

Additions to the systematic of the bethylid fauna (Hymenoptera, Chrysoidea) from Chile

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ABSTRACT. *Bethylopsis carinatus* sp.n., and *Epyris chilensis* sp.n., from Chile are described and illustrated. Taxonomic data on *Chilepyris herbsti* Evans, *Lytopsenella herbsti* (Kieffer), *Lytopsenella testaceicornis* (Kieffer) and *Pseudisobrachium erythrocephalum* Evans are included. Male of *Lytopsenella herbsti* is recorded for the first time to genus and species.

KEY WORDS. Hymenoptera, Bethyloidea, Chile

The bethylid fauna of Chile has been poorly studied. Up to now, there were only nine species of five genera known from Chile, all of them endemic, including one species from Juan Fernandez Island (Tab. I). All bethylid fauna of Chile is known from south to the Atacama desert.

The bethylid fauna of Chile is closely associated to Australian fauna. *Lepidosternopsis* Oglobin, 1953 is a genus exclusively from both regions with three species. *Lytopsenella* Kieffer, 1911 is endemic genus to Chile deeply associated to Australian *Eupsenella* Westwood, 1874. Both genera have the largest number of fully closed cells on the forewing of any bethylid (EVANS 1964) and are the most primitive of Bethyloidea POLASZEK & KROMBEIN (1994).

The bethylid fauna of Chile is also associated to North American fauna, but not so much as to Australian one. Examples which illustrate this case are *Epyris chilensis* sp.n., (see further discussion) and *Apenesia chilena* which is most similar to *A. exilis* Evans, 1963 from the southwestern United States (EVANS 1967).

The present study provides descriptions of two new species, *Bethylopsis carinatus* sp.n. and *Epyris chilensis* sp.n., and new data on species variation and distribution of *Chilepyris herbsti* Evans, 1964, *Lytopsenella herbsti* (Kieffer, 1904), *Lytopsenella testaceicornis* (Kieffer, 1910) and *Pseudisobrachium erythrocephalum* Evans, 1973. *Bethylopsis* Fouts, 1939 and *Epyris* Westwood, 1832 are recorded for the first time to Chile. The male of *Lytopsenella* is described for the first time.

The material examined in this study was provided by American Museum of Natural History (AMNH, E. Quinter & J. Carpenter), Canadian National Collection of Insects (CNCI, J.T. Huber), Museo Nacional de Historia Natural de Chile (MNNC, A. Camousseight), Museum of Comparative Zoology (MCZ, S. Cover & P.D. Perkins) and Universidade Federal do Paraná (DZUP, K. Zanol).

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Abbreviations used mostly follow EVANS (1964): (LFW) length of forewing; (WH) maximum width of head, including eyes; (LH) length of head, measured from apical margin of clypeus to median point of vertex; (WF) minimum width of frons; (HE) maximum height of eye; (WOT) maximum width of ocellar triangle, including posterior ocelli; (OOL) shortest ocello-ocular line; (VOL) vertex-ocular line, measured in lateral view; (DAO) diameter of anterior ocellus. The nomenclature of the integument follows HARRIS (1979).

Table I. Distribution of Chilean species of Bethyilidae.

Species	Sex	Locality	Reference
<i>Lytopsenella herbsti</i>	1 female	Concepción	KIEFFER (1904)
<i>Lytopsenella testaceicornis</i>	1 female	Vallee de Rengo	KIEFFER (1910)
<i>Lepidosternopsis kuschilliana</i>	1 female	Juan Fernandez Island	OGLOBLIN (1953)
<i>Chilepyris herbsti</i>	1 male	Baños de Cauquenes	EVANS (1964)
<i>Apenesia chilena</i>	1 male	Pichinahuel	EVANS (1967)
<i>Pseudisobrachium chilensi</i>	3 males	Rinconada Maipú	EVANS (1969a)
<i>A. pygmaea</i>	1 male	Rinconada Maipú	EVANS (1969b)
<i>Pseudisobrachium erythrocephalum</i>	2 males	Malleco	EVANS (1973)
<i>Pseudisobrachium cunco</i>	3 males	Dalcabue	PEREZ (1981)

