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THE GENUS *MARSHALLA* PAJNI (COLEOPTERA) FROM INDIA

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ABSTRACT

The monotypic genus *Marshalla* Pajni is herein reviewed with diagnostic characters. The only known description of *Marshalla bituberculatus* given by Pajni is revised. Diagnostic characters with SEM images, line diagrams and male, female genitalia with current terminology are provided.

Key words: Curculionidae, Entiminae, Cyphicerini, East India.

The entimine genus *Marshalla* Pajni (Coleoptera: Curculionidae), is endemic to India and is distributed only in its eastern region. It is currently placed in the tribe Cyphicerini Lacordaire (1863) under the subfamily Entiminae (Alonso-Zarazaga and Lyal, 1999). This tribe is characterized by well developed shoulders and functional wings. Of its genera, *Marshalla* forms an exception with poorly developed shoulders and non-functional wings.

In 1990, Pajni established *Marshalla* based on a single species *bituberculatus* from east India in his work 'Fauna of India'. This genus is characterized by the following: mentum with two setae, raised interscrobal area forming a large plate carrying a high epistome, frons narrower than length of an eye, scape of antennae reaches middle of the pronotum, non-functional wings, legs longer than body and hind tibial apex open (as against the closed given in earlier description). Since these earlier descriptions are inadequate, the present study describes them with more details.

MATERIALS AND METHODS

The holotype and paratypes from the National Pusa Collection, Division of Entomology, Indian Agricultural Research Institute, New Delhi (NPC) were studied. The study of genitalia and elytral vestiture was carried out in accordance with Supare *et al.* (1990), Thompson (1992), Poorani and Ramamurthy (1997) and Wanat (2007). The taxonomic characters and genitalia were studied with a Wild Heerbrugg M8 stereozoom microscope fitted with an ocular grid and

drawing tube. Line diagrams of elytral vestiture were drawn using a drawing tube attached to a Leica DM500 research microscope. SEM images were taken with Zeiss EVOMA10 Scanning Electron Microscope (SEM) at 20kV/EHT and 109-123 Pa between 108x-1.76kx, without any coating. Photographs were taken with Leica DFC425C digital camera attached with Leica M205FA stereozoom microscope with automontage. The values given in figures are in mm. The following abbreviations used: NPC – National Pusa Collection, SEM – Scanning Electron Microscope, BL – Body length, BW – Body width, RL – Rostrum length, RW – Rostrum width, PL – Pronotum Length, PW – Pronotum width, EL – Elytral length, EW – Elytral width.

RESULTS AND DISCUSSION

Marshalla bituberculatus Pajni (1990)

Diagnosis. Rostrum running parallel from base to one third and then widening towards apex; with a few pale erect setae along each dorsolateral carina, with interscrobal area raised to form a plate (Fig. 1); central carina distinct, complete; epistome forming an obtuse angle extending far beyond level of insertion of antennae; scrobes small, almost visible from above. Mentum with 2 long curved setae (Fig. 2).

Redescription

Body medium-sized, elongate oval (Fig. 4, 5); colour black, antennae and legs blackish brown with whitish scales; scales round to oval, moderately dense, imbricate; scales on dorsal part of head moderately dense, round to oval, scales behind the eyes and ventral part of the head round to elongate-oval; rostrum

