



Revision of the genus *Dasyopa* Malloch (Diptera: Chloropidae) from the Oriental Region with description of six new species from India

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ABSTRACT: Six new species of the genus *Dasyopa* Malloch namely, *convexa*, *flavisetosa*, *pentastriata*, *tomentosa*, *unimaculata* and *venadensis* are described from India. *Dasyopa orientalis* Cherian described earlier from India is transferred to genus *Caviceps* Malloch, to which it belongs. The new species described together with the earlier known remaining four species from India represent ten of the nineteen species of the genus so far known from the world.

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KEY WORDS: Chloropidae, Oscinellinae, *Dasyopa*, six new species, India.

INTRODUCTION

Andersson (1977) placed the species of *Dasyopa* Malloch under the genus *Trachysiphonella* Enderlein and included them along with *Tricimba* Lioy and related genera under *Aphanotrigonum* genus group proposed by him. Sabrosky (1980) synonymised *Trachysiphonella* with *Dasyopa*. Nartshuk (1983, 1987) in her revisionary works on the family Chloropidae placed *Dasyopa* along with four other genera namely, *Anomoeoceros* Lamb, *Calamoncosis* Enderlein, *Lipara* Meigen and *Pseudeurina* de Meijere under the tribe Liparini which she erected. Of these genera only *Calamoncosis*, *Dasyopa* and *Pseudeurina* have been reported from India.

Dasyopa is a small genus known by fourteen species from the world of which Cherian (1990) described five from India. On a closer examination of the type and study of more species belonging to the genera *Dasyopa* and *Caviceps* Malloch, *Dasyopa orientalis* Cherian (1990) which was placed with stated reservation under *Dasyopa* in the original description is here by transferred to *Caviceps* Malloch, the genus it comes under. While revising the genus from the Oriental Region, the authors came across six new species from India which are described here.

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These together with the remaining four species reported earlier from India constitute 10 of the 19 species of the genus known from the world.

MATERIAL EXAMINED

The type specimens are retained for the present in the collections of the Department of Zoology, University of Kerala, Trivandrum and shall later be transferred to the National Zoological Collections, Western Ghats Regional Centre, Zoological Survey of India, Kozhikode (Calicut). Types of earlier reported five species from India are in the National Zoological Collections, Zoological Survey of India, Kolkata (Calcutta).

Morphological nomenclature is followed after Mc Alpine (1981).

RESULTS AND DISCUSSION

Genus *Dasyopa* Malloch

1918. *Dasyopa* Malloch, *Bull. Brooklyn ent. Soc.*, **13**: 20. Type species: *Dasyopa latifrons* (Loew) (= *Siphonella latifrons* Loew) as *Dasyopa pleuralis* Malloch. By original designation and monotypy.

1936. *Trachysiphonella* Enderlein, *Die Tierwelt Mitteleuropas Insekten*, **6**(3): 187. Type species: *Trachysiphonella pumilio* (Zetterstedt) (= *Oscinis pumilio* Zetterstedt (= *Oscinis scutellata* Von Roser). Monotypy. Synonym, Sabrosky (1980).

Diagnostic Characters: Usually yellow species with very small tomentose frontal triangle, mostly long proboscis and almost always with two to four pairs of *prsc*.

Head with slightly projecting generally longer than wide and tomentose frons with numerous short *fr*; *if* in a row outside triangle along its margin; face concave; facial carina narrow, triangular in upper part and usually reaching epistomal margin; antenna mostly with very fine dense pubescence; *ant 3* wider than long; arista mostly short, basally thickened, rarely long with fairly dense hairs; eye mostly oval, with oblique to horizontal long axis and very dense hairs; gena well developed, sometimes as wide as *ant 3*, normally with numerous hairs in lower half; vibrissal corner almost always projecting; parafacialia linear or indistinct, rarely well developed; palpi cylindrical or flattened, with dark hairs; proboscis normally long, labella sometimes longer than fore tibia; *ovt* and the convergent *pvt* subequal; *ivt* shorter than *ovt*; *orb* 9-13, reclinate; *oc* reclinate, cruciate or convergent; thorax normally yellow with black markings; scutum moderately convex, tomentose, with indistinct depressions along *dc* lines and with longitudinal stripes and dense evenly distributed hairs; scutellum rounded, convex to flattened, tomentose and pubescent like scutum; thoracic bristles usually long and slender but in some species short and fairly stout; *h* 1 very distinct; *npl* 1+2, rarely an additional bristly hair present near inner posterior *npl*; *pa* 1 and 1 *dc* equal to *npl*; *pa* 2 short; *as* mostly longer than scutellum; *ss* 1-3; legs stout, yellow with darkened areas in some species; tibial

organ narrow; femoral organ “an oval group of warts”; wing with *m-m* cross-vein oblique; haltere yellow or white; abdomen oval, tomentose, usually with brown to dark brown transverse bands; female cerci slender; male cerci free; surstyli relatively large and broad; postgonites distally angular with heavily sclerotised margins and corners; hypandrium open.

Remarks: *Dasyopa* Malloch is a relatively small genus which is widely distributed in India. Cherian (1990) described five species from India of which, as stated earlier, *D. orientalis* Cherian is transferred to *Caviceps*. Six new species namely, *convexa*, *flavisetosa*, *pentastrata*, *tomentosa*, *unimaculata* and *venadensis* from India are described here. A revised key to the species from the Oriental Region is also given. All the 10 species, including the 6 new ones, from the Oriental Region are known only from India and represent 52.6% of the known world fauna of 19 species of this genus.

Distribution: Palearctic, Nearctic and Oriental Regions.

Key to species of *Dasyopa* from the Oriental Region

1. Vibrissal corner prominently projecting beyond anterior margin of eye.....2
 Vibrissal corner not or only slightly projecting beyond anterior margin of eye.....6
2. *r-m* cross-vein proximad of middle of discal cell; some distal tarsal segments black...3
 r-m cross-vein distad of middle of discal cell; tarsi wholly yellow or last tarsus of all legs with brown tinge.....4
3. *ant* 3 black in females and wholly yellow or medially black with yellow margins in males; arista with dark brown pubescence; terminal sector of M1+2 sinuate and not convex above along its entire length; parafacialia well developed..*prescutellata* Cherian
 ant 3 wholly yellow in males and females; arista with yellow pubescence; terminal sector of M1+2 convex above along its entire length; parafacialia sublinear
 *convexa* Cherian sp. n.
4. Gena as wide as the black *ant* 3; scutum predominantly brownish black.....*humeralis* Cherian
 Gena not more than two-thirds as wide as *ant* 3; *ant* 3 yellow, at most with dark tinge along anterodistal margin; scutum predominantly yellow or brownish yellow.....5
5. Frons 0.7x as wide as long, projecting beyond eyes anteriorly; vibrissal corner angulate, projecting prominently beyond anterior eye margin; *orb* about 12; scutum densely grey tomentose with 3 brownish black longitudinal bands; terminal sector of M1+2 weakly sinuate, joining costa at apex of wing.....*venadensis* Jyothi sp.n.

