

THE MEGALOPTERA OF CHILE

(Neuroptera)

By

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The Megaloptera (or Sialoidea) are one of three suborders (or orders, according to some authors) comprising the Neuroptera, which are one of the more primitive members of the "Panorpoid" group of holometabolous insects. These large membranous-winged insects, with carnivorous, aquatic larvae, are found in almost all parts of the world.

The suborder is easily divided into two families. The Sialidae is a rather small, homogeneous unit of dark, medium-sized insects, whose adults lack ocelli and have the fourth tarsal joint bilobed. Their larvae possess 7 pairs of long lateral filaments on the abdomen and a long terminal filament, but lack anal prolegs. The second family, the Corydalidae, contains numerous species of rather diverse appearance, large to very large in size, and which possess ocelli but have a cylindrical fourth tarsal segment. Their larvae possess 8 pairs of lateral abdominal filaments, but some in addition have clusters of ventral gills, and all lack the terminal filament but possess a pair of anal prolegs with strong hooks.

The Chilean subregion contains a single species of Sialidae, and several corydalids belonging to two genera. These corydalids belong to the subfamily Chauliodyninae which are limited to this subregion in the Neotropics, but which are better represented in North America, Asia, including Australia and New Zealand, and South Africa. The other subfamily, the Corydalinae, is found throughout the other subregions of the Neotropics, with one genus *Corydalus*, being found from northern Argentina north to Canada. Their distribution outside the New World generally parallels that of the Chauliodyninae, except that they are absent in Australia and New Zealand.

Although many larvae of the Chilean Megaloptera are available, none have been reared.

The association of the sialid larvae with *S. chilensis*, the only known regional species, seems secure. However, the association of larvae with *Archichauliodes* and *Protochauliodes* is extremely tenuous, being based only on the collection of adults and larvae in the same area on frequent occasions. For this reason, the association of the two larval types with the respective adults must be considered tentative until the two types have been reared.

Key to genera

Adults

1. Without ocelli; forewing less than 20 mm. long.
..... *Sialis*
With ocelli, forewings generally
longer than 25 mm. 2
2. Anterior branch of 2A in forewing separate from
1A *Archichauliodes*
Anterior branch of 2A united to 1A then separating. *Protochauliodes*

Larvae

1. Abdomen ending in a long terminal filament
..... *Sialis*
Abdomen terminating in a pair of hook-bearing
prolegs. 2
2. Head rounded laterally, muscle scars distinct and
pale; abdominal spiracles large. *Archichauliodes*
Head straight-sided laterally, muscle scars dark and
concolorous; spiracles small *Protochauliodes*

Genus *Sialis* Latreille

Sialis Latreille, 1802, p. 290.

Type species: *Semblis lutaria* Fabricius, by designation of Latreille, 1810.

Protosialis Weele, 1909, p. 263.

Type species: *Semblis americana* Rambur, monobasic.

The sialids are easily recognized by their

lack of ocelli, enlarged and bilobed fourth tarsal segment, small size (less than 20 mm.) and dark color. The recognition of genera within the family, however, is not so simple. Classically, the venation has been used to define genera, but many aspects of venation are notoriously variable, and I question the validity of many genera based on this characteristic alone.

The New World species have been placed in two genera, *Sialis* and *Protosialis*, which were considered synonymous by Ross (1937) in his revision of the North American species. The most constant venational difference between the species attributed to the two genera lies in the branching of R_{2+3} in the fore- and hindwings. In *Sialis*, R_{2+3} bears apically 2 to 3 erect veinlets; in *Protosialis*, R_{2+3} ends in a single symmetrical fork. Unfortunately the genitalia do not offer any clear-cut differences between the two groups; in fact, there are greater differences between typical species of *Sialis*, than between the two groups. In addition, there are described from the southern hemisphere a number of other genera with basically the *Protosialis* type of venation. However, the genitalia have not been described for any of these. *Sialis chilensis* only complicates the picture further, because, it has the typical *Protosialis* type of venation, but the genitalia are very different from those of all other species known to me.

Because of these difficulties in defining the genera of Sialidae and because *Protosialis* has been formally synonymized, I am returning *chilensis* to *Sialis*. However, when the world fauna is studied, the generic placement of this species must be reconsidered.

There is a single collection of larvae from Prov. Cautín, a small stream near Villarrica, 26 nov. 1963, G. F. Edmunds. These appear to be typical *Sialis* larvae (fig. 6), and are undoubtedly the larvae of *S. chilensis*.

Sialis chilensis McLachlan

Figures 1-5

Sialis chilensis McLachlan, 1870, p. 145. Davis, 1903, p. 451.

Protosialis chilensis (McL.). Weele, 1910, p. 77. Navas, 1930b, p. 353. Lestage, 1930, p. 108.

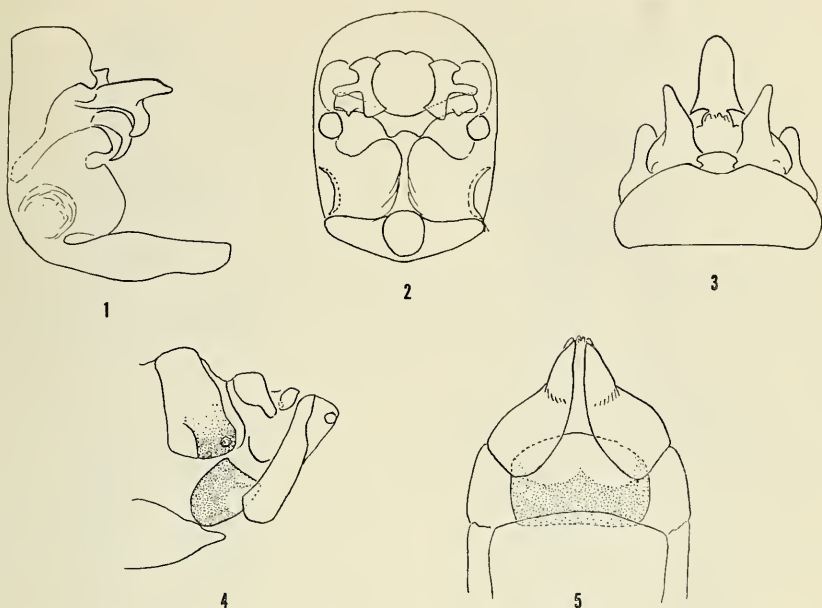
On the basis of genitalia, this species does not seem to be closely related to any other species of sialid. The bifurcate terminal plate and simple strap-like genital plate are unique among those species for which this structure is known.

