexivum structures; and connexivum first basal dark brown with apex dark red.

Local distribution. Limbang.

Remarks. *Yolinus fuliginosus* is known only from female specimens from Forest Research Centre, Sarawak.

CONCLUSION

A total of 99 specimens comprising 11 genera and 14 species were examined from northern Sarawak, where the Harpactorinae species were found in four vegetation types, namely: 1) Oil palm plantation in Miri PPB Oil Palm Plantation and Samling (44 specimens, 6 species); 2) Fragmented forest in Miri PPB Oil Palm Plantation (44 specimens, 7 species); 3) Mixed dipterocarp forest in Mulu National Park (6 specimens, 5 species); and 3) Peat swamp forest in Limbang (5 specimens, 2 species).

ACKNOWLEDGEMENTS

This study was supported by Ministry of Higher Education, Malaysia (MOHE) under Research Acculturation Grant Scheme (RAGS/SWTN10(4)/1045/2013(12)) led by Ms. Ratnawati Hazali. The authors would like to thank Sarawak Forest Department and Agriculture Research Centre Semongok for the

permission to study their assassin bug collections. The authors also would like to thank all the staff and students of Department of Zoology, Faculty of Resource Science and Technology, UNIMAS who assisted in the samples collection, and UNIMAS for providing the research facilities. Special acknowledgement goes to Sarawak Forest Department for the permission to conduct this study (research permit NCCD.907.4.4 (JLD.12)-13).

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