- Frons 1.1x as wide as long, not projecting beyond eyes anteriorly; vibrissal corner not angulate, only moderately projecting beyond anterior margin of eye; *orb* about 9; scutum finely grey tomentose with 3 brown longitudinal bands; terminal sector of M1+2 convex above, especially medially and joining costa beyond apex of wing
*unimaculata* Jyothi sp. n.
6. Width of gena one-third that of *ant* 3.....*flavisetosa* Cherian sp.n.
 Width of gena half or more than half that of *ant* 3.....7
7. Scutellum nearly subtriangular with flattened disk..... 8
 Scutellum nearly semicircular with convex disc..... 9
8. Scutum dull black with two sublinear longitudinal striae along *dc* lines; disc of scutellum entirely dull black; terminal sector of M1+2 joining wing margin before apex of wing; hind femur and tibia with diffused blackish brown colouration medially
*meghalayensis* Cherian
- Scutum predominantly brownish yellow with broad ill defined median and more defined infuscated lateral longitudinal bands; disc of scutellum yellow with light infuscation confined to median part; terminal sector of M1+2 joining wing margin at apex of wing; hind femur and tibia entirely yellow.....*tomentosa* Cherian sp. n.
9. Scutum predominantly brownish black with submedian and lateral sublinear yellow striae; terminal sector of M1+2 very slightly sinuate and hardly convex above in distal half*intermedia* Cherian
- Scutum predominantly brownish yellow with median, submedian and lateral infuscated broad, not clearly defined longitudinal striae; terminal sector of M1+2 prominently sinuate and convex above in distal half;*pentastriata* Cherian sp. n.

***Dasyopa convexa* Cherian sp. n. (Plates 1- 4)**

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Male (Pl. 1), *female*: *Head* (Pls. 2, 3): Length, height and width ratio 24:25:30. Frons slightly narrowing anteriorly, finely and densely grey tomentose, width at vertex half that of head and 0.9x its own length, widening at vertex, very slightly projecting above and in a few specimens a trifle beyond eye margin anteriorly, ending with convex anterior margin and with fairly dense, short, yellow *fr*; frontal triangle very narrow, width less than half that of frons at vertex, grey tomentose, yellow but for black ocellar triangle, reaching hardly beyond anterior ocellus and ending with broadly obtuse apex. Face deeply concave, yellow, densely and finely grey tomentose; facial carina running as a prominent low ridge to epistomal margin; antenna yellow in males and females; *ant* 3 about 1.4x as wide as long; arista short, dark brown, with short

concolourous pubescence. Gena yellow, grey tomentose, divided by a diagonal ridge extending from posterolateral margin to vibrissal corner, width in the middle less than that of *ant* 3, with a few short yellow hairs in lower half; vibrissal corner rounded, projecting beyond anterior margin of eye. Parafacialia sublinear. Eye densely and conspicuously pubescent with nearly oblique long axis. Palpi cylindrical, yellow; proboscis as in *prescutellata*, labella yellowish brown, shorter than fore tibia. Head bristles slender, yellow but in some specimens a few are dark brown; 3-4 posterior *orb* black and more conspicuous, the rest hardly distinguishable from *fr*; other head bristles as in *prescutellata*.

Thorax: A trifle wider than head (10:11). Scutum 1.1x as long as wide, predominantly yellow, densely greyish yellow tomentose with punctate, fairly long yellow hairs and with 3 broad longitudinal blackish brown indistinctly defined bands, running from anterior to almost posterior margin, of which median is again medially divided longitudinally into two and is partly shiny and each submedian one runs along *dc* lines; besides there are two smaller such bands each extending from below transverse suture to nearly base of *pa* 2; all the bands together impart deeply brownish tinge to convex surface of dorsum but for yellow, narrow longitudinal stripes between them; humeral callus dull yellow to yellowish brown. Pleura partly tomentose and partly shiny, yellowish brown to predominantly dark brown, in some specimens with yellow densely tomentose area covering upper and in a few anterior part of *kepst*. Scutellum (Pl. 4): 1.3x as wide as long, half way between semicircular and subtriangular with convex very rarely a little flattened disc, grey tomentose, brownish yellow with dark tinge except for median linear yellow area in some specimens and with punctate, fairly long yellow hairs. Some of the thoracic bristles yellow and a few brown to dark brown; *h* 1 well developed; *npl* 1+2 to 1+3 of which innermost of the posterior three short and the rest subequal and equal to *pa* 1 and 1 *dc*; *pa* 2 about half as long as *pa* 1; a row of 6-8 *prsc* present; *as* not widely separated at base; distance between bases of *as* only a little more than that between bases of *as* and *ss* 1; *ss* 1 half the *as* and *ss* 2 two-thirds the *ss* 1 but more slender.

Wing (Pl. 1): 2.4x as long as wide, hyaline with dark brown costa and brown veins; proportions of costal sectors 2-4 in the ratio 28:19:14; *r-m* cross-vein proximad of middle of discal cell, opposite 0.4 of its length; terminal sector of M1+2 greatly convex above along its entire length, especially in the middle and joining costa beyond apex of wing; R4+5 and M1+2 diverging distally; anal area slightly receding. Haltere yellow, but in some specimens knob with brown tinge medially.

Legs: Predominantly yellow but partly with deep brownish tinge especially on femora and in some specimens even on tibiae; tarsi yellow except for black last two tarsi each of mid and hind legs in both sexes; tibial organ well developed; femoral organ a row of warts.

Abdomen: Narrower than thorax, grey tomentose with dark brown dorsum and sides of basal segments, distal margin of some of the other segments and terminal part of terminal segment with yellowish tinge. Female cerci very slender, yellow but terminally black.

Length: Male 2.0-2.1mm; wing: 2.4-2.6 mm

Female 2.3-2.5 mm; wing: 2.8-3.1mm

Holotype: Male, India. Meghalaya. Nangpo, 18.iv.1980, Coll. P.T.Cherien. *Paratypes:* 20 males, 18 females, collection data same as of holotype.

Etymology: The name of the species is derived from the prominently convex character of its M1+2 vein.

Remarks: *D. convexa* shows affinities to *prescutellata* Cherian but while in the latter *ant* 3 is black in females and wholly yellow or medially black with yellow margins in males, terminal sector of M1+2 is sinuate and not convex above along its entire length and parafacialia is well developed, in *convexa* *ant* 3 is wholly yellow in males and females, terminal sector of M1+2 is convex above along its entire length and parafacialia is sublinear.

