

TAXONOMY

GENUS GORYPHUS HOLMGREN (1868)

Goryphus belongs to the tribe mesostenini. The Goryphus complex includes large number of species and whose taxonomy is in the state of confusion.

The genus Goryphus is one of the commonest genera of the mesostenini. It is abundant in tropical and sub tropical parts of old world. It includes robust species that are parasitic upon various mall or medium sized cocoons, or sometimes naked pupae of host. At present it includes a rather heterogeneous assemblage of taxa and is therefore sub divided into three genera (Goryphus, Skeatia and Perjiva) which are collectively termed as the Goryphus - complex.

Townes et al., (1961) segregated species of Goryphus under the various genera listed. Townes, Towns and Gupta included sixty one species and ten subspecies under Goryphus from Indo-Australian region. Fislistina cameron and Brachy coryphus Holmgren were synonymized by Townes (1969 b). The former was containing

eleven species and later only one species from the Indo-Australian region. The work of Jonathan and Gupta on the Goryphus - complex from the orient includes sixty taxa. They considered thirty six taxa under Goryphus, ten transferred to Skeatia, nine synonymized either under Goryphus or Skeatia and rest of the nine taxa were unsettled. Jonathan and Gupta divided the species of Goryphus into two species groups viz., (1) The mesoxanthus group and (2) the Albomaculatus group. They studied forty seven species of Goryphus in their work and this also contains a well defined key to the species of this genus from the orient.

The present work is based on the new species :

- a) G. punctatus.
- b) G. shakeraii.

Goryphus punctatus Sp. nov. (Fig. 7) :

♀ : 11mm. Head 0.73 times as long as broad, in profile 0.68 times as long as high; vertex finely punctate; ocellar triangle punctate; lateral ocelli separated from eye by 0.9 its diameter; frons punctate, rugoso striate around median ocellus, without median horn and a semicircular carina above each antennal socket; antenna 2 + 30 segmented; scape 1.3 times as long as broad apical truncation of scape strongly oblique; pedicel 0.6 as long as broad; face convex, punctate 0.71 times as long as broad; clypeus convex, punctate 0.5 times as long as broad without an apical fringe of long parallel bristles and pre apical tooth; mandibles punctate, 1.33 times as long as broad, moderately wide at apex, lower tooth of mandible not longer than

upper tooth; labrum concealed; maxillary palps five segmented and labial palps four segmented; cheek finely punctate, 1.66 time as long as width of mandible; occipute smooth; temple smooth; occipital carina complete, in its normal location so that head is much narrower at this carina than at the eyes; genal carina joining the oral carina above the mandibles.

Thorax 1.60 times as long as broad; collar punctate; epomia strong reaching dorsally to the collar, diverging gradually from swollen margin of pronotum; pronotum punctate, shiny, mesoscutum convex, punctate, striate along the margin of notaulus; notaulus distinct, reaching the line connecting tegulae; scutellum smooth, convex, shiny without lateral carinae; propodeum wrinkled, reticulate, without areola; propodeal apophysis present as crest; basal transverse carina present, portion behind basal transverse carina wrinkled; propodeal spiracle 1.75 times as long as broad; propleurum smooth, shiny, mesopleurum punctate, wrinkled; speculum smooth; prepectal carina reaching above midheight of mesopleurum away from its front margin; postpectal carina in form of flange, interrupted before middle coxa; median section of post-pectal carina wider and not high; sternaulus reaching the hind edge of mesopleurum ending just below lower hind corner of mesopleurum; metapleurum rugose; sub metapleural carina in form of a flange reaching to base of hind coxa; hind tarsal claw weakly curved, not pectinate, 3.33 times as long as broad; front side of hind coxa without a basal short horizontal groove; fourth segment of front tarsus bilobed. Fore wing 9 mm long and 4 mm broad; stigma 5.6 times as long as broad; first abscissa of radius 0.66 times the length of second abscissa; first abscissa

of cubitus with one bulla; second recurrent with one bulla, not strongly arched, second recurrent meeting sub discoidal at right angle, seven times the length of second intercubitus; intercubiti sub parallel; first intercubital vein joining cubital vein basad of second recurrent vein; discocubitus unifenestrate; second discoidal cell 2.83 times as long as broad; sub discoides times the length of apical abscissa of discocubitus; areolet pentagonal, sessile, open; nervulus curved,