Adult. Length of forewing, male 14-17 mm, female 18 mm. Color fuscus; head orange, with a large central dark spot roughly divided into thirds by orange lines, the posterolateral dark areas often showing 1 or 2 orange muscle scars and the anteromesal area subdivided into thirds by narrow orange lines along epicranial sutures. Stigmal area of fore and hindwings distinctly whitish, remainder of wings fuscus.

Male genitalia. Ninth sternum produced as a long apicomeresal terete process. Ninth tergum heavily sclerotized, arched, with small posterolateral knoblike structures. Terminal plate completely divided into right and left halves, each half with a posteriorly directed process and appressed lateral and ventromesal straplike sclerites. Genital plate a complete, transverse, ribbonlike sclerite, genital hooks reduced to a pair of submesal rounded lobes. Lateral plate rather lightly sclerotized, consisting of a ventromesal lobe with an impressed lateral area, and a distinct, terete, dorsolateral process.

Female genitalia. Seventh sternum with posterior margin slightly produced over eighth sternum. Eighth sternum smooth, quadrangular, basal half dark; displaced internad to surrounding sclerites. Tenth segment divided midventrally with basoventral lobes partially overlying eighth sternum; with a pair of apicolateral papillae. Eighth and ninth terga lightly sclerotized; ninth with a pair of apicolateral processes; eighth with lateral spiracle situated on a large, smooth sclerotized plate.

Material. Chile, Prov. O'Higgins, Graneros (1100 m), 4 mar. 1962, L. E. Peña G., 3 ♂. Prov. Talca, Molina, 7-8 mar. 1968, Flint & Peña, 1 ♂. Prov. Concepción, Salto de Laja, 8 nov. 1966, Schlinger & Irwin, 1 ♀. Prov. Arauco, Caramávida (750 m), 1-10 jan. 1954, L. E. Peña G., 1 ♀; same, but (1310 m), 1-6 jan. 1954, 1 ♀. Prov. Malleco, Angol, 21 july,



Figures 1-5. *Sialis chilensis* McL.: 1, male genitalia, lateral; 2, male genitalia, posterior; 3 male genitalia,

lial, dorsal; 4 female genitalia, lateral; 5, female genitalia, ventral.

1965, O. Pérez V., 1 ♂; same, but 3 sept. 1965, C. Banc. G., 1 ♂; same, but 6 sept. 1965, Balboa, 1 ♀; same, but 12 sept. 1965, D. Díaz, 1 ♂; same, but 16 sept. 1965, D. Díaz, 1 ♂; same, but 1 nov. 1965, J. Petron, 1 ♂; same, but 2 nov. 1965, M. Pilqui L., 1 ♂; same, but 5 nov. 1965, E. Muñoz, 1 ♂; same, but 17 nov. 1965, M. Pilqui L., 1 ♂. Prov. Valdivia, Valdivia, 19 feb. 1965, Scheihing, 1 ♂. Prov. Llanquihue, Frutillar, 15 feb. 1950, J. Herrera, 1 ♂; Ensenada, 13-14 nov. 1964, L. E. Peña G., 2 ♂ 1 ♀.

Genus *Archichauliodes* Weele

Archichauliodes Weele, 1909, p. 258.

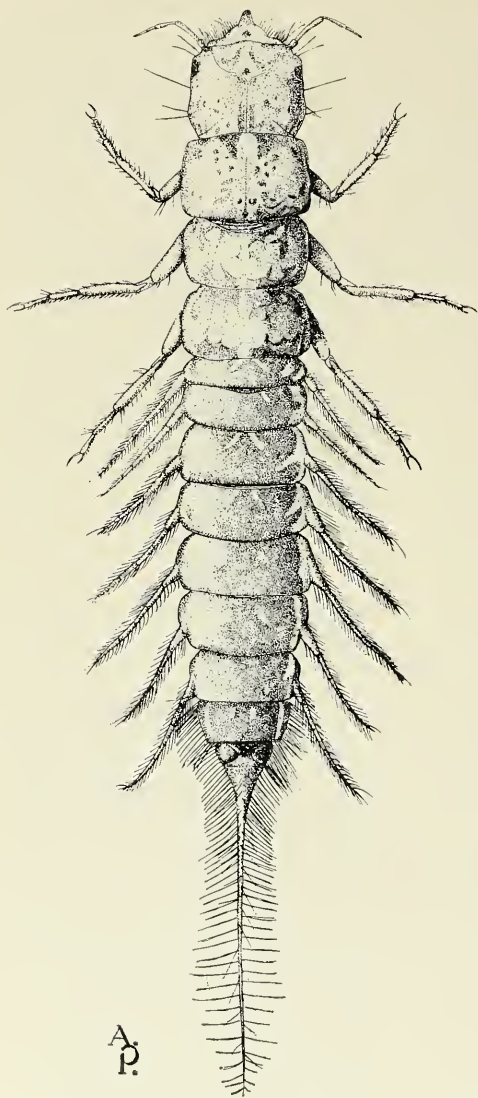
Type-species: *Hermes diversus* Walker (= *Archichauliodes dubitatus* Weele, nec Walker), desig. Kimmins 1938.

Archichauliodes, which is known from Chile, New Zealand, and Australia, is extremely

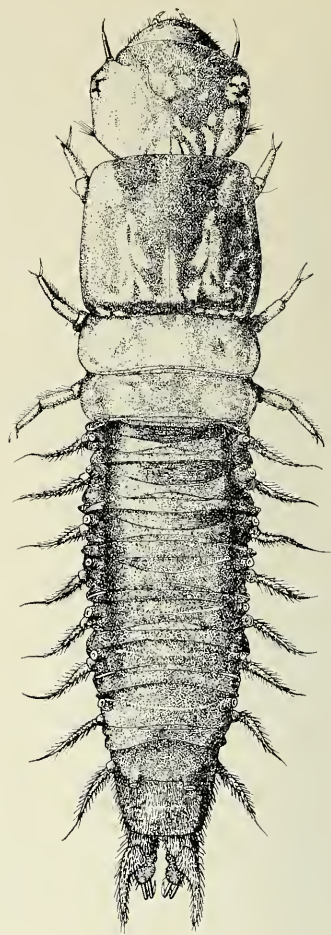
close to *Platychauliodes* from South Africa which may possibly be synonymous. As pointed out in the generic key, the branching of 2A in the forewing easily separates *Archichauliodes* from *Protochauliodes*, the only other Chilean chaulioidine.

