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## A REVIEW OF THE MONOTYPIC GENUS *CHILELIMNOPHILA* ALEXANDER (DIPTERA: TIPULOMORPHA: LIMONIIDAE)

GUILHERME CUNHA RIBEIRO<sup>1</sup>

### ABSTRACT

*A review of the monotypic genus Chilelimnophila Alexander (Diptera: Tipulomorpha: Limoniidae). The Chilean species Chilelimnophila lyra (Alexander, 1952), the only included species in the genus Chilelimnophila Alexander, 1968, is redescribed on the basis of new available material from adjacencies of the type locality and other areas. Misinterpretations from the original description are corrected. Adult anatomical structures are described and illustrated in detail, including information on the previously unknown female. Better grounds for the recognition of the taxon are provided.*

KEYWORDS: *Chilelimnophila lyra*, crane flies, taxonomy, Chile, Neotropical Region.

### INTRODUCTION

Alexander (1952), described *Limnophila lyra* from Chile, referring to a single specimen from Curacautín (Malleco Province) designated as the holotype. Alexander (1952) considered this fly as a very distinctive species. Its original placement in *Limnophila* was admittedly provisional as the distinctive morphology of the antenna and male terminalia would require the erection of a new higher group for it.

Alexander (1968) then erected for the inclusion of *Limnophila lyra* the genus *Chilelimnophila*. The heterogeneity and artificiality of *Limnophila* has been previously recognized by Alexander (e.g., Alexander, 1924, 1929), and the proposal of a monotypic genus for this distinctive species seemed fully justified. A more rigorous demonstration of *Limnophila* paraphyly (Ribeiro, 2006a; Ribeiro, 2007) corroborates this decision. Alexander (1968) mentioned the avail-

ability of more specimens from Chiloé Island without indicating how many and did not add substantive information on the species morphology.

During a research visit by the author to the National Museum of Natural History of the Smithsonian Institution, Washington DC, USA (USNM) in 2004, an effort of examining samples of undetermined Chilean crane flies in the Alexander Collection resulted in the finding of additional material of *Chilelimnophila lyra*. These specimens, coming from two different localities (including a locality adjacent to Curacautín, the type locality), add considerably to the number of known specimens of this interesting and poorly known species. These specimens allow for a redescription of the taxon, with a study on its morphology which is more detailed than those by Alexander (1952, 1968). This redescription is aimed to provide better grounds for the recognition of *Chilelimnophila* (and its single included species).

1. Departamento de Biologia (FFCLRP), Universidade de São Paulo. Avenida Bandeirantes, 3900, 14040-901, Ribeirão Preto, SP, Brasil.  
E-mail: ribeirogc@hotmail.com

It may also be useful in the eventual discovery of new taxa related to *C. lyra*, and for future comparative studies.

## MATERIAL AND METHODS

The studied specimens belong to the Alexander Collection of Crane Flies housing at USNM. Descriptive terminology follows McAlpine (1981) for most characters. The adopted terminology for the wing veins is shown in Figure 5. The terminology for the structures of the male gonostylus is in accordance with Ribeiro (2006b).

Dissections of the head, thorax, male and female terminalia were cleared in warmed KOH and mounted for study in non-permanent slides with glycerol. After study and illustration the dissected structures were transferred to microvials with glycerol and pinned with their corresponding specimens. Illustrations were made with a drawing tube attached to a compound microscope. Measurements were taken with an ocular reticule. Photographs were taken with a digital photography system attached to both stereoscopic and compound microscopes. Details on the examined specimens are as follows (label information in italics; information of different labels separated by a vertical line; precise information on locality within square brackets):

*Holotype*: Male. *Chile, Curacautín, Dec. 14. 50, Peña.* (pin label); *Chile-Malleco, Curacautín, 400 m, XII-14, 50 (Luis E. Peña)* (slide label) [Chile, Malleco, Curacautín, ca. 38°27'S 71°53'W].

*Preservation*. Pinned parts: head with left antenna; thorax with both midlegs and right hindleg. Slide mounted parts: right antenna; wings; 2 legs; abdomen; terminalia.

*Non-type specimens identified by Charles Paul Alexander*: 1 male (pinned with terminalia mounted in slide) and 1 female (pinned). *Chile, Arauco, Nahuelbuta, Butamalal, 1100-1400 m, I-23-31 '54, Peña.* | *Chilelimnophila lyra* Al. Det. C.P. Alexander [Chile, Arauco, Cordillera de Nahuelbuta, Butamalal, ca. 37°54'S 73°12'W]; 2 males (pinned with terminalia mounted in slide). *Chile, Arauco, Nahuelbuta, Pichinahuel, 1100-1400 m, I-23/31 '54, Peña.* | *Chilelimnophila lyra* Al. Det. C.P. Alexander [Chile, Arauco, Cordillera de Nahuelbuta, Pichinahuel, ca. 37°47'S 73°02'W]; 3 males (mounted in slide). *Chilelimnophila lyra* (Alex), *Chile, Chiloe I. Dalcahue, Feb.*

*1954, (L.E. Peña)* [Chile, Chiloé Island, Dalcahue, ca. 42°23'S 73°40'W].

*Note*: Only the specimens from Chiloé Island were referred to by Alexander (1968), who erroneously indicated them as having been collected in 1945.