Lytopsenella Kieffer, 1911

KIEFFER (1914) proposed a key to species of *Lytopsenella* based on the presence and absence of hairs in the eyes, but all analyzed specimens of *Lytopsenella* have hairy eyes. A new key to the species of this genus is presented:

1. head subquadrate in dorsal view (Fig. 1), and large behind the eyes, VOL 0.74-1.0 X HE (Fig. 2); scutellar groove thin as a line (Fig. 1) *testaceicornis*
- . head rounded in dorsal view (Figs 4, 7), and not large behind the eyes, VOL 0.44-0.6 X HE X HE (Figs 5, 8); scutellar groove thicker than above, nearly as thick as the pits (Figs 4, 7) *herbsti*

Lytopsenella testaceicornis (Kieffer, 1910)

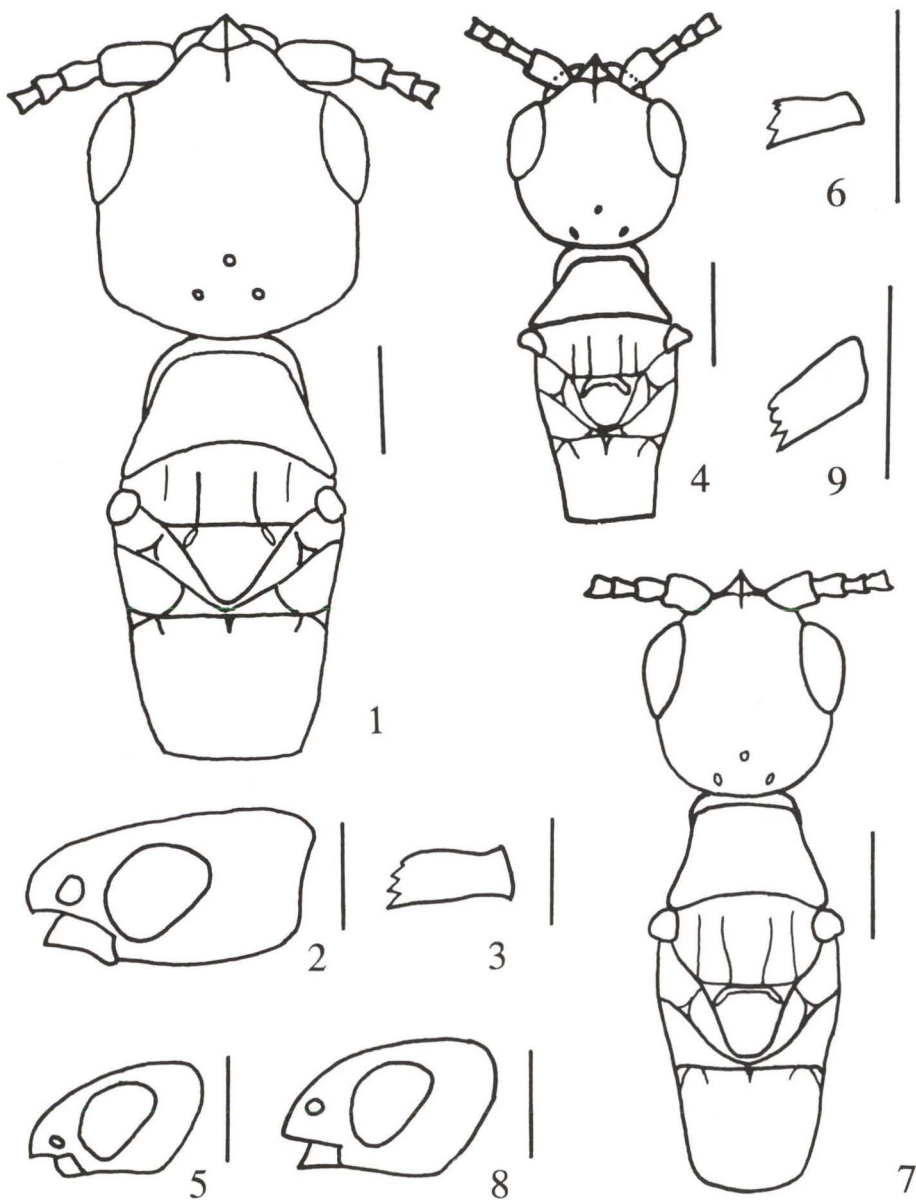
Figs 1-3

Eupsenella testaceicornis Kieffer, 1910: 54

Lytopsenella testaceicornis; Kieffer, 1911: 203, 1914: 554. -Evans, 1964: 183. -Gordh & Moczar, 1990:

