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Tipulparra — a New Genus of Halyini with New Species

(Heteroptera, Pentatomidae, Pentatominae)

With 97 Figures

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Abstract. Based on the type specimen of *Dalpada deplanata* var. *subdecora* BREDDIN and other material in the British Museum (Natural History), London, and the Royal Natural History Museum, Tervuren, Belgium, a new genus with five new species and two new subspecies, is described in this paper. The descriptions of the new and old species are based on the external and internal characters. These species are confined to the temperate climate of Nilgiri Hills and adjacent areas in south India and although resembling superficially species of genera *Sarju* and *Cahara* living in the cooler sub-himalayan region of north India, Pakistan etc., their male and female genitalia differ fundamentally from the latter's. If it is a case of convergence in two parts of the Oriental region, it requires field studies as the distribution of the northern and southern genera is exclusive. On the other hand, the superficial resemblance in colour and pattern may be due to mimicry, in which case a third group, as yet unknown, acts as the model. A key to species is provided.

Introduction

In my previous five studies (GHAURI, 1975a, 1975b, 1977a, 1977b and 1978) the position of the so-called *Dalpada* species and other allied genera such as *Apodiphus* and *Paraneisanus* has been clarified. Those species originated, mainly, from northern subhimalayan region, but also areas further east such as Khasi Hills, Burma, Indo-China and China, and west including Pakistan, U.S.S.R., Afghanistan, Iran, Arabia, Turkey and parts of Europe. The present investigation is based on the material originating from southern India, mainly Vellangiri Hills (Nilgiri Hills) part of western ghats and plains adjacent to eastern ghats. The southern Indian 'Dalpada' proved very different from northern Indian, particularly the material under investigation for this paper, which was found to be different from any existing genus. These species required a genus of their own. Therefore a new genus, namely *Tipulparra*, is described here to accommodate them.

It would have been inadvisable to attempt to describe new genus and new species without first studying all the type material which is closely as well as remotely related to the specimens under investigation. There are several species which have been synonymised in the past, but on reexamination of their types were found to be distinct and valid. This proved the point (vide infra) that not only those type specimens whose names are in current usage, but also those which are lying "dormant" in the lists of synonymies need

studying, so as to clear up the background before embarking upon describing new taxa. It goes without saying that the relevant types are scattered in many museums in the world and in some cases it has become quite difficult even to find out their whereabouts.

The only already existing type material which belongs to the genus *Tipulparra* is a female specimen of *Dalpada deplanata* BREDDIN var. *subdecora* BREDDIN (1909) in Institut für Pflanzenschutzforschung, Eberswalde, G.D.R. A matching male specimen to this female has been found among the collections of the British Museum (Natural History), London. The *subdecora* specimens are not congeneric with *Dalpada deplanata* and so, will be defined as a distinct species under the new genus. Apart from these, all other specimens used in this study are representative of hitherto undescribed species and mainly belong to the British Museum (Natural History), London (BMNH). Two specimens on loan from the Royal Natural History Museum, Tervuren, Belgium, are also included. These will be indicated under their appropriate name.

Although superficially resembling other *Dalpada*, these specimens on closer examination of the scent gland spout (auricle of scent gland) and dissected parts of male and female genitalia, proved difficult to be retained in *Dalpada sensu stricto*. In the past when internal male/female genitalia were not yet found to be of generic and specific value, some of these specimens have been identified as *Dalpada versicolor* (HERRICH-SCHÄFFER) whose type originated from Java. This type specimen which was described as *Halys versicolor* by HERRICH-SCHÄFFER (1840) is now not traceable. It was supposed to be deposited in the 'Munich Museum' where it seems to have been lost probably in fire during the Second World War. A Javan specimen which would totally agree with the description as well as the colourful painting of *Dalpada versicolor*, has not yet been found. A northern Indian specimen determined as *Dalpada versicolor* (H.-S.) by DALLAS (1851) and mentioned by DISTANT (1902) proved to belong to a different genus and distinct species (GHAURI, 1978). DISTANT (1902) also listed a specimen collected by HAMPSON from 'Nilgiri Hills' as *Dalpada versicolor*. This was also found not to be *D. versicolor*.

Tipulparra gen. n.

Body elongate oval, thickly but not uniformly punctate, not rugose, punctures brown, intervening impunctate surface dull yellow, groups of closely adjacent punctures forming dark patchy areas; apex of head resembles that of *Dalpada sensu stricto*, length of juga a little less than tylus, jugum at apex sinuate, inner lobe acute but not pointed, outer lobe shorter than and at an angle of about 100° to inner lobe, in lateral view tylus visible, anteroventral angle of bucculae not produced although clearly forming a right angle, lateral margin of head in front of eye with \pm minute 'tooth' rostrum extended beyond posterior margin of third abdominal segment, often reaching posterior margin of fourth abdominal segment; prosternum with median channel, meso and metasterna without prominent carina, third and fourth abdominal segment with a deep channel; pronotum, lateral margins markedly concave, humeral angles not horny, but marginal ridge of pronotum more sclerotised at this point than proximal area; auricle of metasternal scent gland of moderate width (length) as long as half to one third width of metasternum; fore tibia not at all expanded.

Male genitalia Pygophore, posteroventral margin with a central shallow emargination forming posterior boundary of an excavation laterally bounded by ridges further lateral to which remaining margin of pygophore curving semicircularly or sinuately,

lateroventral angles produced greatly or shortly into processes, (called here ventro-posterior appendages), posteromedial margin provided with sclerotised ridged sensory processes, lower margin of pygophore opening with a fringe of stiff setae; paramere curved, base as wide as head, apex beak-shaped with a large ridged area adjacent to which lies a large setose area, stem as broad as base and head, head with or without a "thumb-like" process more or less developed providing specific differentiation; aedeagus (Fig. 77), vesica a fine and long tube curved into characteristic shape somewhat like a question mark, vesical appendages long and narrow, sclerotised with their apices less so or totally membranous, dorsal conjunctival appendages leafy, large, broad, semi-sclerotised, ventral conjunctival appendages semi-sclerotised, broad at basal half, apical half gently tapering, mesal membranous conjunctival appendage single-lobed.

Female genitalia (Fig. 4) external plates, first valvifer broadly triangular, posterior inner angle rounded, inner margin straight, posterior margin sinuate, swollen, somewhat like that of *Paranevisanus* DISTANT (vide GHAURI, 1975b), paratergites 9 long with inner margin produced medially, second valvifer triangular with apex swollen and densely spinose; spermatheca (Fig. 63 & 64), proximal part of duct (nearest to opening) strongly bulbous (unlike that of *Paranevisanus* DISTANT) similar to that of *Apodiphus* SPINOLA (vide GHAURI, 1977a), both pump flanges present, bulb small with few and simple tubules, duct outside spermathecal bag, joining bulb fine.

Type species, *Tipulparra subdecora* (BREDDIN) stat. et comb. n. for *Dalpada deplanata* BREDDIN var. *subdecora* BREDDIN; type locality Coorg, South India.

Comments *Tipulparra* superficially resembles *Dalpada* s. str. from which it differs by the shape of its male and female genitalia. The new genus is similar in some characters to genera other than *Dalpada*, but the shape of its paramere and to some extent its pygophore are unique amongst the groups of genera referred to in the Introduction.

