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New record of *Vechtia rugosa* (F. Smith, 1858) (Hymenoptera, Crabronidae, Crabroninae) from India

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ABSTRACT. Range extension of the square-headed wasp, *Vechtia rugosa* (F. Smith, 1858), which is primarily the Southeast Asian species, towards India is presented. A key to species and subspecies of the genus *Vechtia* Pate, 1944 is also provided with illustrations of *V. rugosa rugosa* (F. Smith, 1858). The known distribution of the *Vechtia* species in Southeastern Asia is also discussed.

Key words: Square-headed wasps, Crabronini, Crabronina, Mookambika Wildlife Sanctuary, Karnataka

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INTRODUCTION

The genus *Vechtia* Pate, 1944 is primarily an Oriental genus of square-headed wasps with only two species namely *V. rugosa* (F. Smith, 1858) and *V. perugosa* Leclercq, 1963. This genus is characterised by having dorsal carina of scapal basin expanded medially into a downcurved, triangular lamella and sternaulus present. These characters differentiate it from other genera of the tribe Crabronini with a dorsally and laterally margined scapal basin (Pulawski & Court, 1992). In the present study, the species *V. rugosa* is newly recorded from India based on a specimen collected from the Mookambika Wildlife Sanctuary of Karnataka state.

MATERIAL AND METHODS

Among a huge collection of crabronid wasps assembled by us during the last eight years from Southern India, we got only a single specimen of the *Vechtia*. One male specimen was collected from Areshiroor of the Mookambika Wildlife Sanctuary of Udupi district of Karnataka (Fig. 1). Further attempts to collect more specimens of this species from the same locality were not successful. The specimen has been studied and photographed under a Leica Stereo microscope model LEICA M 205A with LEICA DFC 450 Camera.

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Figure 1. Collection locality of *Vechtia rugosa rugosa* (F. Smith, 1858).

The terms used for morphology follow Leclercq (1963) and Bohart and Menke (1976). The classification follows Pulawski (2023). The specimen is deposited at Western Ghat Regional Centre, Zoological Survey of India, Kozhikode (ZSIK). The following abbreviations were used for the morphometric characters in the text: H = Head; M = Mesosoma; OOL = Ocello-Ocular Length (the minimum distance between a posterior ocellus and eye); POL = Posterior Ocellar Length (distance between the two posterior ocelli); T = Metasomal tergum. The following abbreviations have been used for depositories: NHMUK — British Museum (Natural History), London, UK; OXUM — Oxford University Museum, Oxford, UK; ZSIK — Western Ghat Regional Centre, Zoological Survey of India, Kozhikode, India.

RESULTS

Taxonomic hierarchy

Order Hymenoptera Linnaeus, 1758

Superfamily Apoidea Latreille, 1802

Family Crabronidae Latreille, 1802

Subfamily Crabroninae Latreille, 1802

Tribe Crabronini Latreille, 1802

Subtribe Crabronina Latreille, 1802

Genus *Vechtia* Pate, 1944

Vechtia rugosa rugosa (F. Smith, 1858) (Figs 2 & 3A–3J)

Crabro rugosus Smith, 1858:106, ♂, junior primary homonym of *Crabro rugosus* Herrich-Schaeffer, 1841 (which is a junior synonym of *Crossocerus leucostoma* (Linnaeus, 1758)). Holotype or syntypes: ♂, Malaysia: Sarawak: no specific locality (OXUM); *Crabro bucephalus* Smith, 1865:86, ♀ (as *Bucephalus*, incorrect original termination), junior primary homonym of *Crabro bucephalus* Smith, 1856. Holotype or syntypes: ♀, Indonesia: Moluccas: Island of Morty, now Morotai (NHMUK). Synonymized with *Vechtia rugosa* by Leclercq, 1957:107; *Crabro spinifrons* Bingham, 1897:327, ♀, ♂. Syntypes: Burma (now Myanmar): Tenasserim (NHMUK). Synonymized with *Vechtia rugosa* by Leclercq, 1957:106, 107.

Material examined. India: Karnataka, Udupi district, Areshiroor (13°49'34.428"N, 74°44'56.202"E, 87 m a.s.l.), 1♂, 18.vi.2022, Coll. V.D. Hegde & Party, Regd. No. ZSI/WGRC/IR/INV.23911.

Diagnosis — **Male.** Mandible bidentate (Fig. 3C); dorsal carina of scapal basin expanded medially into a downcurved, triangular lamella (Fig. 3A); median carina extending from anterior ocellus reaching to dorsal carina of scapal basin (Fig. 3B); ocelli in equilateral triangle (Fig. 3B); OOL as long as POL (Fig. 3B); head (Figs 3A, 3B) and metasoma (Fig. 3J) smooth and shining with somewhat dense and strong setigerous punctures; mesoscutum not punctate, but with longitudinal striations (Fig. 3F); scutellum with longitudinal striations (Fig. 3F); dorsal surface of propodeum with irregular striations developed as rugose punctures (Fig. 3F); posterior surface of propodeum with deep median groove and surface polished (Fig. 3H); dorsolateral and posterolateral margins of propodeum carinate; sternaulus present (Fig. 3G); mid femora thickened and with tufts of long hairs (Fig. 3I).

