

**STUDIES ON CRICKETS (ORTHOPTERA : GRYLLIDAE)
FROM KERALA, INDIA.**

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INTRODUCTION

This study of crickets from Kerala is based on specimens received on loan from the Western Ghats Regional Station, Zoological Survey of India, Kozhikode. Although the collection is small, a considerable variety of taxa are found. This is not surprising as the rain-drenched coast of Kerala and the Western Ghats present ideal habitats for the adaptive radiation of crickets. A total of thirteen species, belonging to nine genera under four subfamilies are dealt with, including three new species under three genera, one new record for India, one new record for South India, and four new records for Kerala State.

Measurements (in mm) are given for the new species, and also for those species in which the variations in measurements are insufficiently known, and/or are found to be significant.

Abbreviations used in this paper are as follows : Type-loc., Type-locality; Coll., Collector; Dist., District; pty., party; pron., pronotum; post. fem., posterior femur; post. tib., posterior tibia ; post met., posterior metatarsus; teg., tegmen; ovip., ovipositor.

SYSTEMATIC ACCOUNT

Family GRYLLIDAE

Genus 1. *Gymnogryllus* Saussure, 1877

1. *Gymnogryllus humeralis* (Walker)

1871. *Gryllus humeralis* Walker, *Cat. Derm. Salt. Br. M.*, 5, Suppl.), 5; *Type-loc.*: Bombay

Material examined : 1 Male, Kozhikode Dist., Eranhipalam; Coll. Mohan Lal, 28.v. 1982.

Distribution : India : Maharashtra, U.P., Goa, Karnataka, Kerala, Tamil Nadu. Sri Lanka ; Malaysia ; Vietnam.

Measurements : Body length: 15; head to tip of teg.: 16.5 ; length with wings: 24.5 ; length of post. fem.: 10; length of teg.: 11.

Remarks : This species is reported earlier from Cochin and Trivandrum and is being here recorded from farther north in Kerala, viz., Kozhikode.

The yellowish lines on the occiput not clearly visible in the specimen before me,

pronotum only feebly widened anteriorly, only 4 external spines on posterior tibiae, and 6-8 denticles on posterior metatarsi; tegmina differ from Chopard's (1969) description in that they extend a little beyond tip of abdomen, mirror is of equal length and breadth, diagonal vein not connected to first chord, and there are 6 (vs 4) free veins in lateral field.

Location of type : British Museum (Natural History), London.

Genus 2. *Teleogryllus* Chopard, 1961

2. *Teleogryllus mitratus* (Burmeister)

1838. *Gryllus mitratus* Burmeister, *Handb. Ent.*, 2 : 34 ; *Type-loc.* : Java.

Material examined : 1 Male, 1 Female, Kozhikode Dist., Kannadi Payil; Coll. K.N. Nair & pty., 7.iii.1984; 1 (M), Wynad Dist., Padari Palam; Coll. S.C. Nahar & pty., 13.iii.1982.

Distribution : India : Assam, Meghalaya, W. Bengal, Bihar, Orissa, U. P., MP., Karnataka, Kerala, Tamil Nadu, Andaman and Nicobar Islands. Sri Lanka; Nepal; China; Burma; Malaysia; Singapore; Thailand; Java; Sumatra; Borneo; Philippines; Vietnam.

Remarks : This species was earlier known as *Teleogryllus testaceus* (Walker) (*vide* Townsend, 1980).

The female from Wynad District shows some characters reminiscent of *T. occipitalis* (Serville), *viz.* prominent yellow lines on inner margin of eyes, separation of first 4 veins of lateral field from the rest to a greater degree than is normal for this species, and the shorter ovipositor which is, nevertheless, within the range given for this species by Townsend (1980).

Location of Types : British Museum (Natural History), London.

3. *Teleogryllus occipitalis* (Serville)

1838. *Gryllus occipitalis* Serville, *Handb. Ent.*, 2 : 339; *Type-loc.*: Sumatra, Fort de Kock.