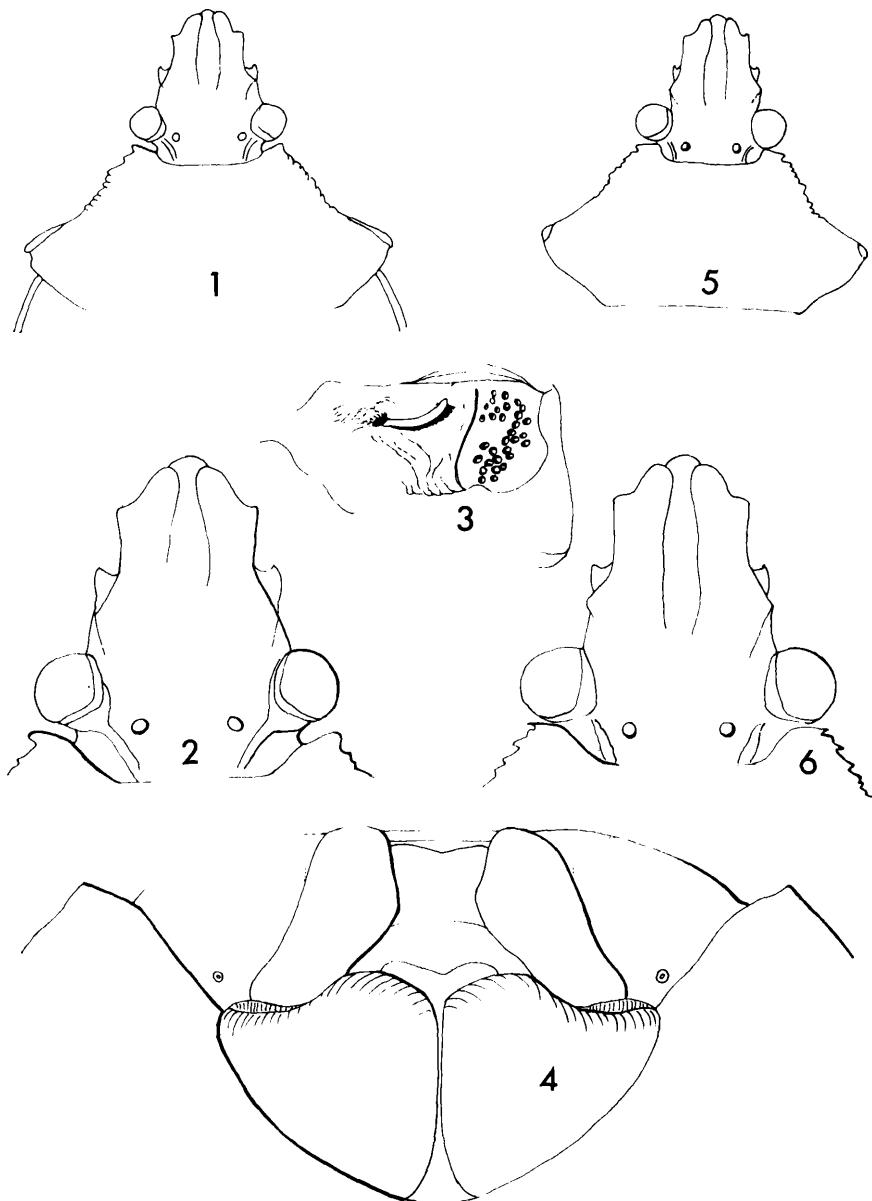
***Tipulparra subdecora* (BREDDIN) (Figs. 1-19)**

Dalpada deplanata var. *subdecora* BREDDIN, 1909.

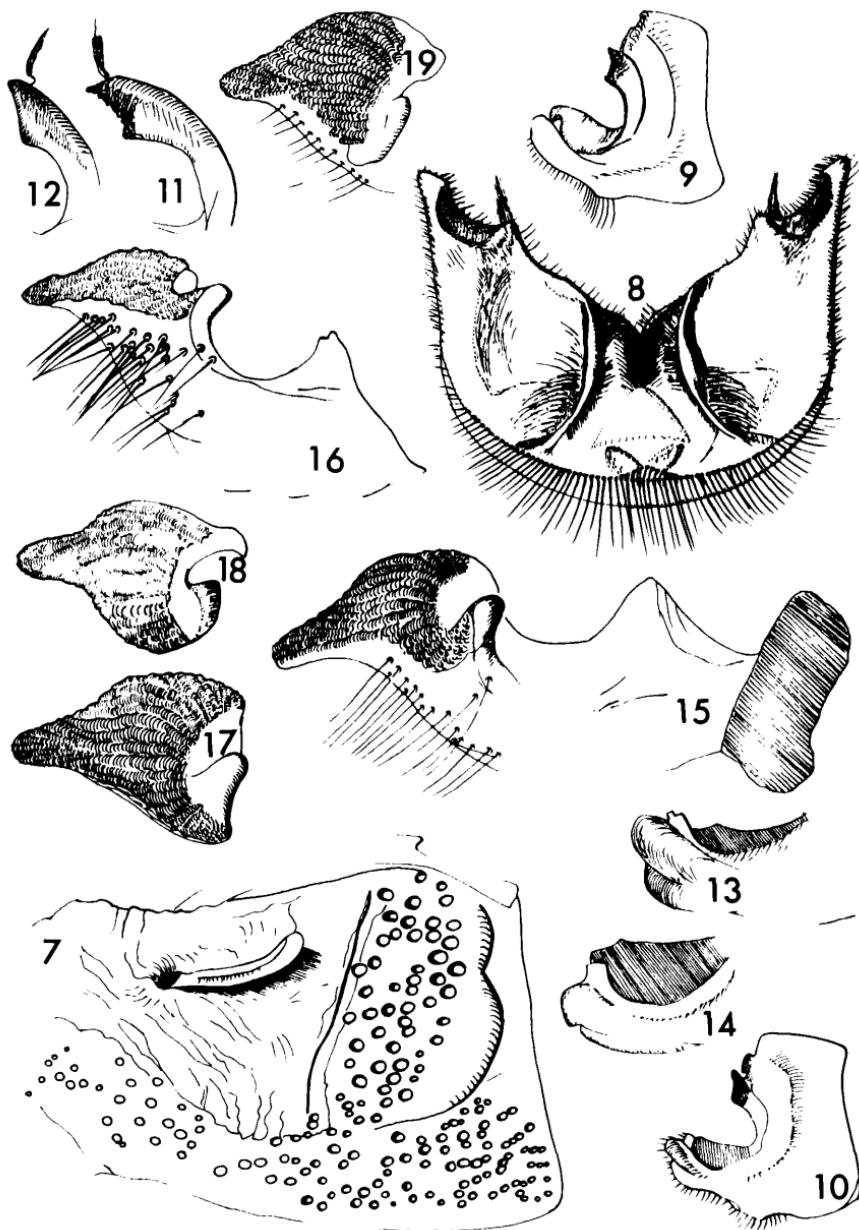
Colour Ground colour reddish/yellowish with dark brown black punctures unevenly distributed, congregated in small patches mainly on dorsal body surface, forming broken dashes running in parallel lines at acute angle to axis or middle line of body on corium and scutellum, more or less parallel to middle line on pronotum and head, eyes dark brown with basal yellow outline, anterior angles of scutellum minutely shining, impunctate, apex of light colour, membrane smoky with veins black with wider black patches alongside them, connexiva with a pattern consisting of black and yellow/yellowish-reddish alternate areas of almost equal size, each black fascia made up by anterior/posterior margins of adjacent connexivum, midventral surface of abdomen largely impunctate shining, lateral area with a band of thinly scattered black punctures, marginal (i. e. ventral connexival) area with semi-circular impunctate area surrounded by narrow black band a continuation of dorsal broad marginal black connexival pattern, ventral surface of head and thorax with bold longitudinal black dashes alternated, though irregularly with yellowish reddish impunctate fascia. Antennae first and second segments and legs with longitudinal black markings, last three segments of antennae black with basal annulation, in third narrow, in fifth segment wide, yellow.