Dasyopa flavisetosa Cherian sp. n. (Plates 5- 6)

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Female (Pl. 5): *Head:* Length, height and width ratio 9:11:13. Frons subparallel, abruptly widening at vertex, brownish yellow, densely grey tomentose, projecting slightly above and a little beyond anterior margin of eye, ending with nearly straight anterior margin and with short punctate yellow *fr*; frontal triangle black, densely grey tomentose, width about half that of frons at vertex, reaching a little beyond anterior ocellus and ending with broadly obtuse apex; a few yellow hairs present in a row along vertex margin. Face brownish yellow, densely grey tomentose, a little concave; facial carina very low, linear, reaching epistomal margin. Basal antennal segments yellow, *ant* 3 about 1.5x as wide as long, yellow in lower half, brownish black in upper half and brownish black along anterodistal and lower margins; arista shorter than in *orientalis*, slender yellow with short fairly dense concolourous hairs. Gena yellow, grey tomentose, width in middle, one-third that of *ant* 3, with a row of whitish yellow hairs on lower margin; vibrissal corner receding, not reaching anterior margin of eye. Parafacialia not developed. Eye large, occupying much of the area of head in profile, suborbicular and unlike in most other species of *Dasyopa* so far known, sparsely and finely pubescent with nearly vertical long axis. Palpi yellow; proboscis short, partly brownish black and partly yellow. Head bristles slender, yellow; *orb* 8, reclinate, three anterior most ones shorter than the rest; other head bristles as in *orientalis*.

Thorax: A trifle narrower than head. Scutum 1.2x as wide as long, dull black with yellowish brown sides, very densely grey tomentose with convex disc which is slightly depressed along *dc* lines and bearing fairly dense short, punctate yellow hairs; humeral callus yellowish brown; part of *anepst* and *anepm* black and grey tomentose; meron, *kepst* and *propleuron* (*ppl*) shiny, not tomentose, partly dark brown and partly yellowish brown with yellow colouration more prominent on *ppl*. Scutellum 1.5x as wide as long, semicircular with convex black grey tomentose disc bearing punctate hairs as on scutum and with yellow laterodistal

margins with yellow colouration extending to nearly one-third its length distally. Thoracic bristles yellow; *h* 1 only a trifle shorter than *npl*; *npl* 1+2, subequal and equal to *pa* 1 and 1 *dc*; *pa* 2 about half as long as 1 *dc*; *prsc* in a row of about 6, which are hardly longer than scutal hairs; *as* more approximated at base than in *orientalis*, 0.8x as long as scutellum; *ss* 1, 0.6 x and *ss* 2, 0.2x as long as *as*.

Wing (Pl. 6): 2.5x as long as wide, hyaline with yellowish brown veins; proportions of costal sectors 2-4 in the ratio 11:7:5; *r-m* cross-vein almost in middle of discal cell; terminal sectors of R4+5 and M1+2 parallel along almost their entire lengths, the former very weakly bending upwards towards costa terminally, the latter entirely straight and joining costa a little beyond apex of wing; anal area fairly well developed. Haltere yellow.

Legs: Slender, almost wholly yellow but for diffused dark brown incomplete bands in distal halves of femora and short complete bands in basal halves of tibiae; tibial organ present.

Abdomen: Narrower than thorax, brownish black, finely grey tomentose, basal 2-3 segments with yellowish brown tinge on dorsum; female ovipositor very short and slender with pale hairs.

Length: Female 1.9 mm; Wing 2.1 mm

Holotype: Female, India, Kerala, Trivandrum Dist., Kariavattom; 25 m., 7.xii.2005, Coll. A.K. Shinimol.

Etymology: The species derives its name from the yellow colour of its head and thoracic bristles.

Remarks: *D. flavisetosa* shows affinities to *D. Meghalayensis* Cherian but while in the former width of gena is only one-third that of *ant* 3, scutellum is yellow one-third its length distally and M1+2 joins costa beyond apex of wing, in the latter species gena is more than half as wide as *ant* 3, scutellum is wholly black and M1+2 joins costa before apex of wing.

Dasyopa humeralis Cherian

Dasyopa humeralis Cherian (1990) *Oriental insects*, **24**: 358- 359.

Type locality: Tripura: Amarpur: Belonia.

Types studied: *Holotype*: Female, India: Tripura: Amarpur, 16.x.1977, Coll. N. Muraleedharan (ZSI). *Paratype*: 1 female, Tripura: Belonia, 3.x.1977, Coll. N. Muraleedharan. **Other specimens studied**: 3 Females, Kerala: Trivandrum Dist., Kariavattom, 25m, 21.xii.2005. Coll. A.K. Shinimol.

Length: Female 3.0 mm; wing 2.8 mm

Variations: Specimens from Kariavattom, Kerala differ from the types in scutellum being subtriangular and scutum prominently bulging at sides in the area above *pa* 1 and behind transverse suture. It is possible that two species are involved, the specimens from Kerala representing a new species. This can be ascertained only by the study of the male genitalia. Hence they are considered for the present belonging to the same species.

Remarks: *D. humeralis* differs from *prescutellata* Cherian in the nature of frons, number of *orb*, colour of *fr*, thoracic hairs and thorax, position of *r-m* cross-vein, wholly yellow colour of tarsal segments and entirely black antennae. This species was collected from Kerala in southern India 28 years after it was originally collected from Tripura in north-eastern India

***Dasyopa intermedia* Cherian**

Dasyopa intermedia Cherian (1990) *Oriental insects*, **24**: 360-361. Type locality:

Tripura: Chandrapur.

Type studied: *Holotype:* Male, India: Tripura: Chandrapur, 7.x.1977, Coll. N. Muraleedharan (ZSI).

Length: Male 1.76 mm; wing 1.55 mm

Remarks: *D.intermedia* is related to *meghalayensis* Cherian but in the former scutellum is nearly semicircular with convex disc and scutum is with submedian and lateral yellow striae but in *meghalayensis* scutellum is subtriangular with flattened disc and scutum is entirely black.

