

Studies on a collection of aculeate Hymenoptera from Nayachar Island, West Bengal

P. Girish Kumar¹ and Gaurav Sharma²

Aculeata is a subgroup of the order Hymenoptera whose significant peculiarity is the transformation of the female ovipositor into a venom-injecting device or stinger and the members of which are commonly called as ants, bees and wasps. They play an important role in the terrestrial ecosystems as pollinators, predators and producers. India has a rich fauna of Aculeata and Bingham (1897, 1903) was the first to publish a consolidated account of aculeate Hymenoptera (Wasps & Bees and Ants & Cuckoo wasps) of the region, including Burma and Ceylon. Batra (1977), Das & Gupta (1989) and Gupta & Jonathan (2003) were also made comprehensive studies on Indian species of Apidae, Vespidae and Scoliidae respectively.

The present account is based on a collection of Hymenoptera (Aculeata) obtained from Nayachar Island of West Bengal which includes the report of 8 species under 7 genera belonging to the families Vespidae (5 species), Scoliidae (2 species) and Apidae (1 species). Nayachar is an island located at the confluence of the Hooghly River and the Haldi River at the northern extent of the Bay of Bengal in the East Midnapore district of West Bengal state of India. It is a small island with an area of 64 square kilometers located at 22°02' N 88°04' E coordinates and is believed to have accreted from alluvial derived sediment over the past 100 years.

Material and Methods

The specimens were collected from various localities of Nayachar Island during the period 1994-2000 by using sweep net specially made for the purpose. The card mounted specimens were studied under Olympus SZX9 stereo zoom microscope (Japan).

All specimens studied are properly registered and added to the 'National Zoological Collections' of the Hymenoptera Section, Zoological Survey of India, Kolkata (NZSI).

Acronyms for museums and depositories: BMNH = The Natural History Museum, London, England; DZUK = University of Kiel, Department of Zoology, Kiel, Germany; EDZMU = Entomology Department, Zoological Museum, Uppsala University, Sweden; MCSN = Museo Civico di Storia Naturale, Genova, Italy; MNHN = Laboratoire d'Entomologie, Museum National d'Histoire Naturelle, Paris, France; NRES = Naturhistoriska Riksmuseet (Entomologiska), Stockholm, Sweden; NZSI = National Zoological Collections, Zoological Survey of India, Kolkata, India; USNM = National Museum of Natural History, Washington D. C., U. S. A.; ZMUC = Zoologisk Museum, Copenhagen, Denmark.

^{1&2} Zoological Survey of India, M- Block, New Alipore, Kolkata, West Bengal, India. Email: ¹ kpgiris@gmail.com (corresponding author), ² drgaurav.zsi.india@gmail.com



Image 1. *Vespa affinis* (Linnaeus) ♀



Image 2. *Polistes (G.) olivaceus* (De Geer) ♀



Image 3. *Polistes (P.) stigma tamula* (Fabricius) ♀

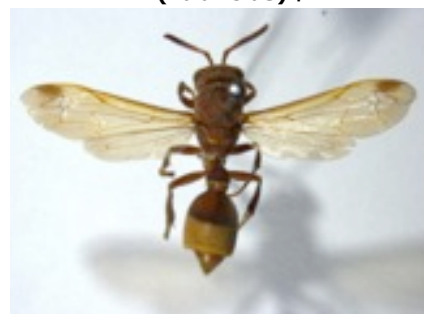


Image 4. *Ropalidia brevita* Das & Gupta ♀



Image 5. *Delta pyriforme pyriforme* (Fabricius) ♀



Image 6. *Campsomeriella (C.) collaris collaris* (Fabricius) ♀



Image 7. *Campsomeriella (C.) collaris collaris* (Fabricius) ♂



Image 8. *Scolia (D.) affinis* Guerini ♀



Image 9. *Scolia (D.) affinis* Guerini ♂



Image 10. *Apis (Megapis) dorsata dorsata* Fabricius Worker

Systematic Account

Superfamily Vespoidea

Family Vespidae

Subfamily Vespinae

Genus ***Vespa*** Linnaeus

1. *Vespa affinis* (Linnaeus) (Image 1)

Apis affinis Linnaeus, 1764, *Mus. Ludov. Ulricae*: 417, Holotype Female, "in *Calidis* regionibus" (EDZMU).

Vespa cincta var. *picea* du Buysson, 1905 (1904), *Ann. Soc. Ent. France* 73: 488 (key), 537, female, "Nouvelle-Guinée, Tupuseleia...; Ile Yule...; N^{le} -Guinée, Kapa-Kapa" (lectotype MCSN).

