

A CHECKLIST OF ROPALIDIINI WASPS (HYMENOPTERA: VESPIDAE; POLISTINAE) IN INDOCHINA

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Abstract – As a basis for intensive study of the taxonomy and biogeography of Ropalidiini wasps in Indochina (Hymenoptera: Vespidae: Polistinae), a checklist of Ropalidiini wasps (Hymenoptera: Vespidae) is presented. A total of 57 Ropalidiini species and subspecies belonging to three genera from Indochina are listed, together with information of the type material deposited in the Natural History Collection, Ibaraki University, Japan (IUNH) and the Institute of Ecology and Biological Resources (IEBR). References of their distribution in Indochina are also provided.

Key words: Bio-indicators; Himalaya; pollinators; Ropalidia; Vietnam; Vespid wasps.

INTRODUCTION

The hymenopteran family Vespidae, with more than 5 000 species worldwide, is divided into six subfamilies. They are Euparagiinae, Masarinae, Eumeninae, Stenogastrinae, Polistinae and Vespinae with 10 species in one genus, 344 species in 14 genera, 3 579 species in 210 genera, 58 species in 7 genera, 958 species in 26 genera and 69 species in 4 genera, respectively (Pickett and Carpenter, 2010).

The study of vespid wasps is necessary to know their life history, habits and habitat, as well as their role in the ecosystem. Vespidae wasps are beneficial insects in that they attack caterpillars and other insects, including many pests, to feed their young (Das and Gupta, 1989; Goulet and Huber, 1993). Despite their nuisance aggressiveness and deadly stings, such foraging habits allow them to be effective predators of insect pests in biological control programs (Iwata, 1967; Gould and Jeanne, 1984). In addition,

because they are at the top-position in a food web of terrestrial arthropods (or even animals) as well as visiting various flowers for nectar as their own energy source, they are pollinators of many plants (Kojima, 1993; Carpenter and Wenzel, 1999; Khuat et al., 2004). These considerations suggest that vespid wasps play important roles in an ecosystem, and can be good bioindicators for environmental conditions and/or habitat perturbation (Itô, 1984; Carpenter, 1991).

Indochina is a peninsula in Southeast Asia lying on the southeast slope of the Himalayas, one of the centers of biological divergence of the world. In Indochina four of the six vespid subfamilies occur. They are Eumeninae, Stenogastrinae, Polistinae and Vespinae, of which Polistinae is one of the largest subfamilies with two tribes, Polistinae and Ropalidiini. Ropalidiini is an endemic tribe of the Old World with 269 species in four genera. In Indochina, however, the tribe only occurs with three genera, *Ropalidia*,

Parapolybia and *Polybioides*. A catalog of species in the Polistinae tribe Ropalidiini in the world was presented by Kojima and Carpenter in 1997. However, that work is near 20 years old, and a large number of species has been described since then. Nicolas et al. (2011) showed that 18 species of the tribe Ropalidiini occurred in on the Malay Peninsula. In the Indonesian Archipelago, the number of species and subspecies of this tribe were 87 (Hari Nugroho et al., 2011). In Vietnam, the number of species was 19 (Nguyen et al., 2006b). As the basis for intensive study on the species-level biodiversity of Ropalidiini in Indochina, the present checklist provides basic taxonomic information and distribution records for the Ropalidia wasps.

MATERIALS AND METHODS

The present paper is based partly on previously published faunistic records and also on the check of ropalidiine specimens that are housed at the Natural History Collection, Ibaraki University, Mito, Japan, the Institute of Ecology and Biological Resources, Hanoi, Vietnam, and in private collections.

Species and subspecies names are listed alphabetically in each genus insofar as they are considered valid in the most recent citations. Species are numbered, with a sub-number for each subspecies, if any. Distributional data are summarized under "Distribution" by country, with reference not only to countries in Indochina but also to other countries/regions. Abbreviations are as follows: NP – National Park; ISD-c – collectors of the Insect Systematic Department of the IEBR.

Museums or institutions where the type specimens are kept are as follows. Typically, the designation is the city in which the collection is located.

Amsterdam: Zoologisch Museum Amsterdam, Plantage Middenlaan 64, 1018 DH Amsterdam, the Netherlands.

Berlin: Zoologisches Museum der Humboldt-Universität, 1040 Berlin, Germany.

Calcutta: Zoological Survey of India, 34, Chittaranjan Avenue, Calcutta 700 012, India (including Gupta collection).

Cambridge, U. K.: University Museum of Zoology, Downing Street, Cambridge, CB3 2EJ, England.

Cambridge: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts 02138, U.S.A. (including Bequaert collection).

Geneva: Museum d'Histoire Naturelle, Case Postale 434, CH-1211 Geneva, Switzerland.