Material examined : 1 Male, Kozhikode Dist., Eranhipalam; coll. D.V. Rao, 18.x. 1982.

Distribution : India: Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, W. Bengal, Bihar, U. P., Himachal Pradesh, Gujarat, Maharashtra, M. P., Orissa, Tamil Nadu, Kerala, Andaman Islands. Bhutan ; Nepal ; Tibet ; Bangladesh ; Sri Lanka ; Malaysia ; Japan ; Philippines ; Vietnam ; Thailand ; Java ; Sumatra, Borneo ; Celebes.

Remarks : This widely distributed species, which has undergone recent nomenclatural changes (*vide* Townsend, 1980), has so far remained unrecorded from Kerala. The closest report is from Valparai, Coimbatore District, Tamil Nadu (Chopard, 1969).

Location of neotype : British Museum (Natural History), London.

Genus 3. Plebeiogryllus Randell, 1964.**4. Plebeiogryllus guttiventris (Walker)**

1871. *Gryllus guttiventris* Walker, *Cat. Derm. Salt. Br. M.*, 5 (Suppl.) 6; *Type-loc.*: India, Bombay.

Material examined : 1 Male, 3 Female, Malappuram Dist., Karipur; Coll. K.N. Nair & pty., 26.vii.1982.

Distribution : India : Manipur, W. Bengal, Bihar, U.P., Maharashtra, Goa, M.P., Karnataka, Kerala, Tamil Nadu, Pondicherry, Orissa. Sri Lanka; Burma; throughout the Oriental Region.

Location of type : British Museum (Natural History), London.

Genus 4. Modicogryllus Chopard, 1961**5. Modicogryllus signifrons (Walker) ?**

1869. *Gryllus signifrons* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 38; *Type-loc.*: North India.

Material examined : 1 Female, Kozhikode Dist., Eranhipalam; coll. Mohan Lal, 28.v.1982; 1 (F), Kozhikode Dist., Arinkode, Mavoor; Coll. K.N. Nair & pty., 18.vi.1982.

Distribution : India : Bihar, U.P., North India (?). Pakistan ; Upper Burma.

Measurements : Body length : 13.5-14.5 (vs 11-13) ; length of pron.: 3 (vs 2.5-2.6) ; width of pron. : 4.5-5 ; length of post. fem.: 9-10 (vs 8-8.2) ; length of teg.: 8-9 (vs 7-7.5) ; length of ovip.: 7-8 (vs 9).

Remarks : The two specimens examined agree fairly well with the description by Chopard (1969), except for slightly larger size, and shorter ovipositor. A little doubt remains about the true identity of the specimens because no males were available for comparison and confirmation. The precise collection locality of the type appears to be unknown. Hence, written as North India.

Location of type : British Museum (Natural History), London.

Genus 5. Velarifictorus Randell, 1964.**6. Velarifictorus aspersus (Walker)**

1869. *Gryllus aspersus* Walker, *Cat. Dem. Salt. Br. M.*, 39 ; *Type-loc.*: Hong Kong.

Material examined : 1 Male, Kozhikode Dist., Arinkode, Mavoor; Coll. K.N. Nair & pty., 18. vi. 1982 ; 1 (F), Kozhikode Dist., Kodencheri, Chembukdava ; Coll. K. N. Nair & pty., 9. vi. 1982 ; 1 (F) Kozhikode Dist., Thiruvambadi (Mukkam) ; Coll. K. N. Nair & pty., 18.v.1982.

Distribution : India : Arunachal Pradesh, Meghalaya, W. Bengal, U. P., Jammu, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh. Sri Lanka ; Burma ; Malaysia ; Singapore ; Java ; Borneo ; Hong Kong ; Vietnam ; China.

Remarks : This species is being recorded here for the first time from Kerala. It was known earlier from Valparai, and Shimoga, in the Western Ghats.

