The Patagonian species of the genus *Atrichopogon* Kieffer, with a biogeographic analysis based on Forcipomyiinae (Diptera: Ceratopogonidae)

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The following five new species of *Atrichopogon* Kieffer from southern Argentina and Chile are described and illustrated: *A. aridus* Spinelli & Marino, *A. comechingon* S. & M., *A. endemicus* S. & M., *A. inacayali* S. & M. and A. *similis* S. & M. *A. aridus* and *A. comechingon* also occur north of Patagonia. The previously known species *A. obfuscatus* Ingram & Macfie is redescribed, and notes on its type are provided. A key to recognition of males and females of the seven species inhabiting Patagonia is included. A biogeographic parsimony analysis of endemicity (PAE) interprets the relationships among the provinces of the southern South America. It is based on seven areas of endemism and distributional data of 30 species of the subfamily Forcipomyiinae. The analysis results in two most parsimonious cladograms and their strict consensus depicts the following relationships: ((Monte, Patagonian steppe) (Central Chile, Magellanic Moorland (Magellanic Forest, Maule, Valdivian Forest))).

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Introduction

Atrichopogon Kieffer, a worldwide genus with 474 species, is one of the most speciose in the family Ceratopogonidae, surpassed only in the Neotropics by *Culicoides* Latreille and *Forcipomyia* Meigen (Marino & Spinelli 2003a). It is placed, together with *Forcipomyia* Meigen, in the subfamily Forcipomyiinae Lenz.

The feeding habits of the female adults of *Atrichopogon* are poorly known. Some suck haemolymph from blister beetles (Wirth 1956a,b), while others are pollinivorous (Soria & Wirth 1979, Soria et al. 1980) or appear to be autogenous. Larvae are aquatic or semiaquatic and are found on the surface of mud, wet wood, or stones, feeding on diatoms and other algae (de Meillon & Wirth 1991).

Borkent & Spinelli (2000), in their catalog of the New World ceratopogonids south of the United States of America, listed 75 species of *Atrichopogon* for the region, and since then 20 species were been described: *A. mexicanus* Huerta (2001) from Mexico, *A. carpinteroi* Marino & Spinelli (2003a) from Argentina, and the remaining 18 from Costa Rica by Borkent & Picado (2004). Only 12 of the above mentioned species are known to occur in Argentina and/or Chile.

Ingram & Macfie (1931) described the following four species from southern temperate areas of Argentina and Chile: *A. assimilis*, *A. chilensis*, *A. obfuscatus* and *A. obnubilus*. These species were never been mentioned again in the literature, except in reference to the original description, until Spinelli & Wirth (1992) synonymyzed the first two under *A. obnubilus*, and fully redescribed the species. As such, only two species, *A. obnubilus* and *A. obfuscatus* are currently recognized from Patagonia. During the past 15 years, several collecting trips to many localities in Argentinean and Chilean Patagonia were undertaken, resulting in a large collection of adults of the genus *Atrichopogon*, all deposited in the Museo de La Plata, Argentina. The purpose of this paper is two-fold. First we give the results of our taxonomic study of these Patagonian specimens, providing the description and illustrations of five new species, the redescription of *Atrichopogon obfuscatus*, and a new diagnosis of *A. obnubilus*. Second we present a biogeographic analysis interpreting the distributional patterns within the subfamily Forcipomyiinae. The Patagonian species of the other genus of the subfamily, *Forcipomyia* Meigen, was recently fully reviewed in several papers by Marino & Spinelli (2001a, 2001b, 2001c, 2003b, 2004a, 2004b).

Material and methods

Specimens were slide mounted in Canada balsam and examined, measured and drawn using a binocular compound microscope with attached camera lucida. Given the fact that the slide mounts are somewhat crushed and although the best specimens were selected for the drawings, it was not possible to make good illustrations of the female genitalia, the interpretation of the different segments being very difficult. Types of the new species are deposited in the collection of the Division Entomología, Museo de La Plata, Argentina (MLPA).

Terms for structures follow those used in the Manual of Nearctic Diptera (McAlpine et al. 1981), and for special terms applying to *Atrichopogon* see Borkent & Picado (2004). Terms for wing veins follow the system of the Manual of Nearctic Diptera, with modifications proposed by Szadziewski (1996).

The biogeographic analysis was carried out on the basis of the distributional patterns of 30 species of Forcipomyiinae (23 species of *Forcipomyia* and seven of *Atrichopogon*). The analysis was done using parsimony analysis of endemicity (PAE) as proposed by Rosen (1988); for details on the method see Crisci et al. (2003 and literature cited therein). Seven area units were considered for this analysis. These areas correspond to those defined by Morrone (2001) for southern South America (Fig. 74):

1. Monte province: belonging to the Neotropical region, Chacoan subregion; this area is characterized by open shrubs with Zigophilaceae of the genera *Larrea*, *Bulnesia*, and *Plectrocarpa* (Morrone 2001).
2. Patagonian steppe: subregion belonging to the Andean region; this semidesert area is characterized by bush steppes. Among the dominant species are: *Chuquiraga avellanedae*, *C. aurea*, *Colliguaya integerrima*, *Festuca argentina*, *F. pallescens*, and *Haplopappus pectinatum* (Morrone 2001).
3. Central Chilean subregion: belonging to the Andean region; this area is characterized by its xeric vegetation defined by mediterrenean shrubs (Dinerstein et al. 1997). Among the dominant species are: *Argylia* spp., *Balbisia peduncalaris*, and *Oxalis gigantea* (Morrone 2001).
4. Maule province: belonging to the Andean region, Subantarctic subregion, this area is characterized by the the presence of typical temperate *Nothofagus* forests mixed with *Araucaria araucana* forests (Peña 1966).
5. Valdivian Forest province: belonging to the Andean region, Subantarctic subregion, this area is characterized by the presence of dominant temperate *Nothofagus* forests, and is the area where this forest reaches its highest diversity (Pisano 1977).
6. Magellanic Forest province: belonging to the Andean region, Subantarctic subregion, this area is characterized by an impoverished version of the typical Valdivian forest, likely due to the latitudinal decrease in temperature (Pisano 1977).
7. Magellanic Moorland province: belonging to the Andean region, Subantarctic subregion, the most characteristic communities in this area are bogs, which are dominated by *Sphagnum magallanicum* or an association of *Donatia fascicularis* and *Astelia pumilia* (Pisano 1977).

A data matrix showing the distribution of 30 species of Forcipomyiinae in these seven areas (Table 1) was constructed using Tree Gardener (Ramos 1996). In this matrix the presence of a taxon in an area was coded as 1 and its absence as 0. An all zero's outgroup was included to root the tree. The analysis of data matrix was performed with Hennig86 1.5 (Farris 1988) using an exact search (ie*). Character optimization was analysed using Winclada (Nixon 1999) considering only unambiguous characters.

Table 1. Data matrix for parsimony analysis of endemicity.

	0	1	2
		0	0
Out	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0
Monte	0 0 1 1 1 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 1 0 0 0
Patagonian Steppe	0 0 0 0 1 1 1 1 1 1	0 0 0 0 0 0 1 1 0 0	0 0 0 0 0 1 1 0 0 0
Central Chile	0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 1 0 0 0 0	1 0 0 0 0 0 0 0 0 0
Maule	1 1 1 0 0 0 0 0 1 1	0 0 0 0 0 1 0 0 0 0	1 0 0 1 1 0 0 0 0 1
Valdivian Forest	1 1 1 0 0 1 0 0 1 1	1 0 0 1 1 1 0 0 1 0	1 0 1 0 1 0 0 1 1 0
Magellanic Forest	1 1 0 0 0 0 0 0 1 1	1 1 1 0 1 1 0 0 0 0	1 0 0 0 0 0 0 0 0 1
Magellanic Moorland	0 0 0 0 0 0 0 0 0 1	0 0 1 0 1 1 0 0 0 1	0 1 0 0 0 0 0 0 0 0

List of species

0. *Atrichopogon obnubilus*; 1. *A. obfuscatus*; 2. *A. similis* sp. n.; 3. *A. comechingon* sp. n.; 4. *A. aridus* sp. n.; 5. *A. inacayali* sp. n.; 6. *A. endemicus* sp. n.; 7. *Forcipomyia* (*Euprojoannisia*) *esteparia*; 8. *F.* (*E.*) *setosicrus*; 9. *F.* (*Forcipomyia*) *fusca*; 10. *F.* (*F.*) *caliginosella*; 11. *F.* (*F.*) *piroskyi*; 12. *F.* (*F.*) *wygodzinskyi*; 13. *F.* (*F.*) *edwardsiana*; 14. *F.* (*F.*) *minitheca*; 15. *F.* (*F.*) *multipicta*; 16. *F.* (*F.*) *muzoni*; 17. *F.* (*F.*) *somuncurensis*; 18. *F.* (*F.*) *zonogaster*; 19. *F.* (*F.*) *yamana*; 20. *F.* (*F.*) *chilensis*; 21. *F.* (*Metaforcipomyia*) *darwini*; 22. *F.* (*M.*) *maculosa*; 23. *F.* (*M.*) *morenoi*; 24. *F.* (*M.*) *mapuche*; 25. *F.* (*Synthyridomyia*) *soibelzoni*; 26. *F.* (*Thyridomyia*) *riojana*; 27. *F.* (*Trichohelea*) *limnetis*; 28. *F.* (*Trichohelea*) *sayhuequei*; 29. *F.* (*Trichohelea*) *tehuelche*.

