

## ON A COLLECTION OF CHALCIDS (HYMENOPTERA) FROM INDIA \*

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This paper deals with a small collection of Chalcid parasites, received by the School of Entomology for identification, from the Director, Zoological Survey of India, Calcutta and from the Entomologist, Biological Control Scheme, Himachal Pradesh University, Simla. Three new species are described and two known species are recorded here. The types of the new species are being deposited in the Zoological Survey of India, Calcutta. We thank Prof. M.S. Mani for placing this interesting material at our disposal and for valuable advice. The work was done under the PL 480 Project (2) A7-ENT-94 (FG-IN-450) under Prof. Mani.

### FAMILY ENCYRTIDAE

#### 1. *Centroдора chowdhurii* Kaul, sp.nov. (Fig. 1A-J)

*Female* : Length including ovipositor 1.36 mm. Head light orange, eyes reddish-brown, thorax and abdomen pale yellow, antenna yellowish-brown, wings hyaline with faint infuscation below the stigmal vein and near the base.

*Head* viewed from above (Fig.1 E) width about twice the length, interorbital space  $0.54 \times$  head width, eyes bare, ocellular space  $1.60 \times$  ocellar diameters, interocellar space about  $3 \times$  ocellar diameters, front ocellar space  $1.60 \times$  ocellar diameters, with stiff bristles as in figure. *Antenna* (Fig.1 B) 6 segments, 1.1.3.1; scape long and slender,  $7.0 \times$  as long as thick; pedicel  $0.36 \times$  the scape; first funicular segment  $0.33 \times$  pedicel, thickness about  $2 \times$  the length, the second  $1.25 \times$  as long as thick, distinctly thicker apically than basally; club long, equal to the pedicel and funicle combined,  $3.3 \times$  as long as thick.

*Thorax* : width equals head width, pronotum and scutellum smooth, mesonotum finely shagreened with long bristles (Fig.1 J), pronotum : mesonotum : scutellum 50:100:170, pronotum width about  $3 \times$  the length, mesonotum width  $1.7 \times$  the length, scutellum (Fig.1 J) large,  $1.3 \times$  as long as wide, projecting posteriorly upto the third abdominal segment. Fore wing (Fig. 1 A) length to width 100:34, *sm:m:st* 50:100:12, stigma sessile, *pm* absent, linea clava complete, discal ciliation basal to the linea clava sparse but coarser & longer than beyond;

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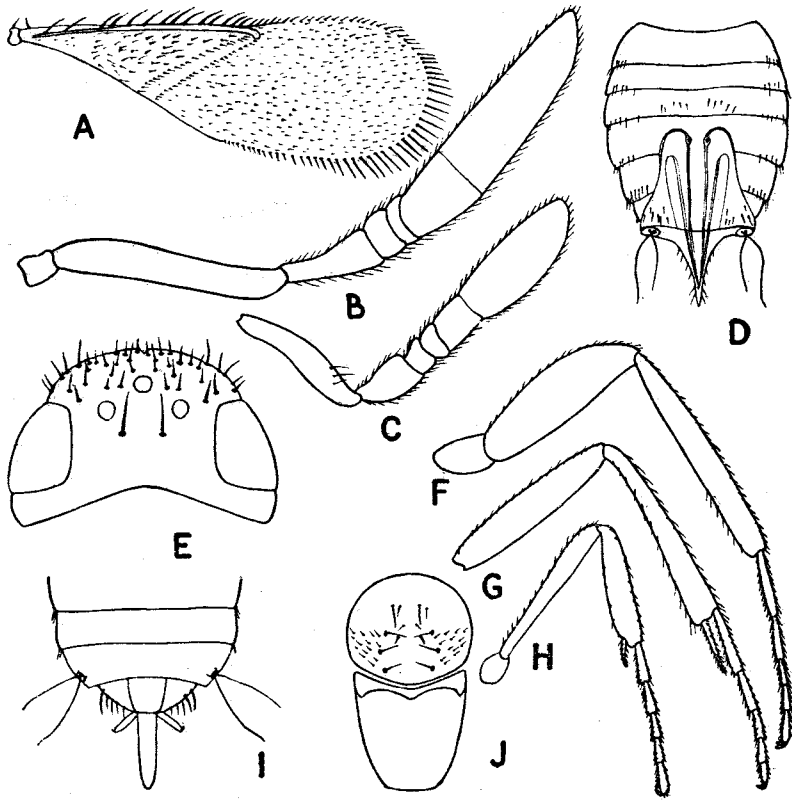