One specimen from Arinkode Mavoor has strongly excavated face and mandibles, and it lacks the inverted Y-shaped yellow marking below the anterior ocellus.

Location of type : British Museum (Natural History) London.

7. *Velarifictorus fallax* (Chopard)

1969. *Scapsipedus fallax* Chopard, *Fauna Ind. Grylloidea*, 2: 117; *Type-loc* : India, Karnataka, Nedungadu.

Material examined : 1 Male, Malappuram Dist., Manjeri; Coll. S.C. Nahar & pty., 25. i. 1983.

Distribution : India : Karnataka, Kerala.

Measurements : Body length; 9; length of pron.: 1.8; width of pron ; 3 ; length of post. fem.: 6.2 ; length of post. tib.: 4.5; length of teg.: 5.

Remarks : This small species, with unexcavated face and mandibles, was so far known only from Karnataka (Chopard, 1969; Bhowmik, 1977b). It is being recorded here for the first time from Kerala. The specimen examined bears no tympanum on the internal face of anterior tibiae, and there are only about 8 cells in the apical field of tegmina. In the lateral field the Sc. bears 0-2 branches.

Location of type : Museum National/ d' Histoire Naturelle, Paris.

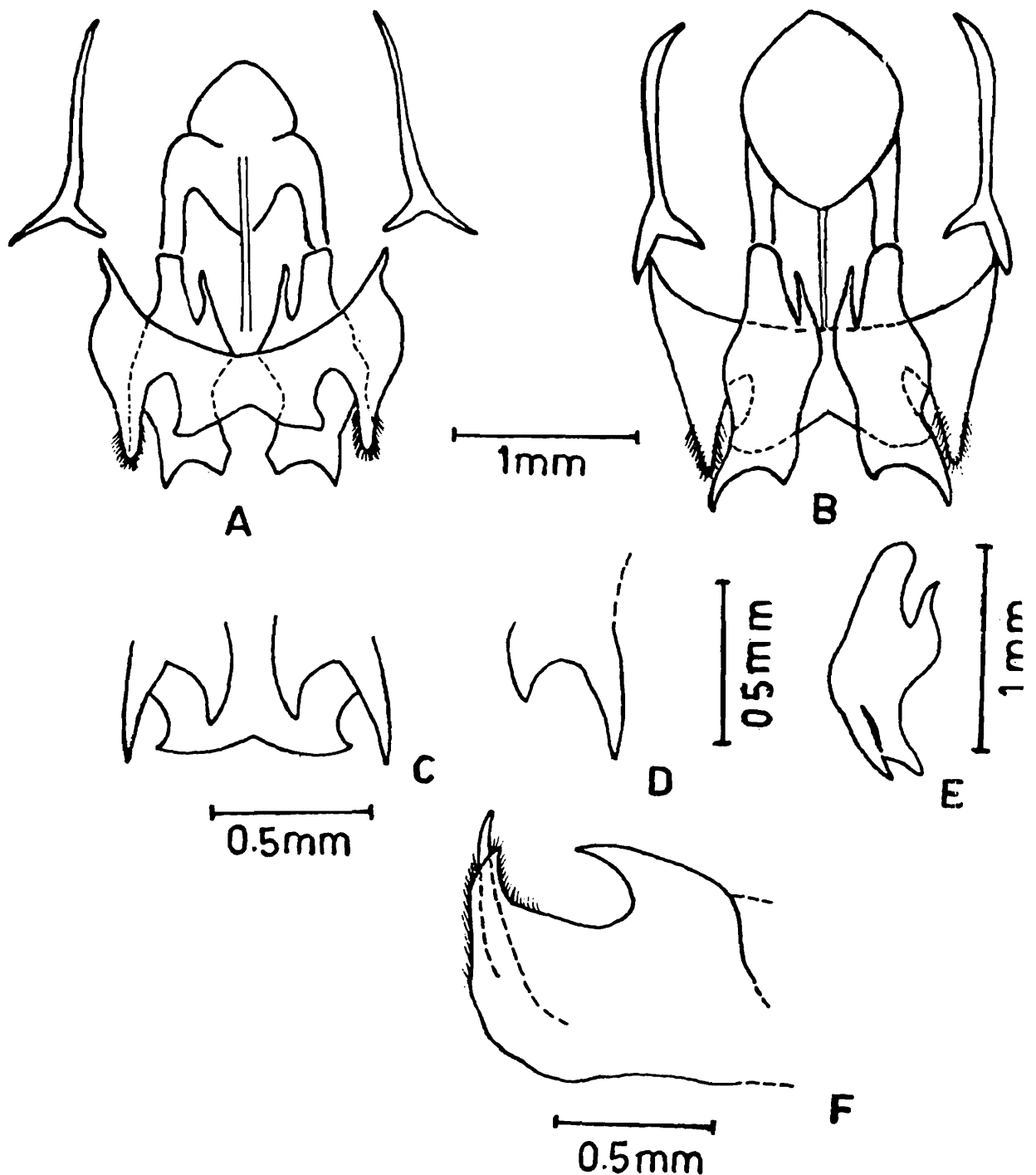
8. *Velarifictorus sahyadrensis* sp. nov.