Results

Key to Patagonian species of the genus *Atrichopogon*

1. Males 2
– Females 8
2. Antenna normally developed (with terminal 4 flagellomeres elongate) (Figs 2, 13, 26, 49, 60); wing without macrotrichiae; scutum uniformly pigmented 3
– Antenna female-like (with terminal 5 flagellomeres elongate) (Fig. 39); wing with macrotrichiae, scutum with contrasting pattern of pigmentation (Fig. 42) .... *Atrichopogon inacayali* Spinelli & Marino sp. n.
3. Hindtibial spur length less than width of hindtibia at midlength 4
– Hindtibial spur length longer than width of hindtibia at midlength (Fig. 15)....................... *Atrichopogon comechingon* Spinelli & Marino sp. n.
4. Abdominal terga with pattern of pigmentation, tergites 1-5 brown with lateral patches paler, 6-8 entirely brown (Figs 30, 63) 5
– Abdominal terga uniformly pigmented................. 6
5. Legs dark brown; gonostylus slender, nearly straight except distal 1/3 curved; aedeagal-parameral complex broad, striated posteroventrally, posterodorsal projection tapering to cap-like tip, with V-shaped, sclerotized, dorsal sclerite reaching tip (Fig. 64) .... *Atrichopogon similis* Spinelli & Marino sp. n.
– Legs pale brown; gonostylus stout, swollen at base, distal ½ curved; aedeagal-parameral comple composed only of ventral portion, broad, with conical posteromedial lobe, basal arch striated (Fig. 31) .... *Atrichopogon endemicus* Spinelli & Marino sp. n.
6. Aedeagus and parameres forming a partially fused complex (Figs 17, 31, 44, 52, 64) 7
– Aedeagus and parameres separated, not forming an aedeagal-parameral complex (Fig. 5).... .... *Atrichopogon aridus* Spinelli & Marino sp. n.
7. Posterior margin of sternite 9 strongly concave; gonostylus without apical teeth; posterodorsal T-shaped projection of aedeagal-parameral complex tapering to truncate tip (Fig. 52) .... *Atrichopogon obfuscatus* Ingram & Macfie
– Posterior margin of sternite 9 broadly concave; gonostylus with three apical teeth; posterodorsal T-shaped projection of aedeagal-parameral complex tapering to cap-like tip .... *Atrichopogon obnubilus* Ingram & Macfie
8. One spermatheca 9
– Two spermathecae... .... *Atrichopogon obnubilus* Ingram & Macfie
9. Scutum with contrasting pattern of pigmentation (Figs 20, 42); flagellomere 13 with apical nipple not basally constricted (Figs. 18, 39)........ 10
– Scutum without contrasting pattern of pigmentation; flagellomere 13 with apical nipple basally constricted (Figs 32, 53, 65)....................... 11
10. Mandible poorly developed, unarmed; hindtibial spur longer than width of hindtibia at midlength (Fig. 15)... *Atrichopogon comechingon* Spinelli & Marino sp. n.
– Mandible with strong teeth; hindtibial spur less than width of hindtibia at midlengt .... *Atrichopogon inacayali* Spinelli & Marino sp. n.
11. Maxillary palpus with segments 4 and 5 separate, segment 5 rounded (Figs 33, 41, 54, 66); mandible with 20 or more teeth 12
– Maxillary palpus with segments 4 and 5 closely appressed, segment 5 conical (Fig. 7); mandible with 8-9 minute teeth.............................. .... *Atrichopogon aridus* Spinelli & Marino sp. n.

12. Flagellomeres 1-8 subspherical, broader than long (Figs 53, 65); maxillary palpal segment 3 swollen at midlength (Figs 54, 66); wing with macrotrichiae in cells r_3, m_1, m_2 and/or cua_1 (Figs 55, 67); abdominal terga with or without pattern of pigmentation.. 13
– Flagellomeres 1-8 vasiform, as broad as long (Fig. 32); maxillary palpus slender (Fig. 33); wing with macrotrichiae in apical portion of cell r_3 and a few in cell m_1 (Fig. 34); abdominal terga with pattern of pigmentation (Fig. 30) ..*Atrichopogon endemicus* Spinelli & Marino sp. n.
13. Wing with macrotrichiae in cells r_3, m_1, m_2 and a few in cell cua_1 (Fig. 67); abdominal terga with pattern of pigmentation (Fig. 63) ....*Atrichopogon similis* Spinelli & Marino sp. n.
– Wing with macrotrichiae in cells r_3, m, or cell m_2, none in cell cua_1 (Fig. 55); abdominal terga without pattern of pigmentation .... *Atrichopogon obfuscatus* Ingram & Macfie

Atrichopogon aridus Spinelli & Marino, **sp. n.**

(Figs 1- 11)

Type material. – Holotype male, allotype female, Argentina: Mendoza prov., Malargue, 10-XI-1994, G. Spinelli, sweep net. Paratypes 2 males, 2 females, as follows: same data as holotype, 2 males, 1 female; Río Negro, Bariloche, Río Limay (anfiteatro), 4-II-1981, G. Spinelli, 1 female, at light.

Derivation of specific epithet. – A reference to the arid zones inhabited by this species.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of characters: male with fifth palpal segment conical; thorax and abdomen without pattern of pigmentation; parameres represented by two separated lobes, each one gradually narrowed posteriorly; aedeagus broad, triangular, stout, tapering to conical, blunt tip. Female: fifth palpal segment conical; mandible with 8-9 minute teeth; wing with a few macrotrichiae near the very apical portion of cell r_3; thorax and abdomen without pattern of pigmentation; posterior portion of sternite 8 with faint armature of spicules.

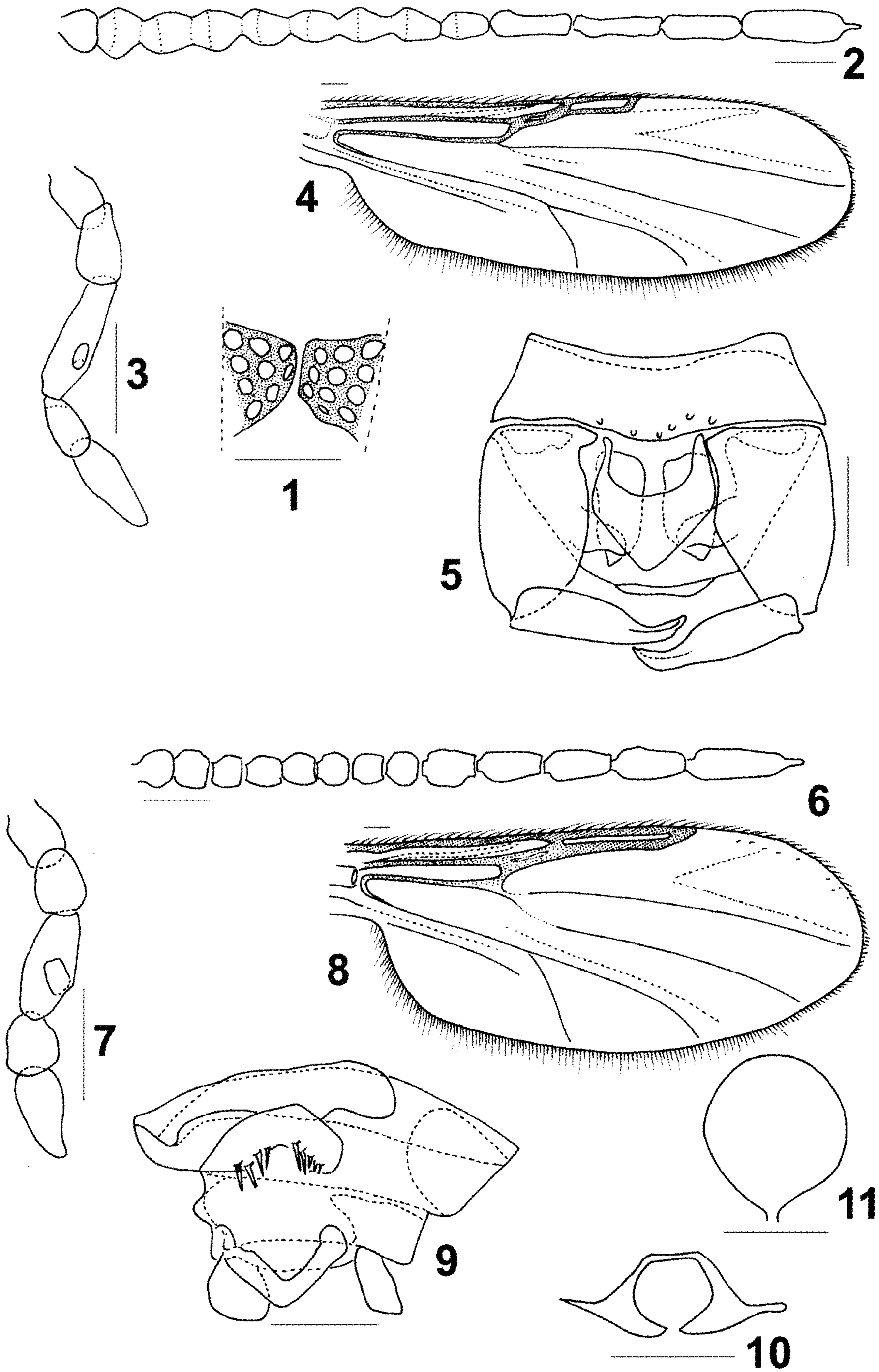
Description. – Male. Head: Dark brown. Ommatidia (Fig. 1) with interfacet spicules, abutting medially for length of 2-3 ommatidia. Antenna (Fig. 2) with plume setae well-developed, flagellomeres 1-8 fused, flagellomeres 9-10 with plume setae, 10-13 elongate, 10 longer than 1-9; flagellomere 13 with apical nipple, slightly constricted basally; AR 0.85 (0.84-0.86, n = 3). Maxillary palpus (Fig. 3) brown; third segment slender, moderately elongate, with subapical sensory pit opening on distal third; segments 4, 5 closely appressed; segment 5 conical; PR 3.40 (3.22-3.88, n = 3). Proboscis length 0.248 (0.240-0.256, n = 3) mm; P/H ratio 0.96 (0.94-0.97, n = 3).