Size Length of body 18 mm, width across shoulders 7 mm.

Structure Marginal tooth in front of eyes very much reduced; pronotal lateral



Figs. 1–19. *Tipuliparra subdecora* (BREDDIN). 1: head & pronotum, holotype ♀ – 2: head of same, much enlarged – 3: metasternum of same, showing scent gland auricle – 4: external plates of same – 5: head and thorax of a second ♂ – 6: head of same – 7: metasternum of the second ♂ – 8: pygophore of the matched ♂, posterior view – 9: lateral view of pygophore of same (magnification much smaller) – 10: the same of a third ♂ –



11 dorsal and middle ridged sensory processes of posteromedial margin of pygophore of matched ♂ – 12: the same of the third ♂ – 13: ventroposterior appendage of same ♂ – 14: apex of same – 15: paramere of matched ♂, internal lateral view – 16: the same of the second ♂ – 17: head of paramere, dorsal view, of matched ♂ – 18: the same of the second ♂ – 19: the same of the third ♂.

margin strongly sinuate, humeral angles extended beyond bases of elytra; scent gland spout relatively short, its width to remaining width of metasternum 1:1.5, ratio of II and III antennal segments 1:1.25, rostrum reaching middle of 4th abdominal segment.

Male genitalia Pygophore, posterior margin with middle sensory processes well developed, dorsal less prominent, ventroposterior appendages well developed; paramere with well developed "thumb" (Figs. 15–19) close to dorsal margin, ridged area confined to head, setae numerous, head of paramere flat with long "beak"

Female genitalia Spermatheca of the only available ♀ (type of *D. subdecora*) was not dissected; external plates moderately swollen (Fig. 4).

Material examined Type ♀ of *Dalpada deplanata* var. *subdecora* BREDDIN, South India (Ostindien), Coorg (BREDDIN) in Institut für Pflanzenschutzforschung, Eberswalde, G.D.R. 1 ♂, Mysore, 4.400 ft., Arabidacool Est. 20 March – 29 April, 1913 (P. B. coll.), as *Tolumnia*; 3 ♂♂, Nandidrug South India, B.M.1930–599 (T. V. CAMPBELL coll.); BMNH.

Comments ♂♂ from Nandidrug and Mysore show some individual variation in their genitalia (cf. Figs. 17, 18, 19) but other body characters including the shape of head of these males as well as of the type female, remain within the intraspecific range of variation. Although *D. subdecora* was described as a variety of *D. deplanata*, the former is quite distinct even to the extent of being in a different genus. The name *D. depressula* is only on the label and as such nomen nudum (GAEDIKE, 1971, 84) for *D. deplanata* BREDDIN.

Tipulparra trivandera sp. n. (Figs. 20–29)

Colour Ground colour yellowish smoky, punctures black or greenish black, pattern of dashes and streaks similar to *T. subdecora* except that basal angles of scutellum not impunctate.

Size Length 16 mm, width across shoulders 7 mm.

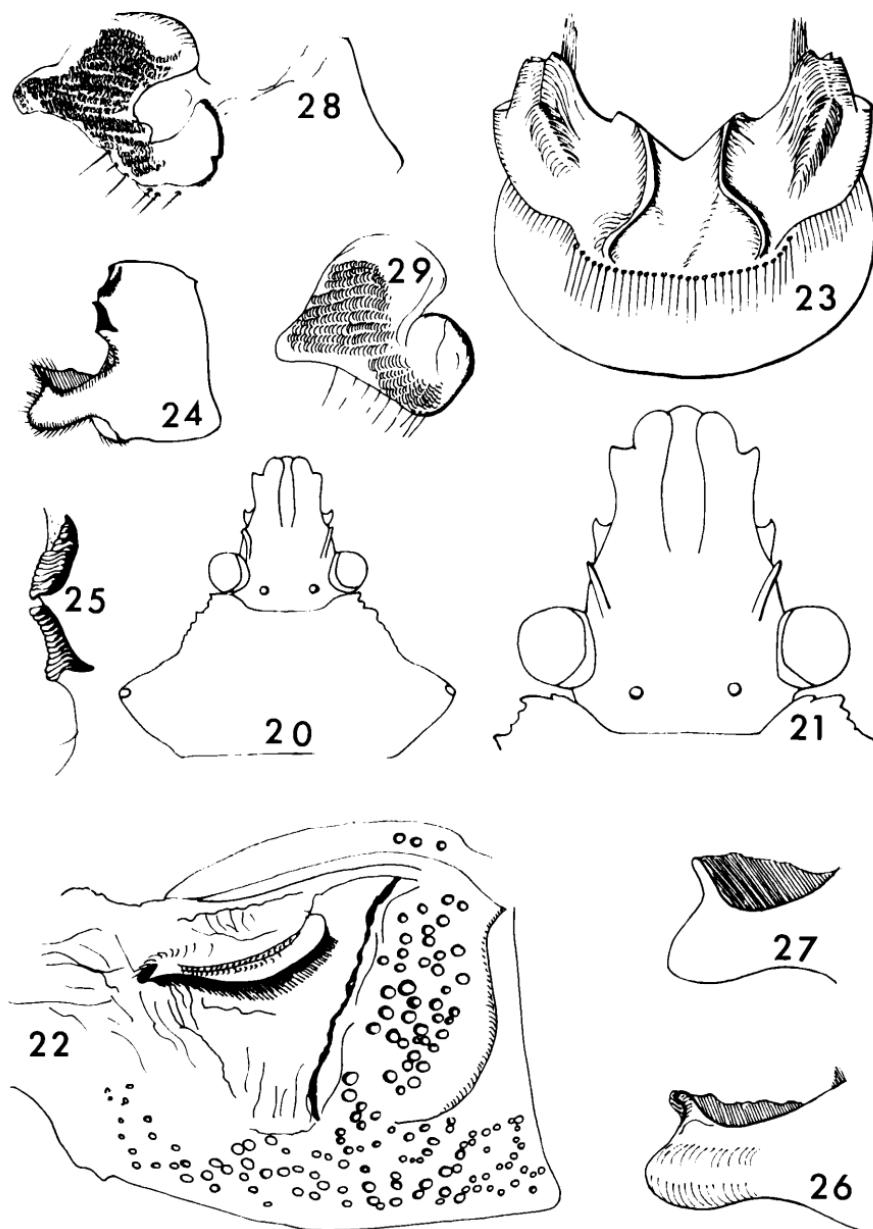
Structure Similar to *T. subdecora* except that angle of juga more clear and marginal tooth in front of eyes very prominent; spout of scent gland relatively long, i. e. ratio of its width to remaining width of sternum 1:1, also in absolute terms it is wider (longer) than that of *T. subdecora* in side-by-side comparison, rostrum reaching middle of fourth abdominal sternum.

