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IMPORTANCE OF THE PROSTERNAL CANAL IN THE SYSTEMATICS OF GENUS *PODESCHRUS* ROELOFS (CURCULIONIDAE: COLEOPTERA)

Dalip Kumar

P.G. Department of Zoology, Post Graduate Govt. College for girls. Sector 42, Chandigarh, India.

ABSTRACT

The tribe Isorhynchini is represented from India by three genera viz., *Elattocerus* Schonherr, *Podeschrus* Roelofs (1875) and *Telephae* Pascoe (Pascoe 1870, Hustache, 1932 & 1934 and Marshall, 1938). The genus *Podeschrus* Roelofs, is known by two Indian species viz., *chatterjee* Marshall (1938) and *fuscoturalis* Marshall. A critical examination of the two Indian species viz., *chatterjee* Marshall and *fuscoturalis* Marshall shows that both of them do not actually fall under genus *Podeschrus* Roelofs. The prosternal canal in *chatterjee* Marshall reaches to the middle of fore-coxae and that of *fuscoturalis* Marshall extends up to the posterior margin of the mesosternum. The prosternal canal in the case of genus *Podeschrus* Roelofs, as characterized by Morimoto (1960), should reach the posterior margin of fore-coxae. In fact, this study concluded that *chatterjee* Marshall fulfils all the important requirements of the genus *Kumoz* Morimoto. The other species, is exceptional in the extraordinary extension of its prosternal canal and has, therefore, been used as a type of new genus, *Hemisulcus*, proposed in the present communication.

Keywords: Curculionidae, Zygopinae, Prosternal Canal, Isorhynchini, Tribe, Genitalia.

INTRODUCTION

The family Curculionidae is the largest family of super-family Curculinoidea and the number of described weevils species is calculated to be nearly 62,000 (Oberprieler et al., 2007). The curculionids form an important part of the phytophagous beetles and are associated with a variety of flora. The members of subfamily Zygopinae mainly include stem borers and attack many forest trees like *Artocarpus chaplasha*, *Acacia leucopholea*, *Ficus glomerata*, *Butea frondosa*, *Bombax malabaricum*, *Terminalia tomentosa* and *Thespesia populnea*. (Beeson, 1941 and Mathew, 1982). The family Curculionidae includes weevils which can be recognized by their pronounced rostrum and are commonly called, 'snout beetles'. The curculionids have generally a dark black or brownish colouration with the bodies often squamose but sometimes without any ornamentation. The family Curculionidae is characterized by the possession of geniculate antennae, with each antenna differentiated into a scape, a funicle

composed of 5-7 segments. The scape of the antenna is accommodated at rest into a furrow on either side of the rostrum, called scrobe. The family Curculionidae is generally divided into two groups, one characterized by a short snout is 'Curculionidae Adelognathes' and the other marked by a long snout is 'Curculionidae Phanerognathes' (Lacordaire, 1863). The subfamily Zygopinae belongs to 'Curculionidae Phanerognathes'. The member of this sub-family can be easily distinguished from their large flat eyes which are closely approximated to the dorsal side, occupying major part of the frons. The subfamily Zygopinae has worldwide distribution under which nearly 2000 species under 197 genera (Kumar, 2014). The importance of the prosternal canal in the systematics and characterization of various genus under tribe Isorhynchini of great taxonomic significance. Morimoto (1960) revised this tribe from Japan by taking into account prosternal canal. In genus *Telephae* Pascoe prosternal canal limited by the front coxae both sides of the canal bordered with obtuse and broader keels while in case of genus *Podeschrus* Roelofs this canal reaching the posterior margin of front coxae, both sides of the canal sharply limited by keels. In genus

* Corresponding Author:

Email: dalipchd@yahoo.co.in

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Ellatocerus Schonherr prosternal canal reaching the anterior margin of the front coxae and bordered with obtuse and broad keels. The prosternal canal reaching the middle of front coxae and bordered with sharp keels in *Kumozo* Morimoto. In the proposed genus *Hemisulcus* prosternal canal reaching posterior margin of mesosternum.

RESULTS AND DISCUSSION

TRIBE ISORHYNCHINI

1866. Isorhynchides gr. Isorhynchides vrais Lacordaire, Gen.Col., VII : 174.

1894. Isorhynchidae: Heller, Tijdschr Ent., XXXVII : 39.

1898. Isorhynchinae: Faust, Deutsche Ent. Zeit. : 48.

1932. Isorhynchini: Hustache, Soc Ent. Fr. Livre Cent: 380.

Fore-tibiae longitudinally furrowed on ventral and dorsal surface, with fine carinae on borders of each furrow. Prosternum canaliculated, with margins of canal keeled.

