

TWO NEW SPECIES OF THE RARE GENUS *GASTROTRYPES* BRUES (HYMENOPTERA: PLATYGASTRIDAE) FROM INDIA

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Gastrotrypes Brues (Hymenoptera: Platygastridae) is a rare genus, represented so far by only 7 species globally. Two new species viz. *Gastrotrypes brevis* Sunita et Rajmohana **sp. n.** and *Gastrotrypes carinatus* Sunita et Rajmohana **sp. n.** are hereby described as new to science from Kerala, India. A revised identification key to species is also provided.

Key words: Platygastridae, India, new species, key, *Gastrotrypes*.

INTRODUCTION

Gastrotrypes Brues, 1922 (Hymenoptera: Platygastridae), with the type species *Gastrotrypes spatulatus* Brues, 1922 is a rare and less diverse genus and is represented so far by only 7 species in the world (ANJANA *et al.* 2016). Four species are known from India *G. vindhyensis* (Mukerjee, 1978), *G. longicaudatus* Veenakumari and Buhl, 2015, *G. manii* Veenakumari *et al.* 2015 and *G. keralensis* Anjana, Rajmohana *et al.* 2016, whereas *G. caudatus* (Brues, 1922), *G. spatulatus* are from Trinidad and Tobago and *G. malaysianus* (Buhl, 2008) from Malaysia (BRUES 1922, MUKERJEE 1978, BUHL 2008, VEENAKUMARI *et al.* 2015, ANJANA *et al.* 2016).

Host record is available only for the type species, the host being *Xylocleptes praecox* (Winnertz, 1853) (Diptera: Cecidomyiidae), which emerged from the oak gall *Quercus robur* L. (VLUG 1995). The members of this genus are easily distinguished by their small body size, often <2mm, their 10 segmented antennae, 4 segmented female clava, well-separated clavomeres, lateral ocelli placed near to orbital margin than to anterior ocellus and also by the absence of notaulari (BRUES 1922). Except for *G. malaysianus*, the most striking feature of the genus generally is the five-segmented female metasoma, in which the apical tergite is never transverse, instead, tubular and often elongate at times. The genus is also characterized as having longitudinal ridges on the first tergite.

The genus was first reported in India by the generic transfer of *Trichacis vindhyensis* Mukerjee, 1978, to *Gastrotrypes* by BUHL (2014). Later VEENAKUMARI *et al.* (2015) described two new species *viz.* *G. manii* and *G. longicaudatus*, followed by *G. keralensis* by ANJANA *et al.* (2016). In the present study, two species *viz.* *Gastrotrypes carinatus* Sunita et Rajmohana sp. n. and *Gastrotrypes brevis* Sunita et Rajmohana sp. n. are hereby described as new to science from India. Morphological affinities with closely resembling species are also discussed. A revised key to world species of genus *Gastrotrypes* is also provided.

MATERIAL AND METHODS

Standard morphological terminology and abbreviations followed (MASNER & HUGGERT 1989, MIKO *et al.* 2007). Description and imaging works were done using Leica M205A and Leica DFC-500 digital cameras. The types are deposited in the National Zoological Collection (NZC), Zoological Survey of India, Kolkata, India.

Abbreviations used are as follows: FCI = a ratio of head width/head height; LCI = a ratio of head height/head length; OOL = ocular ocellar line; LOL = lateral ocellar line; OD = ocellar diameter; POL = posterior ocellar line; A1–A10 = antennal segments 1–10; IOS = interorbital space and T1–T5 = metasomal tergites 1–5; S1–S5 – metasomal sternites.