Male genitalia Pygophore with middle as well as dorsal sensory processes well developed (Figs. 24 & 25), ventroposterior appendage well developed (Figs. 26 & 27); paramere with well developed thumb but unlike *T. subdecora*, located much lower down from dorsal margin of its head and ridged area extended ventrally along with "thumb" (Fig. 28), head of paramere domeshaped with short and blunt "beak" (Fig. 29), setae numerous.

Female Not available.

Material examined Holotype ♂ (1903–173), South India, Travancore Tea Co., 1903 (G. S. IMRAY). In BMNH.

Comments Relatively speaking the new species is not closely related to *T. subdecora* because the shape of the head of paramere, its "thumb" is widely separated from the main dorsal ridged area (cf. Figs. 15, 16 & 26) and is much larger than that of *T. subdecora*.



Figs. 20–29. Holotype ♂ of *Tipulparra trivandera* sp. n. 20: head and pronotum – 21: head, much enlarged – 22: metasternum – 23: pygophore, posterior view – 24: the same, lateral view (magnification smaller) – 25: dorsal & middle ridged sensory processes – 26: ventroposterior appendage of same – 27: apex of same – 28: paramere – 29: head of paramere, dorsal view.

(cf. Figs. 17, 18, 19 & 20), apart from this the sensory processes of pygophore and the prominent marginal tooth of head would distinguish it from *T. subdecora*.

Tipulparra trivandera producta subsp. n. (Figs. 30–42)

Colour Similar to nominate species, dark patches more/less intense; anterior angles of scutellum impunctate.

Size Length 16 mm., width across shoulder 7 mm.

Structure Similar to nominate species except that angle of juga sloping, marginal tooth in front of eyes smaller (Figs. 30 & 31), rostrum reaching almost posterior margin of fourth abdominal segment.

Male genitalia Similar to that of nominate species except that head of paramere not dome-shaped, "beak" long (Figs. 38–42), scent gland spout a little shorter (Fig. 32).

Material examined Holotype ♂ (30), South India, Trivandrum, VII. 1901 (DISTANT coll. B.M.1911–383). Paratypes, 1 ♂, South India, Nelliampathi Hills, Top Slip Camp, 26. IV 1937 (B.M.C.M. Expdn. to S. India, April-May 1937); 1 ♂ (15), Trivandrum, VII. 1888. All in BMNH.

Comments The three males show slight individual intrasubspecific variation but together are subspecifically different from the nominate species mainly in the shape of paramere (cf. Figs. 28, 29, 38, 39, 40, 41 & 42).

Tipulparra trivandera neela subsp. n. (Figs. 43–47)

Colour Similar to nominate form, a little faded.

Size Length 16 mm., width across shoulders 7 mm.

Structure Angles of juga sloping, marginal tooth in front of eyes small, rostrum reaching hind margin of fourth abdominal segment, in all these respects very similar to *T. trivandera producta*.

Male genitalia Similar to previous subspecies except that "thumb" of paramere much smaller (cf. Figs. 29, 40, 41 & 47).

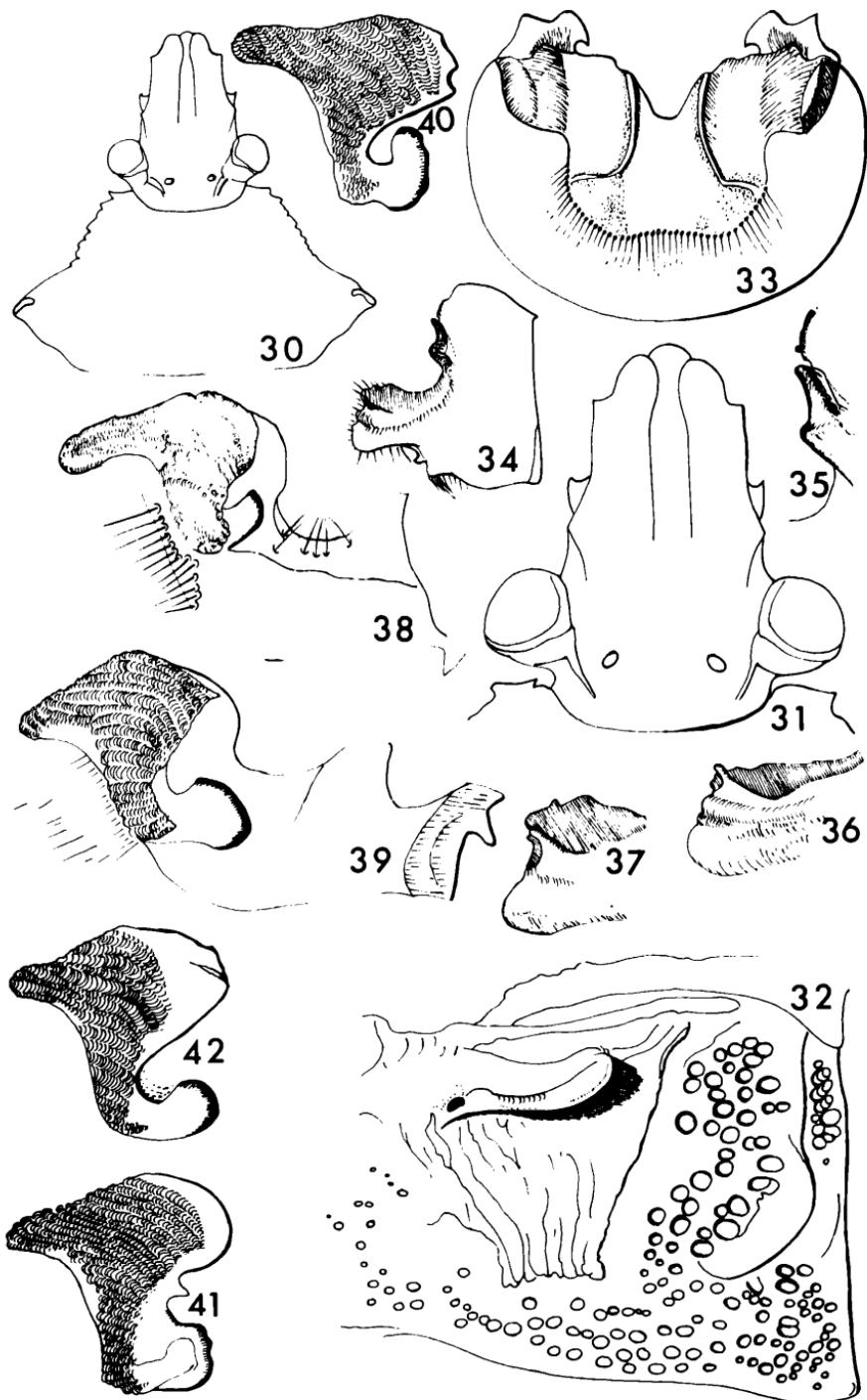
Material examined Holotype ♂, South India (Neelgiri) (HAMPSON) (DISTANT coll. B.M.1911–383).