Vespa indosinensis Perez, 1910, *Act. Soc. Linn. Bordeaux* 64: 8, female, "Cochinchine; Annam (M. Boutan); Malacca; Célèbes septentrionalis; India" (lectotype MNHN).

Vespa affinis continentalis Bequaert, 1936, *Treubia* 15 (4): 346 (key), 350, female "INDIA: Mangalore" (USNM).

Vespa affinis affinis (Linnaeus): Bequaert, 1936, *Treubia* 15 (4): 347.

Vespa affinis indosinensis Perez: Bequaert, 1936, *Treubia* 15 (4): 349.

Diagnosis: Body slender and moderate in size; apical margin of clypeus less hairy and in females with short broadly rounded lobes on each side of the median emargination; punctures on vertex, temple, mesoscutum, scutellum, postscutellum, metapleuron and propodeum small and crowded; second gastral tergum almost entirely orange yellow; body hairs fine, shorter and comparatively dense.

Size: Sterile female: 18 mm.

Material examined: 1 Female, India: West Bengal, East Midnapore district, Nayachar Island, 28.x.1996, Coll. A. K. Hazra & Party, NZSI Regd. No. 12737/H3.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh and West Bengal. [China, Indonesia, Japan (in Ryukyu Island), Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam and New Zealand].

Subfamily Polistinae

Tribe **Polistini**

Genus ***Polistes*** Latreille

Subgenus ***Gyrostoma*** Kirby

2. *Polistes (Gyrostoma) olivaceus* (De Geer) (Image 2)

Vespa olivacea De Geer, 1773, *Mem. Hist. Insect.*, 3: 582, Type: Sex unstated, America (NRES).

Polistes hebraeus (Fabricius): Bingham, 1897, *Fauna Brit. India, Hym.*, 1: 398.

Polistes (Megapolistes) olivaceus (De Geer): Das and Gupta, 1989, *Oriental Ins. Monogr.*, 11: 52.

Polistes (Gyrostoma) olivaceus (De Geer): Carpenter, 1996, *Amer. Mus. Novitates* 3188: 1-39.

Diagnosis: Female: Body yellow with variable black markings and few red markings; Head wider than high; clypeus densely and finely punctate, with a few larger scattered punctures interposed; supraclypeal area, interantennal space and inner orbit including ocular sinus almost smooth; frons and vertex with fine scattered punctures; ocellocular distance about 3x interocellar distance; occipital carina incomplete; pronotum sparsely and finely punctate; mesoscutum mat to almost impunctate; scutellum, postscutellum and metapleuron impunctate; mesopleuron behind epicnemial carina and above sternopleural suture with scattered fine punctures, with round ventral edge; propodeum with distinct striations which do not reach the inner margin on side, without distinct lateral edge, median groove narrower; gaster almost impunctate, covered with short velvety pubescence, first gastral sternite finely striate.

Size: Female: 17 mm.

Material examined: 1 Female, India: West Bengal, East Midnapore district, Nayachar Island, 5.i.1994, Coll. A. K. Hazra & Party, NZSI Regd. No. 12734/H3.

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Odisha, Rajasthan, Sikkim, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.

[Afghanistan, Amirantes, Australia, Bangladesh (new record), Cambodia, Chagos Archipelago, Chile (introduced), China, Egypt, Fiji, Indonesia, Iran, Japan (?), Laos, Madagascar, Malaysia, Marianas, Marquesas, Mauritius, Myanmar, Nepal, New Caledonia, New Zealand, Oman, Pakistan, Philippines, Reunion, Samoa, Seychelles, Singapore, Society Is., Sri Lanka, Tanzania, Thailand, Tongas, Tuamotu Archipelago, U.S.A., Vietnam].

Subgenus ***Polistes (Polistella)*** Ashmead

3. *Polistes (Polistella) stigma tamula* (Fabricius) (Image 3)

Vespa tamula Fabricius, 1798, *Ent. Syst. Suppl.*: 263, female, Type female, "in India Orientali, Dom Daldorff" (DZUK).

Polistes (Polistella) stigma tamula (Fabricius): Das and Gupta, 1989, *Oriental Ins. Monogr.*, 11: 76.

Diagnosis: Female: Body predominantly red with some black markings and the following yellow markings: clypeus, mandible, a broad line along inner orbit upto lower half of ocular sinus, a line on temple bordering eye margin, malar space, basal and apical margin of pronotum narrowly, a line on scutellum at base, another on postscutellum at base, a mark on subtegular area, an elongated mark on mesepisternum at top and another in the middle of apicolateral margin in front of metapleuron, raised ventral margin of mesepisternum and ventral metapleuron each, a mark on dorsal metapleuron, two lines on mesosternum, two broad curved marks on propodeum, apical valvula entirely, fore coxa in front entirely, marks on middle coxa in front and two lines on hind coxa below, first gastral tergite except broad reddish mark at base, apical broad band on third gastral tergite and sternite, fourth gastral segment almost entirely, first gastral sternite and a narrow band on second gastral tergite apically or basally.