33

This species was known only from the type. In this study three more females are analyzed. Some taxonomic data are as follow: length of body 4.17-4.33 mm; LFW 2.56-2.66 mm; head (Figs 1, 2): frons coriaceous, punctures very shallow, separated by 1-2 X their diameters; mandible tetradentate (Fig. 3); clypeus with angulate median lobe, with a very high median carina; eye sparse-haired; LH 1.09-1.16 X WH; WF 0.63-0.66 X WH; eye small, WF 1.43-1.56 X HE; frontal angle of ocellar triangle right to obtuse; OOL 1.58-1.88 X WOT; head developed behind the eye top, VOL 0.74-0.92 X HE (Fig. 2); vertex slightly convex with rounded corners; temples parallel; head subquadrate; mesosoma (Fig. 1): notauli absent in the anteriorly; parapsidal furrows very weak, weaker behind; propodeal



Figs 1-9. (1-3) *Lytopsenella testaceicornis*, female: (1) head and mesosoma, dorsal; (2) head. Lateral; (3) mandible, frontal. (4-6) *L. herbsti*, (4-6) female: (4) head and mesosoma, dorsal; (5) head. Lateral; (6) mandible, frontal; (7-9) male: (7) head and mesosoma, dorsal; (8) head lateral; (9) mandible, frontal. Scale bars = 0.3 mm.

disc 1.1 X as wide as long, wholly alveolate, with an anterior stub of median carina and with a pair of anterior stub of discal carinae far from the median one; mesopleuron with a rounded and deep central pit, gaster polished, transversal section elliptical, slightly larger than mesosoma.

Material examined. CHILE, *Arauco*: Pichinahuel (Cord. Nahuebuta), 3 females, XII.1958-I.1959, L. Peña leg. (CNCI, DZUP).

Lytopsenella herbsti (Kieffer, 1904)

Figs 4-11

Eupsenella herbsti Kieffer, 1904: 142-144; 1908: 12.

Lytopsenella herbsti; Kieffer, 1911: 203, 1914: 554-555. – Evans, 1964: 181-183. – Gordh & Moczar, 1990: 33.

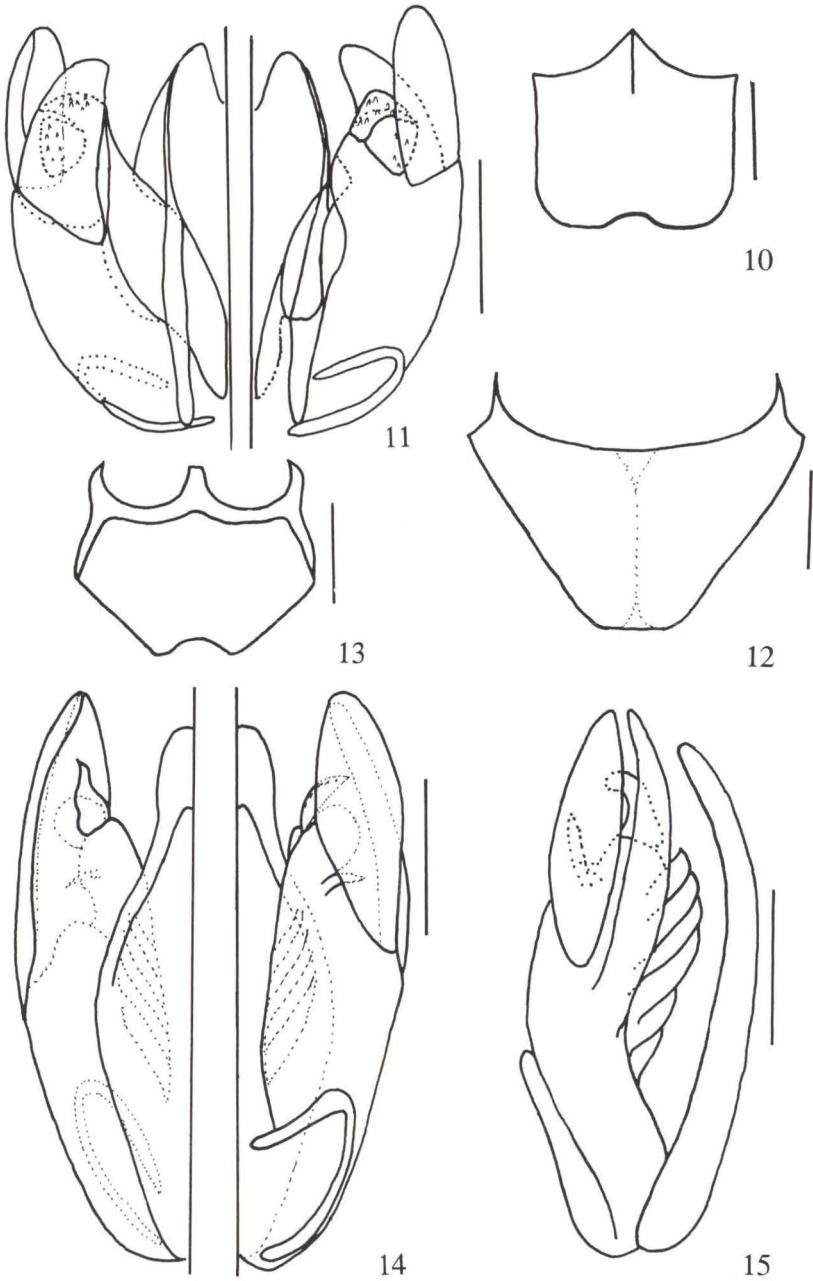
This species was known only from the type. In this study 24 specimens are analyzed, some of them males, which are described below by the first time to the species and genus. This species has been the most collected Bethyliidae species in Chile.