Fig. 1. *Centrodora chowdhurii*, sp. nov., ♀ : A, fore wing; B, antenna; D, abdomen; E, head viewed from above; F, hind leg; G, middle leg; H, fore leg; J, mesonotum and scutellum; ♂ : C, antenna; I, genitalia.

14 dorsal bristles on marginal vein & 2 on submarginal, marginal fringe at the posterior margin  $0.2\times$  the width of wing, marginal fringe on hind wing equals the wing width. *Fore leg* (Fig. 1 H) : Femur long and slender; tibia about  $0.8\times$  the femur; tarsus subequal to femur. *Mid leg* (Fig 1 G) : Femur about  $1.2\times$  fore femur and  $6\times$  as long as thick; tibia little longer than the femur, tibial spur equals metatarsus; tarsus subequal to femur, metatarsus  $0.33\times$  the tarsus, second tarsal segment  $0.7\times$  the metatarsus, the third  $0.7\times$  the second, fourth a little shorter than the third, fifth subequal to the fourth. *Hind leg* (Fig.1 F) : Femur a little shorter than midfemur but stouter,  $3.2\times$  as long as thick; tibia  $1.25\times$  the femur; tarsus  $0.8\times$  the tibia, metatarsus  $0.36\times$  the tarsus, the second about  $0.6\times$  the first, the third  $0.63\times$  the second, fourth and fifth subequal to the third.

*Abdomen* (Fig.1 D) including ovipositor  $0.55\times$  the body, length to width 100:60, ovipositor slightly exserted, about  $0.3\times$  abdomen, rest as in figure.

*Male* : Length 1.00mm. Body pale yellow, head pale yellow, eyes reddish-black, tibia and tarsi yellowish-brown.

*Antenna* (Fig.1 C) 6 segments, 1.1.3.1; scape long, slender, about  $6\times$  as long as thick; pedicel about  $0.4\times$  the scape and  $1.5\times$  as long as thick; first funicular segment  $0.4$  the pedicel,  $1.3\times$  thicker than long, the third subequals second, fourth  $2\times$  the second,  $1.2\times$  as long as thick; club equals the funicle and pedicel combined and about  $1.6\times$  longer than thick. Abdomen including genitalia  $0.5\times$  the body,  $1.7\times$  as long as wide, rest as in fig. 1 I. Other characters similar to female.

*Holotype* : ♀, *allotype* ♂, INDIA : HIMACHAL PRADESH : Baldawan, 21.xi.1973, Coll. A.N. Chowdhuri.

*Other material examined* : ♀♀, ♂♂ INDIA : HIMACHAL PRADESH : Baldawan, 28.ix.1973, Coll. A.N. Chowdhuri.

#### FAMILY PTEROMALIDAE

### 2. *Anysis tripathii* Kaul, sp.nov. (Fig.2 A-I)

*Female* : Length 2 mm. Body black with bluish-green reflections, antenna brownish-black, all femora black with blue reflections, tibiae and tarsi brownish-black, wings hyaline, veins brown.

*Head* viewed in front (Fig. 2 E) broadly triangular, width to length 100:70; interorbital space at the middle of face  $0.5\times$  the head width, ocellular space equals ocellar diameter, interocellar space  $5\times$  ocellar diameters, front ocellar space about  $3\times$  ocellar diameters, antennae inserted close to clypeus, scrobe does not reach the front ocellus; viewed from above (Fig.2 I) width to length 100:30, vertex margined behind; viewed from side height to thickness 100:50, eye almost circular, gena equals  $1.5\times$  the length of the eye. *Antenna* (Fig.2 D) 9 segments, 1.1.5.2; scape long and slender,  $7\times$  longer than thick; pedicel about  $0.3\times$  the scape, thicker apically; first funicular segment  $0.4\times$  the pedicel, the second  $2.4\times$  the first, second to fourth segments subequal but gradually becoming thicker apically; club 2 segments, equals almost two and a half preceding segments combined.