(Fig. 1, A-F)

Material examined : HOLOTYPE Male, Wynad Dist., Kottappadi ; Coll. K.N. Nair & pty., 27.ix. 1983 ; PARATYPE Male, same data as holotype.

Description : *Male :* *Head* large; occiput reddish-brown, with at least 4 vertical yellow lines, which become prominent as they descend over vertex, the two inner ones approaching the lateral ocelli, the two outer ones the eyes. Eyes small, feebly projecting. Ocelli big, yellow region below anterior ocellus upto straight clypeofrontal suture yellow. Antennae brown. Frontal rostrum prominent, brown, about twice as wide as first antennal segment. Face brown and yellow, its upper part with a wrinkled appearance, broad at base of mandibles, deeply excavated. Mandibles greatly excavated. Maxillary palpi brownish, or partly yellow, fourth segment shorter than third and fifth, the latter club-shaped. *Pronotum* large, rufous-brown, disc with anterior and posterior margins straight, the former may be concave. Lateral lobes depressed in postero-ventral portion. *Legs :* anterior and median legs pubescent, with also many bristles. Anterior tibiae with oval external Tympana, but without internal tympana. Posterior femora stout, with clear, well-marked, diagonal, brown striations on the entire external face and part of internal face. Posterior tibiae with 6 slender spines, which are sharply pointed at their apices, on both superior margins, the internal spines being longer and more curved at apices. Apical spurs very pubescent, the internal

ones more so ; medio-internal apical spur greater than half the length of posterior metatarsus, the superior slightly smaller than that, inferior half the superior. External apical spurs less robust than the internal, the median longest, but shorter than supero-internal; supero-external almost resembling a spine. Posterior metatarsi with 5 external, 6 internal denticles. *Tegmina* : mirror with anterior angle rounded, internal a right-angle or rounded, divided in anterior half by an angulate vein; 2 oblique veins. Diagonal vein long, chords



Text-fig. 1. *Velarifictorus sahyadrensis* sp. nov. Male Genitalia. A. Dorsal view. B. Ventral view. C. Apex of ectoparameres and median projection of epiphallus (Ventral view). D. Ectoparamere (apical part). E. Ectoparamere F. Epiphallus (lateral view).

highly curved, first one connected to mirror by a veinlet, second one almost angulate. Apical field short and wide, with 3-4 veins and small, irregular cells. Lateral field of same colour as dorsal, or paler, with 8-9 rather close veins of which 2 are branches of Sc. *Wings*: micropterous. *Abdomen* : subgenital plate elongate, with rounded apex.