The larvae that I attribute to this genus (figures 7, 15, 16) are also easily differentiated from those of *Protochauliodes*. Their head is more rounded laterally, and the muscle scars are pale, contrasting with the dark ground color of the head. The abdominal notae bear numerous short, scalelike and clublike setae together with typical setae, and the spiracles are much larger and slightly protuberant.

Although larvae have been taken in streams adjacent to sites where adults of both species have been taken, I am unable to find distinctives specific differences in the larvae. I have only taken in the larvae of this genus in small



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Figures 6-7. *Sialis chilensis* McL.: 6, larva, dorsal.
(?) *Archichauliodes* sp.: 7, larva, dorsal (abdomen
somewhat contracted).

(1-2 feet wide by 1-6 inches deep), spring-fed streams.

The larval collections bear the following data. Prov. Valparaíso, Colliguay, near La Retuca, 5 nov. 1963, G. F. Edmunds, 1 larva. Prov. Santiago, río Arrayán, El Arrayán, 2 dec. 1963, G. F. Edmunds, 2 larvae; El Alfalfal, 30 feb. 1968, Flint & Peña, 4 larvae; Los Maitenes, 3 nov. 1963, G. F. Edmunds, 1 larva; tributary río Mapocho, 1,000 m. 2 nov. 1963, G. F. Edmunds, 2 larvae; San José de Maipo, 1,000 m, 3 nov. 1963, G. F. Edmunds, 3 larvae. Prov. Concepción, Fundo Pinares, 30 dec. 1965, Flint & Cekalović, 2 larvae. Prov. Malleco, Parque Nacional Contulmo, 2 jan. 1966, Flint & Cekalović, 1 larva.

Key to species: Adults

Head with muscle scars dark; aedeagus of male with apex short, bilobed, with lateral points **A. Chilensis**.
Head with posteromesal scars pale (lateral scars dark); aedeagus prolonged apically, bilobed without lateral points. **A. pinares**.

Archichauliodes chilensis Kimmins

Figures 8-10, 14, 39

Archichauliodes chilensis Kimmins, 1954, p. 425.

This and the following new species are very similar in appearance. All of the many specimens of this species examined have dark posteromesal muscle scars which are concolorous with the surrounding sclerites of the head, whereas in the following species the two large mesal scars are pale and contrasting. The male genitalia of the two species also offer several clear-cut differences. The anal plate of *chilensis* has the apex slightly angled centrad, and the mesal surface is convex. The aedeagus is barely prolonged apically, with lateral points subapically, and the whole structure is slightly asymmetrical.

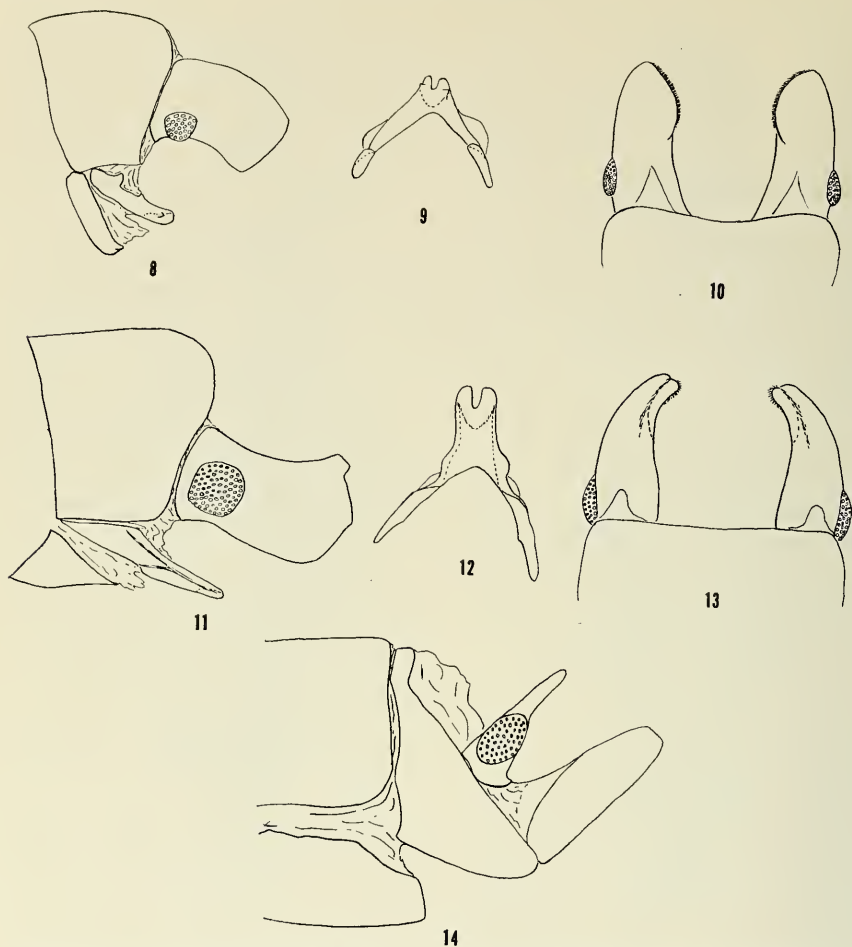
Adult. Length of forewing: male 24-37 mm, average (58 ♂) 28.7 mm; female 31-41 mm, average (18 ♀) 35.4 mm. Mouthparts and most of head fuscous, muscle scars and area around ocelli and antennae slightly darker; head pos-

terior to muscle scars (generally inserted in pronotum), bases of mandibles and genae ventrally, yellowish; antennae fuscous. Body and legs fuscous. Wings hyaline with a slight brownish tinge, veins distinctly fuscous; forewing and apical radial area of hindwing with a pattern of small, closely set brownish spots, marks at stigmal areas of fore, and hindwings distinctly darker.

Male genitalia. Ninth sternum small, posterior margin semicircular, with a mesal triangular membranous flap. Ninth tergum with posterior margin unmodified, slightly less produced centrally than laterally. Anal plate in lateral aspect slightly less than twice as long as broad, apex angled slightly ventrad; in dorsal aspect, terete, apex inflated with a large scabrous pad mesally; wart small, protuberant displaced ventrad. Aedeagus V-shaped, slightly asymmetrical; apex in dorsal aspect with 2 small rounded lobes each bearing a small lateral point.