*Thorax* : Narrower than head; finely punctate, parapsidal furrows complete; pronotum : mesonotum : scutellum in the ratio of 25:100:125, pronotum narrow, mesonotum  $2.75\times$  wider than long, scutellum (Fig.2 B)  $1.6\times$  wider than long, produced posteriorly conspicuously over the propodeum, propodeum smooth with faint median carina and well developed lateral carina. Fore wing (Fig. 2 A & C) length to width 100:45, *sm:m:pm:st* in the ratio of 200:100:33:33, *sm* with 13 long bristles, *sm* abruptly swollen before apex. *Fore leg* (Fig.2 F) : Femur  $3.4\times$  longer than thick; tibia  $0.8$  the femur and about 5 longer than thick; tarsus a little longer than tibia, metatarsus  $0.36$  the tarsus, second tarsal segment about  $0.5\times$  the metatarsus, third  $0.8\times$  the second, fourth  $0.8\times$  the third, fifth longer, about 2 the fourth. *Mid leg* (Fig.2 G) : Femur equals fore femur but a little thinner; tibia a little longer than the femur and about  $8\times$  longer

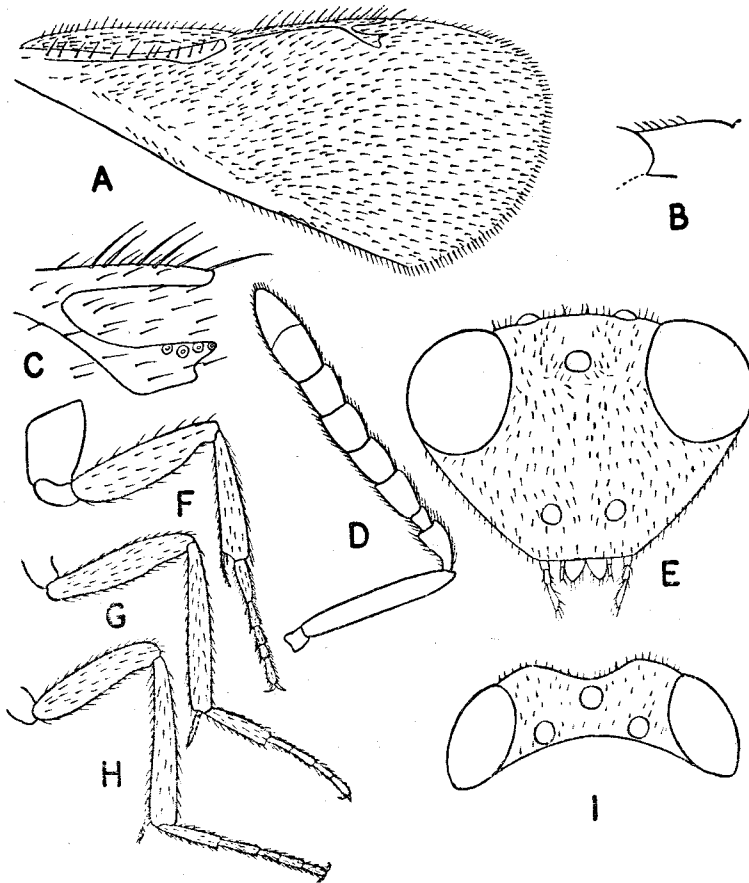


Fig. 2. *Anysis tripathii*, sp. nov. ♀ : A, fore wing; B, scutellum; C, stigmal vein; D, antenna; E, head front view; F, fore leg; G, middle leg; H, hind leg; I, head viewed from above.