Colour. Body black with following white to pale yellow markings: labial palpus, maxillary palpus, antennal scape (Fig. 3D), medially interrupted band on pronotum and scutellum (Fig. 3F), pronotal tubercle (Fig. 3G), metanotum (Fig. 3F), T1–T3 with somewhat oval-shaped spots (Fig. 3J), T4 with laterally elongated spots (Fig. 3J), T5 with a transverse band at base (Fig. 3J), apical third of fore femur, extreme base and apex of fore and mid tibiae, basal third of hind tibia, hind tibial spurs, basitarsus of all legs, ventral side of remaining tarsal segments. The following are brown to ferruginous: Mandible (except base) (Fig. 3C), antenna (except scape) (Fig. 3D), tegula (Fig. 3F), dorsal surface of tarsal segments (except basitarsus). Pubescence silvery. Wings hyaline.

Size (H+M+T1+T2)**.** 4.71 mm.

Distribution. India **(new record)**: Karnataka. *Elsewhere*: Brunei; Cambodia; Indonesia; Laos; Malaysia; Myanmar; New Guinea; Philippines; Singapore; Thailand (Pulawski, 2023).

Figure 2. *Vechtia rugosa rugosa* (F. Smith, 1858), male habitus, lateral view.

Figure 3. *Vechtia rugosa rugosa* (F. Smith, 1858), male. **A.** Head, frontal view; **B.** Head, dorsal view; **C.** Lower half of head, frontal view; **D.** Antenna; **E.** Fore wing; **F.** Mesosoma, dorsal view; **G.** Mesosoma, lateral view; **H.** Posterior side of propodeum; **I.** Femur and tibia of mid leg; **J.** Metasoma, dorsal view.

Key to the known species and subspecies of *Vechtia*

1 Ocelli in a flattened triangle; OOL = 2× POL; mesonotum strongly and irregularly punctate, without longitudinal striations; mid femora not thickened and without tufts of long hairs; metasoma immaculate; metanotum entirely black. ..... ***Vechtia perugosa* Leclercq, 1963**

– Ocelli in equilateral (Fig. 3B); OOL = POL; mesonotum not punctate, with longitudinal striations (Fig. 3F); mid femora thickened and with tufts of long hairs (Fig. 3I); metasoma maculate, T1–T4 with lateral diagonally placed pale spots and T5 with a transverse pale line at base (Fig. 3J). .... ***Vechtia rugosa*** **(F. Smith, 1858) 2**

2 Punctures on head much finer and more delicate than in alternate; colour of maculae more whitish than in alternate. ..... ***Vechtia rugosa palawana*** **Tsuneki, 1976** [Philippines]

– Punctures on head denser and stronger than in alternate (Fig. 3B); colour of maculae less whitish to yellow. **3**

3 Two lateral spots of fourth tergite small, round, and not distinctly elongated; body smaller and slender than in alternate. ..... ***Vechtia rugosa forticarinata*** **Leclercq, 1951** [Indonesia]

– Two lateral spots of fourth tergite distinctly elongated (Fig. 3J); body larger and stouter than in alternate. ..... ***Vechtia rugosa rugosa*** **(F. Smith, 1858)**

DISCUSSION

Specimens of the genus *Vechtia* are very rarely collected in India. The last finding of this genus from India is from the year 1953 (Leclercq, 1963) by describing the second species of the genus, *V. perugosa* Leclercq, 1963. It is also based on a single male from Coimbatore, Tamil Nadu collected by P.S. Nathan during the year 1953. Later there was no further information about the genus from India. *Vechtia perugosa* has a limited distributional range and is so far reported from southern India (Coimbatore) and Sri Lanka (Trincomalee) only (Leclercq, 1963 & 2007). It may be an endemic species in the Western Ghats – Sri Lanka biodiversity hotspot. *V. rugosa* (F. Smith, 1858) has primarily a Southeast Asian distribution and is more widespread. It is recorded from Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, etc. (Pulawski, 2023). Bingham (1897) reported it from Tenasserim in Myanmar, which is adjacent to Thailand. Tsuneki (1983) reported it from New Guinea of Melanesia in the southwestern Pacific Ocean also which is the only record of the genus *Vechtia* outside the Oriental Region.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: P.G.K.: Designed the methodology; P.G.K.: Wrote the manuscript with support from R.K.P.H., S.A., & V.D.H. All authors discussed the results and contributed to the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The authors declare that the data and material during the study are publicly available after publication with proper citation. The specimens listed in this study are deposited in the collection of Western Ghat Regional Centre, Zoological Survey of India, Kozhikode (ZSIK), and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The authors declare that this study received ethics approval and consent for the publication of details including the photograph and details within the text to be published in the journal from the competent authority.

CONSENT FOR PUBLICATION

The authors declare that this study received consent for publication from the competent authority.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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اولین گزارش زنبور *Vechtia rugosa* (F. Smith, 1858) (Hymenoptera, Crabronidae, Crabroninae) از هند

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چکیـده: گسترش دامنه پراکنش زنبور سرمربعی *Vechtia rugosa* (F. Smith, 1858) یک گونه با پراکندگی در جنوب‌شرق آسیا، به سمت هند ثبت شد. کلید شناسایی گونه‌ها و زیرگونه‌های جنس *Vechtia* Pate, 1944 نیز تهیه و تصاویر زیرگونهٔ *V. rugosa rugosa* (F. Smith, 1858) ارایه شد. پراکنش ثبت شدهٔ گونه‌های جنس *Vechtia* در جنوب شرق آسیا مورد بحث قرار گرفت.

واژگـان کلیدی: زنبور سرمربعی، Crabronini، Crabronina، موکامبیکا، پناهگاه حیات وحش، کارناتاکا