Genoa: Museo Civico di Storia Naturale, via Brigata Liguria 9, I-16121 Genoa, Italy.

Hanoi: The Institute of Ecology and Biological Resources, 18 Hoang Quoc Viet, Hanoi, Vietnam.

Copenhagen: Universitets Zoologisk Museum, Universitetsparken 15, DK 2100, Copenhagen, Denmark.

Leiden: National Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, the Netherlands.

Linz: Collection of Gusenleitner, Pfitznerstrasse 31, A-4020 Linz/Donau, Austria.

London: The Natural History Museum, Cromwell Road, London SW7 5BD, England.

Mito: The Natural History Collection, Ibaraki University, Mito, Japan.

Oxford: Hope Entomological Collections, University Museum, Parks Road, Oxford OX1 3PW, England.

Paris: Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, 45 rue de Buffon, 75005 Paris, France.

San Francisco: California Academy of Sciences, Golden Gate Park, San Francisco, California 94118, U.S.A.

Singapore: Zoological Reference Collection, Department of Zoology, National University of Singapore, Kent Ridge, S-05 11 Singapore.

Stockholm: Naturhistoriska Riksmuseet (Entomologiska), S-10405 Stockholm, Sweden.

Torino: Istituto e Museo di Zoologia, Università di Torino, via Accademia Albertina 17, Torino, Italy.

Venice: Museo Civico di Storia Naturale, S. Croce 1730, Venice 30135, Italy.

Washington: U. S. National Museum, Washington, D. C. 20560, U.S.A.

Wufeng: Taiwan Agricultural Research Institute, 189 Chungcheng Road, Wufeng, Taichung 41301, Taiwan.

RESULTS

The checklist of ropalidiine species in Indochina presented in this paper includes 57 species and subspecies. *Ropalidia birmanica*, a new species that was raised to species rank from a subspecies *Ropalidia taiwana birmanica* subsp. n. van der Vecht, 1962, is also listed in this present paper (this document has not been published by Nguyen yet).

Checklist of Species

Genus *Ropalidia* Guérin-Meneville

Ropalidia Guérin-Ménéville, 1831, in Duperrey, Voyage de la Coquille, Zoologie, Atlas, Insectes: pl. 9 fig. 8, as genus.

Type species: *Ropalidia maculiventris* Guérin-Ménéville, 1831, by monotypy.

(1) *aristocratica* (de Saussure, 1853)

Icaria aristocratica de Saussure, 1853, Et. Fam. Vesp. 2: 37, female – “Les Indes Orientales Pulo-Pinang” (Torino).

Distribution: Thailand; Malaysia (Malay Peninsula); Indonesia (Sumatra).

(2-1) *artifex artifex* (de Saussure, 1854)

Icaria artifex de Saussure, 1854, Et. Fam. Vesp., 2: 236, female – “Java” (Geneva, Torino).

Distribution: Myanmar; Malaysia (Malay Peninsula, Sarawak); Vietnam; Indonesia (Java).

(2-2) *artifex fuscata* van der Vecht, 1941

Ropalidia artifex var. *fuscata* van der Vecht, 1941, Treubia 18: 136, female, male – “N. Sumatra, Toba Lake” (holotype female, Leiden); also from Malay Peninsula, Borneo.

Distribution: Malaysia (Malay Peninsula, Sarawak); Vietnam; Indonesia (Sumatra).

(3) *bicolorata* van der Vecht, 1962

Paraicaria bicolor Gribodo, 1892 (1891), Boll. Soc. Entomol. Ital. 23: 249, female – “Chan-Yoma (Alta Birmania); (Genoa)”; preoccupied by *Ropalidia bicolor* (Smith) (= *Icaria bicolor* Smith, 1865).

Ropalidia bicolorata bicolorata van der Vecht, 1962, Zool. Verh., Lei-den 57: 38, 39. Replacement name for *bicolor* (Gribodo), junior secondary homonym of *Ropalidia bicolor* (Smith, 1865).

Ropalidia bicolorata parvula van der Vecht, 1962, Zool. Verh., Leiden 57: 38, 39, female – “North Borneo, Bettotan near Sandakan” (London).

Ropalidia bicolorata shiva Das and Gupta, 1989, Orient. Insec. Monogr. 11: 153, 154, female – “India:

Tripura: Dharamnagar” (Calcutta); also from Assam, Manipur.

Distribution: Myanmar; Thailand; Vietnam; Malaysia (Sarawak); India (Assam, Manipur, Tripura); China (Yunnan).

(4) *binghami binghami* van der Vecht, 1941

Ropalidia binghami van der Vecht, 1941, Treubia 18: 109 (key), 113, male – “Luang Prabang, Hat Thoun” [Laos] (London); also from Myanmar: Tenasserim (Mergui).

Distribution: Myanmar; Thailand; Laos; China.