***Dasyopa meghalayensis* Cherian**

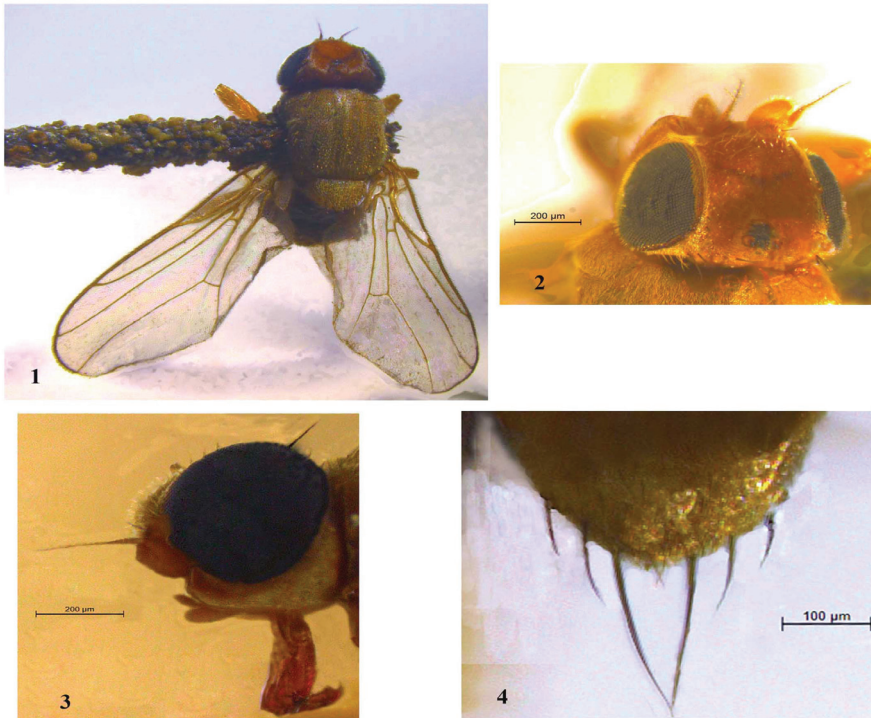
Dasyopa meghalayensis Cherian (1990) *Oriental insects*, **24**: 361-362.

Type locality: Meghalaya: Nangpo

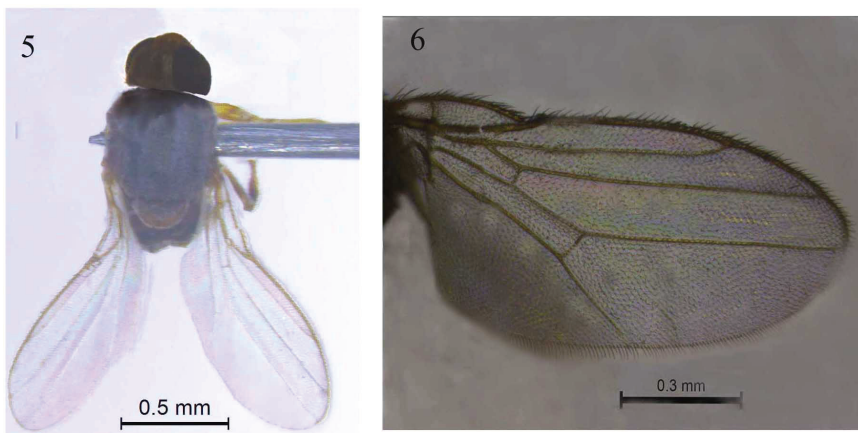
Types studied: *Holotype:* Female, Meghalaya: Nongpo, 18.iv.1980, Coll. P.T.Cherien. from Paratypes: 2 females, collection data same as of holotype. the Holotype and the Paratypes, 2 **Other specimens studied:** 1 male and 1 female, collection data same as of the type specimens.

The additional specimens studied belong to the original type series but were not included in the original description. They agree in all respects with the types. This species was hitherto known only by the females and the male is being reported for the first time.

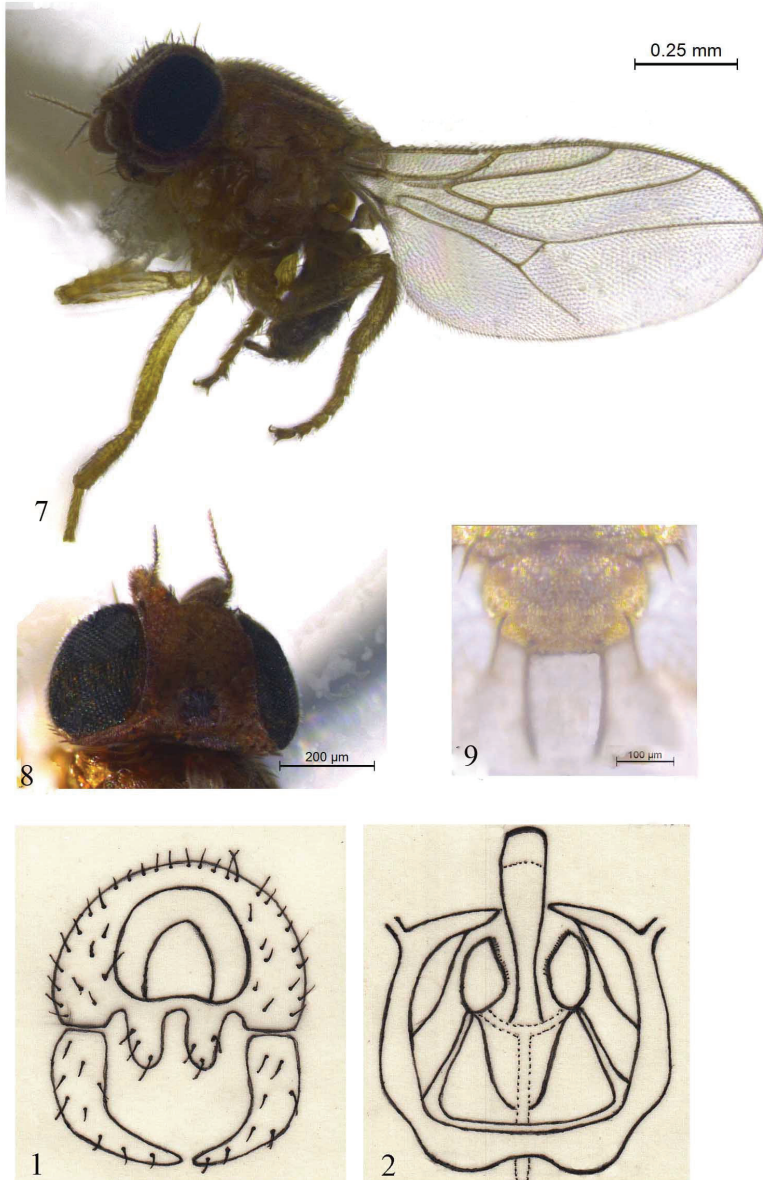
Length: Male 1.8 mm; wing 1.9 mm; Female 1.9 mm; wing 2 mm