Female genitalia. Eighth sternum sclerotized and compressed; about twice as long as high at anterior margin; posterior margin very short. Ninth tergum narrow, oblique, posterior margin strongly angled apicoventrally. Gonapophysis lateralis long and narrow, slightly more than 3 times as long as broad, without apical papillae. Anal plate narrow and fingerlike; wart completely filling middle region.

Material. Prov. Coquimbo, río Hurtado, Ovalle, 500-800 m, 5-6 nov. 1961, L. E. Peña G., 33 ♂ 6 ♀; río Los Molles, Ovalle, 2400 m, 12 nov. 1961, L. E. Peña G., 2 ♂ 1 ♀; río Illapel, Caren, 800 m, 13-14 nov. 1963, Peña & Edmunds, 6 ♂ 2 ♀; El Calabazo, Illapel, 1600 m, 22 oct. 1967, L. E. Peña G., 1 ♂; Pangue, Vicuña, 900 m, 2-3 nov. 1961, L. E. Peña G., 1 ♂. Prov. Valparaíso, estero Marga-Marga, Los Perales, 13 oct. 1966, Irwin & Schlinger, 1 ♂. Prov. Santiago, El Canelo, Santiago, 12 jan. 1950, L. E. Peña G., 1 ♂; El Alfalfal, Cord. Santiago, 3 dec. 1963, L. E. Peña G., 5 ♂; río Colorado, Los Maitenes, 3 dec. 1963, G. F. Edmunds, 2 ♂; río Arrayán, El Arrayán, 2 dec. 1963, G. F. Edmunds, 2 ♀; Pichi-Alhué, 25-27 nov. 1967, L. E. Peña G., 20 ♂ 6 ♀. Prov. Curicó, Est. La Jaula, Los Quenes, 4-18 jan.



Figures 8-14. *Archichauliodes chilensis* Kim.: 8, male genitalia, lateral; 9, aedeagus, dorsal; 10, male genitalia, dorsal. *A. pinares* n. sp.: 11, male genitalia,

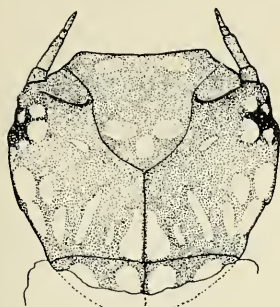
lateral; 12, aedeagus, dorsal; 13, male genitalia, dorsal. *A. chilensis* Kim.: 14, female genitalia, lateral.

1964, L. E. Peña G., 1 ♂. Prov. Arauco, Est. Peral, Contulmo, 1-2 jan. 1966, Flint & Cekalović, 1 ♂. Prov. Bío-Bío, Cord. Pemehue, 10 jan. 1946, L. E. Peña G., 1 ♀. Prov. Malleco, Angol, 30 oct. 1965, Balboa, 1 ♂; same, but 25 nov. 1952, J. Delpino, 1 ♀; same but 8 dec. 1952, 1 ♂; same, but 12 dec. 1964, T. Doerner, 1 ♀; same, but 1937, 1 ♂.

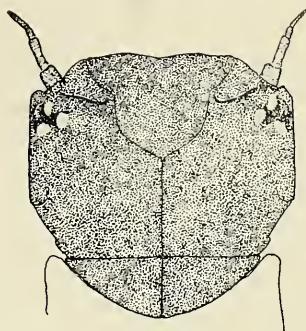
Archichauliodes pinares, new species

Figures 11-13, 40

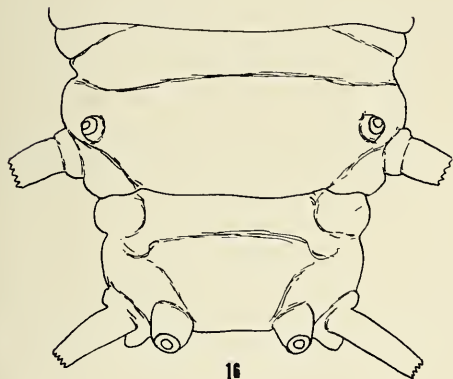
Only a single male has been taken of this species, and although it is closely related to *A. chilensis*, there seems to be several clear-cut colorational and genitalic differences. In color, the head is much paler, especially the two



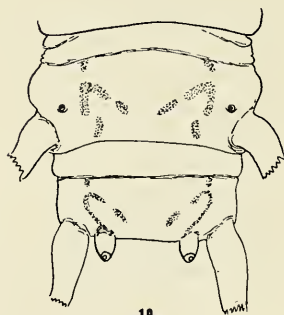
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Figures 15-18. (?) *Archichauliodes* sp.: 15, larval head, dorsal; 16, larval 7th and 8th terga. (?) *Proto-*

chauliodes sp.: 17, larval head, dorsal; 18, larval 7th and 8th terga.

posteromesal muscle scars which are contrastingly paler. The genitalia, especially the concave apicomesal face of the anal plate, and the more elongate apex of the aedeagus without apicolateral points, are all quite distinctive.

Adult. Length of forewing, 33 mm. Most of posterior of head including central muscle scars, genae and gula, around eyes and across clypeus, yellowish; central region dorsally, posterolateral muscle scars, and mouth parts including mandibles, fuscus. Antennae, legs and body, fuscus. Wings marked as in *A. chilensis*.

Male genitalia. Ninth tergum heavily sclerotized, posterior margin almost squarely trun-

cate, anal plate displaced to ventrolateral angle. Ninth sternum small, posterior margin semicircular with a mesal membranous lobe. Anal plate slightly less than twice as long as wide, widened apically, in lateral view with a small thumblike apicodorsal lobe; in dorsal aspect with apex curved slightly mesad, apicomesal face concave, with a few scabrous setae along dorsal margin; oval wart large and protuberant. Aedeagus long and slender in lateral aspect; from dorsum V-shaped, with long slender basal arms (possibly asymmetric); apex elongate, nearly parallel-sided, with a deep apicomesal incision.

Material. Holotype, male: Chile, Prov.

Concepción, Fundo Pinares, near Concepción, 30 dec. 1965, Flint & Cekalović. USNM type 76341.

Genus *Protochauliodes* Weele

Protochauliodes Weele, 1906, p. 258.

Type-species: *Chauliodes cinerascens* Blanchard, orig. designation.