TAXONOMY

***Gastrotrypes brevis* Sunita et Rajmohana sp. n. (Figs 1–6)**

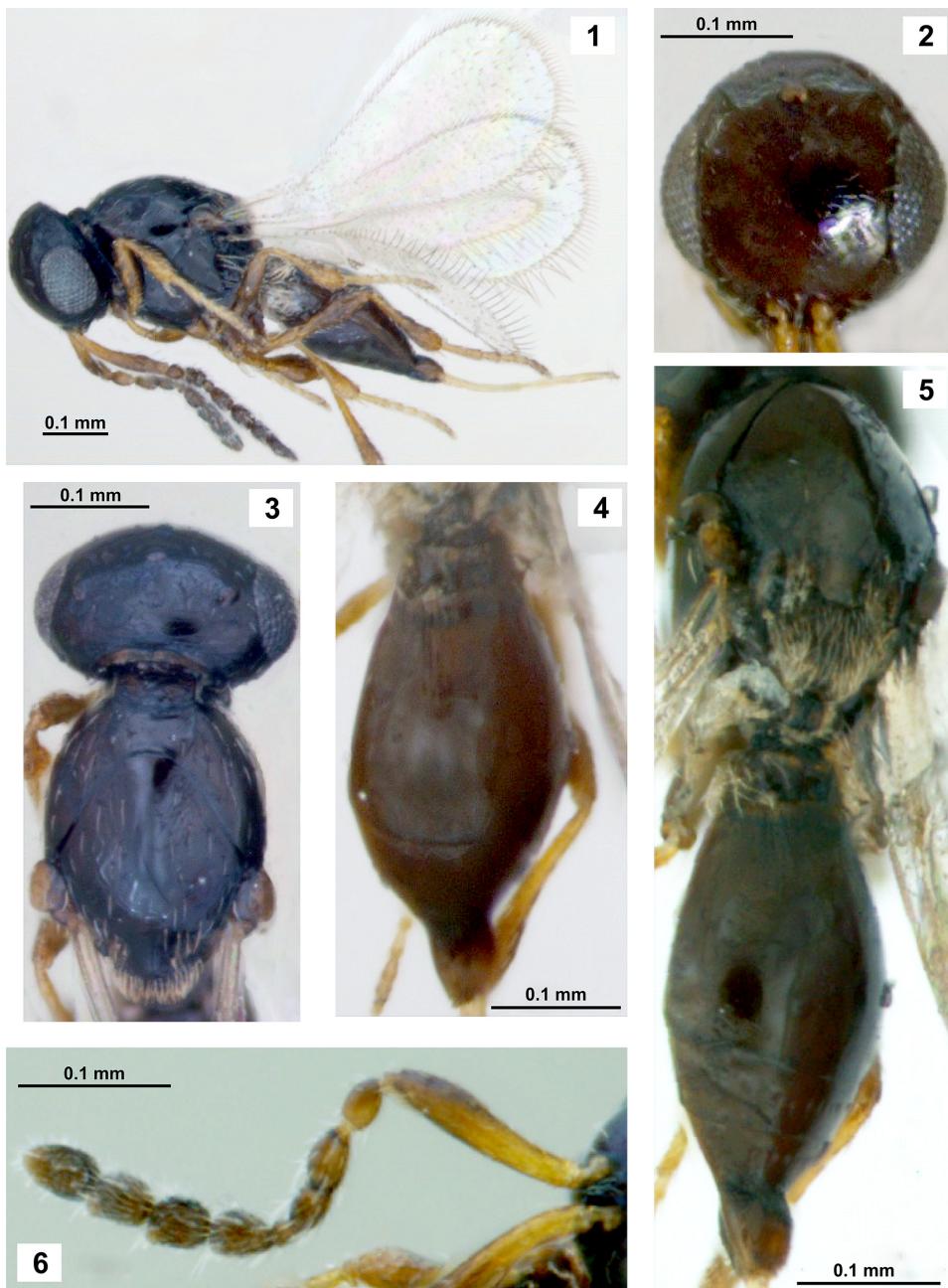
Material examined: Holotype (Reg. No. 27896/H3), female on card labelled INDIA: Karnataka, Kandimakki, Coorg (12°09.545', 075°48.262'), 27.ii.2016, coll. Manoj K. Paratype: 1 female, with same data as holotype.

Diagnosis: Frons, vertex and occiput finely reticulate; hyperoccipital carina absent; OOL subequal to OD; A7–A9 as long as wide, A10 1.5× as long as A9; marginal fringe well developed in both fore wings and hind wings; T5 not much elongate, only 1.1× as long as wide.

Description: Female (holotype) body length = 0.7 mm.