*Specimens found in the USNM collection*: 12 males and 2 females. *CHILE: Curacautín, Rio Blanco, 12-20 January, 1959* | *Chilelimnophila lyra* Alex., G C Ribeiro det 2007 [Chile, Malleco, Curacautín, Rio Blanco, ca. 38°27'S 71°53'W]; 9 males. *CHILE: Cord. Nahuelbuta, Pichinahuel, 1-10 Jan. 1959* | *Chilelimnophila lyra* Alex., G C Ribeiro det 2007 [Chile, Arauco, Cordillera de Nahuelbuta, Pichinahuel, ca. 37°47'S 73°02'W].

*Note*: The labels of these specimens do not include information on collector. Basing on the collecting date and localities, it can be assumed that the collector was L.E. Peña (Oliver Flint, personal communication).

## Genus *Chilelimnophila* Alexander, 1968

*Chilelimnophila* Alexander, 1968: 23. Type species: *Limnophila lyra* Alexander, 1952.

*Diagnosis*: *Chilelimnophila* can be recognized by the following characters combined: first flagellomere ovoid, constricted at base; first three to four flagellomeres partially fused in the male, ovoid and not fused in the female; tibial spurs covered with tiny hairs; clasper of gonostylus glabrous, bifid and with its distal most branch serrated; lateral process of aedeagal sheath long, narrow and acute, strongly sclerotized, twisted at apex.

## *Chilelimnophila lyra* (Alexander, 1952)

(Figs. 1-13)

*Chilelimnophila lyra* (Alexander 1952): 108-109 (original description); 118, figure 7 (male terminalia). Alexander (1968): 24, figures 2 (wing) and 7 (male terminalia). Alexander & Alexander (1970): 4.93 (catalogue citation). Oosterbroek (2007) (catalogue citation).

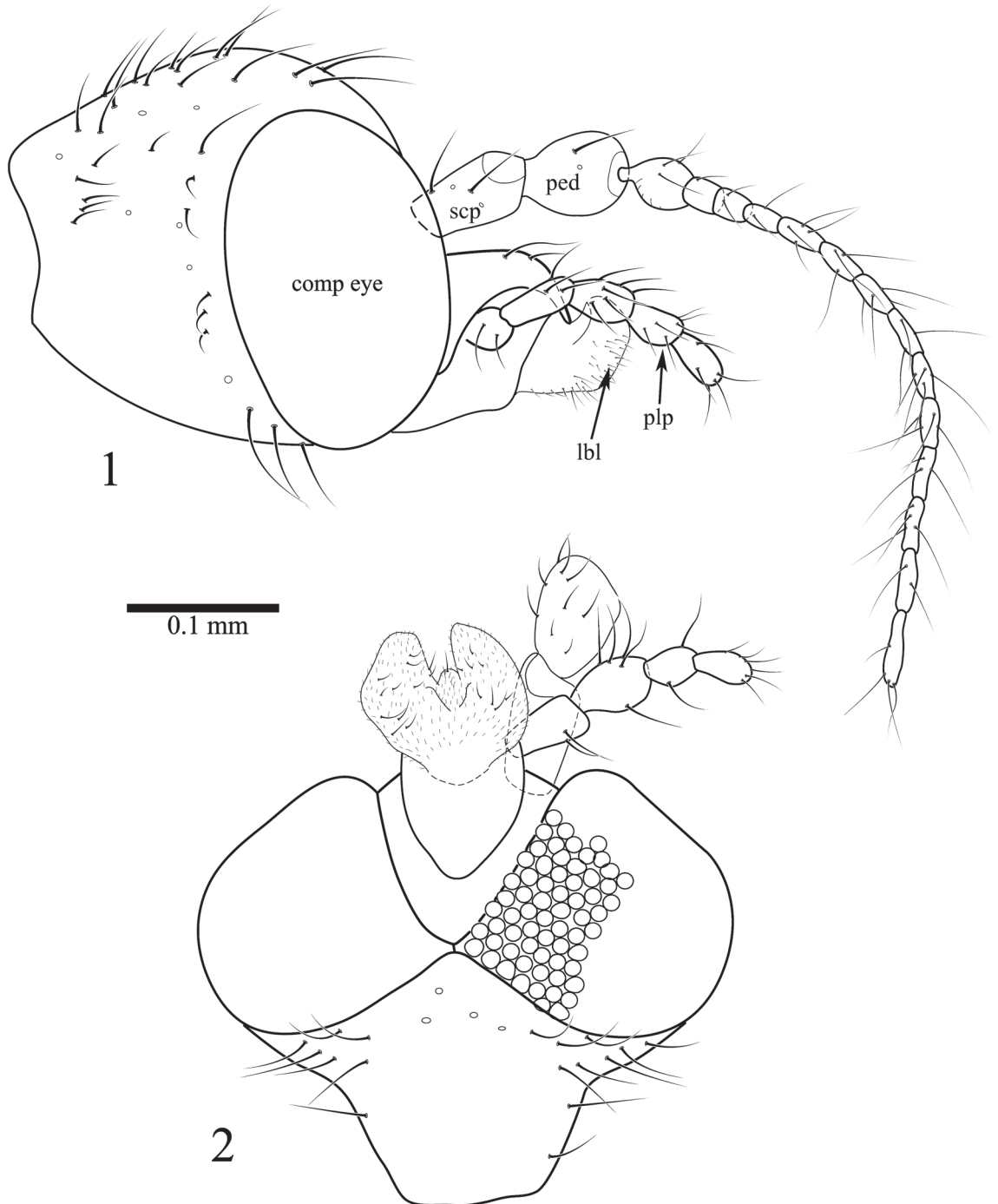
## Redescription

*Coloration (male and female)*: Head brownish yellow, generally darker than thorax; thorax and legs light brown-yellow; abdomen brownish, darker than tho-

rax, with tergum darker than sternum; last abdominal segment darker than previous segments.