than thick, tibial spur long,  $0.7 \times$  the metatarsus; tarsus a little shorter than the tibia, metatarsus a little over  $0.6 \times$  the tarsus, second to fifth tarsal segments almost equal, each  $0.4 \times$  the metatarsus. *Hind leg* (Fig.2 H) : Femur about  $0.9 \times$  the midfemur; tibia about  $1.2 \times$  the femur, tibial spur  $0.35$  the metatarsus; tarsus almost equals tibia, metatarsus about  $0.4$  the tarsus, second tarsal segment  $0.6$  the metatarsus, third  $0.5 \times$  the second, fourth and fifth almost equal, each a little longer than the third. Abdomen smooth and shiny, dorsally somewhat depressed, a little over  $0.5 \times$  the body, length to width  $100:74$ , second tergite shortest, third a little longer; fourth, fifth and sixth subequal, ovipositor slightly exerted.

*Holotype* : ♀ on pin, *paratype* 1 ♀ dissected on slide, ♀♀ in Pampel's fluid, "Z.S.I. Lot No. 19, 1972, tube D, received from R.L. Tripathi, Head Entomology Division, Agric. Res. Ins. Cal. Parasites from hard scales".

This species differs from *A. alcocki* (Ashm.) and *A. saisettiae* (Ashm.)\*, in colour, size, proportions of antennal segments and wing.

#### FAMILY APHELINIDAE

### 3. *Aphycus flavus* Howard

*Aphycus flavus*, Howard, 1881, *US Dept. Agric. Ann. Rep.*, 1880: 365; Mani, 1940. *Misc. Bull. ICAR*, 30:15.

*Material examined* : INDIA : HIMACHAL PRADESH : Baldawan, 1 ♀, parasites of scales, 28.ix.1973, Coll. A.N. Chowdhuri.

### 4. *Aspidiotiphagus citrinus* (Crawford)

*Coccophagus citrinus*, Crawford, 1891, *Destruct. Ins.*, p. 28.

*Encarsia citrinus* : Riley, in Howard, 1891, *Ins. Life.*, 4 : 168.

*Aspidiotiphagus citrinus* : How., 1896, *Ins. Life.*, 6 : 231; *Proc. U.S.Natl. Mus.*, 18 : 635(1894).

*Aspidiotiphagus citrinus* : Mani, 1938, *Cat. Indian Ins.*, 23 : 122; Mani, 1940, *Misc. Bull. ICAR*, 30 : 27.

*Material examined* : INDIA: HIMACHAL PRADESH : Jhalti-Mashobra ♀♀ "Scale parasite (3), on 6.vi.1973 by Surat Ram/Lachmi Chand".

#### FAMILY TETRASTICHIDAE

### 5. *Tetrastichus krishnaiahi* Saraswat, sp.nov. (Fig. 3 A-K)

*Female* : Length of holotype 2.00mm, paratypes 1.70-1.90mm, mean length 1.87mm; [fore wing 1.24-1.38mm, mean 1.31 mm; hind wing 1.00-1.10 mm, mean 1.05 mm; abdomen excluding ovipositor 0.98-1.14 mm, mean 1.06 mm. General colour of body black, except dark brown abdomen of paratypes, with metallic bluish-green reflections. Head concolourous with body, eyes red, antennae brown, scape pale brown. Basal 0.75 of hind coxae concolorous with thorax, otherwise legs pale yellowish. Wings hyaline, veins brownish.

*Head* viewed in front (Fig.3 F) length to width 83-87:100, finely reticulately sculptured, with sparse scattered shallow punctae on vertex and face; clypeal margin in the middle with a pair of toothlike projections; ocellular space about 1.50-2.00×ocellar diameters, front ocellar space slightly more than ocellar diameter, interocellar space 3.00×ocellar diameters; eyes very sparsely

\**Eurycephalus alcocki*, Ashmead, 1903, *Indian Mus. Notes* 5 (3) : 62.

*Eurycranium saisettiae*, Ashmead, 1905, *Proc. U.S. Natl. Mus.* 29 : 405.