Body brown to blackish brown; basal A1 and A2 towards apex yellow, rest of antenna brown, A7–A9 blackish brown; legs including coxae yellowish brownish to brown; mandibles and tegula deep brown; body pilosity whitish brown to brown; wings hyaline.

Head: FCI = 1.2, LCI = 1.6 (Fig. 2); head almost as wide as high and 1.53× as high as long; head 1.1× as wide as mesosoma, rounded; head in front view, including frons, gena and vertex smooth and with fine reticulate impressions, a bit effaced on lower frons (Fig. 3); inner orbits bordered by a row of white setae; upper and lower frons with sparse setae; hyperoccipital carina absent; occiput towards its lower margin with closely placed irregular and concentric curved striae (Fig. 2); eyes with extremely sparse micropilosity, visible



Figs 1–6. *Gastrotrypes brevis* Rajmohana et Sunita sp. n.: 1 = habitus; 2 = head frontal view; 3 = head with mesosoma; 4 = metasoma; 5 = mesosoma with metasoma; 6 = antenna

only in high magnifications; OOL:OD: POL:LOL= 2:2:20:7; IOS 1.40× eye height and 0.69× width of head; antenna with 10 segments, clava 4 segmented. antennal segments finely setose, denser on claval segments; A7 to A9 subequal in length; length to width ratio of A1–A10 being 46:9; 9:7; 0.5:0.5; 11.5:9.3; 7:6; 3.8:3.8; 11:9; 11:9; 11:9; 15:10, respectively (Fig. 5); A10 1.5× as long as wide.

Mesosoma: 1.33× as long as wide; smooth and shiny, with sparse setae; mesoscutum 1.8× as long as wide, without notauli, sparsely setose; with a small patch of reticulation on either side anterolaterally; median lobe 0.78× longer than wide and overlapping mesoscutellum to nearly one-third part of it (Fig. 6); pronotum visible as a wide zone, not angular at sides; cervical area with a few transverse irregular striae; pronotum smooth and shiny, sparsely setose; lateral pronotum and mesopleura also smooth; anterior margin of metapleura smooth, rest with dense yellow recumbent setae; scutoscutellar sulcus not distinct; mesoscutellum slightly wider than long, densely setose; lateral pronotal area with a few white scattered setae; mesopleuron and metapleuron smooth, metapleuron with dense pilosity posteriorly (Fig. 2); median and lateral propodeal carina slightly raised; anterior lateral propodeal area coarse, posterolateral propodeal area densely setose; forewing surpassing tip of metasoma, 2.22× longer than wide and with fine microtrichia; marginal cilia of forewing 0.25× wing width and that of hindwing nearly subequal to wing width (Fig. 1).

Metasoma: With 5 tergites, 2× as long as wide and length 1.2× combined length of head and mesosoma; 1.3× wide as head; length and width of T1–T5 being 3:8; 2:15; 2:7; 1:5; 6:5, respectively (Fig. 4); T1 coarse, with a raised median longitudinal carina, T2 laterally with short longitudinal striations radiating and reaching almost one-third of T2; rest smooth; T3 and T4 anteriorly with a transverse row of sparse and widely placed white setae (Fig. 6); T5 1.1× longer than wide, densely and irregularly striolate at its basal one-fourth; S5 also with same sculpture as of T5. S1 and base of S2 densely setose. Ovipositor exserted (Fig. 1).

Male: Unknown

Etymology: The species is named *brevis* (= short, in Latin), due to their short claval segments.

Comments: Sculpture on frons and metasomal tergites are significant in distinguishing *Gastrotrypes* species (HUGGERT 1980). *G. brevis* sp. n. is morphologically similar to *G. manii* in the proportions of A8 and A9 and POL:LOL ratio. However, *G. manii* can be separated from *G. brevis* at once by their smooth frons and a distinct hyperoccipital carina. Though both *G. brevis* and *G. vindhyensis* have fine reticulations on frons, vertex and occiput and also a slightly elongate T5, both the species differ clearly in length to width ratio of antennal segments, A7–A9.