Some taxonomic data of female are as follow: length of body 2.76-3.74mm; LFW 1.87-2.21mm; body black, mandible black, sometimes either with apical half castaneous or wholly castaneous; ventral side of antenna light castaneous and dorsal side dark castaneous, scape light castaneous with a basal dorsal spot darker, sometimes antenna wholly light castaneous, legs wholly castaneous, sometimes tibiae and tarsi light castaneous; head (Figs 4, 5): mandible tetradentate (Fig. 6); clypeus with angulate median lobe, with a very high median carina, arched in profile; eye short and sparse-haired; frons coriaceous, punctures shallow, separated by 0.7-2 X their diameters; LH 1.04-1.11 X WH; WF 0.57-0.6 X WH; eye large, WF 1.09-1.28 X HE; OOL 1.3-1.72 X WOT; head not large behind the eye top, VOL 0.41-0.48 X HE (Fig. 5); vertex slightly convex with rounded corners; temples slightly divergent anteriorly; mesosoma (Fig. 4): pronotal disc with anterior corners angulate, short, with lateral margin very convergent behind; notauli usually present only in the posterior half, but not reaching the posterior margin of mesoscutum, occasionally either short, reduced to the posterior fourth or longer, missing only in the anterior fourth; parapsidal furrows very weak, absent in the anterior third; propodeal disc about 1.5 X as wide as long, with an anterior stub of median carina and with a pair of anterior stub of discal carinae, 2 X longer than the median one, without other carinae, propodeum alveolate, except lateral sides coriaceous; mesopleuron with a rounded and deep central pit; gaster polished, transversal section elliptical, slightly to much longer than mesosoma.

Description. Male: length of body 2.36 mm; LFW 1.58 mm.

Colors. Body black; clypeus black; antenna and palpi castaneous; mandible light castaneous; legs dark castaneous, trochanters and tarsi lighter; wings hyaline, veins light castaneous, stigma darker.