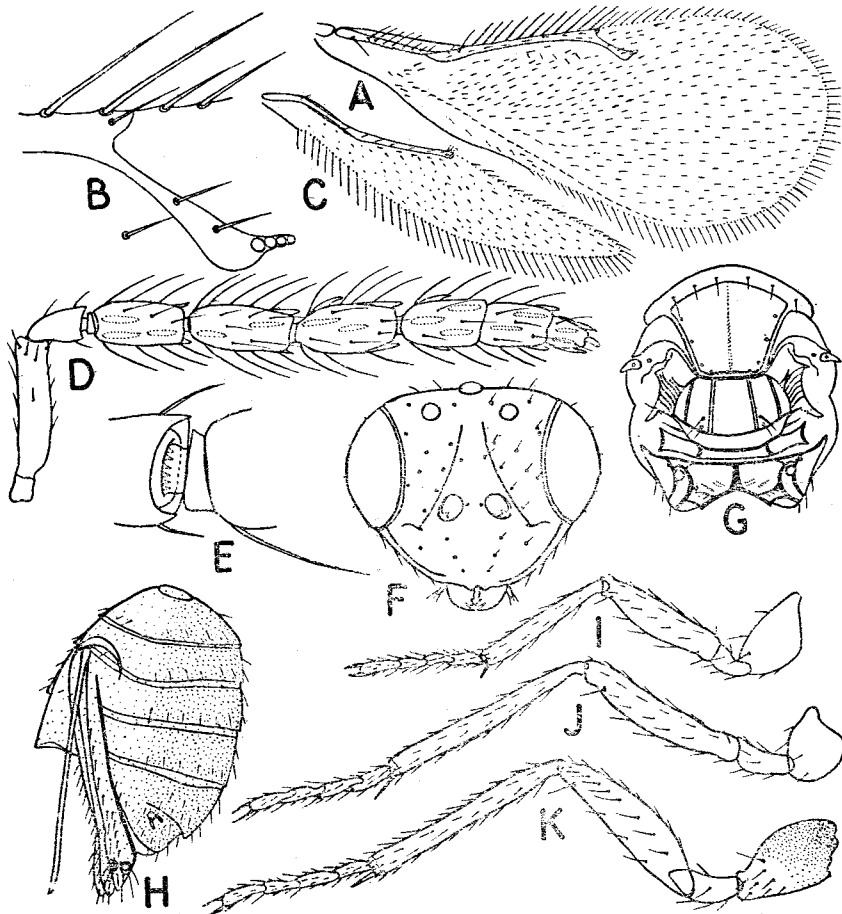


Fig. 3. *Tetrastichus krishnaiahi*, sp. nov., ♀ : A, fore wing; B, stigmal vein; C, hind wing; D, antenna; E, anellus; F, head front view; G, thorax dorsal view; H, abdomen in profile; I, fore leg; J, middle leg; K, hind leg.

pubescent, eye length to head length 55:100; mandibles tridentate. *Antenna* (Fig.3 D & E) including the terminal style 0.88-0.96 mm, antenna to body about 37:100, segments 9, 1.1.1.3.3, antennal sockets slightly above the lower orbital border; scape long, cylindrical, about 4.50-4.60× longer than thick, radicle very short, about 1.20× longer than thick and about 0.20× scape; pedicel 1.60× longer than thick and 0.40 scape; anellus single, much narrower than funicle and thin; first funicular segment shortest, 2.00-2.40× longer than thick, 1.50-1.60× pedicel; second segment longest, 2.25-2.33× longer than thick, about 1.15 the first; third segment almost equal to the second and very slightly longer than the first, about 0.93-0.95× the second, 2.00-2.16× longer than thick; club

not stouter than funicle, excluding terminal style  $4.00 \times$  longer than thick, about equal to preceding  $1.75 \times$  funicular segments combined, first segment of club  $1.83 \times$  longer than thick, about  $0.84 \times$  the preceding funicular segment, second segment  $1.50 \times$  longer than thick and about  $0.77 \times$  the first, third segment with a short obtusely pointed style, about  $0.60 \times$  the third, excluding style  $1.25-1.40 \times$  longer than thick and about  $0.60 \times$  the preceding club segment.