Measurements : Body length: 20; head to tip of teg.: 17.5 length of pron.: 4-4.5 width of pron.: 6-6.2 length of post. fem.: 14.5; length of post. tib.: 11; length of teg.: 10-10.5.

Remarks : The specimens examined are very close to *V. saussurei* (Chopard), described in 1969 from Kerala. The genitalia also show some similarities, but it can be distinguished from that of *saussurei* by the following :

1. Bridge of epiphallus is considerably narrower,
2. Ectoparameres with posterior rounded notch forming two pointed processes, the internal one only very slightly curved inward, while the external one is about twice as long as the internal, almost straight, and sharply pointed (vs highly curved inward in *saussurei*).

Location of type : Presently in the Southern Regional Station, Zoological Survey of India, Madras; to be transferred, in due course, to the National Zoological Collections, Zoological Survey of India, Calcutta.

Genus 6. *Duolandrevus* Kirby, 1906

9. *Duolandrevus nairi* sp. nov.

Material examined: HOLOTYPE Female, Kozhikode Dist., Thakarapar Forest Area; Coll. K.N. Nair & pty., 5.x.1981.

Description : *Female* : General colouration rufous-brown, with paler legs. *Head* dark rufous-brown, shining, laterally convex. Eyes feebly protruding. Frontal rostrum as wide as first antennal segment, its sides a little diverging behind. Face black, dorso-ventrally short; clypeo-frontal suture very feebly arcuate, grooved. Maxillary palpi yellowish, 5th segment club-shaped, obliquely truncated apically. Pronotum rufous-brown, sides convex, anterior margin distinctly concave, posterior margin almost straight. Disc darker in colour towards antero-lateral, postero-lateral and posterior portions. Lateral lobes black, not very deep, posteriorly ascending strongly. *Legs* strong ; all legs paler than body. Anterior tibiae with tympana of equal size and similar shape on both faces. Posterior femora robust, brown, distally dark brown, internal portion of proximal end, and an area about 5mm proximal to apex paler. Posterior tibiae with 4 external spines and 8-10 denticles proximal to them, and 4 longer more sharply pointed internal spines with 6 denticles based of them. Supero-external apical spur resembles a spine, the median much stouter and about twice the length of superior, inferior a little shorter than median ; superior and median internal apical spurs subequal, at least one and a half times the length of medio-external ; superior more curved, inferior not more than half the median. Posterior metatarsi strong, with 4-5 strong, dark brown denticles. *Tegmina* (right one missing): very short, extending only very slightly beyond posterior margin of mesonotum, its internal margin highly curved, and about 2 mm away from median line. Dorsal field brown, with 5 not very

conspicuous veins; lateral field with 3 straight, parallel veins. *Abdomen* rufous-brown, with posterior margins of tergites blackish. Subgenital plate narrowing posteriorly, with a deep, broad, U-shaped notch at apex. *Ovipositor* straight, with relatively small apical valves - 1.5 mm long (8.8% of total length) - which are of about the same width as the stem.

Measurements: Body length: 26; length of pron.: 3.8; width of pron.: 6.5 length of post. fem.: 19; length of post. tib.: 15; length of post. met.: 4.5; length of teg.: 1.5; length of ovip.: 17.

Remarks: Only 3 species have so far been described under the genus *Duolandrevus* Kirby. Of these, the female of only *D. rufus* Chopard, is known. The female reported is definitely not of this species, as there are considerable size differences, and tegmina do not meet on the median line as stated by Chopard (1969) for *rufus*. The female recorded by Bhowmik (1970) is also of comparatively small size.

The other two species, *D. coulonianus* (Saussure) and *D. intermedius* Chopard, are known from males only. These too, especially the latter, are substantially smaller than the female at hand.

This is the first find of the genus *Duolandrevus* from the Indian mainland. Bhowmik (1970) has recorded *D. rufus* Chopard (spelt erroneously as *D. rufous*) from the Great Nicobar Island. Other than the above record, the genus seems so far to be restricted to Malaysia, Thailand and Java.

