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A LIST OF SOCIAL VESPID WASPS (HYMENOPTERA: VESPIDAE) FROM KUALA LOMPAT, KRAU WILDLIFE RESERVE, PAHANG, PENINSULAR MALAYSIA

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ABSTRACT

A total of 272 social vespid specimens consisting of 210 and 62 specimens which collected during this study and previously collected which have been kept in CIS as voucher specimens, respectively, were examined and of this, 22 social vespids species belonging to the three subfamilies, Stenogastrinae (8 species in 3 genera), Polistinae (8 species in 3 genera), and Vespinae (6 species in 2 genera) were successfully recorded for Kuala Lompat with 12 species are new record for this area. Two previously recorded species namely the *L. campanulae* and *V. multimaculata* were not collected in the study. In comparison to those recorded from Peninsular Malaysia, Borneo, Sunda Islands (not including Borneo) and Thailand, the collection from Kuala Lompat represents only 31.8% of the total known species occurred for Peninsular Malaysia, 35.5% for Borneo, 27.5% for Sunda Islands,

and 44%for Thailand. Interestingly, all the 22 species found in Kuala Lompat during this study were also found in the Sunda Islands but only 19 and14 species collected were also previously recorded in Borneo and Thailand, respectively.

Key words: Social wasps, Hymenoptera, Vespidae, Kuala Lompat, Peninsular Malaysia

ABSTRAK

Sejumlah 272 spesimen vespid sosial yang terdiri daripada 210 dan 62 spesimen yang masing-masingnya merupakan hasil daripada pengumpulan semasa kajian dan pengumpulan terdahulu yang di simpan di dalam CIS sebagai baucer spesimen telah diperiksa dan daripada ini, 22 spesies vespid sosial yang dipunyai oleh tiga subfamili, Stenogastrinae (8 spesies dalam 3 genera), Polistinae (8 spesies dalam 3 genera), dan Vespinae (6 spesis dalam 2 genera) telah berjaya direkodkan bagi Kuala Lompat dan daripada jumlah ini, 12 spesies merupakan rekod baru bagi kawasan ini. Dua spesies yang direkodkan sebelum ini iaitu *L. Campanulae* dan *V. multimaculata* tidak dikumpulkan semasa kajian ini. Berbanding dengan rekod dari Semenanjung Malaysia, Borneo, Pulau-pulau Sunda (tidak termasuk Borneo) dan Thailand, koleksi dari Kuala Lompat mewakili hanya 31.8% daripada jumlah spesies yang dikenalpasti terdapat bagi Semenanjung Malaysia, 35.5% bagi Borneo, 27.5% bagi Pulau-pulau Sunda, dan 44% bagi Thailand. Menariknya, semua 22 spesies yang ditemui di Kuala Lompat semasa kajian ini juga telah ditemui di Pulau-pulau Sunda. Manakala, hanya 19 dan 14 spesies yang dikumpulkan masing-masing pernah direkodkan di Borneo dan Thailand.

Kata kunci: Tebuan sosial, Hymenoptera, Vespidae, Kuala Lompat, Peninsular Malaysia

INTRODUCTION

Kuala Lompat forest is located within Krau Wildlife Forest Reserve which covering an area of approximately 60338 ha of

protected area and is under the management of the Department of Wildlife and National Parks (PERHILITAN), Malaysia (Musa & Pan, 1989). The Reserve consist of different types of forest with lowland forest predominates the central and eastern parts while the north-western parts are cover by asuccession of upland and mountain forest.

Lowland dipterocarp forest occurs between 43 m to 300 m above sea level at Kuala Lompat. Most of the remaining forest surrounding Kuala Lompat is a part of permanent forest estate where previously was for rubber, but is now planted with oil palm beside for local community settlements.

The Reserve is reported to have diverse species of mammals especially bats, but high diversity in the insects including social vespids is expected. Social vespids consist of three subfamilies namely Stenogastrinae, Polistinae and Vespinae (Carpenter 1981). Although Schmitz and Moritz (1998) presented molecular data to support a more distant relationship of Stenogastrinae to the social wasps (Polistinae and Vespinae), there are still no robust analyses to proof that the three subfamilies do not form a monophyletic group (Carpenter 2003). All the three subfamilies occur together only in the Oriental and Papuan region (Richards 1971). In fact, Southeast Asia including Sunda Islands (Sumatra, Borneo, Java, etc) and Peninsular Malaysia is a special place for social vespids (Carpenter & Nguyen 2003).