(5) *birmanica* van der Vecht, 1962

Ropalidia taiwana birmanica van der Vecht, 1962, Zool. Verh., Leiden 57: 23, male, female (in subgenus Anthreneida) – “North East Burma, Sadon, 1200 m” (holotype male, Stockholm); also from two other localities in Myanmar.

Distribution: Myanmar; Vietnam.

(6) *curvilineata* (Cameron, 1908)

Icaria curvilineata Cameron, 1908, Dtsch. Entomol. Z. 1908: 564, female; “Inop. Borneo” (London).

Distribution: Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra).

(7) *cyathiformis* (Fabricius, 1804)

Eumenes cyathiformis Fabricius, 1804, Syst. Piez.: 289 – “Java” (holotype female, Copenhagen).

Icaria ceylonica Cameron, 1898, Mem. Manch. Lit. Philos. Soc. 42 (11): 48, female – “Periyakullam, Ceylon” (Oxford).

Icaria cagayanensis Ashmead, 1905, Can. Entomol. 37: 3 [cagayanensis!], female – “Manila” [the Philippines] (Washington).

Icaria bilineata Cameron, 1905, Tijdschr. Entomol. 48: 72, female – “Tjandi near Semarang” (lectotype, London).

Distribution: Myanmar; Malaysia (Malay Peninsula); Vietnam; Indonesia (Java, Sulawesi, Sumba); Nepal; India; Sri Lanka; Philippine Is.

(8) *decorata* (Smith, 1858)

Polybia decorata Smith, 1858, J. Proc. Linn. Soc. Zool. 2: 114, female – “Borneo, (Sarawak)” (lectotype Oxford).

Icaria xanthopoda Cameron, 1902, J. Straits Branch Asiat. Soc. 37: 103, female – “Borneo” (London).

Distribution: Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra).

(9) *erythrospila* (Cameron, 1908)

Icaria erythrospila Cameron 1908, Entomol. Z. 1908: 563, female – “Borneo: Kuching” (London).

Ropalidia malayana var. *erythrospila*; van der Vecht, 1941, Treubia 18: 104, 176 (taxonomy; fig.; distr.) (Leiden).

Distribution: Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra).

(10) *fasciata* (Fabricius, 1804)

Eumenes fasciata Fabricius, 1804, Syst. Piez.: 290, male – “Java” (syntype males, Copenhagen).

Polistes bioculata Fabricius 1804, Syst. Piez.: 278, female – “nova Cam-bria (Copenhagen).

Icaria picta de Saussure, 1854, Et. Fam. Vesp.: 238, female – “Le Bengale” [India] (Paris).

Icaria maculifrons Cameron, 1903, J. Straits Br. R. Asiat. Soc. 39: 172, female – “Santubong” [Borneo] (London).

Icaria intermedia Cameron, 1905, Tijdschr. Entomol. 48: 70, female – “Tjandi near Semarang” (lectotype Amsterdam).

Distribution: Myanmar; Thailand; Vietnam; Malaysia (Malay Peninsula, Sarawak); Nepal; India; Indonesia (Sumatra, Nias, Bangka Is., Java, Karimon Djawa Is., Bali, Flores); South China; Palawan; Taiwan; Ryukyu Is.

(11) *flavopicta* (Smith, 1857)

Icaria flavopicta Smith, 1857, Cat. Hym. Br. Mus. 5: 99, female – “Borneo (Sarawak)” (London).

Distribution: Vietnam; Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra); Hong Kong.

(12-1) *granulata borneensis* van der Vecht, 1941

Ropalidia granulata borneensis van der Vecht, 1941, Treubia 18: 190, female – “Borneo: Bettotan near Sandakan” (Leiden).

Distribution: Malaysia (Malay Peninsula, Sarawak).

(12-2) *granulata granulata* van der Vecht, 1941

Ropalidia granulata van der Vecht, 1941, Treubia 18: 113 (key), 189, female – “Malay Peninsula, Pahang, Kuala Teku” (Leiden); also from Sumatra.

Distribution: Malaysia (Malay Peninsula); Indonesia (Sumatra).

(13-1) *hongkongensis* (de Saussure, 1854)

Icaria hongkongensis de Saussure, 1854, Ét. Fam. Vesp. 2: 239, female – “La Chine, Hong- Kong” (London).

Ropalidia hongkongensis juncta van der Vecht, 1941, Treubia 18: 141, female, male, – Tjiboerial near Buitenzorg [= Bogor], W. Java” (holotype female, Leiden); also from Bangka; Myanmar; India.

Distribution: Myanmar; Vietnam; Indonesia (Bangka, Java); South China; Hong Kong; India (Meghalaya).