Thorax: Dark brown. Scutum with setae arising directly from surface, not in pits; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, broadly bilobed posteriorly. Legs uniformly brown; hindtibia slightly expanded at apex; hindtibial spur length less than width of hindtibia at midlength; hindtibial comb with 7-8 spines; prothoracic TR 3.16 (3.125-3.25, n = 3), mesothoracic TR 2.81 (2.67-3.00, n = 3), metathoracic TR 2.67 (2.55-2.73, n = 3); claws curved, moderately stout, bifid at tip; empodia present. Wing (Fig. 4) plain, without pattern of pigmented membrane; without macrotrichiae on membrane, second radial cell 3 times longer than first; first radial cell reduced; wing length 1.15 (1.14-1.16, n = 2) mm; breadth 0.39 (0.38-0.40, n = 3) mm; CR 0.58 (0.58-0.59, n = 2). Halter whitish.

Abdomen: Tergites uniformly brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 5): Segment 9 about equal in width to segment 8, tergite 9 short, not extending to level of apex of gonocoxite; posterior margin truncate; sternite 9 narrow, with posterior margin nearly straight, with single row of setae. Gonocoxite without medial lobe, moderately stout, 1.6 times longer than greatest breadth; gonostylus 0.75 as long as gonocoxite, swollen at base, tapering to apical 1/3, gently curved, tip pointed. Parameres represented by two separated lobes, each one gradually narrowed posteriorly. Aedeagus broad, triangular, stout, tapering to conical, blunt tip; lateral arms slender, directed anteriorly; basal arch extending to 2/5 of total length. Cercus slender, lobe-like, ventral to tergite 9.

Female: As for male, with following differences; antenna with flagellomeres 1-8 slightly broader than long; flagellomeres 9-13 elongated, proportions as shown in Fig. 6, flagellomere 13 with apical nipple, slightly constricted basally; AR 1.39 (1.34-1.44, n = 3); Maxillary palpus (Fig. 7) brown; third segment slender, with broad deep sensory pit opening on distal third; segments 4, 5 closely appressed, its combined length longer than third segment; segment 5 conical; PR 2.51 (2.27-3.00, n = 3); proboscis length 0.264 (0.256-0.272, n = 2) mm; P/H ratio 1.25 (1.19-1.31, n = 2). Mandible with 8-9 minute teeth.

Thorax: Legs brown, prothoracic TR 3.28 (3.14-



Figs 1-11. *Atrichopogon aridus*. 1-5, male, 6-11, female. 1, ommatidia; 2, 6, flagellum; 3, 7, maxillary palpus; 4, 8, wing; 5, genitalia; 9, female genitalia (segments 8-10); 10, genital sclerotization; 11, spermatheca. Scale bars: 0.05 mm.

3.43, n = 3), mesothoracic TR 2.88 (2.75-3.00, n = 3), metathoracic TR 2.70 (2.60-2.80, n = 3), claws curved; empodia present. Wing (Fig. 8) plain, without pattern of pigmented membrane; with a few macrotrichiae near the very apical portion of cell r_3; second radial cell narrow, nearly 4 times longer than first; first radial cell reduced; wing length 1.09 (1.04-1.14, n = 3) mm; breadth 0.46 (0.44-0.48, n = 3) mm; CR 0.67 (0.67-0.68, n = 3).

Abdomen: Tergites uniformly brown. Posterior portion of sternite 8 with armature of spicules. Segments 8-10 as shown in Fig. 9. Genital sclerotization (Fig. 10) open. One spermatheca (Fig. 11) ovoid with short neck, strongly sclerotized, measuring 0.088 by 0.072 mm (Fig. 10), apical ¼ with minute hyaline punctations. Cercus pale brown.

Distribution. – Argentina, in arid zones of Mendoza and Río Negro provinces (Fig. 71).

Taxonomic Discussion. – Males and females were collected at the same locality and date. The separation of the aedeagus and parameres, with these not forming an aedeagal-parameral complex, is only shared with *A. bicuspis* Borkent & Picado within the Neotropical region. However, this new species can be easily distinguished by the plain wing, without a pigmented pattern on the membrane (wing with pigmented pattern in *bicuspis*).

Characters for distinguishing *A. aridus* from the remaining patagonian species may be found in the key.

Atrichopogon comechingon Spinelli & Marino, **sp. n.**

(Figs 12-24)

Type material. – Holotype male, allotype female, Argentina: Córdoba prov., Cura Brochero, II-2005, H. Lopez, light trap. Paratypes, 7 males, 10 females, as follows: same data as holotype, 5 females; same data as holotype except 17/29-II-2004, 5 males, 2 females; Río Negro prov., Choele-Choel, 22-XI-1994, G. Spinelli, 2 males, 3 females, sweep net.

Derivation of specific epithet. – A reference to the Comechingon Indians, early inhabitants of the type-locality.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of characters: male with fifth palpal segment conical; scutum without pattern of pigmentation; hindtibial spur thick; aedeagal-parameral complex broad, with rounded posterolateral margin, posteroventral process triangular, tip blunt; lateral arms directed laterally, basal arch extending to 1/3 of total length. Female: fifth palpal segment conical; mandible without teeth, scutum with pattern of pigmentation, wing macrotrichiae in apical portion of cells r_3, m_1, m_2 and cua_1.

Description. – Male. Head: Dark brown. Ommatidia (Fig. 12) with interfacet spicules, abutting medially for length of 1-2 ommatidia. Antenna (Fig. 13) dark brown; with plume setae well-developed, flagellomeres 1-8 at least partially fused, flagellomeres 9-10 with plume setae, 10-13 elongated; flagellomere 13 with apical nipple, not basally constricted; AR 1.16 (1.07-1.25, n = 8). Maxillary palpus (Fig. 14) slender; third segment moderately elongate, with shallow sensory pit near midlength; segments 4, 5 separate, broadly abutting; segment 5 conical; PR 2.52 (2.11-2.89, n = 8). Proboscis short, length 0.216 (n = 7) mm; P/H ratio 0.81 (0.75-0.90, n = 4).

Thorax: Dark brown except scutellum yellowish brown. Scutum without pattern of pigmentation, with setae arising directly from surface, not in pits; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, slightly bilobed posteriorly. Legs uniformly yellowish brown; hindtibia slightly expanded at apex; hindtibial spur thick (Fig. 15), length longer than width of hindtibia at midlength; hindtibial comb with 6-8 spines; prothoracic TR 3.22 (3.10-3.33, n = 8), mesothoracic TR 3.18 (2.92-3.45, n = 8), metathoracic TR 2.16 (2.05-2.31, n = 8); claws curved, moderately stout, bifid at tip, empodia present. Wing (Fig. 16) plain, without pattern of pigmented membrane; without macrotrichiae on membrane, second radial cell nearly 3 times longer than first; first radial cell reduced; wing length 1.22 (1.16-1.28, n = 7) mm; breadth 0.40 (0.38-0.42, n = 8) mm; CR 0.63 (0.62-0.64, n = 7). Halter whitish.

Abdomen: Tergites uniformly brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 17): Segment 9 about equal in width to segment 8, tergite 9 short, not extending to about level of apex of gonocoxite; posterior margin rounded; sternite 9 narrow, with posterior margin broadly concave, with single row of setae. Gonocoxite without medial lobe, moderately stout, 2 times longer than greatest breadth; gonostylus 0.85 as long as gonocoxite, swollen at base, tapering to apical 1/3, gently curved, tip pointed. Aedeagal-parameral complex broad, with rounded posterolateral margin, posteroventral process triangular with sclerotized, median portion slender, tip blunt; lateral arms directed laterally; basal arch extending to 1/3 of total length. Cercus not extending beyond to tergite 9.