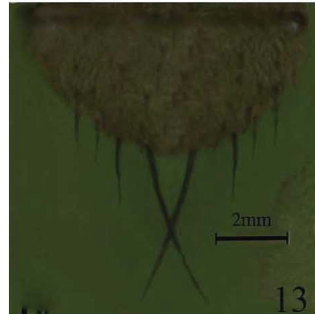
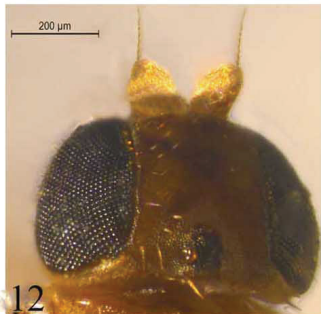
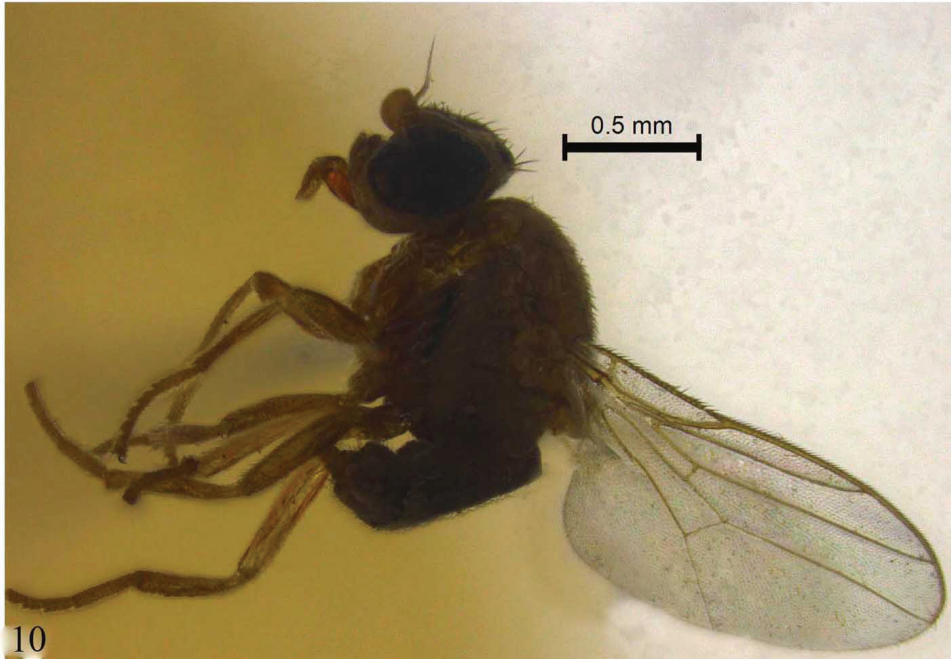
PLATES. 1-4 *Dasyopa convexa* Cherian sp.n. 1- Male fly; 2- head, dorsal view; 3- head, in profile; 4- scutellum.



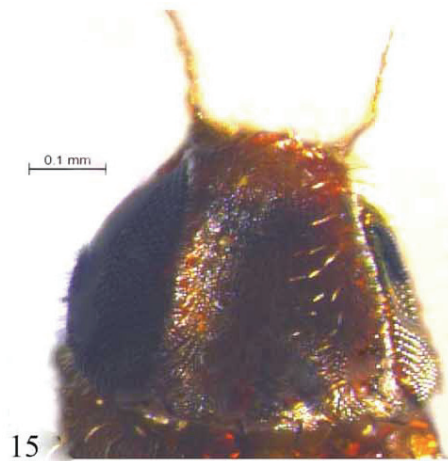
PLATES. 5-6. *Dasyopa flavisetosa* Cherian sp.n. 5-female fly; 6- wing



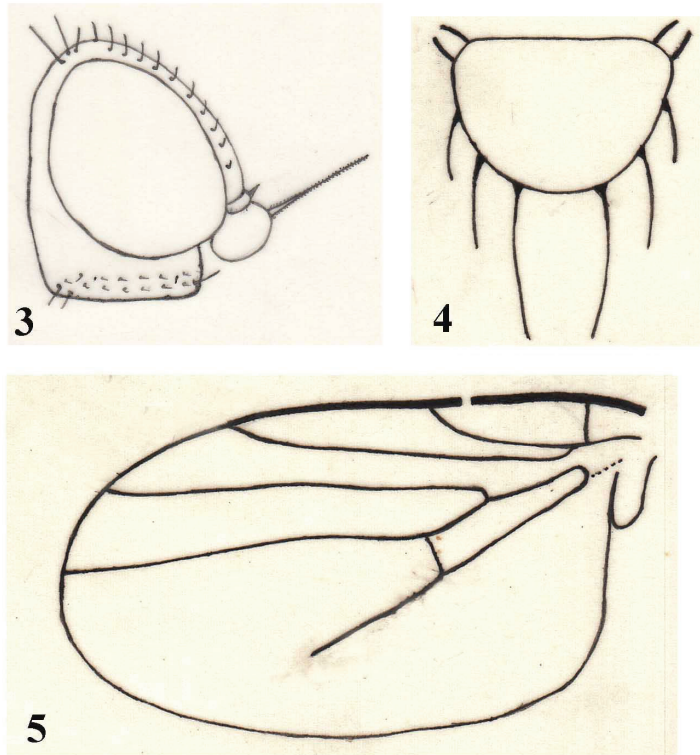
PLATES. 7-9. *Dasyopa pentastrata* Cherian sp.n.
 7- Female fly; 8- head, dorsal view; 9- scutellum
 FIGURES 1-2. *Dasyopa pentastrata* Cherian sp.n.
 1- epandrium; 2- hypandrium & phallic complex



PLATES. 10-13. *Dasyopa unimaculata* Jyothi sp.n.
10- Female fly; 11- head, in profile; 12- head , dorsal view;
13- scutellum.



PLATES. 14-15. *Dasyopa venadensis* Jyothi sp. n. 14- Male fly;
15- head, dorsal view.



FIGURES. 3-5. *Dasyopa tomentosa* Cherian sp.n.
3- head, profile; 4- scutellum; 5- wing.

Remarks: *D. meghalayensis* keys near *intermedia* Cherian but can be differentiated by its subtriangular scutellum with flattened disc and dull and densely grey tomentose thorax. Besides, in the former species there are three pairs of *ss* whereas in *intermedia* there are only 2 pairs of *ss* bristles.

A closer examination of the specimens has revealed that vein M1+2 is weakly concave above in distal half whence it becomes straight before joining costa unlike in the original description where it was stated that M1+2 is straight.