(13-2) *hongkongensis juncta* van der Vecht, 1941

Ropalidia hongkongensis juncta van der Vecht, 1941, Treubia 18: 141, male, female – “Tjiboerial near Buitenzorg, W.-Java” (holotype female Leiden); also from Bangka, Myanmar, India.

Distribution: Myanmar; Indonesia (Bangka, Java); India (Meghalaya).

(14) *jacobsoni* (du Buysson, 1908)

Icaria jacobsoni du Buysson, 1908, Notes Leyden Mus. 30: 123, female – “aux environs de Batavia [=Jakarta]” (lectotype, Leiden).

Ropalidia jacobsoni flavoscutellata Das and Gupta, 1989, Orient. Insects Monogr. 11: 146, 147, fig. 28I, female, male, – India: Assam: Rongooni (holotype female Calcutta).

Distribution: Myanmar; Indonesia (Bangka, Sumatra, Java, Sulawesi); India.

(15) *latebalteata* (Cameron, 1902)

Icaria latebalteata Cameron, 1902, J. Straits Br. R. Asiat. Soc. 37: 100, female – “Kuching, Sarawak” (London).

Distribution: Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra).

(16-1) *magnanima magnanima* van der Vecht, 1941

Ropalidia magnanima magnanima van der Vecht, 1941, *Treubia* 18: 109 (key), 125, male, female - "Burma: Schwego Myo" (holotype female, Venice).

Distribution: Myanmar; Malaysia (Malay Peninsula); Vietnam.

(16-2) *magnanima albitarsis* van der Vecht, 1941

Ropalidia magnanima albitarsis van der Vecht, 1941, *Treubia* 18: 125, female - "Tenasserim: Haundraw Valley" [Myanmar] (London); also from Vietnam.

Distribution: Myanmar; Vietnam.

(16-3) *magnanima anthracina* Das and Gupta, 1989

Ropalidia magnanima anthracina Das and Gupta, 1989, *Orient. Insects Monogr.* 11: 110, 115 (key), 116, figs. 25g, 27a, map 14, male (in *marginata* group of subgenus *Anthreneida*) - "Burma: Kamaeng in Myitkyina District" (Calcutta).

Distribution: Myanmar.

(17) *malaisei* van der Vecht, 1962

Ropalidia malaisei van der Vecht, 1962, *Zool. Verh., Leiden* 57: 42 (key), 65, male, female (in subgenus *Icarielia*) - "Burma: North East Burma, Punkataung, Road Sadon-Myitkyina" (holotype female, Leiden); also from Sadon.

Distribution: Myanmar.

(18) *malayana* (Cameron, 1903)

Icaria malayana Cameron, 1903, *J. Straits Br. R. Asiat. Soc.* 39: 171, female - "Sarawak" (London).

Icaria parvimaculata Cameron, 1907, *J. Straits Br. R. Asiat. Soc.* 48: 25, female - "Marup" [N. Borneo] (London).

Ropalidia delicata Dover, 1931 (1930) *J. Fed. Mal. St. Mus.* 16: 257, female - "Kuala Lipis (Bencha Forest Reserve), Pahang, F.M.S." (London).

Distribution: Malaysia (Malay Peninsula, Sarawak); Vietnam; Indonesia (Sumatra); Sunda Shelf.

(19-1) *marginata marginata* (Lepeletier, 1836)

Epipona marginata Lepeletier, 1836, *Hist. Nat. Insectes Hym.* 1: 541, male, female - "Inde" (coll. Serville, Torino).

Distribution: Vietnam; Pakistan; India; Sri Lanka.

(19-2) *marginata rufitarsis* van der Vecht, 1941

Ropalidia marginata rufitarsis van der Vecht, 1941, *Treubia* 18: 122, female - "Tenasserim: Haundraw Valley" [Myanmar] (London); also from Bhamo and Tavoy.

Distribution: Myanmar; Laos.

(19-3) *marginata sundaica* van der Vecht

Ropalidia marginata sundaica van der Vecht, 1941, *Treubia* 18: 124, female - "Tenasserim: Haundraw Valley" [Myanmar] (London); also from Bhamo and Tavoy.

Distribution: Malaysia (Malay Peninsula, Sarawak); Indonesia (Bangka, Sumatra, Java, Kanman Djawa, Lesser Sunda Is., Sulawesi; Talud Is., Tukang Besi Is.); Philippine Is.; Mariana Is.; Palau Is.; Volcano Is.

(20) *mathematica* (Smith, 1860)

Polybia mathematica Smith, 1860, *J. Proc. Linn. Soc. Zool.* 5: 90, female - "Makassar" [Sulawesi] (Oxford).

Distribution: Vietnam; Indonesia (Sulawesi, Lombok, Flores, Java).

(21) *modesta* (Smith, 1858)

Icaria modesta Smith, 1858, J. Proc. Linn. Soc. Zool. 2: 115, female - "Borneo (Sarawak)" (Oxford).