Female. As for male, with following differences; antenna with flagellomeres 1-8 slightly longer than broad, vasiform, flagellomeres 9-13 elongated, proportions as shown in Fig. 18, flagellomere 13 with apical nipple, not basally constricted; AR 1.71 (1.52-1.87, n = 8). Maxillary palpus (Fig. 19) pale brown with third segment slender, with shallow sensory pit near midlength; segments 4, 5 separate, broadly abutting, its combined length slightly longer than third segment; segment 5 conical; PR 2.07 (2.00-2.27, n = 9); proboscis length 0.254 mm (0.240-0.272, n = 9); P/H ratio 1.15 (1.08-1.26, n = 8). Mandible poorly developed, without teeth.

Thorax: Scutum with pattern of pigmentation as shown in Fig 20; postscutellum, paratergite, propleuron, anepisternum, katepisternum dark brown; scutellum, rest of pleura pale yellowish; setae arising directly from surface, not in pits; with lateral suture. Legs yellowish brown, prothoracic TR 3.28 (2.90-3.50, n = 9), mesothoracic TR 3.37 (3.20-3.55, n = 9), metathoracic TR 2.29 (2.18-2.40, n = 9); claws curved; empodia present. Wing (Fig. 21) plain, without pattern of pigmented membrane; with macrotrichiae in apical portion of cells r_3, m_1, m_2, cua_1; second radial cell nearly 5 times longer than first; first radial cell open; wing length 1.17 (1.10-1.24, n = 8) mm; breadth 0.50 (0.48-0.52, n = 9) mm; CR 0.68 (0.67-0.69, n = 8).

Abdomen: Tergites pale brown. Sternite 8 without elongate, curved setae. Segments 8-10 as shown in Fig. 22. Genital sclerotization (Fig. 23) subquadrangular, open. One spermatheca (Fig. 24) ovoid with short neck, sclerotized, measuring 0.098 by 0.072 mm. Cercus pale.

Distribution. – Argentina, in Córdoba and Río Negro provinces (Fig. 71).

Taxonomic Discussion. – Males and females were collected at the same locality (type-locality) and date. The thoracic pigmentation of the female and male of this species differed somewhat, with a distinctive pattern in the female, absent in the male.

The hind tibial spur longer than width of hindtibia at midlength and the poorly developed mandible easily distinguishes *A. comechingon* from other *Atrichopogon* species inhabiting Patagonia. Of the remaining Neotropical species that share these characters, *A. didymothecae* Macfie and *A. lobatus* Borkent & Picado are the most similar. *Atrichopogon didymothecae* can be distinguished from *A. comechingon* by it having many macrotrichiae in the apical portion of cells r_3, m_1, spermathecae very elongate and sac-like, posterior margin of tergite 9 bilobed, smaller gonostylus and the aedeagal-parameral complex being highly modified. The male of this new species resembles that of *A. lobatus* Borkent & Picado in having a triangular posteroventral portion of the aedeagal-parameral complex, but differs by the short tergite 9 (moderately elongate in *lobatus*), the concave posterior margin of ninth sternite (nearly straight in *lobatus*), and the gonostylus without a basal, pointed lobe. The female can be easily distinguished from the female of *A. lobatus* by it having macrotrichiae in the apical portion of cells r_3, m_1, m_2, cua_1 (only in apical portions of cells r_3 and m_1 in *lobatus*), and by the ovoid spermatheca (elongate in *lobatus*).

Characters for distinguishing *A. comechingon* from the remaining patagonian species may be found in the key.

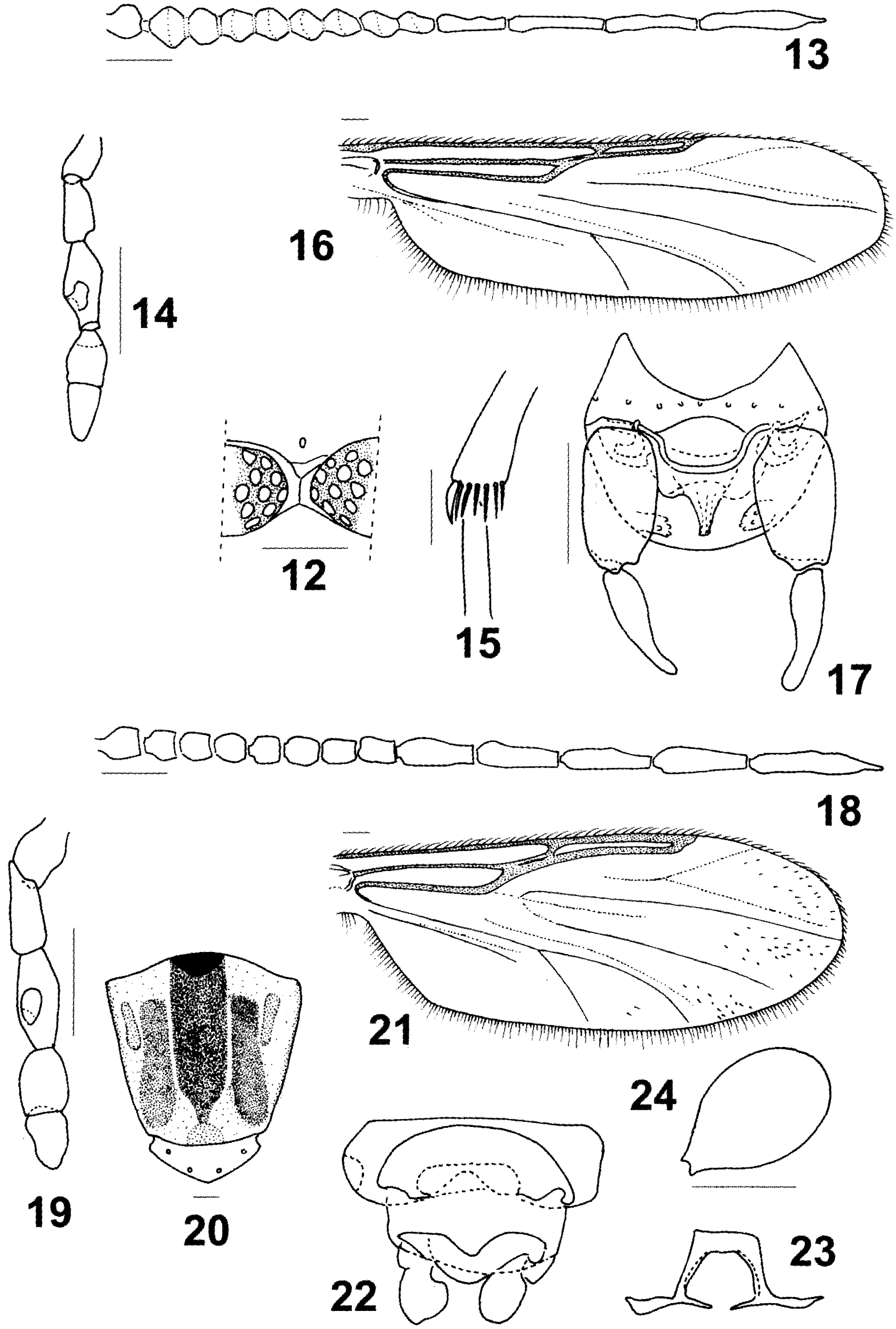
Atrichopogon endemicus Spinelli & Marino, **sp. n.**

(Figs 25-37)

Type material. – Holotype male, allotype female, Argentina: Río Negro prov., Somuncura plateau, Estancia El Rincón, 30-XI/3-XII-1999, J. Muzón, Malaise trap (MLPA). Paratypes 3 males, 6 females, as follows: same data as holotype, 2 males, 1 female; same data except 27-XI-1999, 1 male; same data except 27-II-1995, G. Spinelli, 3 females, sweep net; same data except 28/29-I-1999, P. Marino, 2 females, sweep net.

Derivation of specific epithet. – A reference to the restricted distribution to the type-locality.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of characters: male with fifth palpal segment rounded; scutum and abdominal terga with pattern of pigmentation; aedeagal-parameral complex composed only of ventral portion, with conical posteromedial lobe, basal arch striated, extending to 1/2 of total length. Female: fifth palpal segment rounded; scutum and abdominal terga with pattern of pigmentation; wing with many macrotrichiae in apical portion of cell r_3 and a few in cell m_1.



Figs 12-24. *Atrichopogon comechingon.* 12-17, male, 18-24, female.12, ommatidia; 13, 18, flagellum; 14, 19, maxillary palpus; 15, hindtibial spur; 16, 21, wing; 17, genitalia; 20, scutum; 22, female genitalia (segments 8-10); 23, genital sclerotization; 24, spermatheca. Scale bars: 0.05 mm.