The Stenogastrinae are generally cryptic in their life and are distributed from India, through Southeast Asia and southern China to Papuan region, with five of seven genera occurring in Asia, and four (*Euestenogaster, Parischnogaster, Liostenogaster* and *Metischnogaster)* found in Peninsular Malaysia. The Polistinae are cosmopolitan, with four genera in two tribes (Polistini = *Polistes* and Ropalidiini = *Ropalidia*, *Parapolybia* and *Polybioides*) are distributed in South-East Asia (Carpenter & Nguyen, 2003). The Vespinae are Holarctic and Oriental, with two (*Provespa & Vespa*) of four found in Peninsular Malaysia.

However, report on social vespid wasps in Southeast Asia including Peninsular Malaysia is still very sparse despite their ecological importance not only being at the top of terrestrial insect food web but also as effective pollinators of various plants as well

as valuable bio-indicators for habitat disturbances and environmental changes (Kojima et al., 2009). Based on literature records, approximately 149 species of social vespids so far known to occur at Southeast Asia and of this, 69 species known for Peninsular Malaysia, 62 species for Borneo, 80 species for Sunda Islands (not included Borneo) and 50 species for Thailand (Carpenter, 1996; Carpenter & Kojima, 1997a, 1997b; Kojima & Carpenter, 1997). Kojima (2009) reported that there are 10 social vespid species from Kuala Lompat Forest Reserve, however, we are very sure that there are more species to be discovered from this mixed disturbed and undisturbed forest reserve. Therefore, the aim of our study was to make an inventory of social vespids in Kuala Lompat Forest Reserve, Pahang, Malaysia.

MATERIAL AND METHOD

This study was conducted between the end of September 2009 and March 2010. The field collection was conducted basically once a month in consecutive days within 1.5 km^2 area, viz., along roads and forest trails in both opened (forest fringe) and forested (inner forest) portions of Kuala Lompat Forest. Insects were collected using sweeping net, malaise trap and light trap. Sweep netting was done in both portions of the forest (0800 hours to 1700 hours) over six consecutive days in each collection period. Social vespids caught were killed in a killing jar containing ethyl acetate-wetted cotton tissue before stored in bottles filled with 70% ethyl alcohol. A total of 14 units of malaise traps with collecting bottle half filled with ethyl alcohol (70%) were installed; six and eight units at forest fringe and the inner forest, respectively. Traps were left unattended for a period of study but the collecting bottle were collected and replaced with a new one on the last days of sweep netting in each collection period.

Mercury vapor bulb (160 watt) powered with portable generator (500 watt) and piece of white sheet (10 ft X 5 ft) were used as a light trap, which was installed from 1800 hours to 2200 hours in two consecutive nights in each collection period. Social vespids attracted to light and perched on a white sheet were caught and killed in a killing jar which was then stored as above.

The collected specimens were brought back to entomological laboratory for identification to species level following Kojima *et al.* (2009). Specimens kept at the center for Insect Systematic of Universiti Kebangsaan Malaysia (abbreviated as "CIS") were also identified. All the identified species were then recorded and listed.

RESULT AND DISCUSSION

A total of 22 species consisting of 272 individuals (210 and 62 specimens collected in this study and previously collected but kept in CIS as voucher specimens, respectively) was successfully examined and identified (Table 1). Of this, 22 species were recorded for Kuala Lompat compared to 10 species previously (Kojima, 2009). Surprisingly, the previously recorded *L. campanulae* and *V. multimaculata* were not collected in this study. This is a bad indication and as such further study need to be conducted to investigate the possible reason these species seemed to be missing.

Table 1. List of Social Vespid Wasps and number of specimens examined from Kuala Lompat, Krau Wildlife Reserve, Peninsular Malaysia

VESPIDAE	**Number of Specimens**
STENOGASTRINAE	
***Eustenogaster* van der Vecht, 1969**	
Eustenogaster gibbosa Starr & van der Vecht, 2006	11 **(3)**
Eustenogaster micans (de Saussure, 1852)*	1
***Liostenoagaster* van der vecht, 1969**	
Liostenogaster campanulae Turillazzzi, 1999	1 **(1)**
Liostenogaster varipicta (Rohwer, 1919)	5 **(2)**
Liostenogaster vechti Turillazzi, 1988*	6
***Parischnogaster* von Schulthess, 1914**	
Parischnogaster mellyi (de Saussure, 1852)*	28
Parischnoagaster striatula (du Buysson, 1907)*	10
Parischnoagaster unicuspata Reyes, 1988*	7

Table 1 continue….