Icaria fulvipennis Gribodo, 1892 (1891), Bull. Soc. Entomol. Ital., 23: 245, female - "Marang (Sumatra)" (Genoa).

Icaria ungulata Bingham, 1897, Fauna Br. India, Hym. 1: 387 (key), 391, female - "Tenasserim" [Myanmar] (London).

Distribution: Myanmar; Thailand; Vietnam; Malaysia (Malay Peninsula, Sarawak); Indonesia (Sumatra, Java).

(22) *nigemma* van der Vecht, 1962

Ropalidia nigerrima van der Vecht, 1962, Zool. Verh., Leiden 57: 38 (key), 39, female - Berangas, South East Borneo" (Leiden).

Distribution: Malaysia (Malay Peninsula); Indonesia (Borneo, Sumatra).

(23) *nigrita* Das and Gupta, 1989

Ropalidia nigrita Das and Gupta, 1989, Orient. Insects Monogr. 1 1: 11 1 (key), 130, figs. 24b, 24n, 25n, 26F, 26f, 26H, 26h, 27K, 27n, map 19, male, female (in *stigma* group of subgenus *Anthreneida*) - "India: Manipur: Moirang, 500 m" (holotype male, Calcutta); also from another locality in Manipur.

Distribution: Vietnam; India (Manipur).

(24) *obscura* Gusenleitner, 1996

Ropalidia obscura Gusenleitner, 1996, Linz. Biol. Beitr. 28: 15, figs. 2, 4, female (in subgenus *Icariellia* [!]) - "Thailand, Ching Mai province: Doi Suthep" (holotype San Francisco).

Distribution: Thailand.

(25) *opifex* van der Vecht, 1962

Ropalidia opifex van der Vecht, 1962, Zool. Verh., Leiden 57: 42 (key), 68, female (in subgenus *Icariellia*) - "Malaya: Selangor: Kuala Lumpur, Ampang" (London).

Distribution: Malaysia (Malay Peninsula, Borneo); China (Yunnan).

(26) *opulenta* (Smith, 1857)

Icaria opulenta Smith, 1857, Cat. Hym. Brit. Mus. 5, Vesp.: 99, female - "Borneo (Sarawak)" (lectotype, London).

Distribution: Malaysia (Sarawak, Sabah); Indonesia (Kalimantan).

(27) *ornatipes* (Cameron, 1908)

Icaria ornatipes Cameron, 1908, Dtsch. Entomol. Z. 1908: 564, female - "Borneo: Kuching" (holotype, London).

Distribution: Malaysia (Sarawak, Sabah); Indonesia (Sumatra).

(28) *ornaticeps* (Cameron, 1900)

Icaria ornaticeps Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 496, female - "Khasia Hills" [India] (Oxford, London).

Distribution: India; Myanmar; Thailand; Cambodia; Malaysia (Malay Peninsula); Vietnam.

(29) *pseudomalayana* Kojima, 1996

Ropalidia pseudomalayana Kojima, 1996, Zool. Meded., Leiden 70: 349, 356, 357, female - "Borneo: Sarawak, Sarikei Dist., Rejang Delta" (holotype, Leiden); also from two other localities in Borneo and Bangka.

Distribution: Malaysia (Sarawak); Indonesia (Bangka, Kalimantan).

(30-1) *rufocollaris rufocollaris* (Cameron, 1990)

Icaria rufocollaris Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 497, female – “Khasia Hills” [India] (London, Oxford).

Distribution: India (Meghalaya, Assam, Sikkim, Tipura, Uttar Pradesh, West Bengal); Tibet; Myanmar; Thailand; Vietnam.

(30-2) *rufocollaris atrata* van der Vecht, 1941

Ropalidia rufocollaris atrata van der Vecht, 1941, Treubia 18: 139, female, male – “Siam, Doi Setep” (holotype female, Cambridge); also from Luang Prabang.

Distribution: Thailand; Laos.

(31-1) *rufoplagiata rufoplagiata* (Cameron, 1905)

Icaria rufoplagiata Cameron, 1905b, Tijdschr. Entomol. 48: 71, female, male – “Tjandi near Semarang” [in Java] (lectotype female, Amsterdam).

Distribution: India; Myanmar; Thailand; Vietnam; Malaysia (Peninsular Malaysia); Indonesia (Sumatra, Bangka, Java, Sumbawa, Timor).

(31-2) *rufoplagiata gravelyi* Dover and Rao, 1922

Ropalidia gravelyi Dover and Rao, 1922, J. Asiatic Soc. Bengal (n. ser.) 18: 244, female – “Kavalai, Cochin State, 1,000-3,000 ft.” [India] (Calcutta).