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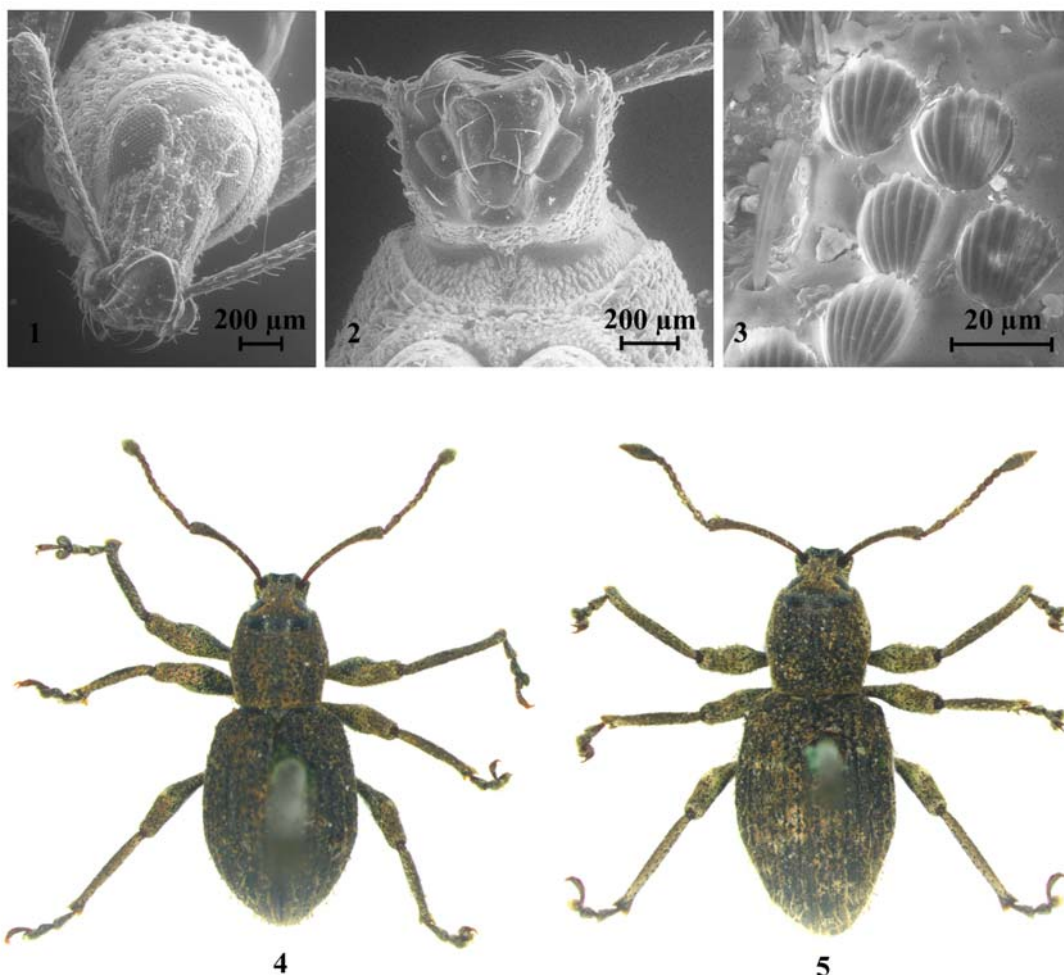


Fig.1-5: Key characters. 1. Epistomal plate, 2. Mentum with two setae, 3. SEM image of elytral vestiture, 4. Male, 5. Female

sparingly covered with recumbent fine setae, setae rather short; epistomal plate without scales, but area behind with scales; antennal scape and funicle with fine and long setae, scape with moderately dense, round to oval scales, funicle with fine and small scales; pronotum with short, suberect setae, its median sulcus covered with sparse scales, forming a distinct blackish stripe, dorsally lateral margin with an ill-defined, moderately wide, pale stripe; setae of each interval of elytra fine, short, subrecumbent to recumbent, white; setae on the ventral surface short.

Head moderately convex, dorsal part smooth, punctations small, moderately dense; eyes lateral, oval, almost flat; frons rather flat, on the same plane as dorsal part of rostrum, with pale erect setae on frons (Fig. 6, 7). Rostrum 1.22x as long as wide, 1.06x longer than

its apical width, divergent from base to apex, widest at apex; base 1.82x as wide as frons; dorsal surface slightly flat in the middle part of rostrum; dorsolateral carina converging behind antennal insertion; with an impression laterally between eyes and antennal scrobes, laterally near the ventral margin with deep sulcus; epistomal plate broad V-shaped, raised above, with distinct carina, non-glabrous; mandibles with distinct scars, scars elongate-oval, mentum with 2 setae; scrobes short in length, broad, curving inwards, closed behind, visible from above. Antennae long, piceous, covered with white scales; scape long, slender, exceeds beyond posterior margin of eye when at rest, reaching the middle of the pronotum, covered with dense oval to elongate oval scales, white to metallic greenish in colour; funicle segments 1 and 2 subequal, 3-7 transverse and subequal, 2.28x as short as 2, 6 1.12x