fenestrate at lower end; hind wing 6 mm long, 2.5 mm broad with 1 + 7 hamuli; basal abscissa of radiella 0.34 times the length of its apical abscissa; apical 0.7 of mediella weakly arched; basal abscissa of cubitella slightly curved 1.30 as long as apical abscissa; superior and inferior nervellar abscissae 3:1, nervellus intercepted below middle; brachiella reaching half the distance to wing margin.

Abdomen slightly compressed, its third and fourth segment deeper than wide, 0.75 times the length of head and thorax combined; first tergite 2.26 times as long as broad, longer than second tergite, widen apically, base of first tergite with lateral tooth; post petiolar part curved; spiracle circular behind the apical 0.45, 0.2 times as long as broad, median dorsal carina present, dorsolateral carina strong complete, ventrolateral carina complete, glymma absent; second and following tergites mat and closely punctate, shiny; second tergite 0.68 times the length of first tergite; epipleurum of second tergite with sparse hairs; ovipositor sheath 0.80 times the length of hind tibia; ovipositor tip without a dorsal lobe, with six transverse ridges ovipositor smaller than abdomen.

Black, fourth to tenth flagellar segment white above; horse shoe shaped mark on apical slope of propodeum; apices of all abdominal tergites except bands on fifth and sixth tergite interrupted in middle, fore and middle coxae and trochanters, yellow; legs yellowish brown except fifth segment of fore and middle tarsi; hind leg with coxa at apex above, extreme apex of its femur, base and apex of tibia, base of first and fifth tarsal segment entirely black.

♂ : unknown.

Holotype : ♀, INDIA : Maharashtra : Miraj 10 IX 1991
on wing. M. V. Chopade Coll No. 1,
Antenna wings, legs mounted on slides and
labelled as above.

Host : Phessus species.

Discussion

According to the key to the species of Goryphus Holmgren given by Jonathan and Gupta (1973) this species runs very close to G. brahminus (Cameron) in the characters of face, pronotum, mesonotum, propodeum, wings, ovipositor etc; but differs from the same ⁱⁿ having i) face punctate ii) clypeus punctate iii) mandible punctate iv) areolet pentagonal and v) metapleurum rugose.

FIGURE : 7

Goryphus punctatus Sp. nov.

- A. Body in lateral view
- B. Head front view, showing face, clypeus and Mandible
- C. Areolet
- D. Metapleurum

Goryphus shakeraii Sp. nov. (Fig. 8) :

♂ : 6.5 mm. Head 0.76 times as long as broad, in profile 0.66 times as long as high; vertex smooth; ocellar triangle smooth; lateral ocelli separated from eye by 0.6 its diameter; frons smooth without a median horn and without a semicircular carina above each antennal socket; antenna 2 + 27 segmented; scape 1.66 times as long as broad; pedicel 1.6 times as long as broad; terminal flagellar segment 3.5 times as long as broad; face convex, finely punctate, 1.04 times as long as broad; clypeus polished, convex, 1.18 times as long as broad, without an apical fringe of long parallel bristles, without pre apical tooth; mandibles coarsely punctate, 3.2 times as long as broad, moderately wide at apex, teeth unequal, upper tooth little longer than lower tooth; labrum concealed; maxillary palps five segmented and labial palps four segmented; cheek punctate 0.8 times as long as width of mandible; occipute smooth; temple smooth; occipital carina complete, occipital carina in its normal position so that head is much narrower at this carina than at the eyes; genal carina joining the oral carina above the mandible.