*Thorax* (Fig.3 G) : Pronotum and propodeum reticulately sculptured, mesonotum and the space between the outer and the inner longitudinal grooves on scutellum finely longitudinally reticulate, the middle portion of scutellum in between the two inner longitudinal grooves more finely longitudinally reticulately striate; pronotum with few sparsely scattered punctae; mesonotum with the median longitudinal groove, distinct and complete, three bristles along the lateral margin on each side and a pair along the posterior margin; scutellum with two pairs of prominent longitudinal grooves, 2-3 pairs of bristles on either side of the inner grooves behind; propodeum with the median carina, two short indistinct transverse carinae near median carina and one short indistinct carina near posterior margin on each side of the propodeum, paraspircular carinae strongly developed, two strongly developed carinae posterolaterally on each side of the propodeum reaching upto the paraspircular carinae, of which the first one with five small branches as shown in the figure, spiracle touching the lateral margin rather coming out of it and separated from the anterior margin by its own diameter. Fore wing (Fig.3 A & B) short, broad, marginal fringe long, length to width 100:43-45, *sm*, *m* and *pm* with 8-10 (6 long and 4 short), 8-11 (long) and 1-2 (short) setae respectively; venation *sm:m:st* 100:100:32; hind wing (Fig. 3 C) to fore wing length about 80:100. *Fore leg* (Fig.3 I) : Coxa  $1.77 \times$  longer than thick; with obscure reticulations; femur about  $4.00$  longer than thick,  $1.50-1.60 \times$  coxa, with a single long seta apically below; tibia only very slightly longer than femur, slightly more than  $7.00 \times$  longer than thick; tarsus  $0.85 \times$  tibia, metatarsus  $0.14-0.16 \times$  tibia and  $0.16-0.20 \times$  tarsus, second segment only very slightly longer than metatarsus, third subequal to the second, fourth  $1.50 \times$  the third. *Mid leg* (Fig.3 J) : Coxa  $1.25$  longer than thick, with obscure reticulations; femur  $5.00 \times$  longer than thick, about  $2.50 \times$  coxa, with a single long seta apically below; tibia long, slender, slightly thickened apically, about  $10$  longer than thick,  $1.25-1.30 \times$  femur, tibial spur  $0.16 \times$  tibia and subequal to metatarsus; tarsus to tibia 2:3, metatarsus  $0.20 \times$  tarsus and  $0.13 \times$  tibia, second segment  $1.25 \times$  metatarsus; third equal to metatarsus, fourth  $1.50 \times$  metatarsus or the third. *Hind leg* (Fig.3 K) : Coxa slightly less than  $2 \times$  as long as wide, with prominent reticulations above; femur  $4.00-4.50 \times$  longer than wide,  $1.63 \times$  coxa, with a single long seta apically below; tibia long, slender, slightly thickened apically, almost equal to mid tibia, about  $10 \times$  longer than thick, tibia to femur 6:5,

tibial spur subequal to metatarsus, about  $0.12 \times$  tibia; tarsus to tibia 2:3, equal to mid tarsus and its segments are also more or less in the same proportions.

*Abdomen* (Fig. 3 H) finely shagreened, otherwise smooth, about  $0.55-0.57 \times$  the body; ovipositor and its sheath not exerted beyond the tip of abdomen or only very slightly exerted.

*Male* (Fig. 4 A-L): Length of allotype 1.60 mm, paratype 1.44 mm, mean length 1.01 mm; fore wing 1.08-1.18 mm, mean 1.13 mm; hind wing 0.76-1.00 mm, mean 0.88 mm; abdomen excluding aedeagus 0.66-0.82 mm, mean 0.74 mm. General colour of body, head, legs and wings as described in female.