shorter than 7, 1-7 covered with metallic green to whitish, sparse, elongate oval scales and with fine, long suberect setae; club elongate oval, apex sharp, blackish brown, and densely and finely pubescent (Fig. 8). Pronotum 1.32x as wide as long; fore margin and hind margin truncate, sides evenly rounded, widest at middle, gradually constricted at both ends, fore margin slightly narrower than hind margin; with a median sulcus, extremely shallow, carina of hind margin indistinct and linear; dorsal surface closely and coarsely punctate, with interspaces in middle part having conspicuous granules and some of them with an erect pale seta; punctations apart by 1.25x of diameter (Fig. 9); post-ocular lobes well developed, vibrissae fine, short, dense, pale yellow, approximating the margins of eye. Scutellum small but distinct, triangular, clothed with brownish and whitish scales. Elytra without shoulders, base not raised as prominent flange, declivous to mesonotum, truncate; moderately convex, elongate oval; subparallel before declivity, strongly narrowed near the apex, widest at middle, strongly narrowed from declivity to base; striae distinct, narrow, moderately deep, linear; punctations elongate, moderately dense; intervals wide, slightly flat, each interval convex at middle, odd intervals not raised than even ones; intervals without tubercles; outer margin behind metacoxae slightly sinuate; pale erect setae present in each interval from apex to base (Fig. 10). Legs moderately long, clothed with scales and subrecumbent and recumbent, fine setae; femora clavate, with scales and subrecumbent fine setae, bearing a tooth in the middle ventrally (Fig. 12); tibiae with erect, long setae; inner margin bisinuate, distinctly with a mucro at the apex, mucro slightly short, covered by setae on inner apical margin (in dorsal view), denticles absent; fore tibiae bent inward and downward at apical one third, inner margin strongly bisinuate, outer margin slightly arcuate toward apex (in lateral view); apex only projected inwards, not projected outwards, with moderately long and thick bristle on the apical margin, bristle dense; hind tibial apex open tarsi moderately long, broad; tarsomere I 1.16x as long II, subequal in width; tarsomere III distinctly wider at apex than II, broadly cordate, rather deeply emarginated; tarsomere IV hidden; tarsomere V slender; tarsomeres dorsally with long, fine setae, ventrally with dense, erect pubescence; claw simple and free. Abdomen with sternites shining black, covered with brownish scales, punctate and each punctation with a pale subrecumbent seta, punctations dense and setae comparatively longer in apical sternite; sternite 1 slightly

depressed at middle, moderately convex laterally; sternites 1 and 2 connate; sternite 2 moderately flat medially, with apical transverse impression; sternite 1 and 2 subequal in length; sternite 2 slightly shorter than or equal to 3 and 4 combined; sternite 3 and 4 subequal in length; sternite 5 moderately flat, apically rounded, subequal in length to sternites 3 and 4 combined (Fig. 13, 14).

Male genitalia with aedeagus arcuate, slightly triangular at apex; with exophallic valve long, its apical end and lateral sides more sclerotized; apophyses 1.67x longer than median lobe; endophallus with a pair of curved plates at apex (Fig. 15, 16, 17); tegmen ring like, manubrium almost equal to median lobe, slightly curved near apex (Fig. 18); basal plate of spiculum gastrale winged at base, shaft curved at apex (Fig. 19). Female genitalia with spermatheca having distal arm 1.1x as long as proximal; nodulus well developed, rounded and bearing a lobe at the apex; ramus rounded and bears the accessory gland, cornu tubular gradually narrowing to a pointed and deflected apex (Fig. 20); spiculum ventrale with a slender shaft, uniformly wide throughout length; basal plate wide, shallowly emarginated at apex, basal half curved, bear numerous fine moderate setae (Fig. 21).

Measurements. BL: 5.08 ± 0.14 mm; BW: 2.13 ± 0.20 mm; PL: 0.99 ± 0.13 mm; PW: 1.32 ± 0.04 mm; EL: 3.17 ± 0.10 mm; EW: 1.95 ± 0.10 mm; RL: 0.85 ± 0.11 mm; RW: 0.70 ± 0.06 mm.