Thorax 1.74 times as long as broad; epomia prominent, reaching dorsally to the collar, divergent gradually from swollen front margin of pronotum (collar); pronotum rough, punctate; notaulus strong, reaching the line connecting tegulae; scutellum smooth, shiny, convex without lateral carinae; propodeum wrinkled without longitudinal carinae; basal and apical transverse carina present; portion behind carina irregularly wrinkled; propodeal spiracle 1.33 times as long as broad; mesopleurum

weakly punctate, striations, shiny; speculum smooth; prepectal carina strong reaching the above midheight of mesopleurum away from its front margin; postpectal carina in form of flange, interrupted in front of middle coxa, median section of postpectal carina wider not so high; mesopleural carina incomplete, interruption in front of middle coxa; sternaulus as half as long as mesopleurum; metapleurum wrinkled; sub metapleural carina reaching to the base of hind coxa; hind tarsal claw curved, not pectinate, two times as long as broad; front side of hind coxa without a basal short horizontal groove; fourth segment of front tarsus bilobed, tibial spur two. Fore wing 5.5 mm long, 2 mm broad; stigma 7.5 times as long as broad, first abscissa of radius 0.75 times the length of second abscissa; first abscissa of cubitus with one bulla; second recurrent vein with one bulla, subvertical, meeting sub discoidal at right angle; 4.5 times the length of second intercubitus, second intercubitus as trace; intercubiti sub parallel; first intercubital vein joining cubital vein basad of second recurrent vein discocubitus unifenestrate; second discoidal cell 2.66 times as long as broad; areolet pentagonal, sessile, open; nervulus curved, basad, fenestrate at lower end; hind wing 3.5 mm long, 1 mm broad, with 1 + 6 hamuli; basal abscissa of radiella / ^{0.55} times the length of its apical abscissa; ^{basal abscissa} of cubitella curved 0.34 as long as its abscissa; nervellus intercepted below middle; branchiella reaching at least half the distance to wing margin.

Abdomen depressed its third and fourth segment wider than deep; 1.75 times the length of head and thorax combined; first tergite three times as long as broad; widen apically with a

lateral tooth at base; post petiolar part curved; spiracle oval near apex, behind the apical 0.45; two times as long as broad; median dorsal carina present; dorsolateral carina present; ventrolateral carina present; glymma absent; second and following tergites mat and closely punctate, shiny second tergite 0.88 times the length of first tergite; epipleurum of second tergite with sparse hair; cerci three segmented.

Black, antenna without whitish band; face completely yellow, pronotum largely apices of first to third and seventh and eighth broadly yellow, hind leg dark orange, its trochanter, tibia broadly at apex and at extreme base, tarsal segments white, basitarsus apically white and last tarsal segment black.

♀ : unknown.

Holotype : ♂, INDIA : Maharashtra : Miraj, 2 IX 1991
emerged from caccon, M. V. Chopade,
Coll No. 7. Antenna, wings, legs mounted
on slides and labelled as above.

Paratype : 6 ♂♂'s .

Host : a. Artona catoxantha.
b. Chrysomelid beetle

Discussion

According to the key to the species of Goryphus Holmgren given by Jonathan and Gupta (1973) this species run very close to G. cinctipes (Cameron) in the characters of face, pronotum, propodeum, wings etc; but differs from the same in having a) antenna complete black, b) temple smooth c) fourth tarsal segment black and d) speculum smooth.

FIGURE : 8

Goryphus shakerai Sp. nov.

- A. Body in lateral view
- B. Head, rear view showing temple
- C. Claw
- D. Speculum

GENUS ARTHULA CAMERON, (1900)

Arthula belongs to the tribe Mesostenini, sub family Gelinae. This is moderate sized genus, occuring in IndoPapuan area and in Southern Japan. It has been reared from nests of Polistes (Vespidae).

In the subtribe sphecophagina three genera are included viz. Sphecophaga, Arthula and Latibulus. All are parasitic in the paper comb nests of Polistinae or Vespinae. One genus is Holarctic (Sphecophaga), one Palearctic and Oriental (Latibulus) and the third is in the Indo-Papuan area and Southern Japan (Arthula).

The present work is based on new species Arthula willingdoni.

