Taxonomic notes on *Sardia rostrata* Melichar [Homoptera, Fulgoroidea, Delphacidae (=Araeopidae)]

BY

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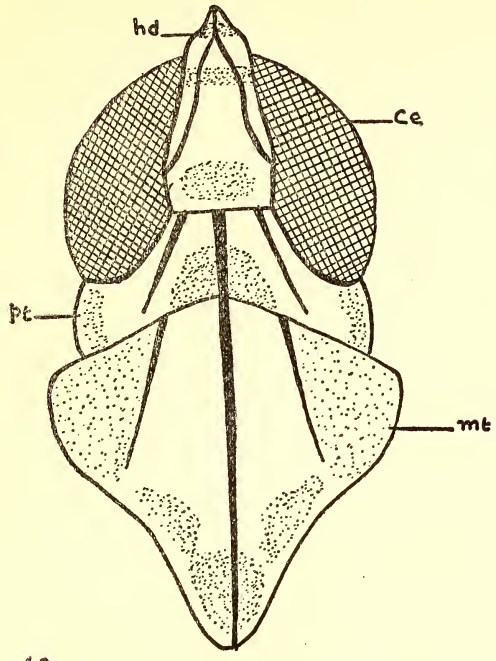
(*With two plates*)

Introduction

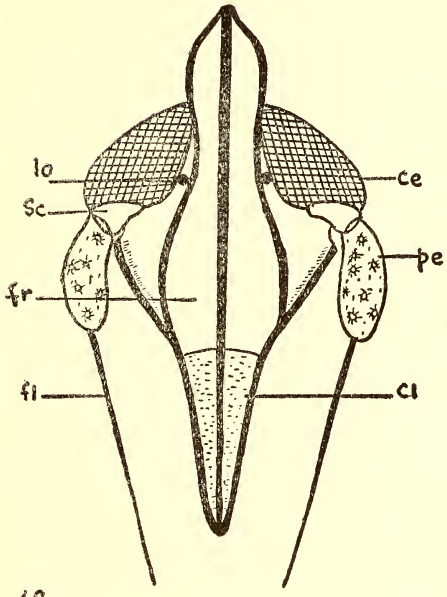
The genus *Sardia* was erected in 1903 with *Sardia rostrata* as the type and was first reported from India by Distant in 1916 and by Muir in 1922. In India, the species has so far been reported from Bombay, Kerala, and Bengal. It is recorded here for the first time from Rajasthan. The author collected specimens of the species from Ajmer (475 metres above m.s.l.) and Mount Abu (1200 metres above m.s.l.).

General Description

Sardia rostrata is a comparatively large-sized Araeopid. The females are bigger than the males. Only the macropterous forms have so far been collected. The female measures 5mm. long and the male 4mm. (from vertex to the tip of the abdomen). They are beautifully coloured, and in profile appear dark brown, with scattered pale yellow marks. The pale yellow colour is more pronounced in the male.. The head and thorax bear alternate bands of dark brown and pale yellow patches. On the mesothorax there is an enlarged pale yellow area in the middle, with two lateral and one posterior dark brown markings. The posterior extremity of the prothorax has a whitish patch, with a narrow extension of the same as a longitudinal strip on the tegmen up to the anterior one-third. On the ventral side, the dark brown colour is deeper and is without the yellow patches.



1A



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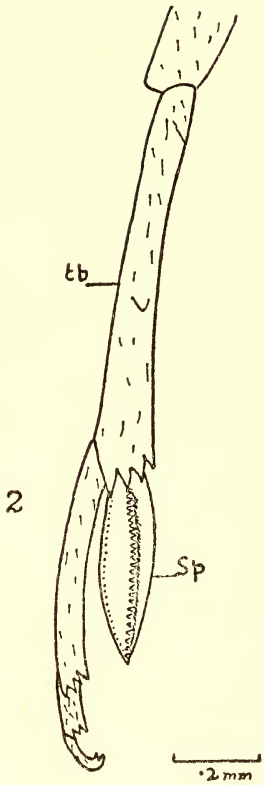