Material examined: Holotype, 1 ♂, India, Assam, Bogapani, 28.iv.1979; paratype, 1 ♂, with data same as holotype, 2 ♀♀, with data same as holotype, 1 ♀, with data same as holotype except 20.ix.1987.

Remarks: This is a unique genus distinct from all the described genera of Cyphicerini and characterized by high and distinct epistome as compared to the height of rostrum. The epistome is bounded by a strong carina, with its posterior margin obtuse and extending well behind the level of insertion of antennae.

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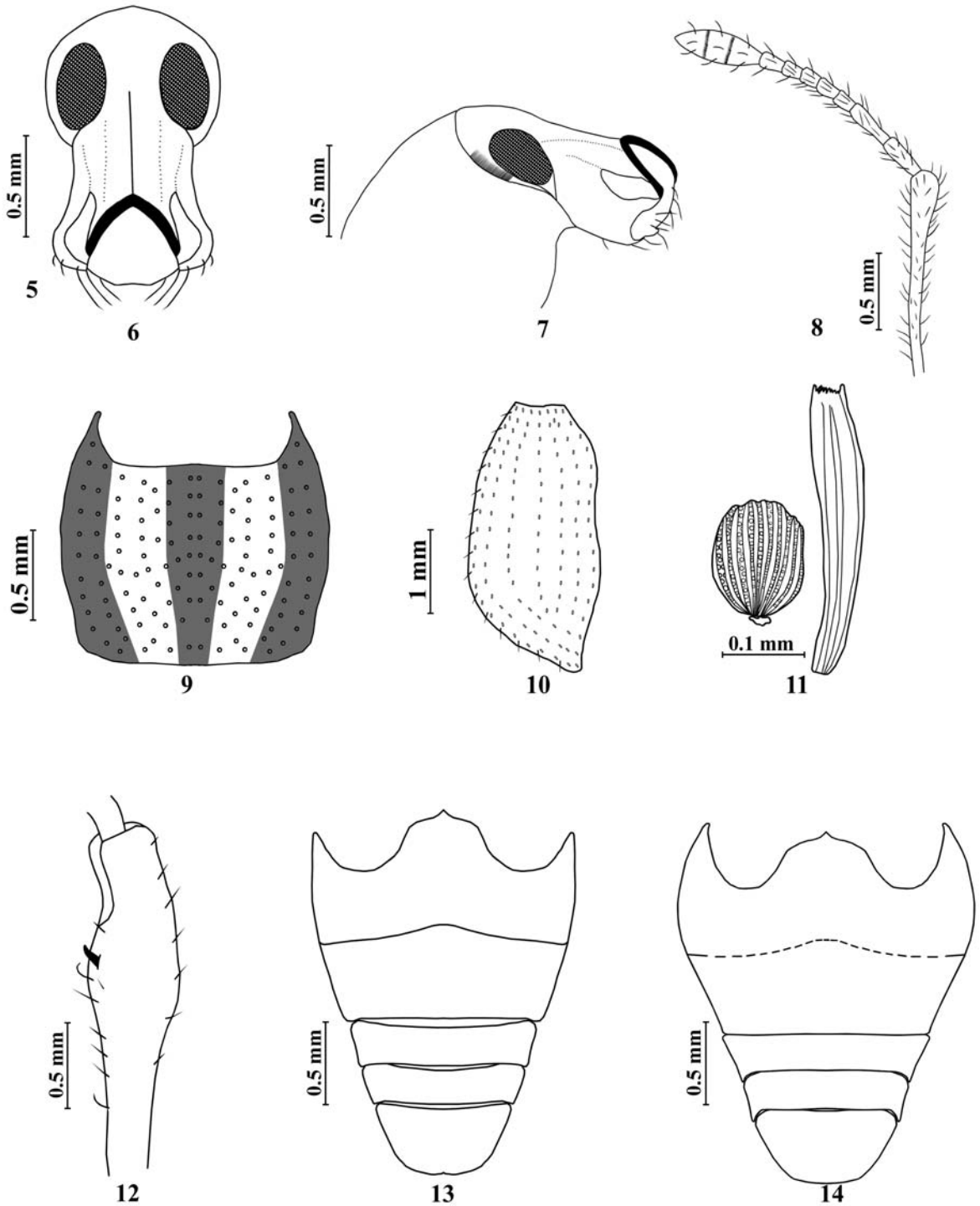


Fig. 6-14: Morphological characters. Head and Rostrum, 6-7. dorsal and lateral view, 8. antennae, 9. pronotum, 10. elytra, 11. elytral vestiture, 12. femora showing tooth, Venter - 13. Male, 14. Female.