Size: Female: 9-11 mm.

Material examined: 2 Female, India: West Bengal, East Midnapore district, Nayachar Island, 5.i.1994 & 26.ii.1999, Coll. A. K. Hazra & Party, NZSI Regd. Nos. 12735/H3 & 12736/H3.

Distribution: India: Delhi, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Odisha, Pondicherry, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal. [Sri Lanka].

Tribe **Ropalidiini**

Genus ***Ropalidia*** Guérin-Méneville

4. *Ropalidia brevita* Das and Gupta (Image 4)
Ropalidia (Anthreneida) brevita Das and Gupta, 1989, *Oriental Ins. Monogr.*, 11: 121, holotype, male, Delhi (NZSI).

Ropalidia brevita Das and Gupta: Kojima *et al.*, 2007, *Entomol. Sci.*, 10: 380.

Diagnosis: Female: Body red with the following yellow portions: a band on clypeus at apex, mandible (except at tip), faint mark on inner orbit below ocular sinus, pronotum anteriorly, two faint marks on post scutellum, two enlarged marks on apical half of propodeum, a faint mark on sides of mesosternum, fore and middle coxae in front, a line on lateral side of hind coxa, fore metatarsus, basal four tarsal segments of mid leg, apical two thirds of mid metatarsus, second to fourth tarsal segments of hind leg, a narrow and a broad apical band on first and

second gastral tergites. In some portions black patches are mixed with reddish body. Temple not much narrower dorsally; gastral petiole as long as hind femur; second gastral tergite 2.33x as wide as gastral petiole.

Size: Female: 12 mm.

Material examined: 1 Female, India: West Bengal, East Midnapore district, Nayachar Island, 11.viii.1999, Coll. A. K. Hazra & Party, NZSI Regd. No. 12733/H3.

Distribution: India: Assam, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Odisha, Rajasthan, Sikkim, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal.

Subfamily Eumeninae
Genus *Delta* de Saussure

5. *Delta pyriforme pyriforme* (Fabricius) (Image 5)

Vespa petiolata Fabricius, 1775, *Ent. Syst.*, ii, 278, syntype, sex not mentioned, Malabar (BMNH).

Eumenes petiolate (Fabricius): Bingham, 1897, *Fauna Brit. India, Hym.*, 1: 341, 342.

Delta pyriforme pyriforme (Fabricius): Krombein, 1991, *Smithsonian Contrib. Zool.*, 515: 8.

Delta pyriforme pyriforme (Fabricius): Gusenleitner, 2006, *Linzer biol. Beitr.*, 38 (1): 694.

Diagnosis: Female: Head yellow, a broad black band between the eyes on the vertex; occiput black; antenna reddish brown; Pronotum entirely and mesoscutum anteriorly yellow, the later posteriorly black; scutellum and postscutellum reddish brown; propleuron black; mesopleuron, metapleuron and legs reddish brown variegated with black; propodeum reddish brown with a narrow medial vertical black line; the sutures between the scutellum, postscutellum and propodeum black; petiole and basal third of the second gastral segment reddish brown, the former black at base and with a subapical black band, the middle of the later black, its posterior third and the remaining abdominal segments yellow. Wings deep flavohyaline. Frons and vertex of the head and thorax with close shallow punctures, petiole smooth, the rest of the abdomen with the surface finely longitudinally aciculate; clypeus pyriforme, its apex truncate; petiole broadening towards the apex and slightly flattened.

Size: Female: 27 mm.

Material examined: 1 Female, India: West Bengal, East Midnapore district, Nayachar Island, 30.vii.1997, Coll. A. K. Hazra & Party, NZSI Regd. No. 12738/H3.

Distribution: India: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Pondicherry, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal. [Bhutan, Cambodia, China, Hawaii, Hong Kong, Indonesia, Malaysia, Moluccas, Myanmar, Nepal, New Guinea, Sri Lanka, Taiwan, Thailand, Vietnam].

Family SCOLIIDAE
Subfamily SCOLIINAE
Tribe **Campsomerini**
Genus ***Campsomeriella*** Betrem

6. *Campsomeriella (Campsomeriella) collaris collaris* (Fabricius) (Images 6 & 7)

Tiphia collaris Fabricius, 1775, *Syst. Ent.*: 354, female, coast of Malabar (ZMUC).