Distribution: India (Uttar Pradesh, Kamataka, Kerala); Myanmar; Thailand; Malaysia (Malay Peninsula); Indonesia (Sumatra).

(32) *scitula* (Bingham, 1897)

Icaria scitula Bingham, 1897, Fauna Br. India, Hym. 1: 387 (key), 392, female – “Rangit Valley, Sikkim” [India] (London).

Distribution: India (Sikkim, West Bengal, Meghalaya); Myanmar.

(33-1) *stigma nigrolineata* van der Vecht, 1962

Ropalidia stigma nigrolineata van der Vecht, 1962, Zool. Verh., Leiden 57: 18, female, male – “Burma, Shan States Road, 40 km east of Taunggyi” (holotype female, Stockholm); also from Taunggyi.

Distribution: Myanmar; Vietnam.

(33-2) *stigma rufa* van der Vecht, 1941

Ropalidia stigma rufa van der Vecht, 1941, Treubia 18: 130, female – “N.E. Assam, Sadiya” [India] (Calcutta); also from Dibrugarh, Meghalaya and Hainan Is.

Distribution: Vietnam; India (Assam, Meghalaya); Nepal; China (Hainan).

(33-3) *stigma stigma* (Smith, 1858)

Polybia stigma Smith, 1858, J. Proc. Linn. Soc. Zool. 2: 114, male – “Borneo (Sarawak)” (Oxford).

Distribution: India; Sri Lanka; Myanmar; Thailand; Malaysia (Malay Peninsula); Vietnam; Indonesia (Borneo; Sumatra; Java; Bali); Philippine Is.

(34) *sumatrae* (Weber, 1801)

Vespa sumatrae Weber, 1801, Observ. Entomol. Kiliae: 103 – “Sumatra” (?Berlin).

Vespa mutillata Illiger, 1802, Magaz. Insektenk. 1: 189 – “Sumatra” (Berlin).

Polistes pubescens Fabricius, 1804, Syst. Piez.: 279 – “Sumatra” (Copenhagen).

Eumenes formicaria Fabricius, 1804, Syst. Piez.: 288 – “America meridionali” (female and male, Copenhagen).

Anthreneida coronata White, 1841. Ann. Mag. Nat. Hist. (1) 7: 321, male – “locality unknown” (London).

Icaria speciosa de Saussure, 1855b, Rev. Mag. Zool. (2) 7: 374, male – “Sumatra” (Copenhagen).

Icharia [!] *marangensis* Gribodo, 1892 (1891), Boll. Soc. Entomol. Ital. 23: 243, female – “Marang (Sumatra) and Perak (Malacca)” (Genoa).

Icaria rufinoda Cameron, 1904, J. Straits. Br. R. Asiat. Soc. 41: 121, female – “Singapore” (London).

Distribution: Myanmar; Thailand; Malaysia (Malay Peninsula); Singapore; Vietnam; China (Yunnan); Indonesia (Borneo, Bangka, Sumatra).

(35) *taiwana* Sonan, 1935

Ropalidia taiwana Sonan, 1935, Trans. Nat. Hist. Soc. Formosa 25: 199 (key), 201, female, male – “Shinchiku” [Taiwan] (holotype female, Wufeng); also from Hori, Koshun, Urai and Hassen-zan.

Ropalidia taiwana var. *koshunensis* Sonan, 1935, Trans. Nat. Hist. Soc. Formosa 25: 199 (key), 202, female – “Kuraru (Koshun)” [Taiwan] (Wufeng).

Ropalidia formosana Kuo, 1987, in Kuo and Yeh, J. Natl. Chiayi Inst. Agric. 16: 84, male, female – “Chiai” (holotype male, Wufeng).

Distribution: North Myanmar; South China; Taiwan.

(36) *thailandia* Gusenleitner, 1994

Ropalidia thailandia Gusenleitner, 1994, Linz. Biol. Beitr. 26: 325-329, female (in subgenus *Icarielia*) – “Thailand: Phang Nga, Takus Pa., Khao Sok N. P.” (Linz).

Distribution: Thailand; Vietnam.

(37) *timida* van der Vecht, 1962

Ropalidia timida van der Vecht, 1962, 42 (key), 62, plate 6, female, male (in subgenus *Icarielia*) – “Singapore” (holotype female, London); also from Malaya, Borneo, Sumatra and Ethology.

Distribution: Malaysia (Malay Peninsula); Indonesia (Kalimantan, Sumatra).

(38) *variegata* (Smith, 1852)

Epipona variegata Smith, 1852, Ann. Mag. Nat. Hist. (2) 9: 48, female – “Poona” [India] (London).

Distribution: Pakistan; India (Punjab, Delhi, Uttar Pradesh, Bihar, West Bengal, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu); Nepal; Myanmar; Malaysia (Malay Peninsula); China.