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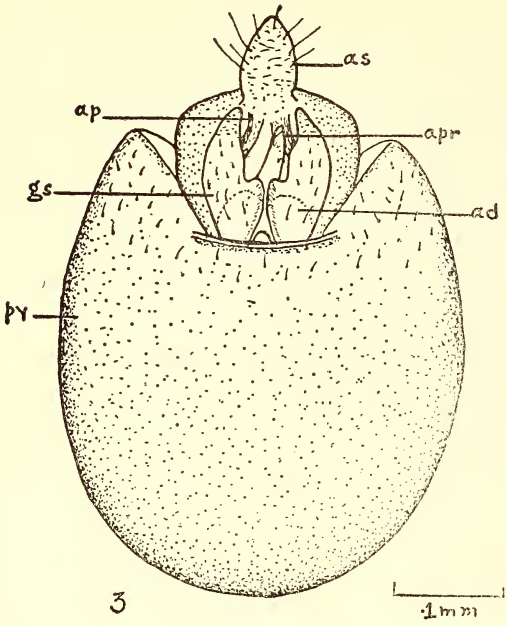
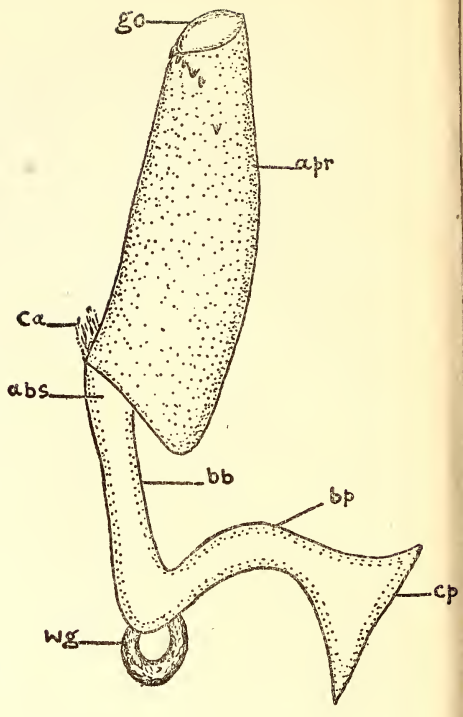
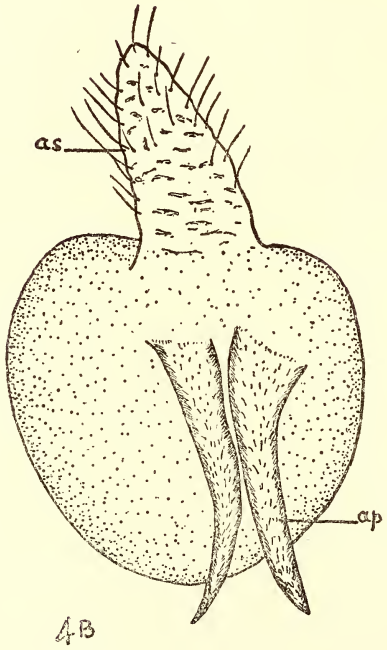
Fig. 1A : Dorsal view of head, pronotum, and mesonotum ; Fig. 1B : Ventral view of head ; ce : compound eye ; cl : clypeus ; fl : flagellum ; fr : frons ; hd : head ; lo : lateral ocellus ; mt : mesonotum ; pe : pedicel ; pt : pronotum ; sc : scape. Fig. 2 : Hind leg ; sp : spur ; tb : tibia.