KEY TO THE STUDIED INDIAN GENERA OF TRIBE ISORHYNCHINI

1. Pronotum with lateral tubercles. Front femur with a pair of long setae between tooth and apex-----*Telephae* Pascoe.

Pronotum without lateral tubercles. Front femur without or with a single seta between tooth and apex.-----2.

2. Rostrum shorter than prothorox. Antennal scape shorter than combined funicular segments. Prosternal canal reaching middle of front coxae. Front femur without seta between tooth and apex. Male genitalia with apex of aedeagus truncate; phallobasic apodeme reduced---*Kumozo* Morimoto
 Rostrum as long as prothorox. Antennal scape longer than combined funicular segments. Prosternal canal reaching posterior margin of mesosternum. Front femur with one stout seta between tooth and apex. Male genitalia with apex of aedeagus rounded; phallobasic apodeme well developed.----- *Hemisulcus* Gen.nov.

Genus *Kumozo* Morimoto

1960. *Kumozo* Morimoto, Kontyu:111.

Head globular, reticulately punctuate; frons narrow; eyes suboval. Rostrum stout; shorter than pronotum with median carina. Antennae inserted just before middle of rostrum; scape touching anterior margin of eyes; funicle with basal segment strongly clavate and longer than second; club oval, Scutellum circular, convex. Elytra broader than prothorax at base, with apices

broadly rounded; intervals much broader than striae. Prosternal canal sharply keeled, extended up to middle of front coxae. Front femur somewhat thicker or not thicker than hind femur; claws free. Abdominal sternite 1st as long as 2nd and taken together. Male genitalia with aedeagal apodemes half as long as aedeagus; phallobasic apodeme reduced. Female genitalia with coxites cylindrical, styli oblong; spermatheca comma-shaped, with collum and ramus undifferentiated.

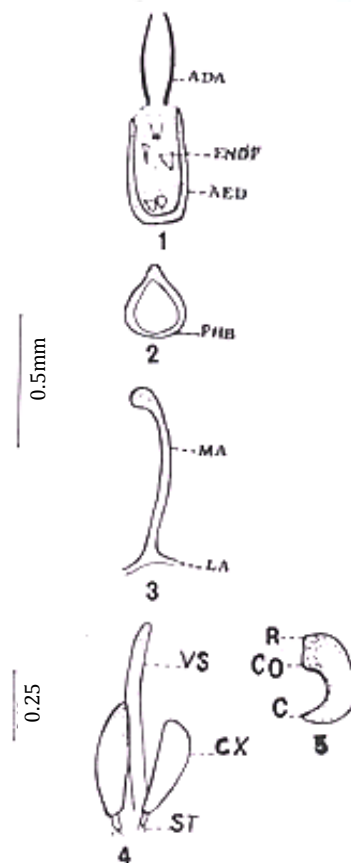
Type-species: *Kumozo ishihawi* Morimoto

DISTRIBUTION: India.

MATERIAL EXAMINED: INDIA: West Bengal: Kalimpong (Samsingh); PHENDUA: 12.IV.1934; N.C. Chatterjee (4) *Kumozo chatterjee* (Marshall) Comb. Nov. (Photo -A; Figs: 1-5).



Photo A



Figures (1-5). Male and female genitalia of *Kumozo chatterjee* (Marshall) Comb. nov. Aedeagus 2. Phallobase 3. Gastral speculum 4. Female genitalia 5. Spermatheca.
 AED: Aedeagus; ADA: Aedeagal apodeme; C: Cornu; CO: Collum; CX: coxite; ENDP: Endophalic Plate ; FG:Flagellum; GS: Gastral spiculum; LA: Lateral arm; MA : Medium arm; PHB: phallobase; PHBA : phallobasic apodeme; PHT : phallorema; R: Ramus; ST: Setae; STY : Stylus; VS: Ventral spiculum.

1936. *Meneudetus chatterjee*: Marshall, Ind.F.Rec., and Ent.1:223.