***Dasyopa pentastrata* Cherian sp. n. (Plates 7-9), Figs. 1-2)**

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Male, Female (Pl. 7): *Head* (Pl. 8): Length, height and width ratio 5:6:7. Frons nearly parallel sided, width at vertex half that of head and 0.9x its own length, not projecting beyond but

slightly above eye margin anteriorly, ending with straight margin, finely and densely grey tomentose, wholly yellow in some specimens and partly or wholly with deep brownish tinge in others, all specimens with punctate short brownish black *fr*; frontal triangle about half as wide as frons at vertex, deeply brown to dark brown but more densely tomentose than rest of frons, reaching a little beyond anterior ocellus and ending with blunt apex; ocellar tubercle black. Face concave, brownish yellow, densely grey tomentose; facial carina reaching epistomal margin in the form of a low, but slightly distinct ridge. Basal antennal segments yellowish brown to brown; *ant* 3, 1.3x as wide as long, almost suborbicular, brownish yellow but infuscated broadly along anterodistal margin. Arista rather short, slender, brownish black with slender fairly dense concolourous hairs. Gena about half as wide as *ant* 3, brownish yellow, grey tomentose with dark brown hairs as in *intermedia*; postgena concolourous with gena, with a row of short postocular setae; vibrissal corner blunt, reaching but not projecting beyond anterior margin of eye; parafacialia not developed. Eye with fine dense pubescence, long axis oblique. Palpi club-shaped, yellow with dark hairs. Proboscis basally dark brown and distally yellow with slender concolourous hairs. Head bristles relatively short; *orb* about 12, erect to slightly reclinate, longest half as long as *ovt*; rest of cephalic bristles as in *intermedia* but a little shorter and stouter.

Thorax: Scutum as wide as head and 1.2x as wide as long, densely grey tomentose with gently convex brownish yellow dorsum bearing well developed punctae and broad posteriorly abbreviated median and submedian dark brown longitudinal bands of which median in some specimens is divided longitudinally by an yellow stria and each submedian one bifurcates at transverse suture to form short lateral bands. Much of the area of *anepst* and *anepm* dull and grey tomentose; lower margin of *anepst*, practically whole of *kepst* and part of meron not tomentose and shiny; part of meron blackish brown, in some specimens pleural region almost wholly yellow; a row of 6-8 short, black *prsc* also present which are more distinct in some specimens. Scutellum (Pl. 9) tomentose and dark pubescent like scutum, 1.5x as wide as long, semicircular with gently convex disc which is broadly brownish yellow along laterodistal margins and infuscated medially. Thoracic bristles brownish black; *h* 1 a little shorter than *npl*; *npl* 1+2, subequal and equal to *pa* 1 and 1 *dc*; *pa* 2 half as long as *pa* 1; *as*, 1.2 x as long as scutellum, convergent, more widely separated at base than in *intermedia*; *ss* 1, 0.4x as long as *as*; *ss* 2 not developed .

Wing (Pl. 7): About 2.2x as wide as long, hyaline with brown veins; proportions of costal sectors 2 to 4 in the ratio 4:3:3; *r-m* cross-vein distad of middle of discal cell, opposite 0.55 of its length; terminal sectors of R4+5 and M1+2 diverging terminally, the latter greatly sinuate, concave above basally, greatly convex above distally and joining costa at apex of wing. Anal area well developed. Haltere yellow.

Legs: In some specimens almost wholly yellow and in a few parts of legs especially mid and hind femora and rarely some tibiae with light dark tinge; tibial organ well developed; femoral organ in the form of a row of 6-7 warts.

Abdomen: Blackish brown, partly subshiny and partly tomentose. Female cerci short, slender, yellow but slightly dark brown terminally and with slender hairs. Male genitalia (Fig.1 & 2) : Epandrium more than 1.5x as broad as long; cerci short and broadly triangular distally, with a few hairs; surstylus in profile broadened at base and gradually narrowing distally; phallapodeme projecting well beyond margin of shallowly concave hypandrium; postgonite in the form of a broad elongated rectangular plate, with a few hairs; basiphallus broadened; distiphallus narrowing distally; basal phallapodemic sclerite broad.

Length: Male 1.2–1.4 mm; wing 1.1–1.3 mm

Female 1.5–1.6 mm; wing 1.32–1.5 mm

Holotype: Female: Kerala: Trivandrum: Kariavattom, 25 m, 23. ix. 2005, Coll. A.K. Shinimol.

Paratypes: 1 Female, collection data same as that of holotype except for the collector P.T.Cherien; 1 Female: Kerala: Trivandrum: Kariavattom, 25 m, 24. vi. 2004, Coll. J. Jasmin; 1 Male: Kerala: Trivandrum: Kariavattom, 25 m, 23. xii. 2005, Coll. A.K. Shinimol; 1 Female: Kerala: Trivandrum: Kariavattom, 25 m, 27. xii. 2005, Coll. A.K. Shinimol; 1 Female: Kerala: Trivandrum: Kariavattom, 25 m, 30. xii. 2005, Coll. Jyothi Tilak; 2 Females: Kerala: Trivandrum: Kariavattom, 25 m, 13. ii. 2006, Coll. Jyothi Tilak; 2 Females: Kerala: Trivandrum: Kariavattom, 25 m, 7. iii. 2006, Coll. A.K. Shinimol; 1 Female: Kerala: Trivandrum: Kariavattom, 25m, 17. iv. 2006, Coll. A.K. Shinimol; 1 Female: Kerala: Trivandrum: Kariavattom, 25 m, 17. v. 2006, Coll. A.K. Shinimol; 1 Female: Kerala: Trivandrum: Pangappara, 25 m, 10. xi. 2006, Coll. Jyothi Tilak; 1 Female: Kerala: Trivandrum: Kariavattom, 25 m, 15. viii. 2007, Coll. A.K. Shinimol; 1 Male: Kerala: Trivandrum: Kariavattom, 25 m, 11. ix. 2007, Coll. Jyothi Tilak.

Etymology: The species derives its name from the five longitudinal bands on scutum.

Remarks: *D. pentastrata* is closely related to *intermedia* Cherian but it differs from the latter in the colouration of scutum, pleura and scutellum and relative width of gena. Besides, while in *pentastrata* M1+2 is prominently convex above in distal half, *as* are widely separated at base and *ss* 2 is not developed, in *intermedia* M1+2 is only weakly convex above in distal half, *as* are less widely separated at base and *ss* 2 is developed.

Dasyopa prescutellata Cherian

Dasyopa prescutellata Cherian (1990) *Oriental insects*, **24**: 356-358. Type locality:

India: Darjeeling Dist., Goke Forest Rest House.

Types studied: *Holotype:* Male, India: Darjeeling: Goke Forest Rest House, 18.iv.1973, Coll. H.S.Sharma (ZSI). *Paratypes:* 33 males, 22 females, collection data same as of holotype.

Length: Male 2.9 mm; wing 2.7 mm; Female 3.2 mm wing 3.0 mm

Remarks: *D. prsecutellata* is related to *scutellata* Von Roser but unlike in the latter, in the former species proboscis is relatively short, parafacialia is well developed, scutellum is convex, thoracic hairs are golden yellow in males and intermittently black and yellow in females and a ridge divides gena in to upper and lower parts. This species has not been reported since it was originally described.