*Dimensions (male; maximum lengths and widths in millimeters):* Head length, 0.40-0.60; head width,

0.35; wing length, 5.87-6.25 (5.87 in holotype); wing width, 1.62-1.70 (1.70 in holotype); gonocoxite length, 0.28-0.31 (0.28 in holotype); clasper of gonostylus length, 0.21-0.24 (0.24 in holotype); lobe of gonostylus length, 0.14-0.17 (0.14 in holotype).



FIGURES 1-2: *Chilelimnophila lyra*, male head. 1, lateral view. 2, ventral view. Abbreviations: comp eye, compound eye; lbl, labella; plp, maxillary palpus.

*Morphology (male and female)*: Head and appendages (Figures 1-2, 4-5): Flagellum 14-segmented; scape cylindrical, *ca.* 1.75 X longer than wide; pedicel ovoid, *ca.* 1.2 X longer than wide; scape and pedicel similar in length; first flagellomere ovoid, constricted at base; first three to four flagellomeres as long as wide and partially fused in the male, ovoid and not fused in the female; flagellomeres length/width ratio gradually increasing toward tip of antenna, with last flagellomere longer than preceding; maxillary palpus 4-segmented; first palpomere more or less cylindrical, *ca.* 2.2 X longer than wide; other palpomeres ovoid, shorter than the first; compound eyes widely separated

dorsally, meeting at median line ventrally; rostrum (including labella) *ca.* 0.4 X the length of head capsule. Thorax (Figure 3): almost as long as high; pleural sclerites as figured. Leg (Figure 8): tibial spurs (1:2:2) *ca.* 0.66 X the width of distal part of tibia, covered with tiny hairs; tarsal claws simple, smooth. Wing (Figure 6): h vein situated between the origin and the fork of M+Cu; Sc ending on C at the level of bifurcation of Rs and A<sub>1</sub>; position of sc-r variable, more or less near the tip of Sc; r-r linking R<sub>1</sub> to R<sub>2</sub> faint or lacking; Rs almost straight, originating well proximally to the level of the tip of A<sub>2</sub>; Rs three branched; R<sub>2+3</sub> *ca.* 0.46 X the length of R<sub>3</sub>; R<sub>2</sub> running more or less