1938. *Podeschrus chatterjee*: Marshall, Ind. F. Rec.: 175. Head piceous, closely punctuate, covered with short recumbent yellowish setae: frons narrow, covered with 2 rows of yellowish setae; eyes fuscus, anteriorly acuminate. Rostrum ferruginous, stout, moderately arcuate, shorter than pronotum; surface confluent punctuate and with a median carina up to antennal insertions; basal half covered with yellowish setiform scales and apical half sparsely so. Antennae short, testaceous with infusate club, inserted at middle; scape gently clavate, sparsely setose; funicle with basal segment 1 strongly clavate and a little longer than 2, 2-3 as long as broad, 4-7 transverse; club uniformly pubescent. Prothorax piceous, transverse, parallel sided from base to middle thereafter narrowing towards constricted and truncate apex, basal margin bisinuate; pronotal surface sub-confluent punctuate and also with abbreviated smooth median line; vestiture consists of blackish setiform scales on disc, large quadrate yellowish patch in basal area and small laterally and median spots of similar scales, pleurae densely covered with yellowish-pale thick scales, Scutellum small, circular, depressed, encircling by groove, sparsely setose. Elytra piceous, subovate, somewhat broader at rounded shoulders than pronotum, with a shallow sinuation behind shoulders, sub-parallel up to three-fourth from base thereafter narrowing towards separately rounded apices and apical calli weakly developed; striae deep, shallowly punctuate, each puncture beset with minute brownish subrecumbent seta; intervals much broader than punctuate striae, flat, rugulose; vestiture consists of pale stripe on interval 1, narrowly interrupted at middle and more broadly so at declivity a large quadrate basal patch on intervals 2-5, a common transverse macular band behind middle extending laterally to stria 3, and elsewhere covered with scattered brownish scales. Legs ferruginous, uniformly covered with yellowish-white setiform scales; fore-femora stout and armed with broadly triangular tooth as compared to less stout and spine like tooth of other pairs; tibiae shallowly sinuate beneath at base, front pair strongly arcuate dorsally; tarsi with joint 1 as long as 2+3 taken together; claws free and simple. Thoracic sternite blackish, closely punctuate; punctures pit like, each beset with yellowish seta; prosternal canal

extended up to posterior margins of anterior coxae; metasternum with a sub-median groove. Abdominal sternites dark, closely punctuate, uniformly covered with yellowish setiform scales; sternite 1 longer than 2, sternite 2 somewhat as long as 3+4 taken together. Male genitalia with aedeagus sub-parallel and apex truncate; aedeagal apodemes half as long as aedeagus; endophallus studded with three pairs of plates and near apex with fine setae. Phallobase ring-shaped; phallobasic apodeme short and pointed. Gastral spiculum with median arm moderately arcuate, dilated towards tip; lateral arms subequal. Female genitalia with coxites broadly tubular, gently narrowing towards apex; styli longer than broad, apices setose. Ventral speculum rod-shaped. Spermatheca c-shaped; corner curved and pointed towards apex; collum and ramus poorly differentiated.

MEASUREMENTS:

Length

Male body: 2.4 mm; rostrum: 0.9 mm.

Female body: 2.3 mm; rostrum: 0.9 mm.

Breadth

Male body: 1.1 mm; rostrum: 0.2 mm.

Female body: 1 mm; rostrum: 0.2 mm.

Hemisulcus Gen.nov.

Head spherical, coarsely punctuate; frons indistinct; eyes broadly ovate. Rostrum as long as pronotum, with median carina in basal half, finely punctuate. Antennal scape longer than combined funicular segments; funicle with 2 basal segments equal. Prothorax transverse with basal margin bisinuate, its surface rugulose punctate. Elytra ovate, broader at base than prothorax, gradually narrowing towards rounded apex; intervals much broader than striae, coarsely rugulose, interval 1 deeply depressed behind scutellum. Front femur with tooth thick, with single seta between tooth and apex. Prosternal canal extending up to posterior margin of mesosternum. Abdominal sternite 1 longer than 2. Aedeagus with apex rounded, aedeagal apodemes shorter than aedeagus; phallobasic apodeme well developed; parameres absent. Type-species: *Podeschrus fuscosuturalis* Marshall.

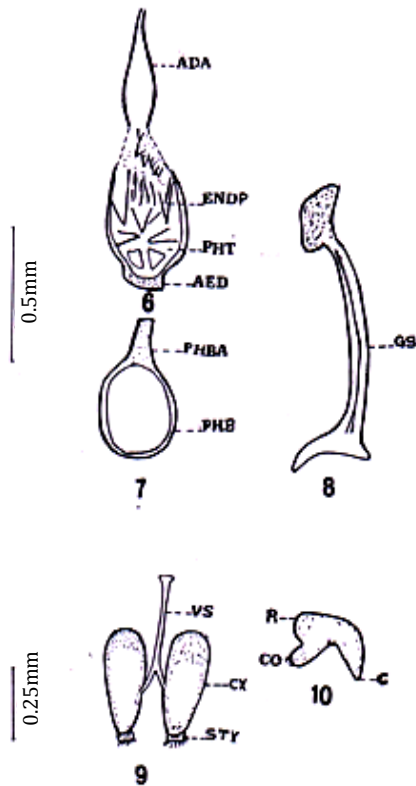
DISTRIBUTION: India.