Head (Figs 7, 8). Mandible tetradentate, two lower teeth larger (Fig. 9). Clypeus with an angulate median lobe, with a very high median carina arched in profile. First four antennal segments in a ratio of 12:6:5:5, segment XI 1.2 X as long



Figs 10-15. (10-11) *Lytopsenella herbsti*, male: (10) hypopygium, dorsal; (11) genitalia, left dorsal and right ventral. (12-15) *Pseudisobrachium erythrocephalum*: (12) epypygium, dorsal; (13) hypopygium, dorsal; (14) genitalia, left dorsal and right ventral; (15) genitalia, lateral. Scale bars = 0.1 μ m.

as thick, scape wide, 0.5 X as thick as long. Frons somewhat weakly coriaceous, punctures very small and shallow, separated by 2-4 X their diameters. Eye short and sparse-haired. LH 1.0 X WH; WF 0.54 X WH; eye large, WF 1.14 X HE; frontal angle of ocellar triangle obtuse; posterior ocelli distant from the vertex crest 0.5 X DAO; OOL 1.37 X WOT; head not large behind the eye top, VOL only 0.36 X HE (Fig. 8). Vertex slightly convex with broadly rounded corners. Temples slightly divergent anteriorly.

Mesosoma (Fig. 7). Thorax weakly coriaceous as frons, punctures small and shallow, separated by 2-5 X their diameters. Pronotal disc with anterior corners angulate. Notauli well-defined, nearly straight, missing in the anterior third of the mesoscutum. Parapsidal furrows very weak and shallow, missing in the anterior third of the mesoscutum. Scutellar pits small, inclined, elliptical and very distant each other. Propodeal disc 1.18 X as wide as long, with an anterior stub of median carina and with a pair of anterior stub of discal carinae, stronger than the median one, without other carinae, propodeum wholly alveolate; declivity without median carina. Mesopleuron with a rounded and deep central pit.

Gaster. Polished, transversal section elliptical, slightly longer than mesosoma. Hypopygium (Fig. 10) long, anterior margin without lateral teeth, only with the median stalk, posterior margin straight with a wide and short median invagination.

Genitalia (Fig. 11). Paramere completely double, both laminas with rounded apex, the ventral slightly inward and the latero-dorsal wider; volsella long-haired in the base, with cuspis very wide, mainly basally, so that it becomes triangular in ventral view, with some denticles in the outer surface, digitus wide with a lot of denticles in the dorsal surface; aedeagus stout, bottle-shaped, wider medially, with apex rounded with a median invagination; basal ring with a pair of dorsal expansion; apodema extending beyond the elliptical basal ring.

Material examined. Holotype female – CHILE, Concepción, (MCZH). New material: 20 females, 4 males CHILE; 6 females Arauco, Pichinahuel, Cord. Nahuelbuta; XI.1958-I.1959; L.E. Peña *leg.* (CNCI, MNNC); 2 females Talca, Canelillos (E. Carrizal); 3.XI.1991; M. Elgueta *leg.* (MNNC); 1 female Cauquenes, Pelluhue (S. Chanco); 5.XI.1991; M. Elgueta *leg.* (MNNC); 1 female Petorca, La Canela (E. Longotoa); 29.X.1991; M. Elgueta *leg.* (MNNC); 1 female Cardenal Car, Tanumé (N. Pichilemu); 2.XI.1991; M. Elgueta *leg.* (MNNC); 1 female Ñuble, Bulnes; 13.XII.1991; M. Elgueta *col.* (MNNC); 1 female Concepción, La Florida, 13.XII.1991; M. Elgueta *leg.* (MNNC); 1 female Concepción, Collico Norte; 13.XII.1991; C. Muñoz *leg.* (MNNC); 1 female Valdivia, Chauquén (S. Panguipulli); 18.I.1992; M. Elgueta *leg.* (MNNC); 1 female Valparaíso, km 7 NE. Papudo; 8.VIII.1968; L. & C.W. O'Brien *leg.* (AMNH); 1 female Malleco, Cabreria, 1100 m, Cord. Nahuelbuta; 9-15.I.1977; L. E. Peña *leg.* (CNCI); 1 female Las Cruces, C. Parral, Linares; X.1958; L.E. Peña *leg.* (CNCI); 1 female Mariluan, 200 m, W. Victoria; 30-31.XII.1976; L.E. Peña *leg.* (CNCI); 2 males *Choapa*, km 272 Panam. Norte; 19.XI-17.XII.1985; M. Elgueta *leg.* (MNNC); 1 male *Cautin*, 15 km NE, Villarrica, Flordel Lago; 14.XII.1984-10.II.1985; S. & J. Peck *leg.* (MNNC); *Linares*, La Vega (6 km S Parral); M. Elgueta *leg.* (MNNC).