Description. – Male. Head. Dark brown. Ommatidia (Fig. 25) with interfacet spicules, abutting medially for length of 4 ommatidia. Antenna (Fig. 26) brown, with plume setae well-developed, flagellomeres 2-8 fused, flagellomeres 9-10 with plume setae, 11-13 elongated, 10 longer than 1-9; flagellomere 13 with apical nipple, basally constricted; AR 1.05 (1.01-1.09, n = 4). Maxillary palpus (Fig. 27) brown; third segment slender, with deep sensory pit opening on distal third; segments 4, 5 separate; segment 5 rounded; PR 3.46 (3.20-3.78, n = 4). Proboscis short, length 0.280 mm (n = 2); P/H ratio 1.00 (n = 2).

Thorax. Dark brown. Scutum (Fig. 28) with setae arising directly from surface, not in pits; dorsocentral pale stripe anteriorly and posteriorly expanded, posterior one divided into two small, rounded pale areas; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, sharply bilobed posteriorly. Legs uniformly light brown; hindtibia slightly expanded at apex; hindtibial spur length less than width of hindtibia at midlength; hindtibial comb with 7-8 spines; prothoracic TR 2.88 (2.80-3.00, n = 4), mesothoracic TR 3.11 (3.00-3.22, n = 4), metathoracic TR 2.78 (2.69-2.83, n = 4); claws curved, moderately stout, bifid at tip; empodia present. Wing (Fig. 29) plain, without pattern of pigmented membrane; without macrotrichiae on membrane, first and second radial cells well formed, the second nearly 3 times longer than first; wing length 1.27 (1.22-1.32, n = 4) mm; breadth 0.43 (0.40-0.46, n = 4) mm; CR 0.65 (0.62-0.66, n = 4). Halter whitish.

Abdomen (Fig. 30). Tergites 2-5 brown with lateral patches paler, 6-8 entirely brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 31): Segment 9 equal about in width to segment 8. Tergite moderately elongate, extending to level of apex of gonocoxite, posterior margin rounded; sternite 9 narrow, with posterior margin concave, with scattered setae. Gonocoxite moderately stout, without medial lobe, 1.6 times longer than greatest breadth; gonostylus stout, 0.85 as long as gonocoxite, tapering from bases, apical 1/3 curved, tip pointed. Aedeagal-parameral complex composed only of ventral portion, broad, with conical posteromedial lobe; lateral arms short, directed anterolaterally; basal arch striated, extending to 1/2 of total length, tip broad, blunt. Cercus not visible.

Female. As for male, with following differences; antenna with flagellomeres 1-8 nearly as longer as broad, vasiform; flagellomeres 9-13 elongated, proportions as shown in Fig. 32, flagellomere 13 with apical nipple, basally constricted; AR 1.79 (1.67-1.89, n = 7). Maxillary palpus (Fig. 33) brown; third segment slender, with narrow deep sensory pit opening on distal third; segments 4, 5 separate, its combined length slightly longer than third segment; PR 2.64 (2.25- 2..83, n = 7); proboscis length 0.272 (0.256-0.288, n = 7) mm; P/H ratio 1.12 (1.06-1.21, n = 7). Mandible with about 20 teeth. Thorax. Legs uniformly light brown; prothoracic TR 2.97 (2.80-3.25, n = 7), mesothoracic TR 3.17 (2.89-3.44, n = 7), metathoracic TR 2.70 (2.55-2.82, n = 7); claws curved; empodia present. Wing (Fig. 34) plain, without pattern of pigmented membrane; with many macrotrichiae in apical portion of cell r_3, a few in cell m_1; radial cells narrow, second 2.7 times longer than first; wing length 1.23 (1.16-1.32, n = 7) mm; breadth 0.52 (0.50-0.56, n = 7) mm; CR 0.72 (0.71-0.76, n = 7). Abdomen. Tergites 1-5 brown with lateral patches paler, 6-10 uniformly brown. Sternite 8 without elongate, curved setae. Segments 8-10 as shown in Fig. 35. Genital sclerotization (Fig. 36) open, anterior margin rounded. One spermatheca (Fig. 37) ovoid with short neck, strongly sclerotized, measuring 0.086 by 0.062 mm, apical ¼ with minute hyaline punctations. Cercus brown.

Distribution. – Argentina, in steppe areas of Río Negro province (Fig. 71).

Taxonomic Discussion. – Male and females were associated by their similar pigmentation pattern and were collected at the same locality and date.

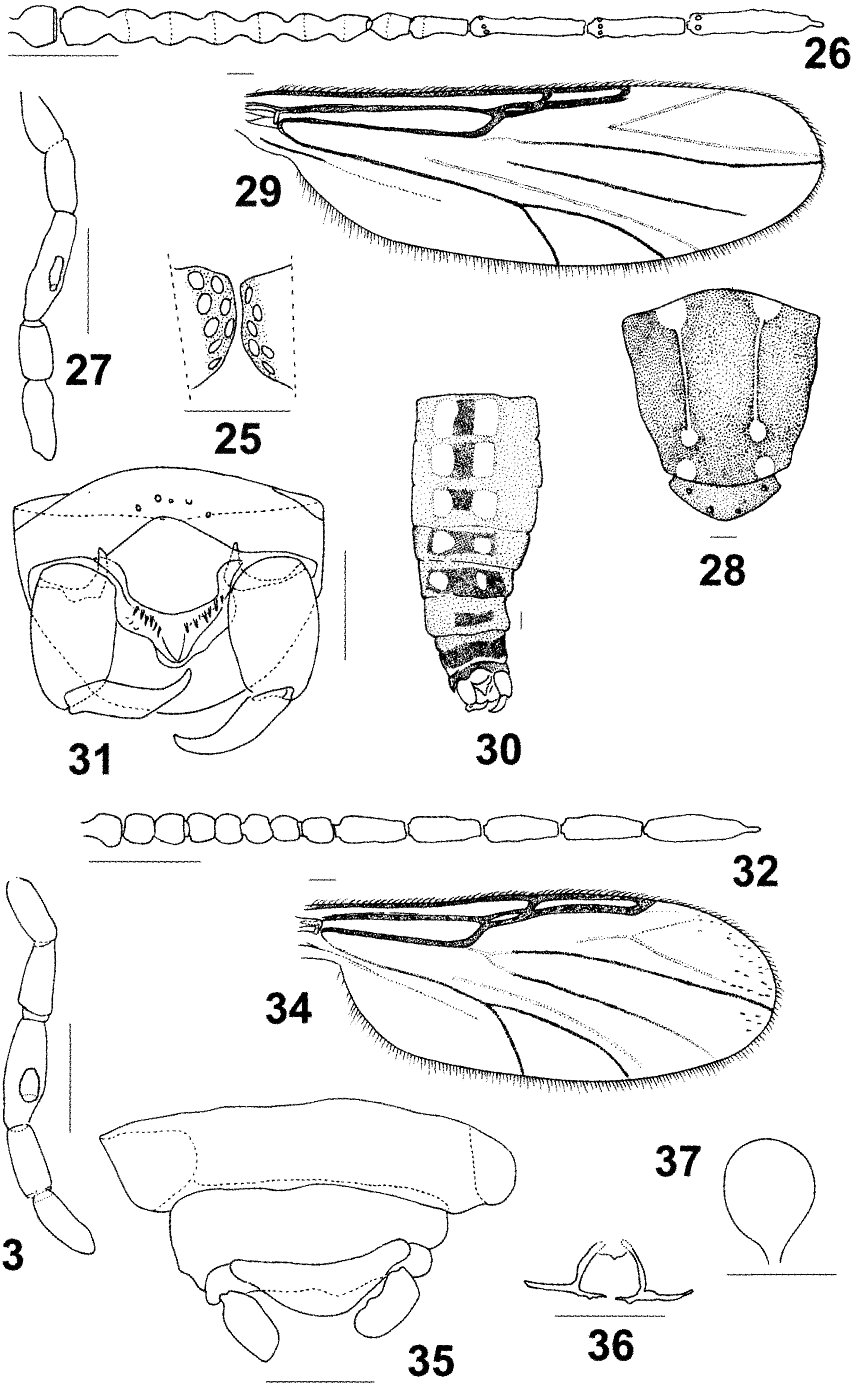
The males of this species is similar to *A. granditibialis* Borkent & Picado by virtue of the aedeagal-parameral complex composed only of the ventral portion, but differs from this species by the shorter tergite 9 and the broadly concave posterior margin of sternite 9.

Characters for distinguishing *A. endemicus* from *A. similis* may be found in the key and in the discussion under the later species.

Atrichopogon inacayali Spinelli & Marino, **sp. n.**

(Figs 38-47)

Type material. – Holotype male, allotype female, Argentina: Chubut prov., 16 km SE Paso del Sapo, 27-II-2001, G. Spinelli, CDC light trap. Paratypes 2 males,



Figs 25-37. *Atrichopogon endemicus*. 25-31, male, 32-37, female. 25, ommatidia; 26, 32, flagellum; 27, 33, maxillary palpus; 28, scutum; 29, 34, wing; 30, abdominal terga; 31, genitalia; 35, female genitalia (segments 8-10); 36, genital sclerotization; 37, spermatheca. Scale bars: 0.05 mm.