MATERIAL EXAMINED: India: Uttar Pradesh; Dehradun, Lachiwala; 10.X.1936; J.C.M. GARDNER (1); Assam; Lakhimpur; Bushes. 16.IV.1978; PL-480 COLL. (2); West Bengal, Raniganj; 4.IV.1979; Beguri 24.IV.1979; Bushes; USPL.480 Coll. (1). (Material deposited in IARI, New Delhi).

Hemisulcus fuscoturalis (Marshall) Comb. nov.
(Photo- B; Figs.6-10).



Photo B



Figures (6-10). Male and female genitalia of *Hemisulcus fuscoturalis* (Marshall) Comb. nov. 6. Aedeagus 7. Phallobase 8. Gastral speculum 9. Female genitalia 10. Spermatheca.

AED: Aedeagus; ADA: Aedeagal apodeme; C: Cornu; CO: Collum; CX: coxite; ENDP: Endophallic Plate ; FG:Flagellum; GS: Gastral spiculum; LA: Lateral arm; MA : Medium arm; PHB: phallobase; PHBA : phallobasic apodeme; PHT : phalloretrame; R: Ramus; ST: Setae; STY : Stylus; VS: Ventral spiculum.

1938. *Podeschrus fuscoturalis* Marshall, Ind. F. Rec.: 174. Head fuscus, closely and coarsely punctate, furnished with subrecumbent blackish setae; frons represented by a single row of whitish-pale sub-recumbent setae; eyes piceous, large, semicircular. Rostrum ferruginous with rufus apex, moderately arcuate, somewhat as long as head and prothorax taken together, surface with a median carina in basal half and two shallow punctate striae in each side of median carina, sparsely punctate in apical half, densely clothed with brownish sub-recumbent setae in basal half: scrobes not touching anterior margins of eyes. Antennae flavescent, slender, inserted at middle of rostrum; space abruptly clavate, sparsely setose : funicle with segment 1

strongly club shaped 2-3 elongated, 4 as long as broad, 5-7 transverse; club oval, uniformly and finely pubescent. Prothorax piceous, transverse, laterally and longitudinally convex, narrowing towards apex, its anterior margin truncate and basal margin bisinuate; pronotal surface reticulately punctate, each beset with subrecumbent whitish setiform scale, mottled with indistinct spots and patches of subrecumbent blackish setiform scales. Scutellum piceous semicircular, encircled by groove, studded with brownish setae. Elytra piceous, oblong-ovate, with rounded shoulders, widest at base and its apices rounded; striae narrow, deep, punctate, each beset with short subrecumbent seta; intervals much broader than punctate striae, rugulose punctate, interval 1 transversely depressed behind scutellum; interval 1 covered with blackish-brown setiform scales broadly interrupted just behind middle by a quadrate patch of whitish-pale setae and with similar narrow patch at apex, other intervals mottled with dense blackish brown and less dense whitish setiform scales. Legs piceous with tarsi honey-brown; femora rugulose punctate, uniformly covered with whitish setae, for-femora strongly pedunculate, armed with broadly triangular carinate tooth than other pairs; tibiae arcuate, laterally compressed, carinate, sparsely covered with whitish setae; tarsi with joint 1 as long as 2+3 taken together, 3rd bilobed and spongy beneath; claws free and distinct. Thoracic sterna piceous, punctate, punctures pit like, each accommodating whitish linear sub-recumbent seta; prosternal canal extended up to anterior margins of mid-coxae. Abdominal sternites piceous punctate, each with whitish seta; sternite 5 with a sub-median shallow depression; sternite 1 about 1.3 times as long as 2, sternite 2 as long as 3+4 taken together. Male genitalia with aedeagus broadly tubular up to three-fourth from base thereafter gently narrowing and again broadened towards truncate apex; aedeagal apodemes shorter than aedeagus; endophallus studded with four pairs of well sclerotized plates and four pairs of sharp tubercles. Phallobase ring-shaped; phallobasic apodeme broad and shorter than each aedeagal apodeme. Gastral spiculum with median arm well sclerotized, broadly dilated towards tip; lateral arms unequal. Female genitalia with coxites broadly tubular; styli with apices setose. Ventral spiculum rod-shaped. Spermatheca c-shaped; corner curved; collum and ramus well differentiated.

MEASUREMENTS:

Length

Male body: 3.1-3.4 mm; rostrum: 1.3 - 1.4 mm.

Female body: 2.6 mm; rostrum: 1.0 mm.

Breadth

Male body: 1.7 -2.0 mm; rostrum: 0.2 - 0.3 mm.

Female body: 1.8 mm; rostrum: 0.6 mm.

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