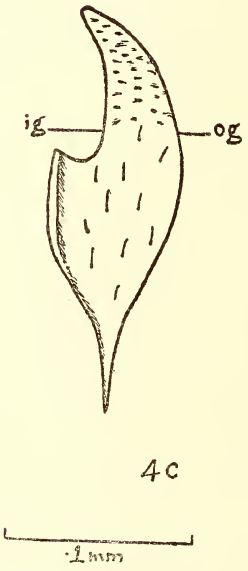


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Fig. 3 : Pygofer, ventral view ; ad : armature of diaphragm ; ap : anal process ; apr : aedeagus periandrum ; as : anal style ; gs : genital style ; py : pygofer. Fig. 4A : aedeagus with the basal connections ; Fig. 4B : Fused tenth and eleventh abdominal segments ; Fig. 4C : Single genital style ; abs : aedeagus basal strut ; ap : anal process ; apr : aedeagus periandrum ; as : anal style ; bb : basal plate bridge ; bp : basal plate prolongation ; ca : connection to the anal segment ; cp : connection to the genital styles ; go : gonopore ; ig : inner margin of genital style ; og : outer margin of genital style ; wg : ' wing '.

Carination

Early taxonomists relied on the carinae on the head and thoracic regions for determining the species. The carinae of the head form an unsatisfactory taxonomic character. Kirkaldy (1907) and Muir (1915) recognised two types of lateral keels on the prothorax, one in which they are almost straight and reach the posterior margin, and a second where they curve under the eyes and do not reach the margin. There are also a number of intermediate types. The carination of the mesothorax is a reliable taxonomic character.

The clypeus is tricarinate, with the two lateral carinae occupying marginal positions with the third in the middle. The middle carina is stouter than the laterals. The frons is five-keeled. The outermost pair are short and situated marginally; they terminate at the basal region of the antennae, at the antennal sclerites. The middle carina is straight and strong. The remaining two carinae are one on either side of the median carina and diverge immediately behind the compound eyes. The lateral carinae run close to the inner margin of the compound eyes and continue to the vertex. There is no median carina on the vertex of *Sardia rostrata* as in many other Araeopids. The two medio-lateral keels of the vertex unite anteriorly to form a Y-shaped carina. It is described as a characteristic feature of the genus *Sardia* by Muir (1915). In *Sardia rostrata* the place of union between the two medio-lateral carinae is well behind the apex of the vertex. The medio-lateral carinae are very faint and appear as a thin ridge. The remaining two carinae, namely the lateral carinae, closely appose the compound eyes. The medio-lateral carinae of the vertex diverge posteriorly and meet the lateral carinae of the same region slightly in front of the posterior margin. The two lateral carinae of the vertex apposing the inner edge of the compound eyes disappear posteriorly in the area of the pronotum. The prothorax is distinctly tricarinate. The lateral carinae are straight and vanish before reaching the posterior margin. The middle carina is stout and joins the mesothoracic middle keel. The mesothorax is also tricarinate, but the lateral carinae are faint and reach a little more than three-fourths of the length of the mesothorax. Though the middle carina is stout and extends up to the posterior extremity it gradually becomes faint towards the posterior margin.

Antennae

The antennae extend well beyond the clypeus. The scape is small and measures only half the length of the pedicel. This is considered

to be a primitive condition by Muir (1915). The pedicel is more than double the length of the combined basal two divisions.

Spur

The hind tibia bears the spur, which is foliaceous with a large number of teeth (between 20 and 25) on the hind margin. The foliaceous type of spur is considered to be the most advanced type by Muir (1915).

Genitalia

The external male genitalia are considered, at the present time, among the reliable characters for specific determination in the Araeopidae. Kirkaldy (1907) was the first to point out the significance of it in generic determination, and from time to time it was stressed by different authors like Muir (1915), Giffard (1921), Metcalf (1943), and Hassan (1948). Hassan (1948) considered the differences in the female external genitalia also important in the generic determination of Araeopidae.