(39) *vietnama* Gusenleitner, 1996

Ropalidia vietnama Gusenleitner, 1996, Linz. Biol. Beitr. 28: 15, 17, figs. 6, 7, female, nest (in subgenus *Anthreneida*) – “Vietnam, Nam Cat Tien, 11°26’N, 107°26’E” (holotype female, Linz).

Distribution: Vietnam.

Genus *Parapolybia* de Saussure

Parapolybia de Saussure, 1854, Et. Fain. Vesp. 2: 207, division of subgenus *Polybia* of genus *Polybia* Lepelletier (3 species).

Type species: *Polybia indica* de Saussure, 1854, by subsequent designation of Bingham, 1897, Fauna Br. India, Hym. 1: 382.

(40-1) *indica bioculata* van der Vecht, 1966

Parapolybia indica bioculata van der Vecht, 1966, Zool. Verh., Leiden 82: 26 (key), 29, fig. 11c, female – “Burma: Tenasserim, Haundraw Valley” (London).

Distribution: Myanmar; South China.

(40-2) *indica indica* (de Saussure, 1854)

Polybia indica de Saussure, 1854, lAt. Fam. Vesp. 2: 207, pl. 26 fig. 3, female (in division Parapolybia) – “La Chine” (Paris).

Parapolybia takasagona Sonan, 1944, Trans. Nat. Hist. Soc. Taiwan 34: 342 (key), 344, female, male – “Taipei, Tamaru, Rato” [in Chinese characters] [Taiwan] (holotype female Wufeng).

Distribution: India; Myanmar; Indonesia (Borneo); China; Taiwan; Korea; Vietnam; Japan.

(41) *nodosa* van der Vecht, 1966

Parapolybia nodosa van der Vecht, 1966, Zool. Verh., Leiden 82: 25 (key), 39, female – “Fornosa: Piam” (Leiden).

Distribution: India; Nepal; Myanmar; Thailand; China; Vietnam; Taiwan.

(42) *varia varia* (Fabricius, 1787)

Vespa varia Fabricius, 1787, Mant. Insectorum 1: 293 – “China” (Copenhagen).

Polybia orientalis de Saussure, 1854, Et. Fam. Vesp. 2: 208, pl. 26 fig. 2, female (in subgenus Parapolybia) – “La Chine” (London).

Polybia artifex Smith, 1860 (1861), J. Proc. Linn. Soc. Zool. 5: 90, female – “Makassar” [Sulawesi] (Oxford).

Icaria quadrimaculata Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 496, male – “Bengal, probably Barrackpore” (Oxford).

Icaria carinata Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 499, male – “Khasia Hills” [India] (Oxford).

Icaria wroughtoni Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 500 – “Poona” (holotype female, London, no. 18.730).

Icaria fuscipennis Cameron, 1900, Ann. Mag. Nat. Hist. (7) 6: 501, female – “Khasia Hills” [India] (Oxford).

Icaria singaporensis Cameron, 1904, J. Straits Br. R. Asiat. Soc. 41: 120, female – “Singapore” (Singapore).

Icaria annulipes Cameron, 1913, Ind. For. Rec. 4: 115, female, male – “Dehra Dun” [India: Uttar Pradesh] (London).

Stelopolybia disticha du Buysson, 1913, Bull. Soc. Entomol. France 1913: 298, female – “Chine: Kiangsi, Chang-Hai” (Paris).

Parapolybia orientalis; von Schulthess, 1913, Mitt. Schweiz. Entomol. Ges. 12: 153 (key), 155, pl. 11 fig. 3, liB fig. 8 (male; distr.); 1927, Suppl. Entomol., (Berlin).

Distribution: India; Nepal; Myanmar; Vietnam; Thailand; Malaysia (Malay Peninsula); Singapore; Indonesia (Borneo, Sulawesi, Sumbawa, Sumba, Philippine Is., Riouw-Archipelago (= Kepulauan Riau)); China; Korea; Japan.

Genus *Polybioides* du Buysson

Polybioides du Buysson, 1913, Bull. Soc. Entomol. France 1913: 299, genus (3 species).

Type species: “*Polybioides tabidus* (F.)” [= *Vespa tabida* Fabricius, 1781], by subsequent designation of Ducke, 1914, Zool. Jahrb. Syst. 36: 330.

(43) *gracilis* van der Vecht, 1966

Polybioides gracilis van der Vecht, 1966, Zool. Verh., Leiden 82: 13 (key), 19, female – “Tenasserim: Ataran Valley” (London).

Distribution: Myanmar; Malaysia (Malay Peninsula); Vietnam.

(44) *psecas* du Buysson, 1913

Polybioides psecas du Buysson, 1913, Bull. Soc. Entomol. France 1913: 299, female – “Cesindo, Malaises” (Paris).