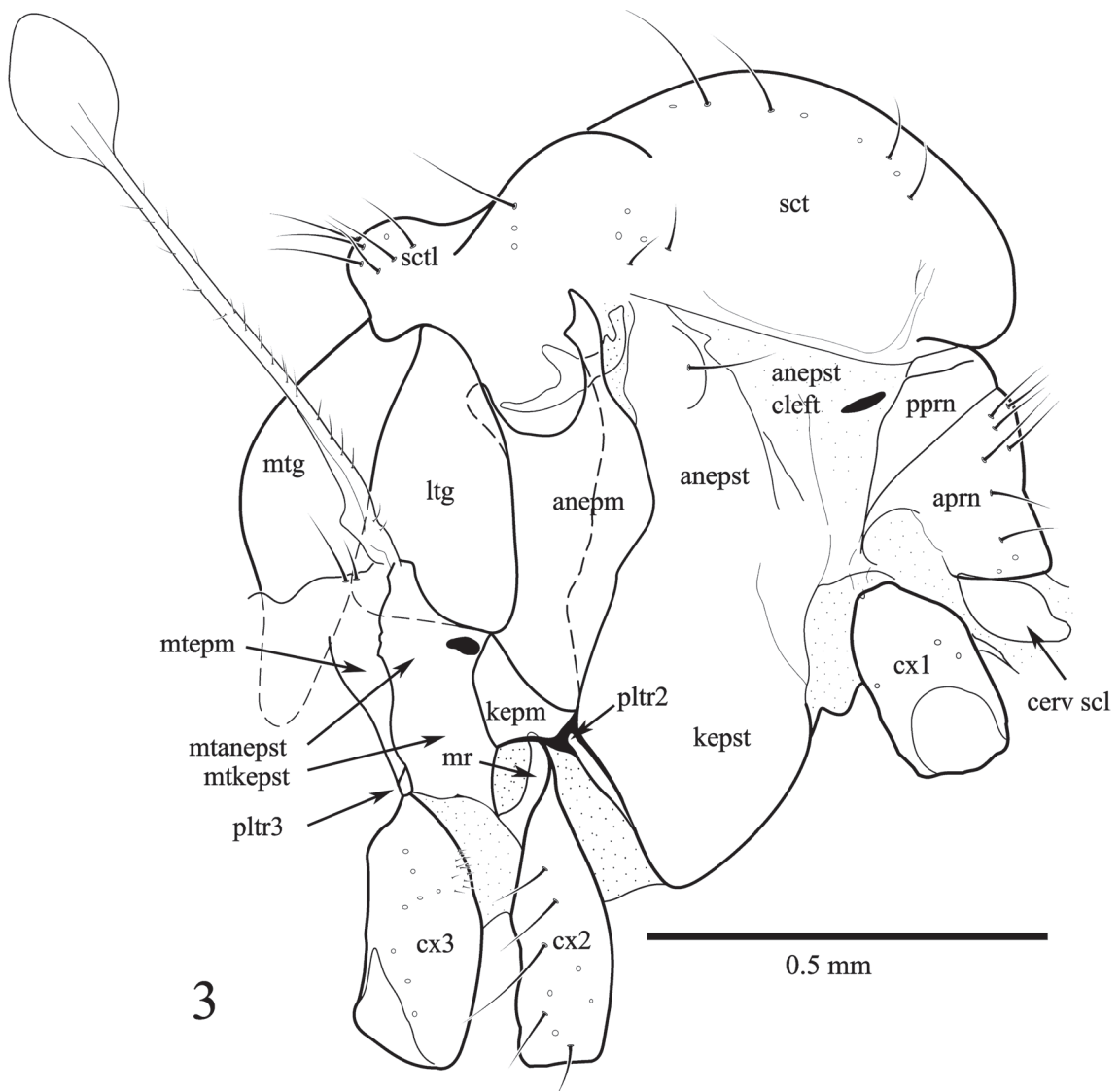
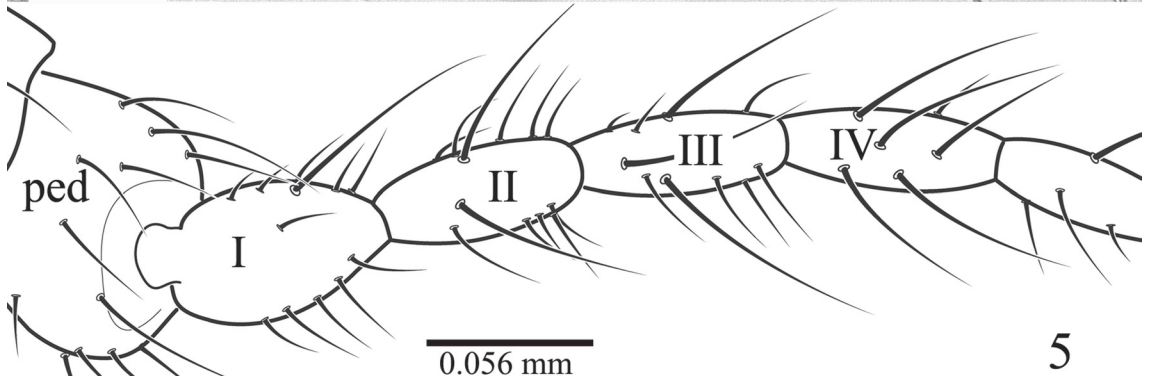
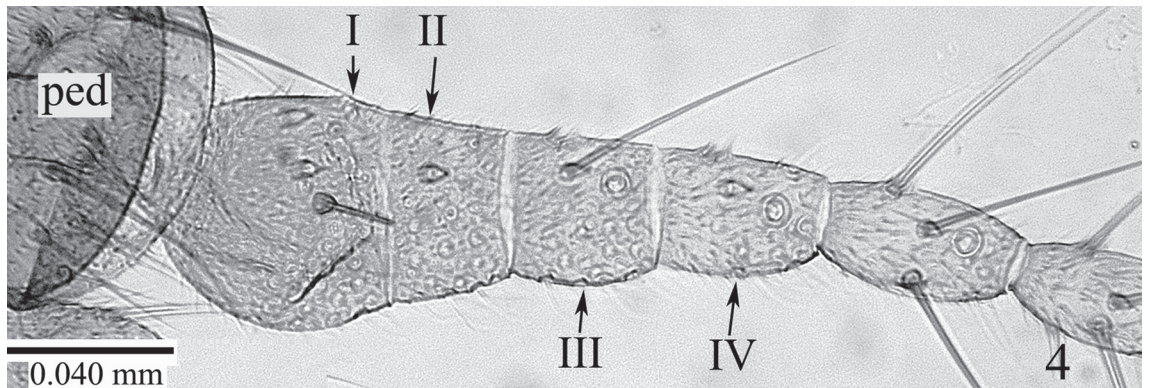


FIGURE 3: *Chilelimnophila lyra*, male thorax, lateral view. Abbreviations: anepm, anepimeron; anepst, anepisternum; anepst cleft, anepisternal cleft; aprn, anteprotuberance; cerv scl, cervical sclerite; cx, coxa; kepm, katepimeron; kepst, katepisternum; ltg, laterotergite; mtepm, metaepimeron; mtkepst, metakatepisternum; mtanepst, metanepisternum; mr, meron; mtg, mediotergite; pltr2, mesothoracic pleurotrochantin; pltr3, metathoracic pleurotrochantin; pprn, postpronotum; sct, scutum; sctl, scutellum.