7 females, as follows: same data as holotype 2 males, 6 females; Río Negro prov., El Bolsón, 29-XI-1999, G. Spinelli, 1 female, at light.

Derivation of specific epithet. – This species is named after Inacayal, who was chief of the Mapuche Indians in the late 1800s.

Diagnosis. – The only species of *Atrichopogon* from Patagonia without secondary sexual dimorphism; ommatidia without interfacet spicules; maxillary palpus darkish at apex, fifth segment rounded; scutum with pattern of pigmentation; wing macrotrichiae in apical portion of cells r_3, m_1 and a few in cell m_2; aedeagal-parameral complex broad, posterodorsal T-shaped projection tapering to cap-like process.

Description. – Male. Head: Vertex, frons light brown; clypeus and proboscis brown. Ommatidia (Fig. 38) without interfacet spicules, broadly abutting medially for length of 4 ommatidia. Antenna dark brown; with plume setae not developed; with 13 flagellomeres, proportions as shown in Fig. 39; flagellomeres separate with sensillae chaetica and trichodea (Fig. 40); flagellomeres 1-8 vasiform, flagellomeres 9-13 elongated; flagellomere 13 with apical nipple, not basally constricted; AR 1.57 (1.49-1.62, n = 3). Maxillary palpus (Fig. 41) pale, darkish at apex; third segment slender, with shallow sensory pit near midlength; segments 4, 5 closely appressed; segment 5 rounded, slightly longer than fourth; PR 2.63 (2.57-2.71, n = 3). Proboscis short, length 0.262 (0.256-0.272, n = 3) mm; P/H ratio 1.10 (1.03-1.17, n = 3).

Thorax. Scutum as shown in Fig. 42; postscutellum, paratergite, propleuron, anepisternum, katepisternum dark brown; scutellum, rest of pleura pale yellowish. Scutum with setae arising directly from surface, not in pits; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, deeply bilobed posteriorly. Legs uniformly yellowish; hindtibia slightly expanded at apex; hindtibial spur length less than width of hindtibia at midlength; hindtibial comb with 7 spines; prothoracic TR 3.25 (3.10-3.33, n = 3), mesothoracic TR 2.91(2.82-3.10, n = 3), metathoracic TR 2.67 (2.58-2.75 n = 3); claws curved, moderately stout, bifid at tip; empodia present. Wing (Fig. 43) plain, without pattern of pigmented membrane; with macrotrichiae in apical portion of cells r_3, m_1, a few in cell m_2; first and second radial cells well formed, the second long, nearly 5 times longer than first; wing length 1.29 (1.28-1.30, n = 3) mm; breadth 0.48 mm; CR 0.75. Halter whitish.

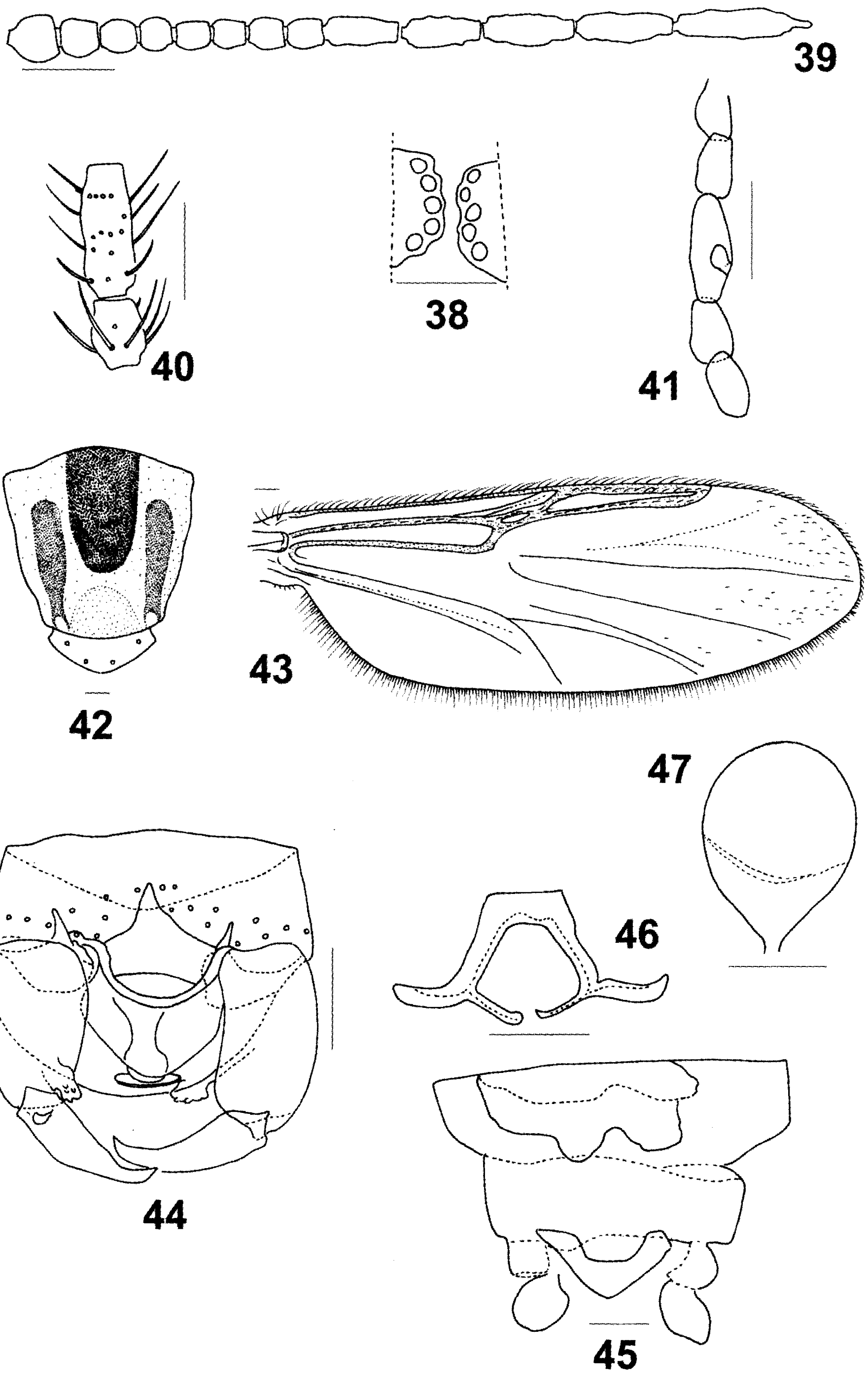
Abdomen. Pale with tergites uniformly yellowish brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 44): Of moderate size, segment 9 about equal in width to segment 8; tergite short not extending to apex of gonocoxite; posterior margin rounded. Sternite 9 narrow, with posterior margin concave, with scattered setae. Gonocoxite without medial lobe, 1.6 times longer than greatest breadth; gonostylus 0.75 as long as gonocoxite, base broad, apical ¼ slightly curved, tip pointed. Aedeagal-parameral complex broad, posteroventrally rounded; posterodorsal T-shaped projection, tapering to cap-like apex; lateral arms directed anterolaterally; basal arch extending to 2/5 of total length. Cercus elongate, barely extending beyond apex of tergite 9.

Female. As for male, only with genital differences; AR 1.48 (1.42-1.53, n = 8); PR 2.45 (2.12- 2.67, n = 8); proboscis length 0.296 (0.280-0.304, n = 8) mm; P/H ratio 1.14 (1.06-1.23, n = 8); mandible with about 15-18 teeth; wing length 1.44 (1.38-1.56, n = 8) mm; breadth 0.58 (0.56-0.60, n = 8) mm; CR 0.75 (0.74-0.76, n = 8); prothoracic TR 3.28 (3.00-3.44, n = 8), mesothoracic TR 2.90 (2.73-3.20, n = 8), metathoracic TR 2.71 (2.69-2.83, n = 8). Tergites uniformly pale brown. Sternite 8 without elongate, curved setae. Segments 8-10 as shown in Fig. 45. Genital sclerotization (Fig. 46) open. One spermatheca (Fig. 47) ovoid with short neck, strongly sclerotized, measuring 0.112 by 0.082 mm. Cercus pale.

Distribution. – Argentina, in forests and steppes of Chubut and Río Negro provinces (Fig. 71).

Taxonomic Discussion. – Males and females were associated by the shared presence of the same pigmentation pattern of the scutum and were collected at the same locality and date.