This genus, which is found in Chile, western North America, and Australia, is, like several others in the subfamily Chauliodinae, rather difficult to define. It is very close to the North American *Neohermes* from which it differs in the male sex by lacking the whorls of erect hairs on each antennal segment. From the only other Chilean genus, *Archichauliodes*, it differs in the form of the anal veins in the forewing. In *Protochauliodes* the anterior branch of 2A is united to 1A for a short distance before separating, whereas in *Archichauliodes* 2A is connected to 1A by a crossvein shortly before 2A branches.

The larvae described here I feel are most likely *P. cinerascens* (Blanch.) (figures 17-18). The head of this form has the lateral margins parallel behind the eyes and is a unicolorous, shining dark chestnut brown to nearly black. The abdominal notae bear normal setae and the spiracles are small and, except for those on the eighth segment, not protuberant. These larvae were taken in rather slowly flowing streams and rivers of from 1 to 5 or 10 yards in width and from a few inches to several feet in depth.

There is a single larva which agrees with the above diagnosis in all structural details. However, the head is distinctly punctate, with the punctures clearly outlining the muscle scars. This, probably represents a second species and was taken in a small, spring-fed stream over which *P. humeralis* was flying.

The data with the larvae of the first species are: Prov. Coquimbo, río Illapel, Huintil, 500 m, 12 nov. 1963, G. F. Edmunds, 4 larvae; río Illapel, Caren, 800 m, 14 nov. 1963, G. F. Edmunds, 20 larvae; same, but 1000 m, 13 nov. 1963, 5 larvae. Prov. Valparaíso, estero Marga-Marga, near La Retuca, 5 nov. 1963,

G. F. Edmunds, 2 larvae; same, but 9 mar. 1968, Flint & Peña, 1 larva. Prov. Santiago, río Arrayán, El Arrayán, 2 dec. 1963, G. F. Edmunds, 7 larvae; tributary, río Mapocho, 1000 m, 2 nov. 1963, G. F. Edmunds, 4 larvae; El Canelo, 880 m, 4 dec. 1963, G. F. Edmunds, 6 larvae. Prov. Curicó, El Coigo, 19 mar. 1968, Flint & Peña, 6 larvae. Prov. Arauco, estero Peral, Contulmo, 2 jan. 1966, Flint & Cekalović, 3 larvae; Puente Trongol, near Pilpilco, 19 jan. 1966, Flint & Cekalović, 8 larvae. Prov. Bío-Bío, río Mulchén, 8 dec. 1963, G. F. Edmunds, 1 larvae. Prov. Malleco, río Manzanares, near Puren, 2 jan. 1966, Flint & Cekalović, 12 larvae; 30 km east of Victoria, 8 dec. 1963, G. F. Edmunds, 9 larvae. Prov. Cautín, río Pedregoso, 8 km north of Villarrica, 28 nov. 1963, G. F. Edmunds, 8 larvae. Prov. Valdivia, río Lollehue, near Pichi-Ropulli, 5 jan. 1966, Flint & Cekalović, 5 larvae.

The data with the second species is: Prov. Malleco, Parque Nacional Contulmo, 2 jan. 1966, Flint & Cekalović, 1 larvae.

Key to species and subspecies: Adults

1. Head yellowish, fuscus between ocelli only; wings marked with larger dark spots; aedeagus short and thick, posterior face with a conical depression
..... *P. bullocki*
Head fuscus anteriorly to antennae and often also posteriorly to ocelli; wings either uniformly fuscus or spotted; aedeagus thin and elongate, posterior face unmodified 2
2. Head completely yellow posteriorly to ocelli; wings infuscate; anal plate of male slightly enlarged and rounded apically. *P. humeralis*
Head infuscate between muscle scars posteriorly; wings generally spotted, but may be infuscate; anal plate of male with apex slightly bilobed.
(*P. cinerascens*) 3
3. Wings infuscate; aedeagus lacking middorsal lobes. *P. c. fumipennis*
Wings spotted; aedeagus with middorsal lobes 4
4. Wings with humeral angles yellowish; middorsal lobes of aedeagus nearly at midlength
..... *P. c. cinerascens*
Wings with humeral angles greyish; middorsal lobes distinctly displaced apicad *P. c. reedi*.

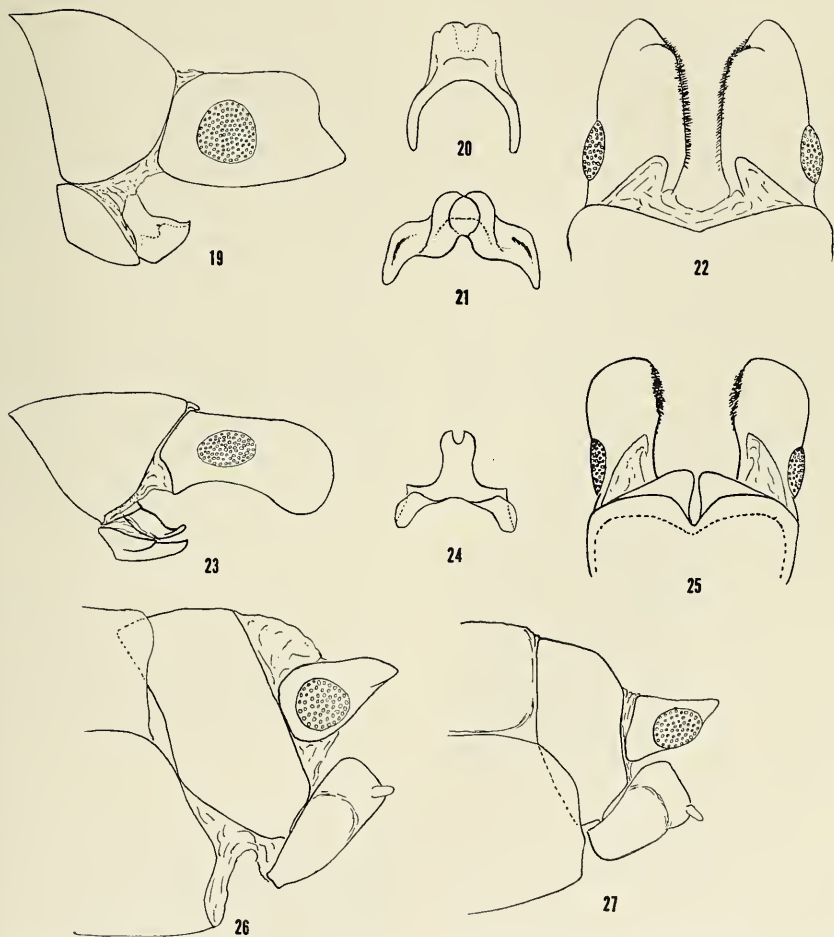
Protochauliodes bullocki, new species

Figures 19-22, 26, 41

This is a very distinctive species, especially in the structure of the male genitalia in which the prolonged apicoventral angle of the anal plate, and the short and very broad aedeagus

with a large posteroventral depression are diagnostic. In appearance the species is also characteristic, with its almost wholly yellow head with only a small black spot in the ocellar triangle, its large size, and its coarsely spotted wings.