parallel to R<sub>3</sub> in most of its length, turning upwards abruptly at tip; section of R<sub>4+5</sub> between its origin and point of contact with r-m curved; section of R<sub>4+5</sub> distal to point of contact with r-m almost straight; r-m straight, similar to m-cu in length; M four branched; M<sub>1+2</sub> long, ca. 3 X the length of M<sub>2</sub>; M<sub>1</sub> ca. 1.37 X the length of M<sub>2</sub>; M<sub>3</sub> sinuous; M<sub>4</sub> almost straight; m-m ca. 0.20 to 0.40 X the length of r-m; m-cu attached to M<sub>3+4</sub> near mid-length of discal cell; A<sub>1</sub> almost straight; A<sub>2</sub> slightly curved at tip. Male terminalia (Figures 7, 9, 10-12): posterior margin of tergite 9 produced

into two small lobes; gonocoxite conical, gradually narrowed toward tip, bearing a ventromedial extension; gonostylus terminal; lobe of gonostylus ca. 3.25 X longer than wide, gradually narrowed toward tip; clasper of gonostylus ca. 5.6 X longer than wide, glabrous, bifid (largest and distalmost bifurcation serrated); aedeagus relatively long, reaching the level the gonostylus insertion; lateral process of aedeagal sheath long, narrow and acute, strongly sclerotized, twisted at apex; interbase blade-like, rounded at apex, bearing a stout lateral extension articulating with paramere, and



FIGURES 4-5: *Chilelimnophila lyra*, antenna. 4, proximal part of male antenna, showing partial fusion of first four flagellomeres (I-IV). 5, proximal part of female antenna. Abbreviations: ped, pedicel.

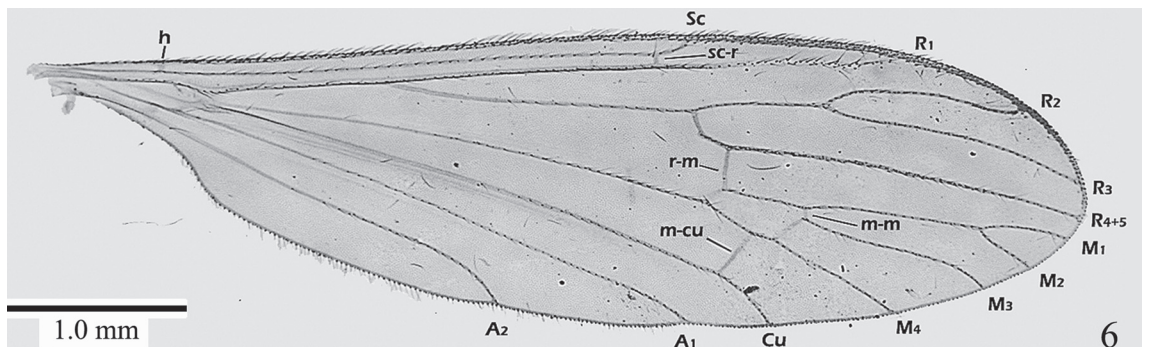


FIGURE 6: *Chilelimnophila lyra*, wing venation.