…Table 1 continued

POLISTINAE	
Tribe Ropalidiini	
***Parapolybia* de saussure, 1854**	
Parapolybia varia (Fabricius, 1787)	37 **(15)**
***Polybiodes* du Buysson, 1913**	
Polybiodes raphigastra (de Saussure, 1854)*	12
***Ropalidia* Guerin- Meneville, 1831**	
Ropalidia fasciata (Fabricius, 1804)*	7
Ropalidia flavopicta (Smith, 1857)*	11
Ropalidia latebalteata (Cameron, 1902)*	9
Ropalidia malayana (Cameron, 1903)*	2
Ropalidia stigma (Smith, 1858)*	5
Ropalidia sumatrae (Weber, 1801)	8 **(3)**
VESPINAE	
***Provespa* Ashmead, 1903**	
Provespa anomala (de Saussure, 1854)	46 **(16)**
Provespa nocturna van der Vecht, 1935	20 **(5)**
***Vespa* Linnaeus, 1758**	
Vespa affinis (Linnaeus, 1764)*	4
Vespa multimaculata Pérez 1910	1 **(1)**
Vespa mocsaryana du Buysson, 1905	13 **(8)**
Vespa tropica (Linnaeus, 1758)	28 **(8)**
TOTAL	272 **(62)**

Note: *: new record for Kuala Lompat
**: Not collected species during this study and
Number of specimens in "**( )**": number of specimens of previously recorded for Kuala Lompat.

The species occur at Kuala Lompat were compared with the species so far known to occur in the Peninsular Malaysia, Borneo, Sunda Islands (not included Borneo) and Thailand (Table 2). The 22 species of social vespids of Kuala Lompat were represented only 31.8% of the total known species occurred for Peninsular Malaysia (69 species), 35.5% for Borneo (62 species), 27.5% for Sunda Islands (80 species), and 44% for Thailand (50 species). Comparing this preliminary list with those so far known to occur

Table 2. A comparison of the species recorded from Kuala Lompat (KL) with species so far known to occur in the Sunda Islands (not included Borneo) (SLD), Peninsular Malaysia (PM), Borneo (BRN) and Thailand (THD)

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
STENOGASTRINAE						
Genus *Cochlischnogaster* Dong & Otsuka, 1997	*Cochlischnogasterspatulata* Carpenter & Starr, 2000	-	-	-	-	√
Genus *Eustenogaster* van der Vecht, 1969	*Euestenogaster agilis* (Smith, 1860)	-	-	-	√	-
	Eustenogaster calyptodoma (Sakagami & Yoshikawa, 1968)	-	√	√	√	-
	Eustenogaster eximia (Bingham, 1890)	-	√	-	-	√
	Eustenogaster fraterna (Bingham, 1897)	-	√	-	-	-
	Euestenogaster fulvipennis (Cameron, 1902)	-	-	√	-	-
	Eustenogaster gibbosa Starr & van der Vecht, 2006	√	√	√	√	-
	Eustenogaster hauxwellii (Bingham, 1894)	-	√	√	√	√
	Eustenogaster latebricola Saito, 2007	-	√	√	√	-
	Euestenogaster Luzonensis (Rohwer, 1919)	-	-	-	-	-
	Eustenogaster micans (de Saussure, 1852)	√	√	√	√	√
	Eustenogaster nigra Saito & Nguyen, 2006	-	-	-	-	√
	Eustenogaster palavanica Reyes, 1988	-	-	-	-	-
	Eustenogaster scitula (Bingham, 1897)	-	√	-	-	-
	*Eustenogasterspinicauda*Saito& Kojima, 2007	-	-	-	-	-
Genus *Liostenoagaster* van der vecht, 1969	*Liostenogaster abstrusa* Turillazzi, 1999	-	√	-	-	-
	Liostenogaster campunulae Turillazzi, 1999	√	√	-	√	-