*Head* viewed in front (Fig. 4 F) length to width 80-87: 100, finely reticulately sculptured, with sparse scattered shallow punctae on vertex and face; clypeal margin in the middle with a pair of toothlike projections; ocellular space  $1.75-2.00 \times$  ocellar diameters, front ocellar space about equal or slightly more than ocellar diameter, interocellar space  $3.00 \times$  or very slightly more than  $3.00 \times$  ocellar diameters; eyes very sparsely pubescent, eye length to head length 55: 100; mandibles tridentate. *Antenna* (Fig 4 D & E) including the terminal style 0.84-0.92 mm, antenna to body about 52-64: 100, segments 10, 1.1.1.4.3, antennal sockets a little above the lower orbital border; scape long, cylindrical, much wider than in female, about 2.57 longer than wide, radicle very short, about  $1.20-1.30 \times$  longer than thick and about 0.20 scape; pedicel 1.50 longer than thick and about  $0.33-0.35 \times$  scape; anellus single, minute, much narrower than funicle; first funicular segment shortest, subquadrate, only very slightly longer than thick, subequal to pedicel; second segment very slightly more than  $2 \times$  longer than thick and about  $1.80 \times$  the first; third segment longest,  $2.45 \times$  longer than thick, about  $1.11-1.14 \times$  the second and  $2 \times$  the first; fourth subequal to the second, very slightly more than  $2 \times$  longer than thick; club as thick as funicle, excluding terminal style  $4.50 \times$  longer than thick, about equal to almost preceding 2 funicular segments combined, first segment of club  $1.80 \times$  longer than thick, about  $0.86 \times$  the preceding funicular segment, second segment also  $1.80 \times$  longer than thick and equal to the first, third segment with a short obtusely pointed style, style about  $0.40 \times$  the terminal club segment, excluding style the terminal segment  $1.25 \times$  longer than thick and  $0.55 \times$  the preceding club segment.

*Thorax* (Fig. 4 G): Pronotum, mesonotum, scutellum and propodeum as in female, except that the mesonotal median longitudinal groove faint. Fore wing (Fig. 4 A & B) short, broad, marginal fringe long, length to width 100 45-47, *sm*, *m* and *pm* with 8 (2 long and 6 short), 8-10 (long) and 1 (short) setae respectively; venation *sm*: *m*: *st* 100: 100: 32-33; hind wing (Fig. 4 C) to fore wing length 80-84: 100. *Fore leg* (Fig. 4 J): Coxa  $2 \times$  longer than thick, with obscure reticulations; femur 5.00 longer than thick,  $1.50 \times$  coxa, with a single long seta apically below; tibia equal to femur, slightly more than  $6.00 \times$  longer than thick; tarsus  $0.80-0.86 \times$  tibia, metatarsus  $0.14 \times$  tibia and  $0.16 \times$  tarsus, second segment to metatarsus 7: 10, third subequal to the second, fourth  $1.60 \times$  the third.



*Mid leg* (Fig. 4 K) : Coxa 1.25-1.30× longer than thick, with obscure reticulations; femur 5.00 longer than thick, subequal to fore femur, 2.70-3.00× coxa, with a single long seta apically below; tibia long, slender, slightly thickened apically, about 9.50× longer than thick, 1.25-1.30× femur, tibial spur 0.16-0.17× tibia and subequal to metatarsus; tarsus to tibia about 2 : 3, metatarsus 0.25× tarsus and about 0.16× tibia, second segment only very slightly shorter than metatarsus or subequal, third equal to the second, fourth 1.50× the third. *Hind leg* (Fig. 4 L) :