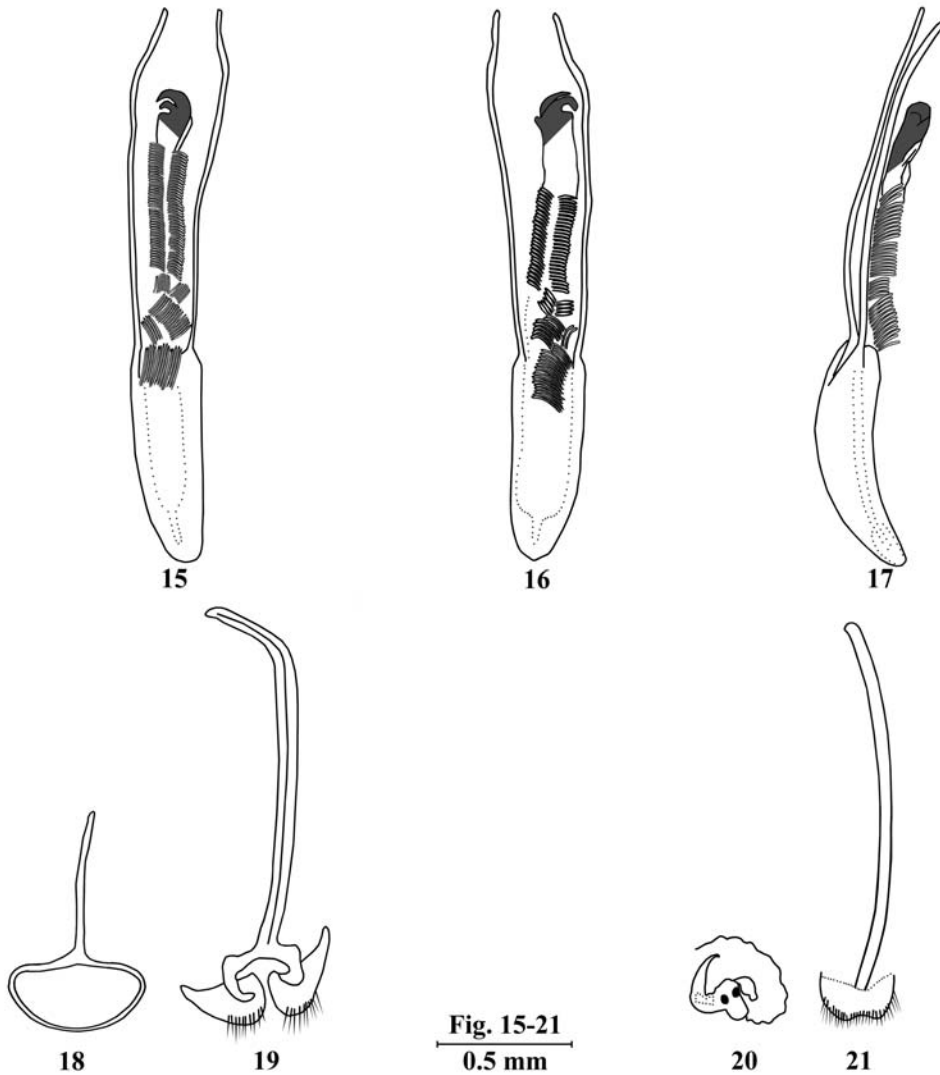


Fig. 15-21: Genitalia. 15-19: Male genitalia. Aedeagus - 15. Dorsal, 16. Ventral, 17. Lateral, 18. Tegmen, 19. Spiculum gastrale, 20-21: Female genitalia. 20. Spermatheca, 21. Spiculum ventrale.

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