Location of type: Presently in the Southern Regional Station, Zoological Survey of India, Madras; to be transferred, in due course, to the National Zoological Collections, Zoological Survey of India, Calcutta.

Subfamily NEMOBIINAE

Genus 7. *Paranemobius* saussure, 1877

10. *Paranemobius vicinus* Chopard

1982. *Paranemobius vicinus* Chopard, *Rec. Indian Mus.*, 30 : 4 ; *Type-loc.*: Kerala, Parambikulam.

Material examined: 1 Male, Kozhikode Dist., Jeerakapara ; Coll. K.N. Nair & pty., 5. iii. 1983.

Distribution: India : Maharashtra, Karnataka, Kerala.

Measurements: Length of teg.: 2.5.

Remarks: The length of the tegmina of the male specimen before me is shorter than given by Chopard (1969), and by Bhowmik (1977a) for a female nymph.

Location of type: Museum National d'Histoire Naturelle, Paris.

Subfamily SCLEROPTERINAE

Genus 8. *Scleropterus* Haan, 1842

11. *Scleropterus coriaceus* (Haan)

1842. *Gryllus* (*Scleropterus*) *coriaceus* Haan, *Temminck Verhandl. Orth.*, 232 ; *Type-loc.*: Java.

Material examined : 1 Female, Kozhikode Dist., Thiruvambadi (Mukkam) ; Coll. K.N. Nair & pty., 18.v.1982.

Distribution : India : Arunachal Pradesh (?), Assam, U. P. (?), Karnataka (?), Kerala. Burma ; Thailand ; Malaysia ; Java ; Sumatra ; Formosa (?) ; Japan ; Vietnam (?).

Measurements : Head to tip of teg.: 11; width of pron. (anterior margin): 2.5 ; width of pron. (posterior margin) :3.5; length of post fem.: 6; length of teg.: 7.

Remarks : Vasanth (*in press*) has discussed the possible synonymy of *S. punctatus* Brunner with *S. coriaceus* (Haan). Accordingly, the distribution of the former species is also given here with query marks.

The pronotum of the specimen examined is strongly narrowing towards the front, and its posterior width is greater than its length. Posterior tibiae are provided on their superior margins with a large number of denticles - some small, others bigger. No teeth are seen on inferior margins of superior valves of ovipositor.

Location of type : Academy of Natural Sciences of Philadelphia, Philadelphia.

Subfamily PODOSCIRTINAE

Genus 9. *Madasumma* Walker, 1869

12. *Madasumma saussureana* (Chopard)

1878. *Calyptotrypus marginipennis* Saussure, *Mem. Soc. Geneve*, 25 : 583 (*non* Guerin) ;
Type-loc. : Not known.

Material examined : 1 Female, Kozhikode Dist., Thiruvambadi (Mukkum); Coll. K.N. Nair & pty.; 18.v. 1982.

Distribution : India : Kerala. Sri Lanka.

Measurements : Body length : 17.5 ; head to tip of teg.: 25 length with wings: 30 + (wings broken) ; length of pron.: 4 ; width of pron. (Anterior margin): 3.7; width of pron. (posterior margin): 5.5 ; length of post. fem.: 14.5 ; length of post. tib.: 15 ; length of teg.: 20 ; (ovipositor broken).

Remarks : The specimen examined has a longitudinal brown band on posterior femora which points to *M. marginipennis* (Guerin). The latter species has already been reported from south India, viz., Tamil Nadu and Pondicherry. But it appears to be probable that the present specimen is a *M. saussureana* (Chopard), which is, so far, known only from Sri Lanka, because most characters fit in better with Chopard's (1969) description of *saussureana*, such as, 1. wings being distinctly longer - at least 6 mm - than tegmina, 2. the shape of the subgenital plate, 3. unequal spurs or posterior metatarsi, and 4. lack of yellow veins in lateral field of tegmina. But as the specimen studied is a solitary female, with no comparable male, it is placed with a query mark as *M. saussureana*.