This new species shares the lack of secondary sexual differences with the following four Neotropical species: *Atrichopogon homofacies* Spinelli and *A. carpinteroi* Marino & Spinelli, both from Argentina, and *A. asuturus* Borkent & Picado and *A. tirzae* Borkent & Picado, the last two from Costa Rica. *Atrichopogon homofacies* differs by the flagellum being entirely dark brown and only the last three flagellomeres elongated in the male antenna, stouter gonostylus, parameres fused with blunt tip, aedeagus Y-shaped with higher basal



Figs 38-47. *Atrichopogon inacayali*. 38-44, male, 45-47, female. 38, ommatidia; 39, flagellum; 40, flagellomeres 8-9; 41, maxillary palpus; 42, scutum; 43, wing; 44, genitalia; 45, female genitalia (segments 8-10); 46, genital sclerotization; 47, spermatheca. Scale bars: 0.05 mm.

arch, and Y-shaped female genital sclerotization. *Atrichopogon carpinteroi* exhibits contrasting pigmentation between the thorax and abdomen, has eight proximal flagellomeres whitish, larger spermathecae, and the aedeagus triangular. *Atrichopogon asuturus* and *A. tirzae* lack the lateral scutal suture, and their tergites 1-4 are darker than 5-8.

This is the only species inhabiting Patagonia without secondary sexual differences.

Atrichopogon obfuscatus Ingram & Macfie, 1931

(Figs 48-58)

Atrichopogon (*Kempia*) *obfuscatus* Ingram & Macfie 1931: 173 (male, female; Argentina).
Atrichopogon obfuscatus: Borkent & Wirth 1997: 26 (in catalogue of World species); Spinelli, 2000: 69 (records).
Atrichopogon (*Atrichopogon*) *obfuscatus*: Borkent & Spinelli 2000: 11 (in catalogue of Neotropical species).

Type material. – Holotype male, allotype female, Argentina: Río Negro prov., Bariloche, 3/25-XI-1926, F. and M. Edwards. In the Natural History Museum, London (examined).

Other specimens examined. – Argentina: Neuquen prov., 15 km E Caviahue, 13-XI-1994, G. Spinelli, 2 males; Río Negro prov., Río Villegas, 57 km S Bariloche, 8/13-XII-1994, L. Quate, 1 female, Malaise trap; Chubut prov. E margin Lago Futalaufquen, 20-I-1988, G. Spinelli, 1 female, sweep net; Puesto de Gendarmería El Triana, Cerro Galera, 2/4-XII-2002, G. Spinelli, 1 male, CDC light trap; N margin Lago La Plata, 13-XII-1995, G. Spinelli, 2 males, 1 female, sweep net; Puesto de Gendarmería El Triana, Cerro Galera, 2/4-XII-2002, G. Spinelli, 3 males, 3 females, Malaise trap; Santa Cruz prov., Lago del Desierto, 10-XII-1996, G. Spinelli, 4 males, 5 females, sweep net; same data except 11/13-XII-1996, 4 males, Malaise trap; Parque Nacional Perito Moreno, Lago Burmeister, 24-XI-1999, Spinelli & Marino, 1 male, sweep net; Lago San Martín, Estancia La Maipú, Laguna Talca, 8-XII-2002, G. Spinelli, 1 male, sweep net; Tierra del Fuego prov., Valle Andorra, Arroyo Grande, 27/29-XI-1997, J. Muzón, 1 male, Malaise trap.

Chile: Osorno prov., 8 km W La Picada, El refugio volcán Osorno, 6-II-1967, 1 male, E. Schlinger; Llanquihue prov., 3 km N Ensenada, 4-XII-1994, L. Quate, 1 male, 1 female, Malaise trap.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of characters: male with fifth palpal segment rounded; thorax and abdomen without pattern of pigmentation; posterior margin of ninth sternite strongly concave; gonostylus longer than gonocoxite; aedeagal-parameral complex broad, with rounded posterolateral margin; posteromedial lobe truncate distally. Female: flagellomeres 1-8 distinctly broader than long; fifth palpal segment rounded; thorax and abdomen without pattern of pigmentation; wing with numerous macrotrichiae in cells r_3, m_1, a few in cell m_2.

Description. – Male. Head: Vertex, frons dark brown; clypeus, proboscis brown. Ommatidia (Fig. 48) with interfacet spicules, abutting medially for length of 3 ommatidia. Antenna (Fig. 49) brown; with plume setae well-developed; flagellomeres 1-8 at least partially fused, 10-13 elongated; flagellomeres 9,10 with plume setae, 10 longer than 1-9; flagellomere 13 with apical nipple, slightly basally constricted; AR 0.96 (0.85-1.03, n = 10). Maxillary palpus (Fig. 50) brown; third segment slender, with deep sensory pit near midlength; segments 4, 5 separate; segment 5 rounded; PR 3.31 (2.50-3.55, n = 10). Proboscis short, length 0.311 (0.288-0.336, n = 9) mm; P/H ratio 1.02 (0.90-1.18, n = 9).

Thorax: Dark brown. Scutum with setae arising directly from surface, not in pits; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, strongly bilobed posteriorly. Legs uniformly brown; hindtibia expanded only at apex, hindtibial spur short, length less than than width of hindtibia at midlength; hindtibial comb with 8-10 spines; prothoracic TR 3.17 (3.08-3.33, n = 10), mesothoracic TR 2.88 (2.58-3.08, n = 10), metathoracic TR 2.81 (2.56-3.00, n = 10); claws curved, moderately stout, bifid at tip; empodia present. Wing (Fig. 51) plain, without pattern of pigmented membrane; without macrotrichiae; first and second radial cells well formed, the second narrow, 2.5 times longer than first; wing length 1.74 (1.42-2.04, n = 10) mm; breadth 0.53 (0.46-0.60, n = 10) mm; CR 0.64 (0.63-0.68, n = 10). Halter brown.

Abdomen: Tergites uniformly brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 52): Segment 9 about equal in width to segment 8. Tergite 9 moderately elongate, extending to about level of apex of gonocoxite; posterior margin rounded. Sternite 9 with posterior margin strongly concave, with lateral group of scattered setae. Gonocoxite moderately stout, without medial lobe, 1.6 times longer than greatest breadth; gonostylus tapering from base, 1.10 times longer than gonocoxite, stout, nearly straight, tip pointed. Aedeagal-parameral complex broad, with rounded posterolateral margin; posteroventrally rounded; lateral arms short, recurved, directed anterolaterally; basal arch strongly sclerotized, extending to 1/3 of total length; posteromedial lobe truncate distally. Cercus small, lobe-like, not projecting beyond apex of tergite 9.

Female. Head: Antenna with flagellomeres 1-8 distinctly broader than long, subspherical; flagellomeres 9-13 elongated, proportions as shown in Fig. 53; flagellomere 13 with apical nipple, slightly constricted basally; AR 1.95 (1.80-2.02, n = 8). Maxillary palpus (Fig. 54) with third segment moderately elongated, swollen at midlength; sensory pit well developed located just beyond midlength; segments 4, 5 separate, its combined length longer than third segment; fifth segment longer than fourth; PR 2.55 (2.16-2.86, n = 8). Proboscis length 0.392 (0.360-0.424, n = 8) mm; P/H ratio 1.54 (1.41-1.63, n = 8). Mandible with 18-25 teeth.

Thorax: Dark brown, with very faint, narrow pale lateral stripes. Legs uniformly dark brown; prothoracic TR 3.03 (2.92-3.20, n = 8), mesothoracic TR 2.91 (2.83-3.09, n = 8), metathoracic TR 2.82 (2.78-2.87, n = 8); claws curved; empodia present. Wing (Fig. 55) plain, without pattern of pigmented membrane; with numerous macrotrichiae in cells r_3, m_1, a few in cell m_2; radial cells narrow, second 2.5 times longer than first; wing length 1.73 (1.34-1.96, n = 8) mm; breadth 0.71 (0.56-0.80, n = 8) mm; CR 0.73 (0.70-0.75, n = 8).

Abdomen: Tergites uniformly dark brown. Sternite 8 without elongate, curved setae. Segments 8-10 as shown in Fig. 56. Genital sclerotization (Fig. 57) rounded. One spermatheca (Fig. 58) ovoid with short neck, sclerotized, measuring 0.108 by 0.080 mm. Cercus brown.

Distribution. – Argentina, in subantarctic forest of Neuquen, Río Negro, Chubut, Santa Cruz and Tierra del Fuego provinces, and Chile (between 41° 03' S and 42° 07' S) (Fig. 72).

Taxonomic Discussion. – Males and females were collected at the same locality and date.

The female of this species is very similar to the female of three Neotropical species from elsewhere: *A. umbratilis* Macfie and *A. brasiliensis* Macfie, both from Brazil, and *A. seudoobfuscatus* Spinelli from the province of Buenos Aires, Argentina. In the later species, however, the eyes are bare, the hind tarsal ratio is shorter, the wing bears a few macrotrichiae in cell cua_1, and the spermatheca is very large (0.170 mm). In *A. umbratilis* the eyes are bare, the flagellomeres 1-8 are flattened, the cell m_2 lacks macrotrichiae, and the spermatheca is pyriform. Finally, *A. brasiliensis* differs by its yellowish brown legs and whitish halter knob. The male genitalia of *A. seudoobfuscatus* and *A. umbratilis* are very similar to that of *A. obfuscatus*. The male of *A. brasiliensis* is unknown.