***Dasyopa tomentosa* Cherian sp. n. (Figs. 3-5)**

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Male: Head (Fig. 3): Length, height and width ratio 11:13:16. Frons parallel sided, width at vertex half that of head and 0.8x its own length, yellow, finely grey tomentose with short yellow *fr*, slightly projecting above but not beyond anterior margin of eye and ending with straight apex; frontal triangle dull, densely grey tomentose, yellowish brown, projecting hardly beyond anterior ocellus, its width at vertex less than half that of frons; ocellar tubercle black grey. Face deeply concave, yellowish brown, grey tomentose; facial carina reaching epistomal margin as a low but distinct ridge. Basal antennal segments brownish yellow; *ant* 3, 1.4x as wide as long, brownish yellow with dark tinge confined to upper half; arista slender, brownish yellow with short concolourous pubescence. Gena 0.65x as wide as *ant* 3, brownish yellow with punctate hairs in lower half; vibrissal corner almost reaches anterior margin of eye, weakly rounded at apex and almost a right angle but appearing in the specimen to project a little beyond because of the projecting palpus; postgena moderately developed, concolourous with gena. Parafacialia not developed. Eye large, densely and finely pubescent with oblique long axis. Palpi cylindrical, yellow; proboscis rather slender, of moderate length, brownish yellow. Head bristles very short, dark brown; *ovt* and *pvt* subequal and *ivt* a little shorter; *orb* about 10, reclinate longest posterior most one about half as long as *ivt*; *oc* very short, reclinate.

Thorax: Scutum a trifle wider than head (14:13) and 1.1x as wide as long, with moderately convex grey tomentose brownish yellow disc bearing short punctate fairly dense brownish black hairs and with three broad longitudinal bands of which median is slightly and the lateral ones are more deeply infuscated (which under certain angles of illumination appears yellowish). Pleural region grey tomentose but for partly subshiny, brownish yellow *kepst* and meron; *anepst* and upper part of *anepm* brownish black. Scutellum (Fig. 4) 1.4x as wide as long, nearly subtriangular with yellow grey tomentose flattened disc which is slightly infuscated medially and pubescent like scutum. Thoracic bristles relatively short, rather stout; *h* 1 a little shorter than *npl*; *npl* 1+2, subequal and equal to *pa* 1 and 1 *dc*; *pa* 2 very short, slender, less than half as long as 1 *dc*; *as* very widely separated at base, 1.2x as long as scutellum; *ss* 1, 0.4x as long as *as*.

Wing (Fig. 5): Hyaline with yellowish brown veins; proportions of costal sectors 2-4 in the ratio 35: 17: 14; terminal sectors of R4+5 and M1+2 subparallel, very slightly diverging terminally, the latter weakly sinuate along its entire length and joins costa at apex of wing; *r-m* cross-vein distad of middle of discal cell, opposite 0.6 of its length. Haltere yellow, knob partly with deep brown tinge.

Legs: Of medium size; coxae yellow with brown tinge; femora yellow with light brown tinge confined mostly to anterodistal margin; tibiae and tarsi yellow; tibial organ distinct; femoral organ in the form of a row of 6-7 warts.

Abdomen: Much narrower than thorax, dull brownish black with yellowish brown tinge confined to lower posterior margin of second segment and tinge of brown medially on the preceding segments.

Length: Male 2.1 mm; wing : 2.5 mm.

Holotype: Male: India: Tamil Nadu: Palani Hills, 27. iv. 1989, Coll. P.T. Cherian.

Etymology: This species derives its name from its densely tomentose frontal triangle and scutum.

Remarks: *D. tomentosa* keys near *meghalayensis* Cherian but the former has predominantly brownish yellow scutum with three broad infuscated longitudinal bands, yellow scutellum with light infuscation confined to median part of dorsum and yellow femora and tibiae. Besides, in this new species M1+2 joins costa at apex of wing and second sector of costa is 2x the third sector. But in *meghalayensis* scutum is dull black with two sublinear longitudinal striae along *dc* lines, scutellum is entirely dull black, hind femur and tibia are with diffused blackish brown colouration medially, M1+2 joins costa before apex of wing and second sector of costa is only 1.5x the third.

***Dasyopa unimaculata* Jyothi sp. n. (Plates 10-13)**

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Female (Pl. 10): *Head* (Pls.11&12): Length, height and width ratio 13:20:26. Frons nearly parallel sided, slightly widening at vertex, 1.1x as wide as long, projecting a little above but not beyond anterior margin of eye, orange yellow with short dark brown fairly dense *fr*; frontal triangle pale yellow, densely but finely grey tomentose, reaching nearly middle of frons and ending with pointed apex. Face concave, yellow, grey tomentose; facial carina running as a low ridge almost to epistomal margin which is raised up. Basal antennal segments yellow, in dorsal view partly hidden by frons; *ant* 3, 1.4x as wide as long, yellow, finely grey tomentose; arista basally thickened and tomentose, flagellum slender, wholly dark brown with conspicuous concolourous hairs. Gena medially 0.6x as wide as *ant* 3, pale yellow, grey tomentose, narrowing a little anteriorly; vibrissal corner rather rounded, appears angulate and in confluence with epistomal margin and unlike in *venadensis* projecting moderately beyond anterior margin of eye; postgena well developed, concolourous with gena; a row of blackish brown oral setae well developed. Parafacialia in profile developed, concolourous with gena. Eye densely and conspicuously pubescent, with oblique long axis. Palpi yellow; proboscis thickened, well developed, yellowish brown with dark tinge, labella shorter than fore tibia. Head bristles brownish black; *ovt* and cruciate *pvt* subequal; *ivt* shorter than *ovt*; *oc* slightly reclinate,

shorter than *ivt*; *orb* about 10, reclinate, longest a little shorter than *ivt*; *if* in a row of about 6 along outer margin of frontal triangle, hardly longer than *fr*.

Thorax: Scutum as wide as long, finely grey tomentose with small nearly irregular circular non-tomentose spots, ground colour yellow with three broad deeply brownish longitudinal bands of which submedian ones fade off posteriorly around 1 *dc*, disc prominently convex with fairly dense short dark brown hairs; humeral callus yellow. Pleura yellow; *anepst* and *anepm* mostly and *kepst* and *meron* partly grey tomentose; non-tomentose areas of pleuron shiny; *anepst* along its lower posterior margin with a well developed black macula. Scutellum (Pl. 13) semicircular, 1.3x as wide as long, disc gently convex, concolourous with and tomentose and pubescent like scutum. Thoracic bristles brownish black; *h* 1 as long as *ovt*; *npl* 1+2, subequal and equal to *pa* 1 and I *dc*; *pa* 2 half as long as *pa* 1; *as* cruciate, not very widely separated at base, 0.9x as long as scutellum; *ss* 1, 0.6x as long as *as*; distance between bases of *ss* 1 and *as* subequal to that between the two *as*; *ss* 2 and *ss* 3 almost subequal, about two-thirds as long as *ss* 1.