Location of type : Not known.

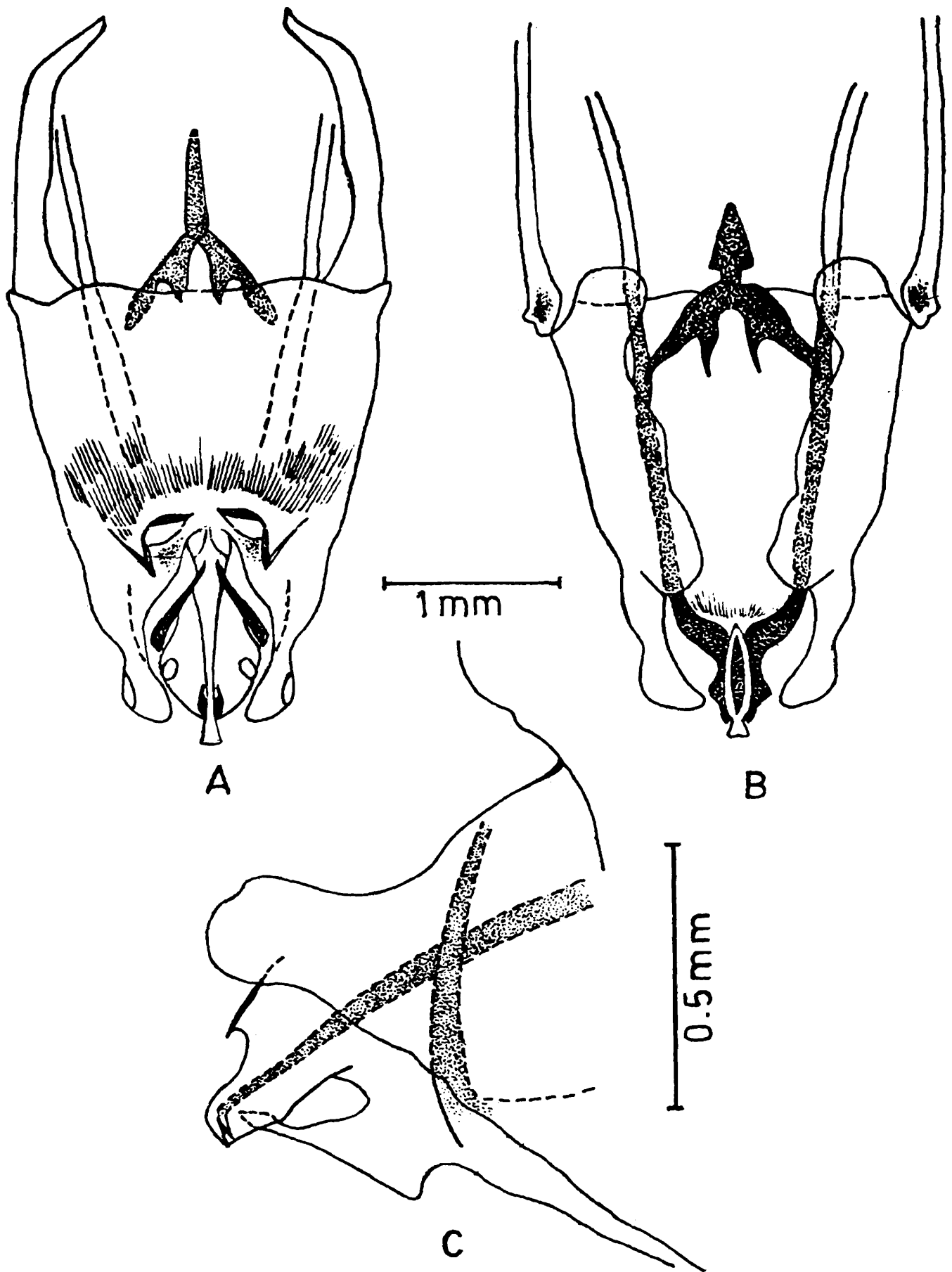
13. *Madasumma keralensis* sp. nov.
(Fig. 2, A-C)

Material examined: HOLOTYPE Male, Cannanore Dist., Kuthupuramba; Coll. K.N. Nair & pty., 27.iii.1983.