Campsomeriella (Campsomeriella) collaris collaris (Fabricius): Betrem, 1967, *Ent. Ber., Amst.*, 27: 29. Additional citation: Gupta and Jonathan (2003). *Fauna of India and adjacent countries, Hym.: Scoliidae*: 45.

Diagnosis: Female: Integument black; vestiture black, except clypeus and front usually with intermixed cinereous setae, occiput and scapula with dense erect and mesoscutum with decumbent white setae. Wings dark brown with deep blue reflections. Upper front and vertex impunctate except for a few scattered punctures; upper plate of metapleuron impunctate except for a few fine, scattered punctures along upper margin; longer spur of hind tibia black and obtuse apically.

Male: Integument black. The following parts are yellow: clypeus except for a median triangular black mark, mandibles at basal half, pronotum anteriorly in the middle, a narrow stripe adjacent to tegula, two large spots on scutellum anteriorly, a small anteromedian spot on metanotum, a spot on each callosity, stripe on apical half of all femora, outer surface of all tibiae, almost entire surface of first tergite, about apical two-thirds of second, apical half of third and fourth, second and third sternites with paired minute posterolateral spots. Vestiture white except black on apical three abdominal segments; sixth and seventh sternites with long dense black setae. Wings hyaline, with weak yellowish reflections.

Size: Female: 19 mm; Male: 13 mm.

Material examined: 1 Female & 1 Male, India: West Bengal, East Midnapore district, Nayachar Island,

10.xii.1994 & 30.vii.1997, Coll. A. K. Hazra & Party, NZSI Regd. Nos. 12724/H3 & 12725/H3.

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Lakshadweep, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal. [Nepal, Sri Lanka].

Tribe **Scoliini**
Genus **Scolia** Fabricius

7. *Scolia (Discolia) affinis* Guerin (Images 8 & 9)

Scolia affinis Guerin, 1838, *Voy. Coq.*: 254, female, male, Senegal (MNHN).

Scolia (Discolia) affinis Guerin: Bradley, 1973, *Bill. Mus. natn. Hist. Nat., Zool.*, 86: 218, lectotype female designated.

Diagnosis: Female: Length 18 mm. Integument black except antennal flagellum orange red. Vestiture entirely black. Wings dark brown with dark bluish reflections. Upper plate of metapleuron with medium sized, subcontiguous punctures on upper half to three-fourths; dorsum of propodeum and posterior surface with very fine scattered punctures; first tergite with a well developed anteromedian tubercle.

Male: Integument black except antennal flagellum orange red. Vestiture entirely black. Wings dark brown with purplish reflections.

Size: Female: 19 mm; Male: 13-14 mm.

Material examined: 1 Female & 3 Male, India: West Bengal, East Midnapore district, Nayachar Island, 28.ix.1996, 30.vii.1997, 30.vii.1997 & 30.vii.1997, Coll. A. K. Hazra & Party, NZSI Regd. Nos. 12726/H3, 12727/H3, 12728/H3 & 12729/H3.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Odisha, Pondicherry, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal. [Bangladesh, Myanmar, Nepal, Pakistan].

Superfamily Apoidea
Series Apiformes
Family Apidae
Subfamily Apinae
Tribe **Apini**
Genus **Apis** Linnaeus

8. *Apis (Megapis) dorsata dorsata* Fabricius
(Image 10)

Apis dorsata Fabricius, 1793, *Ent. Syst.*, 2: 328.

Apis (Megapis) dorsata Fabricius: Ashmead, 1904, *Proc. Ent. Soc. Wash.*, 6: 120.

Diagnosis: Worker: Basal abdominal segments predominantly yellowish brown; first gastral tergum without dense white pubescence; distal abscissa of vein M in hind wing present; fore wing infumated; scutellum black; drones with dense frond-like setae on meso- and metatarsi; fore wing length 12-15 mm.

Size: Worker: 17-18 mm.

Material examined: 3 Worker, India: West Bengal, East Midnapore district, Nayachar Island, 11.xii.1994, 27.ix.2000 & 27.ix.2000, Coll. A. K. Hazra & Party, NZSI Regd. Nos. 12730/H3, 12731/H3 & 12732/H3.

Distribution: India: Almost throughout the country. [China, Indonesia, Malaysia, Myanmar, Sri Lanka].

Summary

The present study includes the record of 8 species of Hymenoptera (Aculeata) belonging to 7 genera under 2 superfamilies and 3 families from Nayachar Island of West Bengal and all are being reported for the first time from Nayachar Island.

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