Wing : (Pl. 10): 2.4x as long as wide, hyaline with brownish yellow veins; proportions of costal sectors 2 to 4 in the ratio 20:13:8; *r-m* cross-vein distad of middle of discal cell, opposite 0.63 of its length; terminal sectors of R4+5 and M1+2 slightly diverging distally, the latter gradually becoming slightly convex above much of its length, especially medially and joining costa beyond apex of wing; anal area well developed. Haltere yellow.

Legs: Moderately developed, almost wholly yellow with light infuscation along anterodorsal and anteroventral, posterodorsal and posteroventral margins of some femora and light infuscation on some tibia which is discernable under certain angles of illumination.

Abdomen: Only a little narrower than thorax, suboval, subshiny, partly grey tomentose, yellowish brown with dark tinge on dorsum of distal segments and with short, dark hairs on margins of basal and dorsum of distal segments. Ovipositor moderately stout at base, yellow with slender terminal part which is almost black.

Length: Female 1.9 mm; wing 1.75 mm

Holotype: Female: India: Kerala: Trivandrum: Kariavattom, 25 m, 12.iii.2007, Coll. A.K. Shinimol.

Etymology: This species derives its name from the single black macula on scutum.

Remarks: *D. unimaculata* keys near *venadensis* Jyothi sp. n. but in the former species frons does not project beyond anterior margin of eye and is 1.1x as wide as long, vibrissal corner projects beyond anterior margin of eye, is confluent with epistomal margin and appears angulate, there are only 9 *orb*, scutum is only finely grey tomentose with three brown longitudinal bands and terminal sector of M1+2 is convex above especially medially and joins costa beyond apex of wing. But in *venadensis* frons projects beyond eyes anteriorly and is

only 0.7x as wide as long, vibrissal corner is angulate and does not project beyond anterior eye margin, there are 12 *orb*, scutum is densely silvery grey tomentose and with 3 brownish black longitudinal bands and terminal sector of M1+2 is weakly sinuate and joins costa at apex of wing.

***Dasyopa venadensis* Jyothi sp. n. (Plates 14-15)**

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Male (Pl. 14): *Head* (Pl. 15): Length, height and width ratio 10:11:13. Frons slightly narrowing anteriorly, width at vertex 0.54x that of head and 0.7x its own length, projecting distinctly above and beyond eyes anteriorly forming a roof over bases of antennae and ending with convex apex, deeply yellowish brown except for yellow anterior part, densely grey tomentose and with finely punctate yellow *fr*; frontal triangle densely grey tomentose, dark brown, projecting a little beyond anterior ocellus and ending with obtuse apex; ocellar tubercle projecting above frontal triangle, dull black and grey tomentose. Face deeply concave. Basal antennal segments brownish yellow, partly hidden by projecting frons and hence not visible; *ant* 3 about 1.4x as wide as long, finely grey tomentose, yellow with dark tinge along anterodistal margin; arista short, brownish black with concolourous pubescence. Gena a little less than two-thirds as wide as *ant* 3, projecting beyond anterior margin of eye, brownish yellow; vibrissal corner subangulate, reaching almost anterior margin of eye with conspicuous vibrissae; postgena moderately developed, brownish yellow to partly dark brown and with slender yellow hairs in its lower area. Parafacialia sublinear. Eye densely and conspicuously pubescent, with oblique long axis. Palpi subcylindrical, yellow; proboscis brownish yellow, partly with dark tinge, labella much shorter than fore tibia. Head bristles brownish black; *orb* about 12, reclinate, other head bristles as in *humeralis*.

Thorax: Scutum a little wider than head and about 1.2x as wide as long, brownish yellow with convex densely silvery grey tomentose disc bearing finely punctate yellow hairs and with 3 indistinctly defined broad brownish black longitudinal bands of which median is longitudinally subdivided a little behind its anterior margin and extends almost to posterior margin and each submedian one commences a little behind level of humeral callus and is divided behind transverse suture into two of which inner one runs almost to 1 *dc* and outer to *pa* 1. Humeral callus clearly demarcated. Pleura yellowish brown, mostly grey tomentose but for partly shiny and a little infuscated lower part of *anepst*, part of *anepm* and *kepst*. Scutellum 1.4x as wide as long, somewhat rounded in outline with yellowish brown grey tomentose convex disc bearing mostly yellow hairs. Thoracic bristles black; *h* 1 almost as long as *npl*, but more slender; *npl* 1+2, subequal and equal to *pa* 1 and 1 *dc*; *pa* 2 only a little shorter than *pa* 1; *as* a little longer than scutellum, convergent; *ss* 1 nearly two-thirds as long as *as* and *ss* 2 about 0.6x as long as *ss* 1; distance between bases of *as* subequal to that between bases of *as* and *ss* 1.

Wing (Pl. 14): 2.5x as long as wide, hyaline with brown veins; proportions of costal sectors 2 to 4 in the ratio 22:14:9, *r-m* cross-vein distad of middle of discal cell, opposite 0.67 of its length M1+2 weakly sinuate along its entire length, joining costa at apex of wing and

terminally diverging a little from R4+5; anal area moderately developed. Haltere yellow.

Legs: Yellow except for partly deeply brown hind and midfemora; midtibiae with short apical spur. Femoral organ a row of 5-6 warts.

Abdomen: Finely grey tomentose, yellowish brown with dark tinge except at sides of some median segments and with mostly yellow and some black hairs.

Length: Male 1.9 mm; wing 1.7 mm

Holotype: Male, India: Kerala: Trivandrum Dist., Kariavattom, 25 m, 13.ix.2004, Coll. P.T. Cherian.

Etymology: The species derives its name from Venad, the historical name of Travancore, the southern part of present day Kerala State where Travancore is located.

Remarks: *D. venadensis* shows affinities to *humeralis* Cherian but while in the former gena is less than two-thirds as wide as *ant 3*, is yellow and at most only with dark tinge along its anterodistal margin, scutum is predominantly brownish yellow and with longitudinal bands and thoracic hairs are yellow, in *humeralis* gena is as wide as *ant 3*, antennae are wholly black, scutum is brownish black and thoracic hairs are black. Besides they also differ in the relative lengths of costal sectors 2 to 4.

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Abbreviations

anepm - anepimeron; *anepst* - anepisternum; *ant 2* - second antennal segment; *ant 3* - third antennal segment; *as* - apical scutellar bristle; *1 dc* - first dorsocentral bristle; *fr* - frontal hair; *h* - humeral bristle; *if* - interfrontal bristle; *ivt* - inner vertical bristle; *kepst* - katepisternum; *npl* - notopleural bristle; *oc* - ocellar bristle; *orb* - fronto-orbital bristle; *ovt* - outer vertical bristle; *pa* - postalar bristle; *ppl* - propleuron; *prsc* - prescutellar bristle; *pvt* - postvertical bristle; *ss* - subapical scutellar bristle; R 2+3- radius 2+3; R4+5- radius 4+5; M1+2- median vein 1+2.

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