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
	Liostenogaster filicis Turillazzi, 1999	-	√	-	-	-
	Liostenogaster flaviplagiata (Cameron, 1902)	-	-	√	√	√
	Liostenogaster flavolineata (Cameron, 1902)	-	√	√	√	-
	Liostenogaster nitidipennis (de Saussure, 1853)	-	√	√	√	√
	Liostenogaster pardii Turillazzi & Carfì, 1996	-	√	√	-	-
	Liostenogaster picta (Smith, 1860)	-	-	-	√	-
	Liostenogaster topographica Turillazzi, 1999	-	√	√	-	-
	Liostenogaster tutua Turillazzi, 1999	-	√	-	-	-
	Liostenogaster varipicta (Rohwer, 1919)	√	√	√	√	√
	Liostenogaster vechti Turillazzi, 1988	√	√	-	√	-
Genus *Metischnogaster* van der Vecht, 1977	*Metischnogaster cillipennis* (Smith, 1857)	-	√	√	√	-
	Metischnogaster drewseni (de Saussure, 1857)	-	√	√	√	-
Genus *Parischnogaster* von Schulthess, 1914	*Parischnogaster alternata* Sakagami, 1969	-	√	√	√	√
	Parischnogaster aurifrons (Smith), 1862	-	-	-	√	-
	Parischnogaster foveata (du Buysson, 1907)	-	√	√	√	-
	Parischnoagaster gracilipes (van der Vecht, 1977)	-	-	√	√	-
	Parischnogaster jacobsoni (du Buysson, 1913)	-	√	√	√	-
	Parischnogaster mellyi (de Saussure, 1852)	√	√	√	√	√
	Parischnoagaster nigricans (Cameron, 1902)	-	√	√	√	-
	Parischnoagaster striatula (du Buysson, 1905)	√	√	√	√	√
	Parischnoagaster unicuspata Reyes, 1988	√	√	√	√	-

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
POLISTINAE						
Tribe Polistini						
Genus *Polistes* Latreille, 1802						
Subgenus *Gyrostoma* Kirby, 1828	*Polistes olivaceus* (DeGeer, 1773)	-	√	√	√	√
	Polistes rothneyi Cameron, 1900	-	√	-	√	-
	Polistes tenebricosus Lepeletier, 1836	-	√	√	√	-
	Polistes diabolicus de Saussure, 1853	-	-	-	√	-
	Polistes tepidus (Fabricius, 1775)	-	-	-	-	-
Subgenus *Polistella* Ashmead, 1904	*Polistes sagittarius* de Saussure, 1853	-	√	√	√	√
	Polistes affinis Gusenleitner, 2006	-	-	-	-	-
	Polistes buruensis Petersen, 1990	-	-	-	-	-
	Polistes elegans Smith, 1859	-	-	-	-	-
	Polistes extraneus Kirby, 1883	-	-	-	-	-
	Polistes flavobilineatus (Cameron)	-	-	√	-	√
	Polistes horrendus Gusenleitner, 2006	-	-	-	-	-
	Polistes lateritius Smith, 1857	-	-	-	-	-
	Polistes callimorpha de Saussure, 1853	-	-	-	√	-
	Polistes meadeanus (von Schulthess, 1913)	-	√	√	-	-
	Polistes nigerrimus Gusenleitner, 2006	-	-	-	-	-
	Polistes nigrifrons Smith, 1859	-	-	-	-	-
	Polistesphilippinensis de Saussure, 1853	-	-	-	-	-
	Polistes simulatus Smith, 1860	-	-	-	-	-
	Polistes stigma stigma (Fabricius, 1793)	-	√	√	√	√