Adult. Length of forewing: male, 42-49 mm,



Figures 19-27. *Protochauliodes bullocki* n. sp.: 19, male genitalia, lateral; 20, aedeagus, dorsal; 21, aedeagus, posterior; 22, male genitalia, dorsal. *P. humeralis* (Bks.): 23, male genitalia, lateral; 24, aede-

gus, dorsal; 25, male genitalia, dorsal. *P. bullocki* n. sp.: 26, female genitalia, lateral. *P. humeralis* (Bks.): 27, female genitalia, lateral.

average (5 ♂) 44.2 mm; female, 50-52 mm, average (3 ♀) 51.3 mm. Head orange-yellow, fuscus between the ocelli; antennae fuscus. Thorax mostly fuscus, pronotum with a few paler spots. Wing membrane slightly yellowish, forewing veins bordered by large and small dark spots. Vein M_{1+2} of forewings often branched before wing margin; r-m in hindwing absent (rarely with a faint indication).

Male genitalia. Ninth sternum with posterior margin slightly produced mesally. Ninth tergum unmodified. Anal plate slightly longer than broad, with apicoventral angle produced; mesal surface covered with short, dark spicules. Aedeagus in lateral aspect very short and broad, apicodorsal angle produced into a short point; in dorsal aspect with apical margin produced into 2 rounded lobes separated by a small mesal excision; from posterior, center with a deep cylindrical depression.

Female genitalia. Eighth sternum sclerotized and compressed. Ninth tergite about twice as long as wide. Gonapophysis lateralis compressed, basal $\frac{3}{4}$ sclerotized, apical fourth membranous, slightly enlarged, with apical papilla. Anal plate elongate, pointed apically.

Material. Holotype, male: Chile, Prov. Linares, estero de Leiva, Cord. Parral, 8, 12 jan. 1953, Barros & Peña. usnm type 7034112. Allotype, female: Prov. Bio-Bío, Loncopangue, 17 Jan. 1957, A. Reyes. Paratypes: same data as allotype, but 13 jan. 1957, 1 ♀. Prov. Malleco, Cord. Nahuelbuta, 30 km. west Angol, 1060 m, 13 feb. 1967, E. I. Schlinger, 3 ♂ 1 ♀. Prov. Ñuble, Fundo El Roble, east of Coihueco, 17 jan. 1968, L. E. Peña G., 1 ♂; Yungay, 16 jan. 1961, Artigas, 1 ♀. (Paratypes in collection of Estación Experimental Agronómica, Santiago, Dept. Entomology, Riverside, and Instituto Central de Biología, Concepción).

Protochauliodes humeralis (Banks)

(Figs. 23-25, 27, 42)

Neohermes humeralis Banks, 1908, pp. 27, 29. *Protochauliodes humeralis* (Banks). Weele, 1910, p. 51. Navas, 1928, p. 64; 1930a, p. 71; 1930b, p. 353; 1934, p. 20.

This species is easily recognized by the bicolored head which is yellow posteriorly

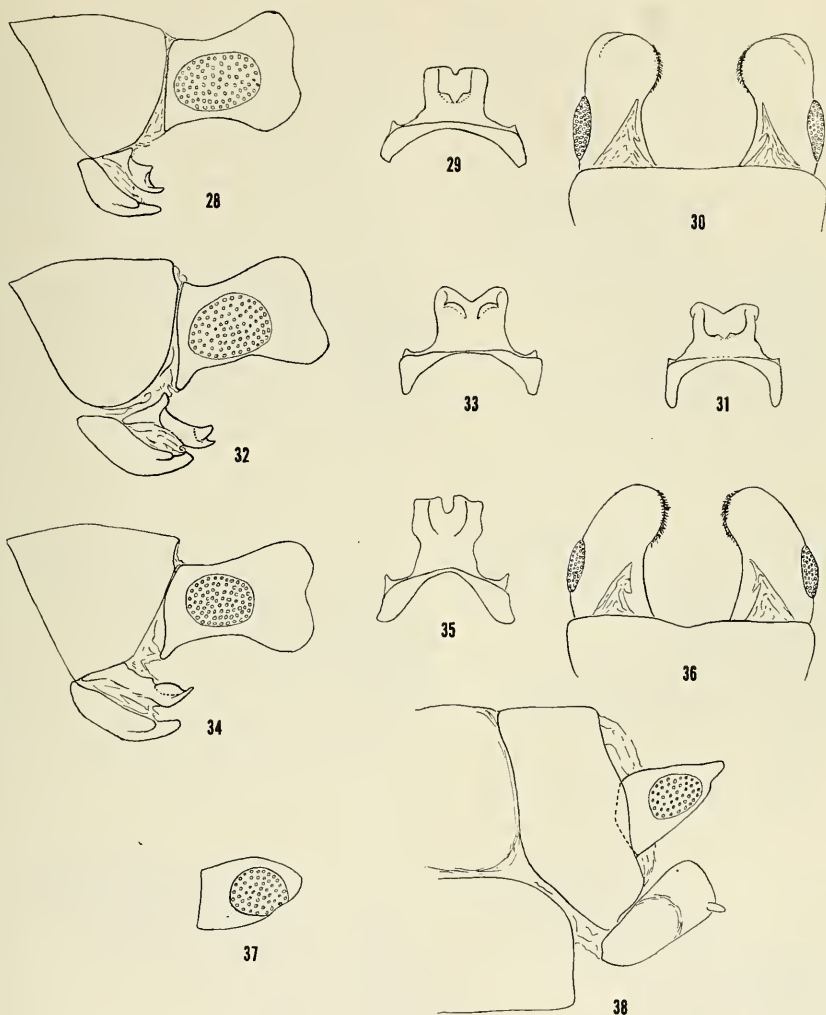
and laterally, and black anteriorly and centrally. The infusate wings with yellow humeri will also separate the species from the other Chilean forms except *P. cinerascens fumipennis*. The male genitalia with their elongate, apically rounded anal plates, narrow aedeagus with bifid tip, and ninth tergum with posterior shelf are very distinctive.