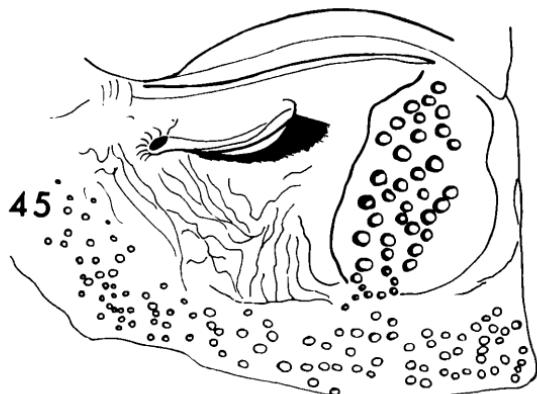
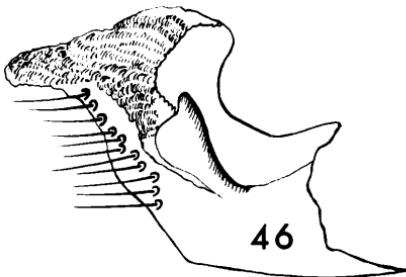
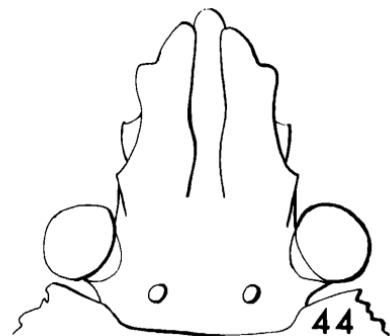
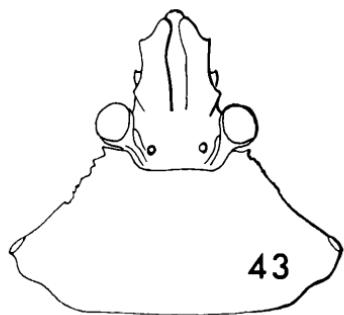
Comments The new subspecies has much smaller "thumb" of the paramere than that in *T. trivandera producta*.

Tipulparra brevisa sp. n. (Figs. 48–64)

Colour Similar to *T. subdecora*, dark punctures more uniformly scattered, anterior

Figs. 30–42. *Tipulparra trivandera producta* subsp. n. 30: head and thorax of holotype – 31: head of same (much enlarged) – 32: metasternum of same – 33: pygophore of paratype, posterior view – 34: the same, lateral view (much smaller magnification) – 35: dorsal & middle ridged sensory processes of same – 36: ventroposterior appendage of same – 37: apex of same – 38: paramere of holotype – 39: the same of a second paratype – 40: head of paramere of holotype, dorsal view – 41: the same of paratype – 42: the same of the second paratype. →





Figs. 43–47. Holotype ♂ of *Tipulparra trivandera neela* subsp. n. 43: head and pronotum – 44: head, much enlarged – 45: metasternum – 46: paramere – 47: head of paramere, dorsal view.

angle of scutellum punctate, apex lighter, ventral fascia formed by dark punctures on lateral area of abdomen much wider than in *T. subdecora*.

Size Length 15 mm., width across shoulder 6.5 mm.

Structure Head in male with reduced tooth in front of eye, in female quite developed, rostrum reaching middle of fourth abdominal segment, scent gland auricle shorter, ratio of its width to remaining width of metasternum 1:1.75.

Male genitalia Dorsal sensory process of pygophore reduced, middle process well developed, ventroposterior appendage long, but without vertical finger-like process (cf. Figs. 27 & 56); paramere with well developed "thumb" remote from dorsal margin of head, this flattish, ridged area extended ventrally, setae numerous.

Female genitalia Similar to that described under generic definition (Figs. 62, 63 & 64).

Material examined Holotype ♂, South India (Nilgiri), (HAMPSON) (DISTANT coll. B.M.1911-383). Paratypes, 1 ♂ same data as holotype, 1 ♂ (Neelgiri) (HAMPSON) (DISTANT coll. B.M.1911-383); 1 ♀ same data as second paratype ♂. All in BMNH.

Comments Superficially the new species looks like *T. subdecora*, but the thumb of its paramere, unlike that of *T. subdecora*, is remote from its head and consequently the sensitive ridged area is extended downwards. The posterior margin of pygophore of *T. brevisa* sp. n. lacks a well developed dorsal sensitive process and the posteroventral appendage the vertical finger. The scent gland auricle is also much smaller in the new species. One of the ♂ paratypes shows a little reduction in the prominence of the "thumb" of its paramere (cf. Figs. 60 & 61).

***Tipulparra pseudoversicolor* sp. n. (Figs. 65-77)**

Colour Very similar to *T. subdecora* (BREDDIN) including impunctate anterior angles of scutellum and its light apex.

Size Length 15 mm., width across shoulders 7 mm.

Structure Marginal tooth in front of eyes prominent; scent gland spout relatively short, its width to remaining width of sternum 1:1.55, rostrum reaching posterior margin of fourth abdominal segment.

Male genitalia Pygophore posterior margin with dorsal and well developed middle sensory processes, ventroposterior appendage well-developed (Figs. 69, 71) with apical finger-like process well developed; paramere with reduced "thumb", away from dorsal margin, in top view appears as a narrow ridge (Fig. 75), ridged area extended ventrally, setae numerous, head flat with moderately long beak.

Female genitalia Similar to that of *T. subdecora* and *T. brevisa*.

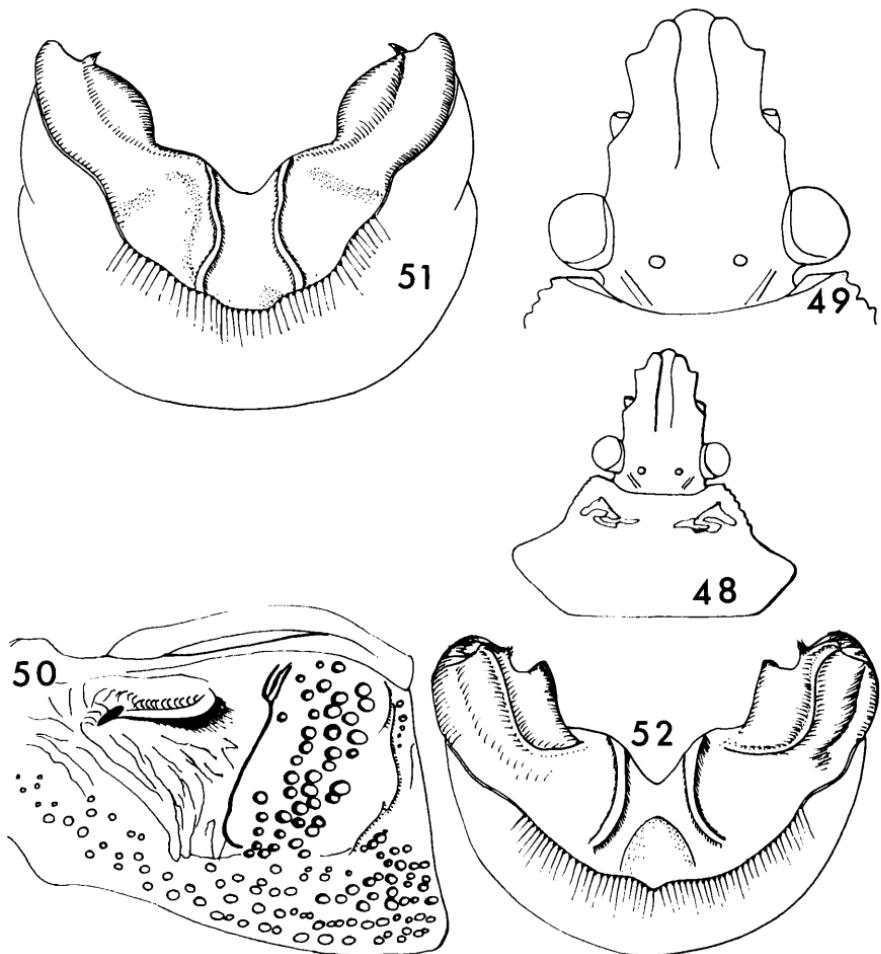
Material examined Holotype ♂, South India, Nandidrug (T. V. C.) (ex. coll. E. A. BUTLER, B.M.1926-171). Paratypes, 2 ♂♂ & 1 ♀, same data as holotype (one ♂ earlier determined as *D. versicolor*). All in BMNH.