***Gastrotrypes carinatus* Sunita et Rajmohana sp. n. (Figs 7–11)**

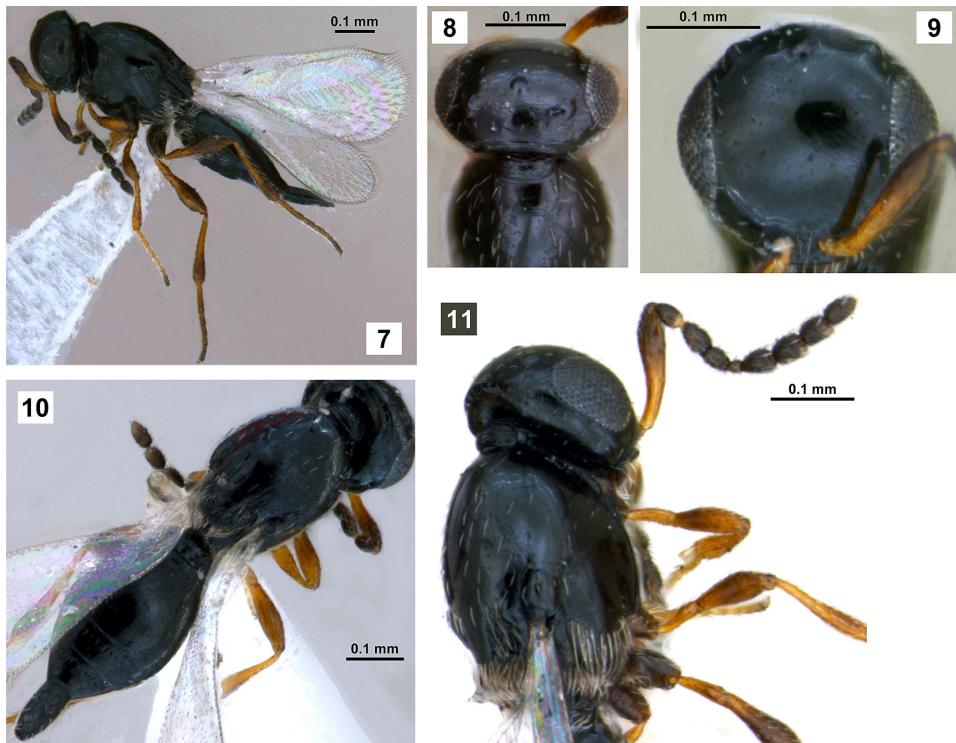
Material examined: Holotype (Reg. No. 27898/H3), female on card labelled INDIA: Kerala, Kasaragod, Cheemeni (12°14.501', 75°14.216'); 08.01.17, coll. Manoj K. Paratype (Reg. No. 27899/H3): 1 female, with the same collection data as that of the holotype.

Diagnosis: Frons, vertex and occiput finely reticulate. Hyperoccipital carina present; OOL subequal to OD; A7–A10 nearly subequal in length; T5 elongate, $>2.5\times$ as long as wide.

Description: Female (holotype) body length = 0.90 mm.

Body shiny black; A1–A2 and legs except coxae, yellowish brown; coxae dark brown; A3–A10 brown; last segment of tarsi slightly darkened.

Head: FCI = 1.1, LCI = 1.5 (Fig. 9); head 1.1× as wide as mesosoma, rounded. Frons, gena, vertex and occiput finely reticulate, sculpture effaced on lower frons (Fig. 10); inner orbits bordered by a row of sparse white setae; upper and lower frons with sparse setae; hyperoccipital carina distinct; occiput without any sculpture below hyperoccipital carina, but with a concave carina medially; eyes with extremely sparse micropilosity, visible only in high magnifications; (Fig. 9); ocellar triangle finely reticulate; OOL:OD:POL:LOL = 2:2:15:6; OOL subequal to OD; IOS 1.3× eye height and 0.68 of head width; antenna with 10 segments; proportion of length to width of antennomeres A1–A10 being 14:3; 3:2; 0.45:0.7; 4.9:2.4; 3.66:2.1; 1:0.8; 4.2:2.8; 4.2:2.8; 4.9:2.45 respectively, A7 to A9 subequal, 1.5× as long as wide; (Fig. 11). A10, not as wide as A9, 1.16× as long as A9.