Adult. Length of forewing: male, 29-34 mm, average (16 ♂), 31.2 mm; female, 36-39 mm, average (10 ♀), 37.6 mm. Mouthparts, antennae, clypeus and ocellar area fuscus; head between eyes and antennae and posteriad to ocelli, golden-yellow. Thorax, abdomen, and legs fuscus. Humeral areas of all wings golden-yellow, membrane and veins mostly fuscus, except crossvein of radial and medial areas, hyaline. Vein M_{1+2} of forewing unbranched; r-m of hindwing present.

Male genitalia. Ninth sternum with posterior margin trilobate, with central lobe about $\frac{2}{3}$ as long as wide. Ninth tergum with posterior margin developed into a distinct shelf, with a deep mesal division. Anal plate slightly more than twice as long as broad, apex slightly enlarged and rounded; mesal face covered with black spicules. Aedeagus thin; in dorsal aspect with an elongate central portion, with apicolateral angles rounded and a small U-shaped apicomeral excision.

Female genitalia. Eighth sternum sclerotized and compressed; about as high as long, almost quadrate in lateral aspect. Ninth tergum erect, about twice as long as broad. Gonapophysis lateralis expanded apically, twice as long as broad, with apical papilla. Anal-plate $\frac{5}{6}$ as high as long, slightly produced apicodorsally, distinctly narrowed distad to lateral wart.

Material. Prov. Maule, Tregualemu, 26 feb. 1967, L. E. Peña G., 1 ♂; 15 km E. Curanipe, 23 jan. 1967, E. I. Schlinger, 2 ♂. Prov. Concepción, Fundo Pinares, 10 nov. 1964, T. Cekalović K., 2 ♀; same, but feb. 1968, 1 ♀; San Rosendo, dec. 1926, R. & E. Shannon, 1 ♀. Prov. Bio-Bío, Pemehue, 10 jan. 1946, L. E. Peña G., 1 ♂ 1 ♀. Prov. Arauco, Cañete, 12 jan. 1946, O. Pérez, 1 ♂; Tirua, 8 dec. 1967, G. Monsalve, 1 ♂; Contulmo, 30 jan. 1953, L. E. Peña G., 1 ♂; same, but 2 feb. 1953,



Figures 28-38. *Protochauioides c. cinerascens* (Blanch.): 28, male genitalia, lateral; 29, aedeagus, dorsal; 30, male genitalia, dorsal; 31, aedeagus, dorsal (from Pichi-Alhue). *P. c. reedi* Kim.: 32, male genitalia, lateral; 33, aedeagus, dorsal. *P. c. fumipennis*

n. sub sp.: 34, male genitalia, lateral; 35, aedeagus, dorsal; 36, male genitalia, dorsal; 37 female anal plate, lateral. *P. c. cinerascens* (Blanch.): 38, female genitalia, lateral.

1 ♂. Prov. Malleco, Nahuelbuta Nat'l. Pk., 1 feb. 1967, E. I. Schlinger, 1 ♀; Parque Nacional Contulmo, 2 jan. 1966, Flint & Ceka-

lović, 2 ♂ 3 ♀; río Manzanares, near Purén, 2 jan. 1966, Flint & Cekalović, 1 ♀; Palo Bocado, near Contulmo, 1 feb. 1967, L. E. Peña

G., 1 ♂; Angol, 1956, C. Sáez P., 1 ♀. Prov. Cautín, Villarrica, 16-31 dec. 1964, M. Rivera, 5 ♂ 1 ♀; same, but 12 feb. 1964, T. Cekalović K., 1 ♂.

Protochauliodes cinerascens (Blanchard)

Chauliodes cinerascens Blanchard, 1851, p. 134. McLachlan, 1869, p. 41. Davis, 1903, p. 464.

Neochermes cinerascens (Blanch.). Banks, 1908, p. 29.

Protochauliodes cinerascens (Blanch.). Weele, 1910, p. 49. Navas, 1924, p. 13; 1928, p. 64; 1930a, p. 71; 1930b, p. 353; 1933, p. 231; 1934, p. 20.

This, the first described Chilean Megalopteron, appears to be quite variable. I am here recognizing 3 subspecies, the typical one found in the Andes from Santiago at least as far south as Bío-Bío, *P. c. reedi* apparently limited to the coastal ranges near Valparaíso, and *P. c. fumipennis* found on the coast near Concepción.

The references to *cinerascens* before Kimmin (1954) are listed above, because it is impossible to be certain as to which subspecies they refer.

Protochauliodes cinerascens cinerascens (Blanchard) (Figs. 28-31, 38, 43)

Chauliodes cinerascens Blanchard, 1851, p. 134.

Protochauliodes cinerascens (Blanch.). Kimmins, 1954, p. 442.

I am following Kimmins' definition for the nomotypical form of this species. The subspecies so defined is the commonest and most widely distributed one of the species.

This subspecies is very similar to the subspecies *reedi* in coloration, differing only in having paler humeral angles. The differences in the genitalia appear to be in the aedeagus which in *c. cinerascens* has the middorsal lobes at about midlength and only a narrow

U-shaped apicomeral excision, whereas in *c. reedi* the middorsal lobes lie well toward the apex, and the apicomeral excision is broadly V-shaped. However, examples from the southern end of the Prov. of Santiago (Pichi-Allhue) are intermediate, having a V-shaped excision but middorsal lobes at midlength.

P. c. cinerascens is easily distinguished from *c. fumipennis* which has evenly infusate wings, and has lost the middorsal lobes of the aedeagus.

Adult. Length of forewing: male, 30-43 mm, average (18 ♂) 35.7 mm; female 35-48 mm, average (8 ♀) 41.0 mm; northern examples tend to be larger than southern. Mouthparts and antennae fuscous; anterior margin of clypeus and bases of mandibles, yellowish; most of head fuscous, except for muscle scars posteriorly and genae posteroventrally, yellowish. Thorax, legs, and abdomen, fuscous. Wing membrane grey with a yellowish tinge, with many small, dark dots bordering the veins except for anal region of hindwing, pterostigma mostly dark, humeral angles yellow. Vein M_{1+2} of forewing unbranched; r-m in hindwing present.