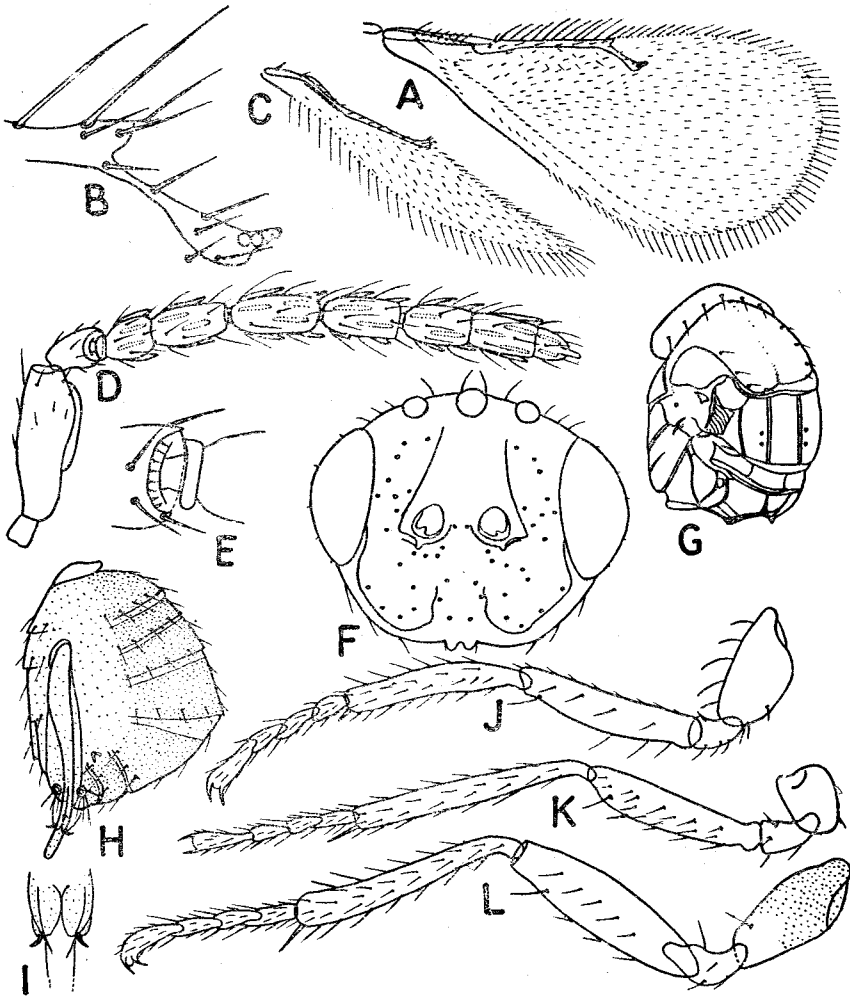


Fig. 4. *Tetrostichus krishnaiahi*, sp. nov., ♂ : A, fore wing; B, stigmal vein; C, hind wing; D, antenna; E, anellus; F, head front view; G, thorax lateral view; H, abdomen in profile; I, enlarged view of genitalia; J, fore leg; K, middle leg; L, hind leg.

Coxa  $2\times$  as long as wide, with prominent reticulate sculpture; femur  $4.00\times$  longer than wide,  $1.60-1.70\times$  coxa, with a single long seta apically below; tibia long, slender, thickened apically, almost equal to mid tibia, about  $8\times$  longer than thick, tibia to femur  $9 : 8$ , tibial spur subequal to metatarsus, about  $0.16\times$  tibia; tarsus to tibia about  $5 : 6$ , metatarsus  $0.16\times$  tibia and  $0.20\times$  tarsus, second segment subequal to metatarsus, third subequal to the second or metatarsus, fourth about  $1.70\times$  the third or metatarsus.

*Abdomen* (Fig. 4 H) finely shagreened, otherwise smooth, slightly more than  $0.50$  the body; aedeagus well exerted, about  $0.24-0.30\times$  the abdomen, clasper with a single hook (Fig. 4 I).

*Holotype* : ♀, *allotype* ♂, *paratypes* 3 ♀♀ and 2 ♂♂, on slides. INDIA : ANDHRA PRADESH : Tenali, Guntur. Z.S.I. Lot No. 1, 1973, tube No. 1, (Received from V.K. Krishnaiah, pulses specialist, Agri. Res. Station, Tenali).

This species is distinguished from *T. polynemae* Ashmead\* in the unequal funicular segments, and finely reticulate mesonotum; it differs from *T. oecanthivorus compar* Gahan in the second funicular segment being the longest in female; and from *T. gibbon* (Girault) in the marginal fringe on hind wing being one-third the wing width at hamulus.

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\*Burks, B.D. 1943. *Proc. U.S. Natl. Mus.* 93 : 574-575 and 576.