Variation. Antenna, palpi and legs wholly light castaneous, mandible nearly white, median carina of the clypeus higher; LH 1.05-1.1 X WH; WF 0.55 X WH; WF 1.09-1.1 X HE; OOL 1.23-1.3 X WOT; frontal angle of the ocellar triangle more obtuse; frons with a linear depression in frons of the anterior ocellus and behind the frontal carina; notauli longer anteriorly or complete; parapsidal furrows can be nearly complete, but almost imperceptible, stronger in one specimen.

Remarks. The sex dimorphism in this species is weak, the lateral margin of the pronotal disc is more divergent behind in females (Fig. 4) than in males (Fig. 7). The most peculiar character in male genitalia is the double paramere. There is a ventral pair completely divided of the lateral pair. There are some species of different genera in Bethyloidea with invaginated paramere, but here, there really are two pairs of parameres.

Pseudisobrachium erythrocephalum Evans, 1973

Figs 12-15

Pseudisobrachium erythrocephalum Evans, 1973: 197-198. – Sarazin, 1986: 295. – Gordh & Moczar, 1990: 252.

This species, endemic to Chile, was known only from the type series, it is characterized by having the reddish or orange head. The median lobe of clypeus can be more invaginated medially than the type. WH 0.94-0.95 X LH; WF 0.7-0.73 X WH; WF 1.87-2.06 X HE; OOL 1.6-2.0 X WOT. Epypygium (Fig. 12) very wide, ventral sides touching each other, anterior margin with a pair of lateral stalks. Hypopygium (Fig. 13) with three basal stalks, the median with the apex blunt, 0.23 X the hypopygium, the lateral ones with apex sharpened, 1.6 X the median and 0.71 X their own root, lateral stalk placed at the lateral margin; posterior margin very convergent, and concave in the median third. Genitalia (Figs 14, 15): paramere deeply divided in ventral and dorsal arms, the ventral one broad with rounded apex, inner margin excavated basally, dorsal one thin with rounded apex; volsella with a very wide cuspis, with several inclined marks and with a long sharpened basal tooth, digitus very wide with several teeth in the dorsal surface, vannus with six inclined marks; aedeagus bottle-shaped, apex rounded without invagination, wider in the median third; basal ring V-shaped and completely downward.

Material examined. 1 male CHILE, Malleco, La Fusta (holotype, CNCI). New material: 4 males CHILE, 1 male Ñuble, Las Trancas; 15-18.II.1959; L.E. Peña *leg.* (CNCI); 1 male Quilotta, Olmue, La Campana, NP, 900m; 2.XII.1984-21.II.1985; S. & J. Peck *leg.* (CNCI); 1 male, Valdivia, Lingueto; 15.I.1992; M. Elgueta *leg.* (MNNC); 1 male Valdivia, Fundo El Molino; 9.IV.1982; D. Jackson *leg.* (MNNC).

Bethylopsis Fouts, 1939

The precise taxonomic place of this genus has long been unknown (GORDH & MOCZAR 1990; TERAYAMA 1995). TERAYAMA (1995) in a phylogenetic approach considered this genus as a member of the tribe Sclerodermini and also similar to *Allobethylus* Kieffer, 1905, due to general appearance, but this genus has short forewing and notauli absent. Both genera have long and rectangular head, which is

peculiar in this tribe; besides their distributions can be considered associated to each other, *A. multicolor* Kieffer, 1905 is from Papua New Guinea and *B. fullawayi* Fouts, 1939 is from Marquesas Islands. *Bethylopsis* is recorded for the first time to Neotropical region. This distribution emphasizes the association between Chilean and Australian bethylid fauna.

Bethylopsis carinatus sp.n.

Figs 16-17

Description of holotype female. Length of body 2,91 mm; LFW 1,12 mm.

Color. Head and mesosoma black; gaster dark castaneous; apical half of mandible, antenna, legs castaneous; wings hyaline, stigma and veins dark castaneous.