Comments The new species externally very closely resembles *T. subdecora*, but mainly differs by its very much reduced 'thumb' of the paramere (cf. Figs. 16 & 74).

***Tipulparra shembaga* sp. n. (Figs. 78-88)**

Colour Very similar to *T. subdecora*, anterior angles of scutellum impunctate, its apex lighter.

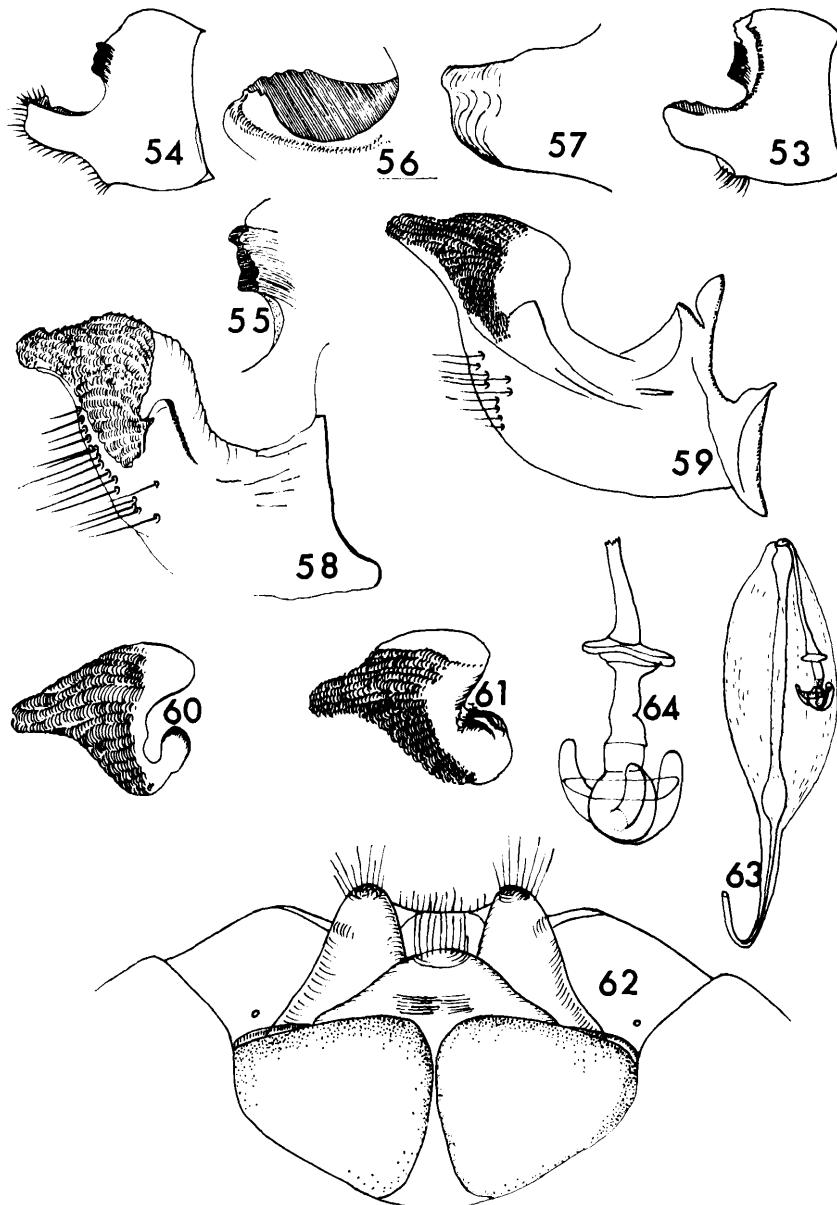
Size Length 14 mm. (17 mm. ♀), width across shoulders 6 mm. (7 mm. ♀).



Figs. 48–64. *Tipulparra brevisa* sp. n. 48: head and pronotum of holotype ♂ – 49: head of same, much enlarged – 50: metasternum of same – 51: pygophore of paratype ♂, posterior view – 52: the same of a second paratype ♂ – 53: lateral view of pygophore of the second paratype ♂ – 54: the same of first paratype ♂ – 55: middle ridged sensory process of same – 56: ventroposterior appendage of same – 57: apex of same – 58: paramere of holotype ♂ – 59: the same of second paratype ♂ – 60: head of paramere of holotype, dorsal view – 61: the same of the second paratype ♂ – 62: external plates of paratype ♀ – 63: spermatheca of same – 64: bulb of same.

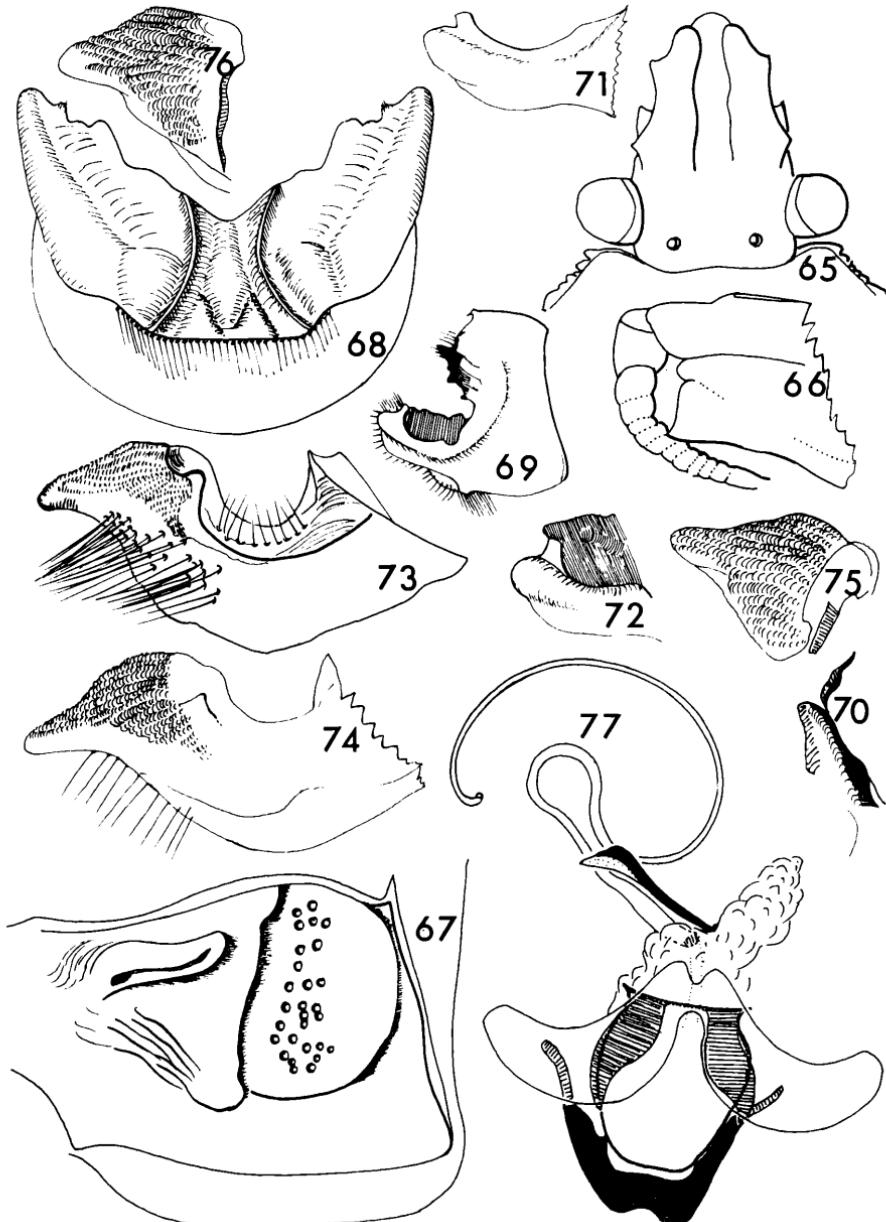
Structure Angle of jugal lobes sloping, marginal tooth in front of eyes reduced; rostrum only a little extended beyond margin of third abdominal segment. Scent gland spout very short, its width to remaining width of metasternum 1:2.