Description : *Male* : General colouration yellowish-brown. *Head* brown ; eyes bulging ; ocelli large, orange, close together. Frontal rostrum as wide as first antennal segment. Face triangular, of the same colour as head. Maxillary palpi pubescent, of same colour as rest of face, 3rd and 5th segments equal, the latter funnel-shaped, 4th segment smaller, First antennal segment quite large. *Pronotum* pale brown, more or less smooth, disc longer along median line than on sides, wider along posterior margin than along anterior; anterior margin more or less straight, posterior sinuated. Impresses conspicuous. Lateral lobes concolourous with disc. Legs of same colour as body, pubescent; anterior tibiae swollen in proximal half, external margins with large oval tympana, internal tympana deeply set within a split. Posterior femora somewhat slender; posterior tibiae very pubescent, equal in length to posterior femora, bearing yellow spines with brown apices - 5 on external margin, 6 longer ones on internal margins - and a large number of denticles running down the superior margins of posterior tibiae, except in the very proximal region; number of denticles greater on external margin than on internal. Inferior internal apical spur slender and shortest, median stouter and double its size, superior about one and a half times the length of median ; external apical spurs short and subequal. Posterior metatarsi short, stout and very pubescent, with 3 denticles on supero-external margin, 1 apical denticle on internal margin, and 2 long, stout, pubescent apical spurs - internal one longer than external. *Tegmina* long and narrow, pale brown with a creamy-white spot at extreme antero-external portion, another more or less triangular spot, of the same colour, at antero-external corner of apical field, and 2 narrow creamy patches - one anterior, the other posterior - along lateral edge of dorsal field. Anal field small ; dorsal field with oval mirror ; anterior angle of mirror a little greater than 90°, other angles rounded, divided about the middle by a straight vein which is roughly parallel to antero-internal margin. Diagonal vein straight; chords parallel to each other, the first one connected to anterior angle of mirror by a thin veinlet, and to antero-internal margin by a short, thin veinlet. Oblique veins 6, all originating separately along stridulating vein. Apical field long, with 6 regular veins, and large, squarish areolae. Lateral field with 14-15 parallel veins of which 11-12 are branches of Sc. *Wings* (broken at tip) longer than tegmina. *Abdomen* : subgenital plate long, apically narrowed, pointed, ventrally grooved.

Measurements : Body length : 19.5; head to tip of teg.: 21 length with wings ; 26 + (wings broken) ; length of pron.: 3 width of pron. (anterior margin): 2.5 ; width of pron. (posterior margin) : 3.7 ; length of post. fem.: 12.5; length of post. tib.: 12.5 ; length of teg.: 17.5.

Remarks : In Chopard's (1969) key the present specimen comes closest to *M. saussureana* (Chopard) and *M. soror* Chopard, but differs greatly from both these species in its genital structure. The number of oblique veins (6) is also intermediate between that of *saussureana* (7) and *soror* (5).



Text-fig. 2. *Madasumma Keralensis* sp. nov. Male Genitalia. A. Dorsal view. B. Ventral view. C. Lateral view.

Location of type : Presently in the Southern Regional Station, Zoological Survey of India, Madras ; to be transferred, in due course, to the National Zoological Collections, Zoological Survey of India, Calcutta.

SUMMARY

The paper deals with an account of thirteen species of Gryllidae under nine genera and four subfamilies from Kerala. Of these, three species are new to science. The genus *Duolandrevus* Kirby is recorded for the first time from the Indian mainland, one species is a new record from India, one a new record from south India, and four other species are new records from Kerala state.

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