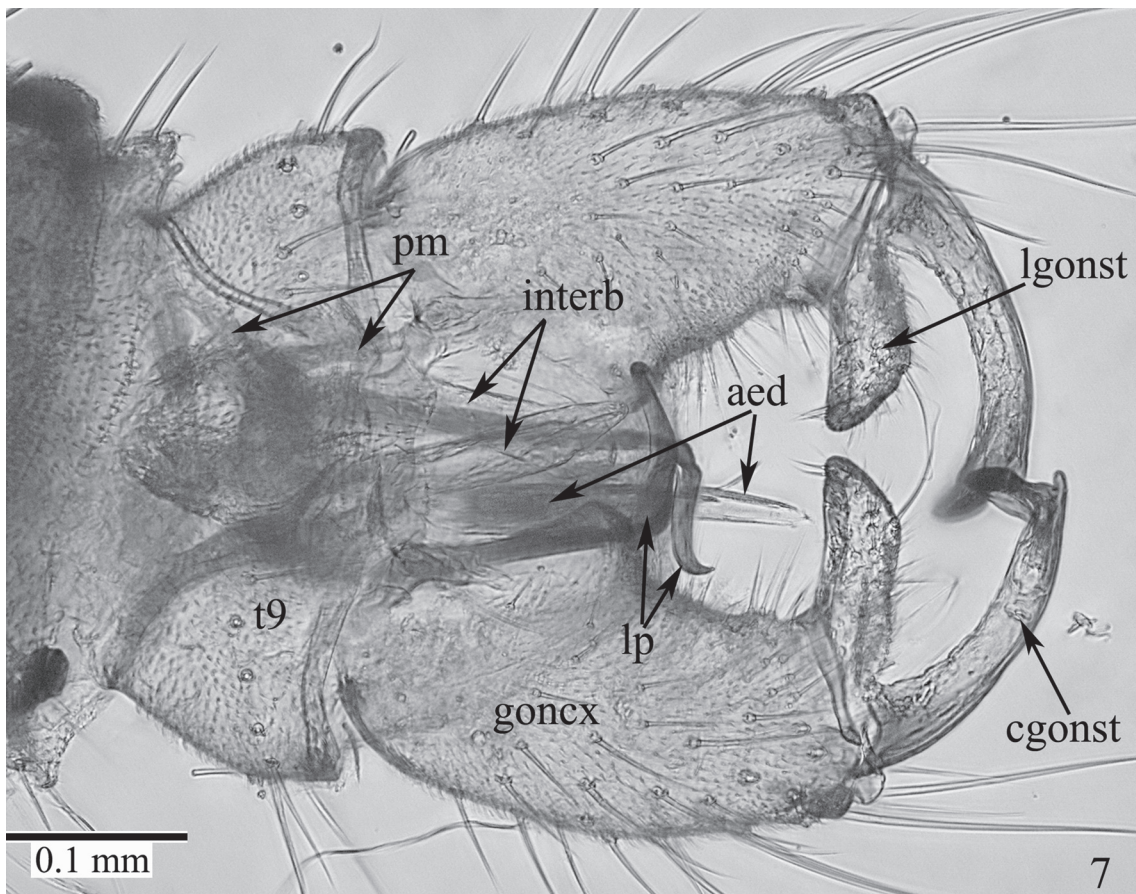


FIGURE 7: *Chilelimnophila lyra*, photograph of male terminalia, dorsal view. Abbreviations: aed, aedeagus; cgonst, clasper of gonostylus; goncx, gonocoxite; interb, interbase; lgonst, lobe of gonostylus; lp, lateral process of aedeagal sheath; pm, paramere; t9, ninth tergite.

a longer, more slender medial extension. Female terminalia (Figure 13): tenth tergite ovoid, ca. 2 X longer than ninth tergite; hypogynial valve with a more or less ovoid and less sclerotized internal area ranging from its midlength to its apex; apex of hypogynial valve reaching midlength of cercus, bearing slender bristle-like filaments. Pilosity: antenna with verticils longer than individual flagellomeres; wing with macrotrichia all along longitudinal veins.

*Remarks:* The rounded structure indicated by Alexander (1952: 118, figure 7; 1968: 24, figure 7) as the ninth tergite is actually the ninth sternite: the posterior margin of the ninth tergite is not rounded, but produced into two small lobes. The three dimensional structure of the clasper of gonostylus is relatively complex. Although some variation may occur in the relative lengths of its two apical extensions, in flattened slide mounted specimens (Figure 9), the apex of the clasper may be distorted in different ways, giving a false impression of variation. Such a distortion has

probably driven Alexander's (1968: 23) description of the apical part of this structure as "expanded into a triangular blade". Sexual dimorphism is noticeable in structure of the antenna. In the male, the first three to four flagellomeres are partially fused (Figure 4), while in the female, they are more ovoid than in male and not fused (Figure 5).

*Distribution:* As far as known, *Chilelimnophila lyra* has a restricted geographical distribution in Chile, ranging latitudinally from ca. 37°S (northernmost limit at the Cordillera de Nahuelbuta) to 42°S (southernmost limit at Chiloé Island) within the Subantarctic Biogeographical Province in South America.

## RESUMO

*Revisão do gênero monotípico Chilelimnophila Alexander (Diptera: Tipulomorpha: Limoniidae). Chilelimnophila lyra (Alexander, 1952), a única espécie*