Male genitalia Pygophore – dorsal margin sensory process absent, middle process well developed, ventroposterior appendage short, triangular, apical finger fine, forming a narrow posterior margin to mesal extension (Figs. 81–84); paramere virtually without thumb, ridged area widely extended ventrally (Fig. 86) with clear-cut boundary.



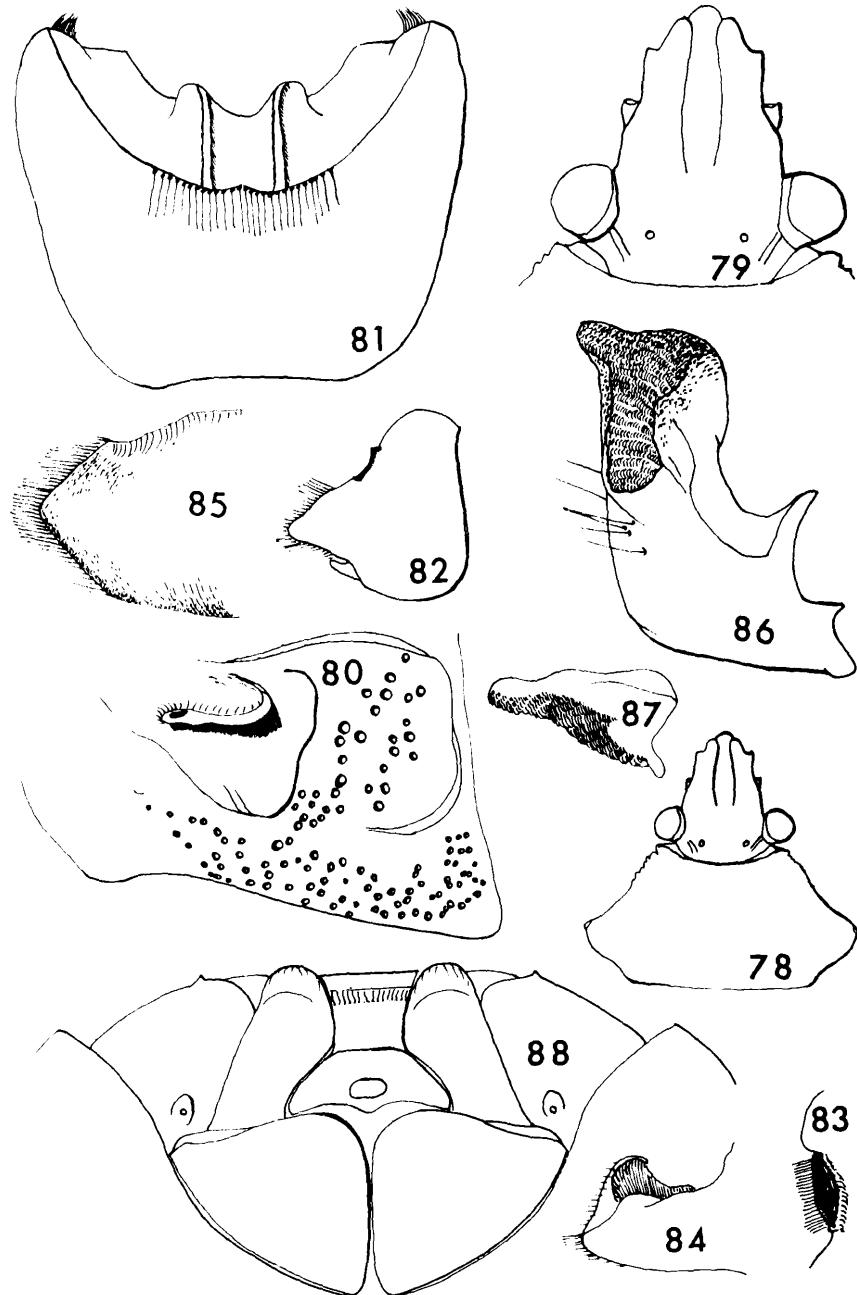
Female genitalia Similar to that of *T. subdecora*, Fig. 88.

Material examined Holotype ♂ (R. Mus. Hist. Nat. Belg. IG.9484), South India (Indes anglaises), Madura, Shémbaganur (R. DE. BUCK). Paratype 1♀ (R.I.Sc.N.B.I.G.), South India (Indes anglaises), Shémbaganur 1350 m. Motor Road, 21. IV. 1930 (R. P. MANUEL). All in Royal Natural History Museum, Tervuren, Belgium.



Figs. 65-77 *Tipulparra pseudoversicolor* sp. n. 65: head of holotype ♂ — 66: apex of same, lateral view — 67: metasternum of same — 68: pygophore of paratype ♂, posterior view — 69: lateral view of same (much reduced magnification) — 70: dorsal & middle ridged sensory processes of same — 71: ventroposterior appendage of same — 72: apex of same — 73: paramere of holotype ♂ — 74: the same of paratype ♂ — 75: head of same, dorsal view — 76: the same of holotype ♂ — 77: aedeagus of holotype ♂.

Figs. 78-88. *Tipulparra shembaga* sp. n. 78: head and pronotum of holotype ♂ — 79: head →



(much enlarged) of same — 80: metasternum of same — 81: pygophore (posterior view) of same — 82: the same (magnification reduced), lateral view — 83: middle ridged sensory process of same — 84: ventroposterior appendage — 85: another view of same — 86: paramere of holotype ♂ — 87: head of same, dorsal view — 88: external plates of paratype ♀.

Comments The new species differs from all others so far described by the shape of its pygophore, which has short ventroposterior appendages and paramere which is without "thumb". The habitat of this species is different from others, being in the east, near Eastern Ghats compared to Western Ghats from north to south, and Nilgiri Hills, Nandidrug etc.

Tipulparra tirunela sp. n. (Figs. 89–97)

Colour Similar to *T. subdecora* (BREDDIN), anterior angles of scutellum narrowly impunctate, its apex light.

Size Length 17 mm., width across shoulders 9 mm. Large size similar to *T. trivandera* sp. n.