Male genitalia. Ninth sternum trilobate, mesal lobe broadly triangular. Ninth tergum with posterior margin straight. Anal plate about 1.5 times as long as broad, apex slightly bilobate; black spicular patch limited to apex of mesal face. Aedeagus thin, with a pair of middorsal lobes at midlength connected to apex by a low ridge, apex with a narrow U-shaped mesal excision.

Female genitalia. Eighth sternum compressed and sclerotized; about $\frac{3}{4}$ as high as long, rectangular in lateral aspect. Ninth tergum nearly erect, about twice as high as wide. Gonapophysis lateralis about 2.5 times as long as broad at midlength, evenly widened apically, with apical papilla. Anal plate about $\frac{3}{4}$ as high basally as long, tapering, but not sharply constricted beyond wart.

Material. Prov. Santiago, río Colorado, Los Maitenes, 3 dec. 1963, G. F. Edmunds, 5 ♂ 3 ♀; Pichi-Allhue, 25-27 nov. 1967, L. E. Peña G., 9 ♂; río Arrayán, El Arrayán, 2 dec. 1963, G. F. Edmunds, 2 ♂ 3 ♀. Prov. O'Higgins, Graneros, 1.100 m, 4 mar. 1962, L. E.

Peña G., 1 ♂. Prov. Curicó, Est. La Jaula, Los Queñes, 4-18 jan 1964, L. E. Peña G., 2 ♂; Buchén, Cord. Curicó, mar. 1956, M. Rivera, 1 ♀; Los Niches, 11 km east Curicó, 20-31 dec. 1963, 1 ♀; El Coigo, 1 mar. 1968, Flint & Peña, 1 ♂ 1 ♀. Prov. Talca, Los

Cipreses, 1.000 m, 14 jan. 1968, L. E. Peña G., 1 ♂ 1 ♀; Tonlema (35°09', 71°41'), jan.-feb. 1943, L. E. Peña G., 1 ♂. Prov. Linares, Bulileo, Cord. Parral, 15 dec. 1960, L. E. Peña G., 2 ♂; Copihue, 25 jan. 1955, L. E. Peña G., 2 ♂. Prov. Ñuble, Invernada, Recinto,



39



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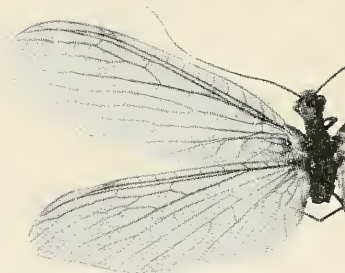
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Figures 39-44. 39, *Archichauliodes chilensis* Kim. 40, *A. pinares* n. sp., holotype. 41, *Protochauliodes bullocki* n. sp., holotype. 42, *P. humeralis* (Bks.) 43,

P. c. cinerascens (Blanch.) 44. *P. c. fumipennis* n. sub sp., holotype.

jan. 1967, 1 ♂ 3 ♀; same, but mar. 1967, 1 ♀; same, but, oct. 1966, 1 ♂; same, but, nov.-dec. 1967, 7 ♂ 4 ♀; same, but, dec. 1966, 1 ♂; same, but, dec. 1968, 1 ♂ 1 ♀; Recinto, mar. 1952, M. Rivera, 1 ♂; Las Trancas, Cord. Chillán, 9-11 mar. 1952, L. E. Peña G., 1 ♀; same, but, jan.-mar. 1967, 1 ♀.

***Protochauiodes cinerascens reedi* Kimmins**
(Figs. 32-33)

Protochauiodes reedi Kimmins, 1954, p. 440. This form is very close to the typical subspecies, from which it differs slightly in coloration and shape of the aedeagus as previously discussed.

Unfortunately, there are only a few specific locality records for this species which make it impossible to be certain of its true range. The two records (the type locality is Chile only) suggest that it may be limited to the coast mountains at the northern end of the range of the species.

Adult. Length of forewing, male 41-46 mm, average (7 ♂) 43,6 mm (Kimmins records males 35-39 mm, females 41-47 mm). Coloration as in *P. c. cinerascens*, except where humeral angles of wings are grey.

Male genitalia. The same as typical subspecies except aedeagus has a broad V-shaped apicomeral excision, and middorsal lobes are large and displaced well toward apex.

Material. Prov. Valparaíso, Cuesta Puacán, 5 oct. 1967, L. E. Peña G., 1 ♂; Est. Marga-Marga, Los Perales, 13 oct. 1966, Irwin & Schlinger, 6 ♂.

***Protochauiodes cinerascens fumipennis*,
new subspecies**
(Figs. 34-37, 44)

This form, which I am considering a subspecies of *cinerascens*, is in appearance a very close mimic of *P. humeralis*. The structure of the genitalia, however, shows beyond doubt that it is closely related to *cinerascens*, not *humeralis*.

As stated under *P. c. cinerascens*, the genitalia of the two forms are very similar with only slight differences to be noted in the

aedeagus. However, the wings are completely fumose in this subspecies rather than spotted as in the other two subspecies.

Adult. Length of forewing; male 36-41 mm, average (6 ♂) 38,7 mm; female 45 mm. Mouthparts yellow, except maxillae and apex and lateral spots of labrum, fuscus. Head ventrally, dorsally anterior to eyes, and on posterior muscle scars, fuscus. Antennae, legs, and body, fuscus. Wings almost evenly fuscus, slightly darker at stigmal region, apical crossveins of forewing pale, in some specimens a slight indication of darker spotting; humeral angles yellow.

Male genitalia. Ninth tergum and sternum, and anal plates as in typical subspecies. Aedeagus lacking middorsal lobes; with a narrow U-shaped apicomeral excision.

Female genitalia. Generally as in typical subspecies, except anal plate seems, more rounded apically. (However, if enough material were available, I expect variation would eliminate this characteristic).

Material. Holotype, male: Chile, Prov. Concepción, Quebrada Honda, near Lirquén, 31 dec. 1965, Flint & Cekalović. USNM type 703.413. Allotype, female: same data. Paratypes: same data, 5 ♂. (Paratypes in collections of Estación Experimental Agronomía, Santiago, and Instituto Central de Biología, Concepción).

Acknowledgements

I wish to express my appreciation to those who have supplied the material making this study possible: Sr. Luis E. Peña G., Santiago, Universidad de Chile, Chile; Dr. E. I. Schlinger, Department of Entomology, University of California, Riverside, Cal.; and Dr. G. F. Edmunds, Department of Zoology and Entomology, University of Utah, Salt Lake City, Utah. I am also indebted to Mr. André D. Pizzini for his fine habitus drawings of the larvae.

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