Arthula willingdoni Sp. nov. (Fig. 9)

♂ : 10 mm. Head 1.48 times as long as broad, in profile 0.7 times as long as high; vertex punctate; ocellar triangle punctate, lateral ocelli seperated from eye by 0.4 its diameter; frons punctate; antenna 2 + 26 segmented; 1.75 times as long as

broad; pedicel 0.83 times as long as broad; terminal flagellar segment 1.75 as long as face convex, finely punctate, 0.78 times as long as broad; clypeus convex, finely punctate, 0.35 times as long as broad; mandible finely punctate, 2.14 times as long as broad; upper tooth little longer than lower tooth; labrum slightly exposed without apical notch; cheek punctate, 2.28 times as long as width of mandible; occipute punctate; temple punctate; occipital carina complete.

Thorax 1.54 times as long as broad; epomia present; pronotum punctate, shiny; mesoscutum convex, punctate; notaulus distinct reaching the line joining tegulae; scutellum punctate, strongly convex; post scutellum punctate; propodeum punctate above basal carina and striate after basal carina; areola absent; basal transverse carina present; propodeal spiracle elliptical; mesopleurum punctate, speculum punctate; prepectal carina reaching above mid height of hind margin of pronotum; post pectal carina in form of a flange; mesopleural suture in form of a groove; sternaulus long reaching half, as long as mesopleurum; submetapleural carina reaching to the base of hind coxa; juxtacoxal ^{Carina} / clear at the base; hind tarsal claw strongly curved, not pectinate, 5.5 long as long as broad; hind tibia with two spurs. Fore wing 7 mm long and 2.5 mm broad; stigma 5.71 times as long as broad; first abscissa of radius 0.54 times the length of its second abscissa; first ^{abscissa} / of cubitus with one bulla; second recurrent vein with one bulla, vertical, meeting sub discoidal at right angle; second intercubital vein absent; intercutitus based of **second** recurrent vein; discocubitus unfenestrate; second discoidal cell 2.04 times as long as broad; nervulus not curved;

hind wing 4.5 mm long and 1.2 mm broad; with 4 + 8 hamuli; basal abscissa of radiella 0.44 times the length of its apical abscissa; mediella not curved apically; basal abscissa of cubitella straight, nervellus intercepted at middle.

Abdomen depressed, its third and fourth segment wider than deep; 1.29 times the length of head and thorax combined; first tergite 3.33 times as long as broad; spiracle circular, near apex, median dorsal and dorsolateral carinae absent; ventrolateral carina strong, complete; first sternite fused with its tergite; tergite first not widen apically; second and following tergites mat, punctate finely, second tergite 0.81 times the length of first tergite, 1.04 times as long as broad.

Brown, with yellow markings on body; collar, face, pronotum, speculum, mesosternum, prepectus, apex of metapleurum, scutellum, post scutellum and apical slope of propodeum yellow; thorax black with yellow markings; apex of femur and tarsal segments black; fore wings showing cloud towards apex; white strips on eye.

♀ : unknown.

Holotype : ♂, INDIA : Maharashtra : Miraj, 6 IX 1991, on wing, M. V. Chopade, Coll. No. 3. Antenna, wing, legs mounted on slides and labelled as above.

Paratype : ♂, Data same as above except K. S. Heble, Coll No. 11 XI 91.

Host : unknown.

Discussion

Out of two species of the genus Arthula cameron recorded from India this species runs close to A. brunneocornis in the characters of antenna, lateral impressions from third to fifth segments, tarsi, areolet, abdomen. But differs from the same in having major part of propodeum reticulate, antenna 2 + 26 segmented etc. stigma clear.

FIGURE : 9

Arthula willigdoni Sp. nov.

- A. Body in lateral view
- B. Stigma
- C. Propodeum, dorsal view

GENUS LEPTOBATOPSIS ASHMEAD (1900)

Leptobatopsis belongs to the tribe Lissonotini, sub family Banchinae. This is moderately large genus of the family Ichneumonidae (Hymenoptera). It occurs in Indo-Papuan area and in the eastern Palearctic Region. Five species have so far been reported from the Eastern Palaearctic Region of which 3 species, viz. appendiculata Momoi indica (Cam) and Lepida (Cam) also occur in Oriental Region. Four species are known to occur in Australia, all of which except indica (Cam) appear to be endemic. In the Oriental Region, the genus was so far known by eleven described species and a sub species of nigra cushman.