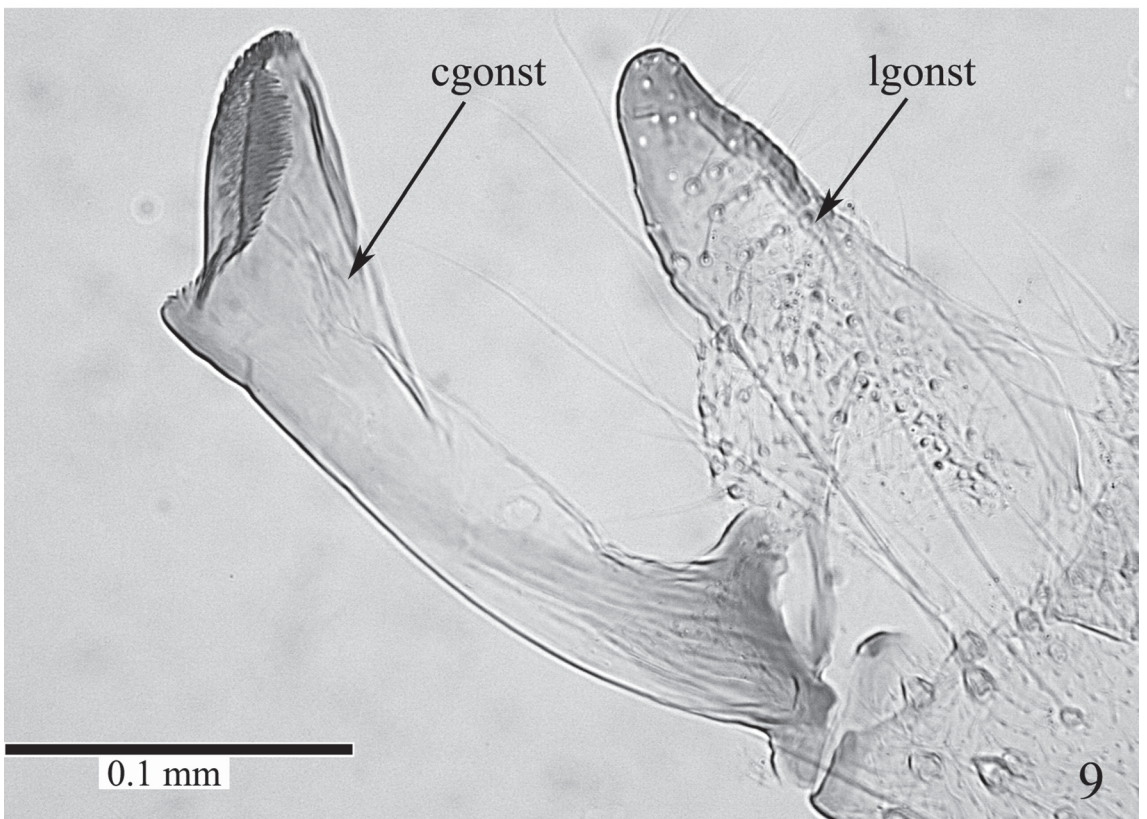
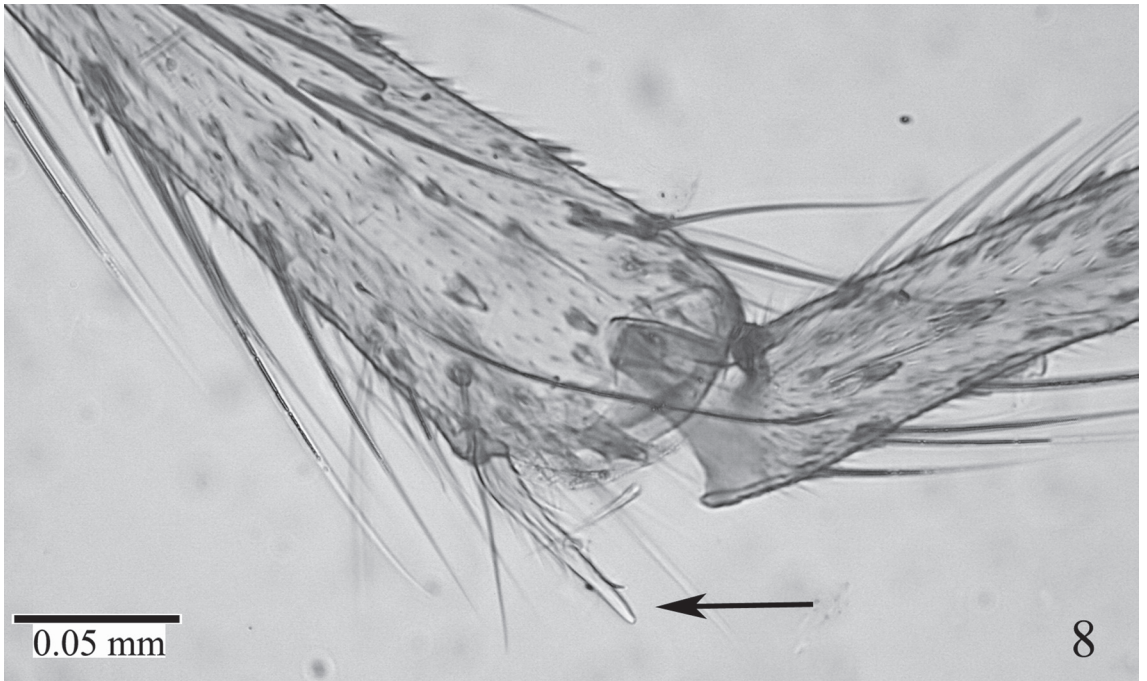
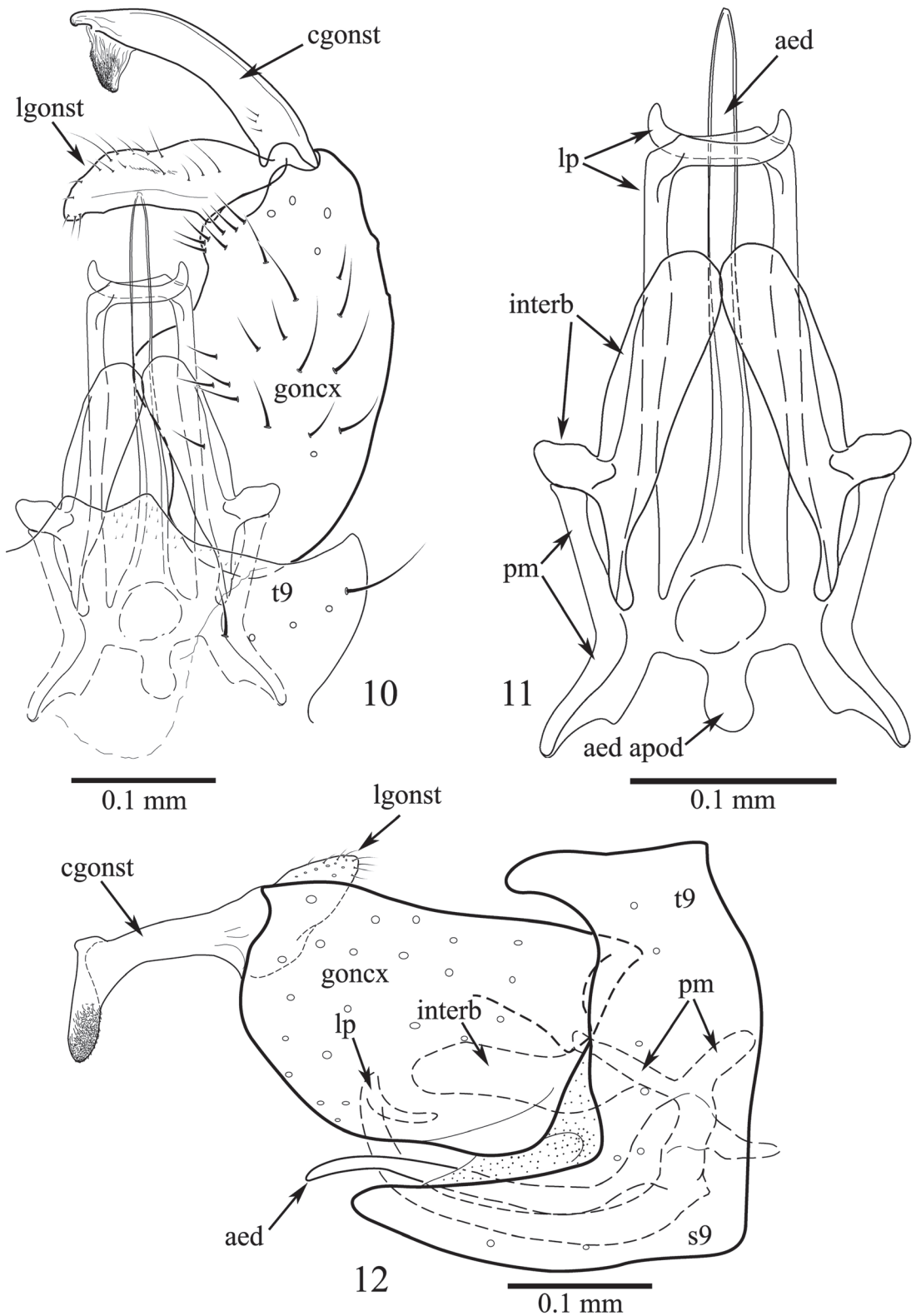