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
Tribe Ropalidiini						
Genus *Parapolybia* de saussure, 1854	*Parapolybia varia* (Fabricius, 1787)	√	√	√	√	√
	Parapolybia indica (de Saussure, 1854)	-	-	√	-	-
	Parapolybia nodosa van der Vecht	-	-	-	-	√
Genus *Polybiodes* du Buysson, 1913	*Polybiodes angustus* van der Vecht	-	-	-	-	-
	Polybiodes gracilis van der Vecht, 1966	-	√	-	-	-
	Polybiodes psecas du Buysson, 1913	-	√	√	√	√
	Polybiodes raphigastra (de Saussure, 1854)	√	√	√	√	-
Genus *Ropalidia* Guerin- Meneville, 1831	*Ropalidia aristocratica* (de Saussure, 1853)	-	√	-	√	√
	Ropalidia artifex (de Saussure, 1853)	-	√	√	√	-
	Ropalidia bicolorata van der Vecht, 1962	-	-	√	-	√
	Ropalidia binghami van der Vecht, 1941	-	-	√	-	√
	Ropalidia bipartita van der Vecht, 1962	-	-	-	-	-
	Ropalidia celebensis van der Vecht, 1941	-	-	-	√	-
	Ropalidia copiaria (de Saussure, 1862)	-	-	-	√	-
	Ropalidia crassa van der Vecht, 1941	-	-	-	√	-
	Ropalidia curvilineata (Cameron, 1908)	-	√	√	√	-
	Ropalidia cyathiformis (Fabricius, 1804)	-	√	-	√	-
	Ropalidia decorata (Smith, 1858)	-	√	√	√	-
	Ropalidia dichroma van der Vecht, 1941	-	-	-	√	-
	Ropalidia erythrospila (Cameron, 1908)	-	√	√	√	-
	Ropalidia extrema (van der Vecht, 1962)	-	-	-	-	-

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
	Ropalidia fasciata (Fabricius, 1804)	√	√	√	√	√
	Ropalidia flavobrunnea van der Vecht, 1962	-	-	-	-	-
	Ropalidia flavopicta (Smith, 1857)	√	√	√	√	-
	Ropalidia granulata van der Vecht, 1941	-	√	√	√	-
	Ropalidia hongkongensisjuncta (de Saussure, 1854)	-	-	-	√	-
	Ropalidia horni Sonan, 1938	-	-	√	-	-
	Ropalidia jacobsoni (du Buysson, 1908)	-	-	-	√	-
	Ropalidia latebalteata (Cameron, 1902)	√	√	√	√	-
	Ropalidia lepida van der Vecht, 1962	-	-	-	-	-
	Ropalidia luzonensis Kojima, 1996	-	-	-	-	-
	Ropalidia magnanima van der Vecht, 1941	-	√	-	-	-
	Ropalidia malayana (Cameron, 1903)	√	√	√	√	-
	Ropalidia javanica van der Vecht, 1962	-	-	-	√	-
	Ropalidia marginata (Lepeletier, 1836)	-	√	√	√	-
	Ropalidia modesta (Smith, 1858)	-	√	√	√	√
	Ropalidia malaisei van der Vecht, 1962	-	-	-	-	-
	Ropalidia laticincta van der Vecht, 1962	-	-	-	√	-
	Ropalidia opifex van der Vecht, 1962	-	√	√	-	-
	Ropalidia lugbris (Smith, 1858)	-	-	√	-	-
	Ropalidia mathematica (Smith, 1860)	-	-	-	√	√
	Ropalidia negerrima van der Vecht, 1962	-	√	-	√	-
	Ropalidia nigrescens Van der Vecht, 1962	-	-	-	-	-
	Ropalidia obscura Gusenleitner, 1996	-	-	-	-	√

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
	Ropalidia orhracea (van der Vecht)	-	-	-	√	-
	Ropalidia ornatipes (Cameron, 1900)	-	-	√	√	-
	Ropalidia ornaticeps (Cameron, 1908)	-	√	-	-	√
	Ropalidia opulenta (Smith, 1857)	-	-	√	-	-
	Ropalidia palawana (Kojima and Tano, 1985)	-	-	-	-	-
	Ropalidia pseudomalayana Kojima, 1996	-	-	√	√	-
	Ropalidia philippinensis (de Saussure, 1854)	-	-	-	-	-
	Ropalidia pilosa (Smith, 1854)	-	-	-	√	-
	Ropalidia plebeja (de Saussure, 1862)	-	-	-	√	-
	Ropalidia rufoplagiata (Cameron, 1905)	-	√	√	√	√
	Ropalidia rufocollaris van der Vecht, 1941	-	-	-	-	√
	Ropalidia socialis (de Saussure, 1862)	-	-	-	√	-
	Ropalidia stigma (Smith, 1854)	√	√	√	√	√
	Ropalidia scitula (Bingham, 1897)	-	-	-	-	-
	Ropalidia sumatrae (Weber, 1801)	√	√	√	√	√
	Ropalidia timida van der Vecht, 1862	-	√	√	√	-
	Ropalidia trimaculata van der Vecht, 1962	-	-	-	√	-
	Ropalidia variegata (Smith, 1852)	-	√	-	√	-
VESPINAE						
Genus *Provespa* Ashmead, 1903	*Provespa anomala* (de Saussure, 1854)	√	√	√	√	√
	Provespa barthelemyi (du Buysson, 1905)	-	√	-	-	√
	Provespa nocturna van der Vecht, 1935	√	√	√	√	-