Leptobatopsis have an slender body, moderately small to large, occipital carina interrupted above the base of mandible, propodeum without carinae, apex of metasternum with a pair of convergent teeth between the bases of hind coxae, areolet always present, first tergite without glymma. They occur in grasses, among shrubs.

The present work is based on the new species L. mirajensis.

Leptobatopsis mirajensis Sp. nov. (Fig. 10) :

♀ : 8.5 mm. Head 0.76 times as long as broad, in profile 0.5 times as long as high; vertex smooth; ocellar triangle smooth, lateral ocelli separated from eye by 0.7 times its diameter; frons smooth; antenna 2 + 41 segmented; pedicel 2.4 times as long as broad; terminal flagellar segment three times as long as broad; clypeus convex, 0.45 times as long as broad; mandible punctate coarsely, 1.66 times as long as broad, teeth equal; labrum entirely concealed; cheek punctate, 1.5 times as long as width of mandible; occiput smooth; temple smooth; occipital carina incomplete, genal carina joining the oral carina over the mandible.

Thorax 1.49 times as long as broad; collar punctate, shiny; epomia prominent reaching dorsally to the collar; pronotum



punctate, shiny; mesoscutum convex, punctate; notaulus absent; scutellum punctate shiny; post scutellum smooth, shiny; propodeum punctate; areola absent; carinae absent; propodeal spiracle elliptical, 1.6 times as long as broad; propleurum punctate; mesopleurum punctate, speculum punctate; prepectal carnia strong, below the midheight of mesopleurum; post pectal carnia in the form of flange; mesopleural suture in the form of groove; mesepimeron small; hind edge of metasternum with a pair of long convergent teeth; juxtacoxal carnia clear only at the base; sub metapleural carnia reaching the base of hind coxa; hind tarsal claw pectinate, curved strongly, 2.33 times as long as broad; hind tibia with two spurs. Fore wing 6.5 mm long broad; stigma 7.5 times as long as broad; first abscissa of radius 0.54 times the length of its second abscissa; first abscissa of cubitus with one bulla; second recurrent vein with one bulla, 1.7 times the length of second intercubitus; discocubitus unifenestrate; second discoidal cell two times as long as broad; areolet rhombic and stalked; nervulus straight, basad; hind wing 5 mm long 1 mm broad; basal abscissa of radiella 0.41 times the length of its apical abscissa; mediella curved apically; basal abscissa of cubitella slightly curved and as long as its apical abscissa; nervellus intercepted below middle, reclivous weakly; post nervellus intercepted distinctly; brachiella present basally.

Abdomen depressed its third and fourth segment wider than deep, 1.64 times the length of head and thorax combined; first tergite 2.72 times as long as broad; post petiolar part basally curved; spiracle circular 1.5 times as long as broad, behind middle; median dorsal carnia absent; glymma absent; first

sternite not fused with its tergite; second tergite 0.75 times the length of first tergite; second and following tergite punctate, tergite two to four without a median pair of oblique grooves that converge anteriorly and diverge posteriorly; rhombic area of third to sixth tergite finely and closely punctate; second tergite slightly punctate; anal cerci three segmented.

Black Antenna without yellow band; scutellum yellow; meta-scutellum black; tegula brown; metapleurum with an apical yellow spot; fore wing with a cloud at apex; trochanter and femur red; tarsus brown, basitarsus yellow, third tergite yellow basal and apical bands.

♂ : unkown.

Holotype : ♀, INDIA : Maharashtra : Miraj 14 IX 1991
on wing, M. V. Chopade, Coll No. 4. Antenna,
wings, legs mounted on slides and labelled
as above.

Host : unknown

Discussion

According to the key to the species of the genus Leptobato-
psis Ashmead, (1900) this species runs very close to L. indicus
(Cameron) in the characters of antenna, scutellum yellow,
metapleurum with an apical yellow spot, third tergite with yellow
basal and apical bands and fore wing with a cloud at apex etc.
but differs from the same in having i) femur complete red,
ii) tarsus brown and iii) basitarsus yellow with basal and apical
black.

FIGURE : 10

Leptobatopsis mirajensis Sp. nov.

- A. Body in lateral view
- B. Femur
- C. Tibia
- D. Tarsus