The external genitalia of the male in Araeopids develop in association with posterior margin of the ninth abdominal segment or pygofer. In *Sardia rostrata* the pygofer is quite conspicuous, because of its larger size. There is no differentiation of tergum, sternum, or pleurite. The tergum of the eighth abdominal segment projects posteriorly into the ninth segment. The opening of the pygofer is longer than broad. The pygofer possesses scattered hairs around its body towards the distal region. There is a triangular notch at the posterior side of it, within which lies the external genitalia. At the posterior side of the pygofer is situated a small projection, formed by the fusion of the tenth and eleventh abdominal segments. These fused segments are partly surrounded by an outgrowth from the posterior side of the pygofer. This is the anal emargination. Looking through the opening of pygofer, one sees a more or less sclerotic wall, dividing it into an inner and an outer chamber, called the diaphragm. It is the sclerotized intersegmental membrane between the ninth and tenth abdominal segments. There is a highly sclerotized region on the diaphragm, supporting the aedeagus, called the armature. The internal genital organs are located behind the diaphragm, whereas the external genital organs are situated in the external chamber. The dorsal margin of the diaphragm is V-shaped. Near the ventral margin of the diaphragm there is a pair of apertures,

one on either side of the middle line, and through these project a pair of small sclerites called the genital styles. They are somewhat sickle-shaped. The genital styles are simple, flat, and plate-like structures with the base much broader than the distal region. As the basal regions are hidden by the pygofer, it is difficult to get a complete view of them unless they are dissected out. Their outer margins are convex and entire, whereas the inner margins are concave and wavy. There is an internal projection at the basal angle, i.e. at the inner margin of the basal part of the genital style. The genital styles are hairy, the basal three-fourths being provided with large scattered hairs, and distal one-fourth with small and closely arranged hairs.

The aedeagus arises from the bottom of the inner chamber. It projects over the middle of the diaphragm and is supported by the armature. The aedeagus is cylindrical and slightly curved basally. It is not of uniform calibre, with the basal region stouter than the distal. It is composed of an ejaculatory duct surrounded by a sheath and passes through a large chitinous tube, the aedeagus periandrum. The aedeagus opens externally by the gonopore and through this aperture the ejaculatory duct comes out during the process of copulation. The periandrum carries a few teeth at its distal region directed proximally. Proximally the aedeagus is supported by sclerotized plates, the basal plates of Pruthi (1925). That part of the basal plate to which the aedeagus periandrum is attached is referred to as the aedeagus basal strut. The basal strut is connected to the tenth segment by a small sclerite. The basal plate is composed of two parts, a basal part called the basal plate bridge, and a prolongation from that to the genital styles, the basal plate prolongation. The latter sclerite is bifurcated distally and is attached to the posterior part of the genital styles. At the junction between the basal plate bridge and the basal plate prolongation, there is a chitinous ring, the 'wing' of Hassan (1948). The present author disagrees with the term 'wing' since it is formed of a clear ring, but prefers to retain the name for want of a better appellation. Probably the ejaculatory duct passes through this before entering into the aedeagus periandrum.

The last two abdominal segments in Araeopids, i.e. the tenth and eleventh, are fused to form a single structure (Giffard, 1921). In *Sardia rostrata* it is oval in shape with a distal projection. It is considerably large and hairy. Giffard (1921) has mistaken the tenth segment for the anal segment. The real anal segment is the eleventh one and its appendage is the anal style, a conical projection situated posteriorly. The anus opens on the eleventh segment. Anterior

to it is the tenth abdominal segment bearing a pair of anteriorly directed spines, the anal processes. The anal processes are slender and the aedeagus lies in between them in the preserved specimens.

Summary

Sardia rostrata is described from the taxonomic standpoint. The following characters are noteworthy:

1. Clypeus is tricarinate whereas the frons is five-keeled. The medio-lateral carinae of the vertex are fused to form a Y-shaped carina. The prothorax as well as the mesothorax are tricarinate.
2. The antennae extend well beyond the clypeus, with the scape only half the length of the pedicel.
3. The spur is foliaceous with a large number of teeth.
4. The opening of the pygofer is longer than broad.
5. The genital styles are simple and pointed.
6. The aedeagus periandrum has a few basally directed teeth.
7. The anal segment is hairy, with an anal style and a pair of slender anal processes.

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* Not seen in original.