Head (Fig. 16). Mandible with four apical teeth, sharpened, progressively larger downward (Fig. 17). Clypeus evenly rounded, with a median elevation, not forming a carina. First four antennal segments in a ratio of about 4:2:1:1; segment three slightly longer than wide. Frons weakly coriaceous, with punctures minute, very distant each other; frons with a very shallow median groove in the anterior half. WH 0.85 X LH; WF 0.6 X WH; WF 1.33 X HE; eye small and removed from posterior margin of head by 1.53 X HE; ocellar triangle very compact, OOL 2.75 X WOT; frontal angle of ocellar triangle acute; posterior ocelli distant from vertex crest 3 X their own diameter. Sides of the head parallel. Vertex barely convex with rounded corners.

Mesosoma (Fig. 16). Thorax coriaceous and punctated as frons. Pronotal disc without anterior carina. Mesoscutum without notauli, parapsidal furrows weak, present only in the posterior half of mesoscutum. Scutellar groove conspicuous, thinner medially. Mesopleuron with a rounded, small and deep upper pit. Propodeal disc 1.47 X as wide as long, with a median carina incomplete behind, median area of disc areolate, lateral of propodeum and declivity coriaceous. Forewing short, barely reaching the tergite III of the gaster, stigma subtriangular, transverse-median vein angulate, without metacarpus. Forefemur 2.33 X as long as thick.

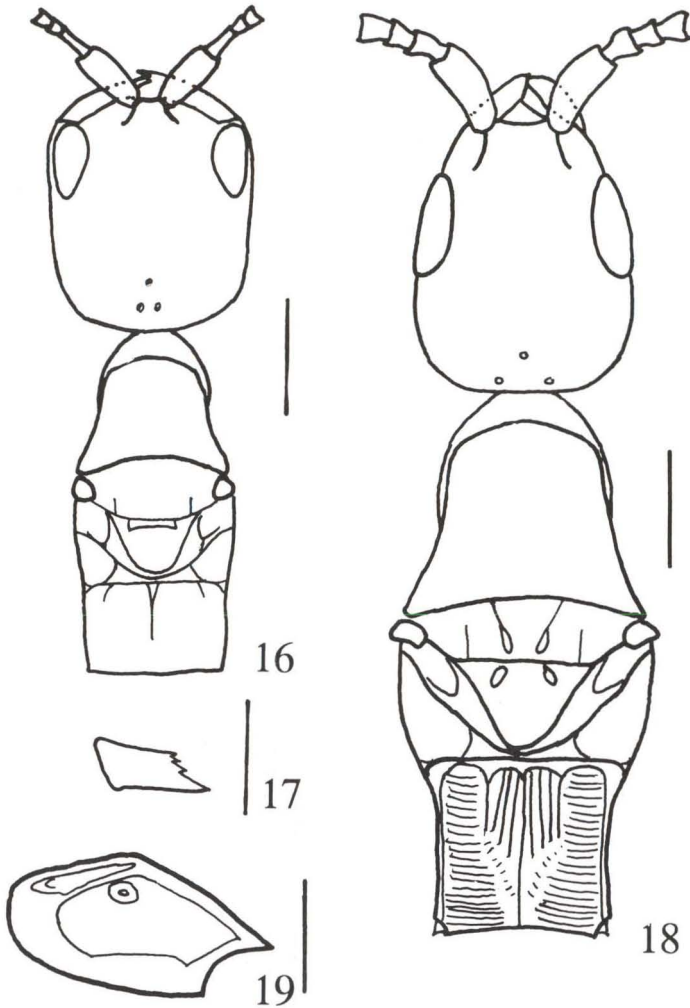
Gaster. Stout; weakly coriaceous; transversal section subcircular. Gaster long, 1.75 X mesosoma.

Material examined. Holotype female – CHILE, Choapa km 272; Panam, Norte, ex. *Ademia microphylla*; 24.IX.1985; M. Elgueta leg. (MNNC); 1 paratype female CHILE, Quilota, Olmue, La Campana, NP; 2.XII.1984-21.II.1985; S. & J. Peck leg. (CNCI).

Variation. Gaster castaneous at the posterior margin of tergite I-III; ocellar triangle slightly broader; parapsidal furrows stronger and longer; forewing conspicuously longer, reaching the tergite IV; propodeal disc 1.33 as wide as long.

Remarks. This species has notauli absent and short forewing, but not so much as in *Bethylopsis fullawayi*. It is recognized by tetradentate mandible, stigma subtriangular, transverse-median vein angulate, scutellar groove conspicuous and the median groove in the frons.