Figs 7–11. *Gastrotrypes carinatus* Rajmohana et Sunita sp. n.: 7 = habitus; 8 = head and anterior mesosoma, dorsal view; 9 = head frontal view; 10 = habitus, dorsal view; 11 = antenna, head and mesosoma in lateral view

Mesosoma: Smooth and shiny; 1.5× as long as wide ; lateral pronotal area with a few white scattered setae; mesoscutum without notaui, sparsely setose, with a small patch of reticulation on either side anterolaterally; 0.9× as long as wide; hind margin with a mid-lobe extending 0.4× of mesoscutellum (Fig. 8,10); median lobe as long as wide; pronotum visible as a wide zone, not angular at sides; cervical area with transverse irregular striae; pronotum smooth and shiny, setose; scutostellar sulcus not distinct; mesoscutellum slightly wider than long, densely setose; median and lateral propodeal carina slightly raised; anterolateral propodeal area coarse, posterolateral propodeal area densely setose; lateral pronotal area with a few white scattered setae; mesopleura and anterior margin of metapleura smooth, rest with dense yellow recumbent setae (Fig. 11). Forewing 0.82× length of body and 2.2× longer than wide, with fine and dense microtrichia; marginal cilia well developed, 0.25× forewing width (Fig. 7), hindwing marginal fringe 0.6× as maximum width of wing.

Metasoma: 2.2× as long as wide and 0.9× of head and mesosoma combined; T5 elongate and tubular; length and width of T1–T5 being 10: 24; 38: 44; 11:30; 12: 15 and 27:11 respectively; T1 with one median carina and two adpressed submedian carinae; T2 submedially striate longitudinally at its anterior one-fourth, rest smooth; T3 and T4 smooth and shiny; T5 2.5× as long as wide with white setae; basal half of T5 densely and finely striolate (Fig. 10).

Male: Unknown.

Etymology: The species is named *carinatus*, after their distinct hyperoccipital carina as well as the emarginated carina below it.

Comments: *Gastrotrypes carinatus* sp. n. can be easily distinguished from other species by the presence of a median longitudinal carina on T1. The species resembles *G. manii* in the presence of a hyperoccipital carina and also an elongate T5. However, the finely reticulate sculpture on the frons, vertex and occiput in *G. carinatus* (smooth in *G. manii*), and a combination of several characters like differences in length to width ratio of the claval segments and much smaller marginal fringe of wings serve to separate the two species.

KEY TO WORLD SPECIES OF GASTROTRYPES BASED ON FEMALES (modified from ANJANA *et al.* 2016)

- | | | |
|---|---|---|
| 1 | T5 distinctly elongate, more than 5× as long as wide | 2 |
| – | T5 as long as or longer than wide, but less than 5× | 3 |
| 2 | A3 twice as long as wide; forewing with distinct marginal fringe at apical margin | <i>G. caudatus</i> Brues |
| – | A3 as long as wide; forewing without distinct marginal fringe at apical margin | <i>G. longicaudatus</i> Veenakumari et Buhl |
| 3 | Metasoma with 6 visible tergites | <i>G. malaysianus</i> Buhl |
| – | Metasoma with 5 visible tergites | 4 |

4	T2 without any basal striations; T3 with scattered punctae <i>G. spatulatus</i> Brues	
–	T2 at extreme base with a few short basal striations; T3 only with a row of transverse setose, punctae towards base	5
5	A7–A9 elongate, at least 2× as long as wide	6
–	A7–A9 not elongate, not more than 1.5× as long as wide	7
6	Frons smooth; OOL > OD <i>G. keralaensis</i> Anjana et Rajmohana	
–	Frons reticulate coriaceous; OOL < OD <i>G. vindhyensis</i> Mukerjee	
7	T1 with a distinct median carina and adpressed lateral grooves <i>G. carinatus</i> Sunita et Rajmohana sp. n.	
–	T1 sculpture not as above, median carina lacking	8
8	Frons, gena and vertex smooth; hyperoccipital carina distinct <i>G. manii</i> Veenakumari et Buhl	
–	Frons finely reticulate; hyperoccipital carina absent <i>G. brevis</i> Sunita et Rajmohana sp. n.	

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