Polybia pendleburyi Dover, 1927, Proc. R. Entomol. Soc. London 1: 40, female – “Bukit Kutu, Selangor, 3 500 ft.” (London).

Distribution: Thailand; Malaysia (Malay Peninsula); Indonesia (Borneo, Sumatra, Nias).

(45) *raphigastra* (de Saussure, 1854)

Polybia raphigastra de Saussure, 1854, It. Fam. Vesp. 2: 204, female (in division My) – “L’Amerique? Etiquet par erreur de Pulo-Pinang (Asie)” [the original label was presumably correct] (Torino).

Polybia sumatrensis de Saussure, 1855, Rev. Mag. Zool. (2) 7: 374, “male” [female] – “Sumatra” (holotype female, London, no. 18.737).

Icaria leptogaster Cameron, 1901, Proc. Zool. Soc. London 1901 (2): 29, female – “Patalung, Malay Peninsula” (Cambridge, U. K.).

Icaria sulciscutis Cameron, 1901, Proc. Zool. Soc. London 1901 (2): 30, female – “Bukit Tomah, Singapor” [Bukit Timahl] (holotype female, London).

Distribution: Malaysia (Malay Peninsula); Indonesia (Borneo, Sumatra, Nias, Natuna Is.).

DISCUSSION

Regarding the subspecies *R. taiwana birmanica*, van der Vecht (1962) examined the specimens from Myanmar that form a new subspecies *birmanica* and has described them as follows: ♀ – Very similar to typical *R. taiwana*, but the second gastral segment not obliquely cut off at end, as seen in profile. Yellow

markings on clypeus and pronotum more or less reduced. ♂ – Antennae slightly less modified than in typical *taiwana*: carina of tenth antennal segment not emarginated. The second gastral segment is only slightly obliquely cut off. Nguyen et al., 2006 treated the specimens from Vietnam. He mentioned that “three females we examined are in general similar to the specimens of typical *R. taiwana*, but have the second metasomal segment vertically cut off at the end. They may belong to *birmanica*, which might be raised to species rank”. At that time, they did not have enough specimens for detailed comparison from various localities. Therefore, they arranged all of these specimens as “typical” *R. taiwana*. After obtaining many specimens from various localities in Vietnam, Nguyen (2007) compared these specimens to specimens of *R. taiwana*, and she raised this subspecies to species rank, *R. birmanica*. In this study, however, she only examines the specimens from Vietnam. In my present examination, I combine the treatment of both Vietnamese specimens and those from other nations. My results are in agreement with those of Nguyen (2007), and also add some characters for comparison between them.

Specimens examined: **Taiwan:** 1♀, Palin, Taoyuan, 23. vii. 1990, C. Yono; **Myanmar:** 2♀, Taunggyi, S. Shan States, 01.ii.2001, So. Yamane; **Vietnam:** 2♀, Hoang Lien NP, Sapa, Lao Cai, 1500-1700m, 10.vi.2004, Khuat D. L.; 1♀, Pa Co, Mai Chau, Hoa Binh, 1100m, 21.iv.2002, Tru H. V.; 15♂, 2♀, 1000m, 23.viii.2005, Nguyen L. & J. Kojima, Nest# VNM-Ro-2005-11; 3♂, 1♀, 1450m, 27.viii.2006, Nguyen L., F. Saito & J. Kojima; 1♀, Bach Ma NP, Thua Thien Hue, 1300m, 4.xi.2001, ISD-c; 2♀, Tam Dao NP, Vinh Phuc, 950-1230m, 24.ix.1994, A. Saito; 1♀, Pha Din pass, Thuan Chau, Dien Bien, 1550m, 26.viii.2006, NL, F. Saito & Kojima.

Acknowledgments - I am grateful to Prof. Kojima (Faculty of Science, Ibaraki University, Mito, Japan) for preparing the necessary papers and for his help with examining the specimens in Mito, Japan, and to Dr. Nguyen (Institute of Ecology and Biological Resources, Hanoi, Vietnam) for additional examinations of specimens. The work described in this paper was financed by the Research Cooperation Program between

Table 1. Comparison of character states between *R. taiwana* and *R. birmanica*

Character states	<i>taiwana</i>	<i>birmanica</i>
Metasomal segment II of female in profile	Slightly longer than high	Less than 1.3 times as high as long
Width of eye of female	About 0.9 times width of gena	From 1.0-1.2 times width of gena
Clypeus of male	Less than 1.3 times as wide as long	More than 1.5 times as wide as long
Ocelli of male	Posterior ocelli more than 2.7 fold as far from inner eye margin as from each other	Posterior ocelli less than 2.6 fold as far from inner eye margin as from each other

Ibaraki University, Japan, and the Institute of Ecology and Biological Resources, Vietnam.

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