Etymology. Name referring to the median carina of the propodeal disc.



Figs 16-19. (16-17) *Bethylopsis carinatus* sp.n.: (16) head and mesosoma, dorsal, (17) mandible, frontal; (18-19) *Epyris chilensis* sp.n.: (18) head and mesosoma, dorsal; (19) mesopleuron, lateral. Scale bars = 0.3 mm.

Epyris chilensis sp.n.

Figs 18-19

Description of holotype female. Length of body 3,99 mm; LFW 2,16 mm.

Colors. Black; antennae, mandibles, legs dark castaneous; tegula castaneous; wings subhyaline, veins and stigma castaneous.

Head (Fig. 18). Mandible five-teethed, the lower large and sharpened, the

four upper very small and rounded in a oblique series. Clypeus with median lobe developed, narrowly rounded, median carina straight in profile, clypeus in an inferior plan to frons. First four antennal segments in a ratio of 7:2:2:3; segment three slightly thicker than long. Eye sparsely long-haired. Frons weakly coriaceous, with punctures small, shallow, separated 3 X their own diameter; frons with a shallow median groove in the anterior fourth, wider behind. WH 0.87 X LH; WF 0.67 X WH; WF 1.5 X HE; distance from eye tops to vertex crest 0,8 X HE; OOL 1.63 X WOT; frontal angle of ocellar triangle slightly acute; posterior ocelli distant from vertex 1.0 X their own diameters. Vertex straight with corners rounded. Temples parallel.

Mesosoma (Fig. 18). Thorax coriaceous and punctated as frons. Pronotal disc 1.17 X as wide as long. Mesoscutum short, 3 X shorter than pronotal disc, depressed transversally. Notauli complete, thin and divergent anteriorly. Parapsidal furrows incomplete and divergent anteriorly, barely wider than notauli. Scutellar pits elliptical and inclined, separated by 1.67 X their own length. Propodeal disc 1.12 as wide as long, median area not sharply defined, except anterior fourth, median carina complete, median area with undefined discal carinae with longitudinal cross-ridges; sides of disc transversally weakly striate; posterior angles with a small fovea; lateral of propodeum imbricate; declivity of propodeum imbricate with a median carina complete. Mesopleuron (Fig. 19) with a very broad fovea fully outlined, except at the anterior corner, with a small rounded pit. Forefemur 2 X as long as thick. Midtibia spinose.

Gaster. Polished, transversal section elliptical.

Material examined. Holotype female – CHILE, Santiago, est. Exp. La Platina; 7.XI.1990; M. Elgueta *leg.* (MNNC); 2 paratypes females CHILE, Santiago, Maipú (Cuidad); 10.XII.1986 and 13.II.1990; M. Elgueta *leg.* (MNNC).

Remarks. This species is the first of *Epyris* known from Chile. It is similar to *E. myrmecophilus* (Brues, 1903), but the vertex of *E. chilensis* **sp.n.**, is straight medially, the median area of propodeal disc is not sharply margined and the midtibia is with some spines instead of *E. myrmecophilus* with the vertex rounded medially, the median area of propodeal disc sharply margined and the midtibia strongly spinose. It also is similar to *E. californicus* (Ashmead, 1893), but mesopleuron fovea of *E. chilensis* **sp.n.**, is not fully outlined anteriorly, the mesoscutum is short and the temples is parallel instead of *E. californicus* with mesopleuron fovea not fully outlined dorsally, long mesoscutum and the temples diverging anteriorly.

Etymology. Name referring to country of type-locality.

Chilepyris herbsti Evans, 1964

Chilepyris herbsti Evans, 1964: 167-168. – Sorg & Walker 1988: 1486-1468. – Gordh & Moczar, 1990: 82.

This species was known only from the type, the second one similar to the type are analyzed, as follows: WH 1.1 X LH; WF 0.64 X WH; WF 1.62 X HE; OOL 2.6 X WOT; distance from the eye tops to vertex crest 0.93 X HE; parapsidal furrows complete; propodeal disc 1.8 as long as wide; forefemur 2.3 as long as thick.

Material examined. Holotype female CHILE, Baños de Cauquenes (MCZH). New material: 1 female CHILE, Santiago, Rio Colorado; 13.XII.1970; L. Alfaro *leg.* (MNNC).

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