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
Genus *Vespa* Linnaeus, 1758	*Vespa affinis* (Linnaeus, 1764)	√	√	√	√	√
	Vespa analis Fabricius, 1775	-	√	√	√	√
	Vespa auraria Smith, 1852	-	√	-	-	√
	Vespa basalis Smith, 1852	-	-	-	√	√
	Vespa bellicosa de Saussure, 1854	-	-	√	√	-
	Vespa bicolor Fabricius, 1787	-	-	-	-	√
	Vespa Binghami du Buysson, 1905	-	-	-	-	√
	Vespa ducalis Smith, 1852	-	-	-	-	√
	Vespa dybowskii André, 1884	-	-	-	-	√
	Vespa fervida Smith, 1858	-	-	-	√	-
	Vespa fumida van der Vecht, 1959	-	-	-	-	-
	Vespa luctuosa de Saussure, 1854	-	-	-	-	-
	Vespa mandarinia Smith, 1852	-	√	-	-	√
	Vespa mocsaryana du Buysson, 1905	√	√	-	√	√
	Vespa multimaculata Pérez, 1910	√	√	√	√	√
	Vespa philippinensis de Saussure, 1854	-	-	-	-	-
	Vespa soror du Buysson, 1905	-	-	-	-	√
	Vespa tropica (Linnaeus, 1758)	√	√	√	√	√
	Vespa velutina Lepeletier	-	√	-	√	√
	Vespa vivax Smith, 1870	-	-	-	-	√
Genus Vespula Thomson, 1869	*Vespula austriaca (Panzer, 1799)*	-	-	-	-	√
	Vespula flaviceps (Smith, 1870)	-	-	-	-	√
	Vespula kingdonwardi Archer, 1981	-	-	-	-	-

Table 2 continue...

...Table 2 continued...

Subfamily /Genera/Tribe	Species known from Southeast Asia	KL	PM	BRN	SLD	THD
	Vespula koreensis (Radoszkowsk, 1887)	-	-	-	-	√
	Vespula nursei Archer, 1981	-	-	-	-	-
	Vespa orbata du Buysson, 1902	-	-	-	-	-
TOTAL	*149*	22	69	62	80	50

in the Sunda Islands, Peninsular Malaysia, Borneo and Thailand, the following observations are made:

a. It is surprising that though this small forest representing a portion of forest in Peninsular Malaysia and sampling was done only for about 6 months, the number of species recorded were high with 20 species.

b. In comparison, Kuala Lompat and Borneo has 19 species in common with four species namely *L. campanulae, L. vechti, R. mathematica* and *V. mocsaryana* occur in Kuala Lompat were not found in Borneo. Based on Kojima *et.al* (2006), *L. campanulae* and *L. vechti* are currently distributed in Sumatra and Peninsular Malaysia, while, *R. mathematica* and *V. mocsaryana* are widely distributed but not in Borneo (see Kojima *et al* 2006 for detail).

c. All the 22 species found in Kuala Lompat were also found in Sunda Islands (Sumatra, Java and lesser Sunda Islands). This support Kojima et al (2006) who reported that most of the social vespids species occur in Sunda Islands also present in Peninsular Malaysia. The Peninsular Malaysia and Sunda Islands has 54 species in common (Table 2).

d. Kuala Lompat and Thailand have only 14 species in common with eight species namely *E. gibbossa, L. campanulae, L. vechti, P. Unicuspata, Polybiodes raphigastra, R. flavopicta, R. latebalteata, R. malayana* and *Provespa nocturna* occur in Kuala Lompat were currently not found in Thailand (Kojima et al. 2006).

CONCLUSION

In conclusion, the Kuala Lompat Forest Reserve seems to house diverse species of social vespids and it is obvious that further study is needed to actually know the species richness, distribution and structure in relation to forest structure and disturbances status. This is particularly true as there may be some vespids species could be useful for bio-indicator for habitat changes.

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