Structure Lateral lobes of juga wide, marginal tooth in front of eyes well developed (Fig. 90); lateral margin of pronotum not deeply sinuate (Fig. 89); rostrum reaching middle of fourth abdominal segment; scent gland spout as wide as remaining width of metasternum (Fig. 91).

Male genitalia Pygophore, both dorsal and middle sensory processes well developed (Figs. 92 & 93), ventroposterior appendage short, apical finger reduced; paramere, thumb absent, ridged area extended very much ventrally, narrowing, without a clear-cut demarcation to its ventral margin.

Material examined Holotype ♂, South India, Naraikadu, 2,500–3,000 m., Tinnevelly, 3–8. X. 1938 (B.M.—C.M. Expdn., Sept.–Oct. 1938) In BMNH.

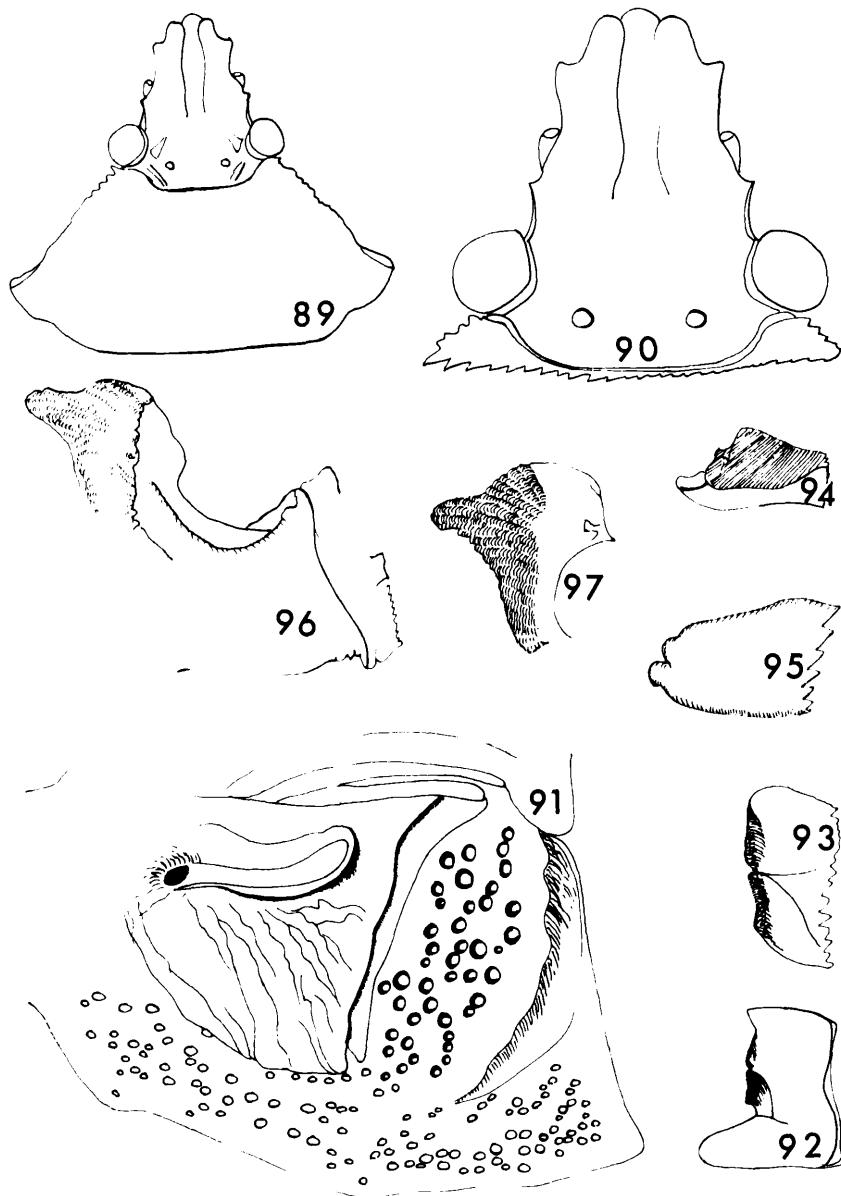
Comments The new species by virtue of the shape of its genitalia is closely related to *T. shembaga* sp. n. because both species lack "thumb" of paramere, but differ from each other in their outline of ridged area (cf. Figs. 96 & 86). The ridged area in *T. shembaga* in its ventral extension is almost uniformly wide, whereas in *T. tirunela* it becomes narrower and has an ill-defined outline ventrally. In body size *T. tirunela* is much larger and also its scent gland spout is much wider (longer) than in *T. shembaga* (cf. Figs. 91 & 80).

General comments

The superficial resemblance of the species of *Tipulparra* to those of the genera *Sarju*, *Cahara* etc. may be due to convergence since none of the northern species was found in southern India. In spite of the natural factors aiding dispersal from Nilgiri's temperate zones to subhimalayan cooler regions, the southern species seem not able to establish themselves in the north, and vice versa. It may be due to different food plants or some other factors such as their natural enemies. This needs further investigation which could be carried out only in the field. On the other hand, both groups look similar as a result of mimicry, for which a common model should occur in both parts of the Indian region.

Key to the species and subspecies of *Tipulparra*

1. Paramere with a "thumb"	2
— Paramere without a "thumb"	7
2. Ridged area of paramere confined dorsally, "thumb" very prominent near dorsal margin (Figs. 15 & 16).	<i>T. subdecora</i> (BREDDIN)
— Ridged area of paramere extended ventrally, "thumb" away from dorsal margins (Figs. 28 & 39); if near head, "thumb" not large (Figs. 73, 74, 75 & 76) in which case scent gland spout short (Fig. 67).	3



Figs. 89-97. Holotype ♂ of *Tipulparra tirunela* sp. n. 89: head and pronotum — 90: head (much enlarged) — 91: metasternum — 92: pygophore, lateral view, slightly distorted — 93: dorsal and middle ridged processes — 94: ventroposterior appendage of pygophore — 95: another view of same — 96: paramere — 97: head of same, dorsal view.

3. Head of paramere convex (Figs. 28 & 29); scent gland spout long (Fig. 22).

T. trivandera trivandera sp. n.

- Head of paramere flattish (Figs. 38–42), scent gland spout short (Fig. 32) or very short (Figs. 50 & 67). 4
- 4. Scent gland spout short (Figs. 32 & 45). 5
- Scent gland spout very short (Figs. 50 & 67). 6
- 5. Scent gland spout short (Fig. 32), "thumb" of paramere large (Figs. 40–42).
 - T. trivandera producta sp. et subsp. n.**
- Scent gland spout short (Fig. 45); "thumb" of paramere small (Figs. 46 & 47).
 - T. trivandera neela sp. et subsp. n.**
- 6. "Thumb" of paramere moderately large (Figs. 58–61), ventroposterior appendage of pygophore without a finger (Figs. 53, 54, 56 & 57). **T. brevisa sp. n.**
- "Thumb" of paramere very small (Figs. 73–76); ventroposterior appendage of pygophore with a finger (Figs. 69, 71, 72). **T. pseudoversicolor sp. n.**
- 7. Ventral extension of ridged area of paramere uniformly wide, with clear-cut boundary; scent gland spout very short (Figs. 86 & 80). **T. shembaga sp. n.**
- Ventral extension of ridged area of paramere narrowed ventrally, without a clear-cut boundary; scent gland spout long (Figs. 96 & 91). **T. tirunela sp. n.**

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