FIGURE 8-9: *Chilelimnophila lyra*, male. 8, articulation of tibia with tarsus (foreleg) showing tibial spur (arrow). 9, dorsal aspect of gonostylus in flattened, permanent slide mounted specimen. Abbreviations: cgonst, clasper of gonostylus; lgonst, lobe of gonostylus.



FIGURES 10-12: *Chilelimnophila lyra*, male terminalia. 10, general aspect of terminalia, dorsal view. 11, aedeagus and associated structures, dorsal view. 12, general aspect of terminalia, lateral view. Abbreviations: aed, aedeagus; aed apod, aedeagus apodeme; cgonst, clasper of gonostylus; goncx, gonocoxite; interb, interbase; lgonst, lobe of gonostylus; lp, lateral process of aedeagal sheath; pm, paramere; s9, ninth sternite; t9, ninth tergite.



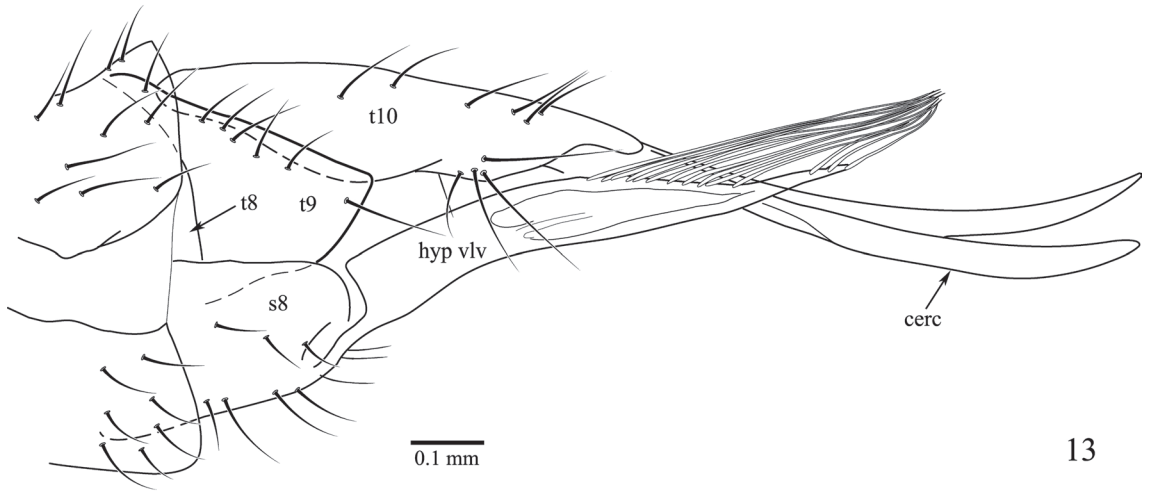


FIGURE 13: *Chilelimnophila lyra*, female ovipositor. Abbreviations: cerc, cercus; hyp vlv, hypopygial valve; s8, eighth sternite; t8-10, eighth to tenth tergites.

do gênero *Chilelimnophila* Alexander, 1968, do Chile, é redescrita com base em novos espécimes de áreas próximas à localidade tipo e outras áreas. Interpretações incorretas da descrição original são corrigidas. As estruturas anatômicas do imago são descritas e ilustradas em detalhe, incluindo informações sobre as fêmeas, até então desconhecidas. Melhores subsídios para o reconhecimento do táxon são fornecidos.

**PALAVRAS-CHAVE:** *Chilelimnophila lyra*, taxonomia, Chile, Região Neotropical.

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