Characters for distinguishing *A. obfuscatus* from *A. similis* may be found in the key and in the discussion under the latter species.

Atrichopogon obnubilus Ingram & Macfie, **1931**

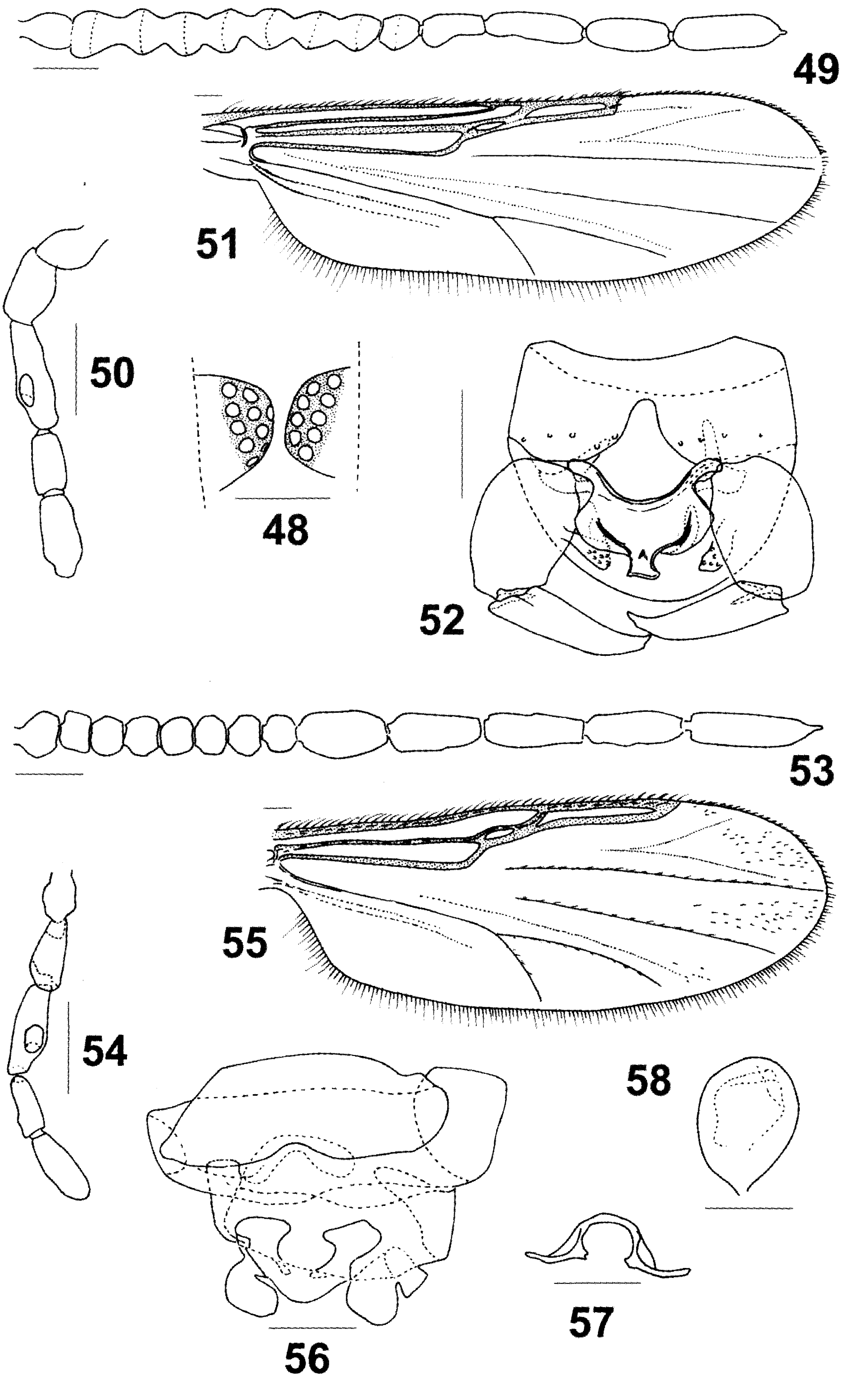
Atrichopogon (*Kempia*) *obnubilus* Ingram & Macfie 1931: 175 (male, female; Argentina).
Atrichopogon (*Kempia*) *chilensis* Ingram & Macfie 1931: 175 (female; Argentina, Chile).
Atrichopogon (*Kempia*) *assimilis* Ingram & Macfie 1931: 176 (male, female; Argentina).
Atrichopogon (*Melohelea*) *obnubilus*: Spinelli & Wirth 1992: 94 (male, female; combination; synonymy).
Atrichopogon obnubilus: Borkent & Wirth 1997: 26 (in catalogue to World species); Spinelli, 2000: 69 (records)
Atrichopogon (*Atrichopogon*) *obnubilus*: Borkent & Spinelli 2000: 11 (in catalogue to Neotropical species).

Type material. – Holotype male, allotype female, Argentina: Río Negro prov., Bariloche, 3/25-XI-1926, F. and M. Edwards. In the Natural History Museum, London (examined).

Other specimens examined. Argentina. – Neuquen prov., Hua-Hum, 16-II-1994, G. Spinelli, 3 males, 2 females; Lago Aluminé, 4/18-I-1997, D. Podestá, 1 female; Laguna Epulafquen, 21/23-II-2001, G. Spinelli, 1 male, Malaise trap; Lago Quillen, 30-XI-2001, G. Spinelli, 1 male, sweep net; Río Negro prov., Lago Gutierrez, I-2003, J. Liotta, 2 females, at light; El Bolsón, 29-XI-1999, G. Spinelli, 1 male, at light; Chubut prov., Parque Nacional Los Alerces, El Alerzal, 22-I-1988, G. Spinelli, 3 males, 1 female, sweep net; Santa Cruz prov., Lago del Desierto, 10-XII-1996, G. Spinelli, 1 male, sweep net; same data except 9/12-XII-1996, 1 male, Malaise trap; Lago San Martín, Estancia La Maipú, Laguna Talca, 7-XII-2002, G. Spinelli, 1 male, CDC light trap; same data except, 8-XII-2002, 1 male, 4 females, Malaise trap.

Chile: Llanquihue prov., Yerbas buenas,13 km N Ensenada, 1/6-XII-1994, L. Quate, 1 male, 3 females; Osorno prov., Pucatrihue, 30-XII-1992, G. Spinelli, 1 male, sweep net; Arauco prov, Parque Nacional Contulmo, 7-XII-2003, G. Spinelli, 5 males, 1 female, sweep net.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of



Figs 48-58. *Atrichopogon obfuscatus* Ingram and Macfie. 48-52, male, 53-59, female. 48, ommatidia; 49, 53, flagellum; 50, 54, maxillary palpus; 51, 55, wing; 52, genitalia; 56, female genitalia (segments 8-10); 57, genital sclerotization; 58, spermatheca. Scale bars: 0.05 mm.

characters: male with fifth palpal segment rounded at apex, shorter than fourth; thorax and abdomen without pattern of pigmentation; gonostylus with 3 distal teeth; aedeagal-parameral complex broad, posteroventrally broad, posterodorsally tapering to cap-like process. Female with two ovoid spermathecae..

Distribution. – Argentina, in subantarctic forest of Neuquen, Río Negro, Chubut and Santa Cruz provinces, and Chile (between 38° 00' S and 41° 52' S in Chiloe) (Fig. 73).

Taxonomic Discussion. – Aside from the species included in the subgenus *Lophomyidium*, the female of *A. obnubilus* shares the presence of two well developed spermathecae with other two Neotropical species: *A. insignipalpis* Macfie and *A. taeniatus* Macfie, both from Brazil. However *A. insignipalpis* is a smaller species (wing length 1.50 mm), the fifth palpal segment is longer than fourth, the wing bear a few macrotrichiae in the anal cell, and the halter is brown. *Atrichopogon taeniatus* can be distinguished from *A. obnubilus* by the yellowish brown coloration, the wing without macrotrichiae in cell cua_1 and only a few in cell m_2, and by the presence of a rudimentary third spermatheca.

A full redescription and accurate illustrations of this species may be found in Spinelli & Wirth (1992). Characters for distinguishing *A. obnubilus* from the remaining patagonian species may be found in the key.

Atrichopogon similis Spinelli & Marino, **sp. n.**

(Figs. 59-70)

Type material. – Holotype male, allotype female, Argentina: Chubut prov., southern shore Lago Futalaufquen, 20-I-1988, G. Spinelli, sweep net. Paratypes 5 males, 5 females, as follows: same data as holotype 2 males, 2 females; Neuquen prov., Laguna Epulaufquen, 22-II-2001, G. Spinelli, 1 male, sweep net; 20 Km W Aluminé, 14-XI-1994, G. Spinelli, 1 male; 30 Km W Chos Malal, 12-XI-1994, G. Spinelli, 2 females.

Chile: Valdivia prov., Mehuin, 27-XI-1992, G. Spinelli, 1 male; Cautín prov., 17 km SW Villarica, 6-XII-2003, G. Spinelli, 1 female, sweep net.

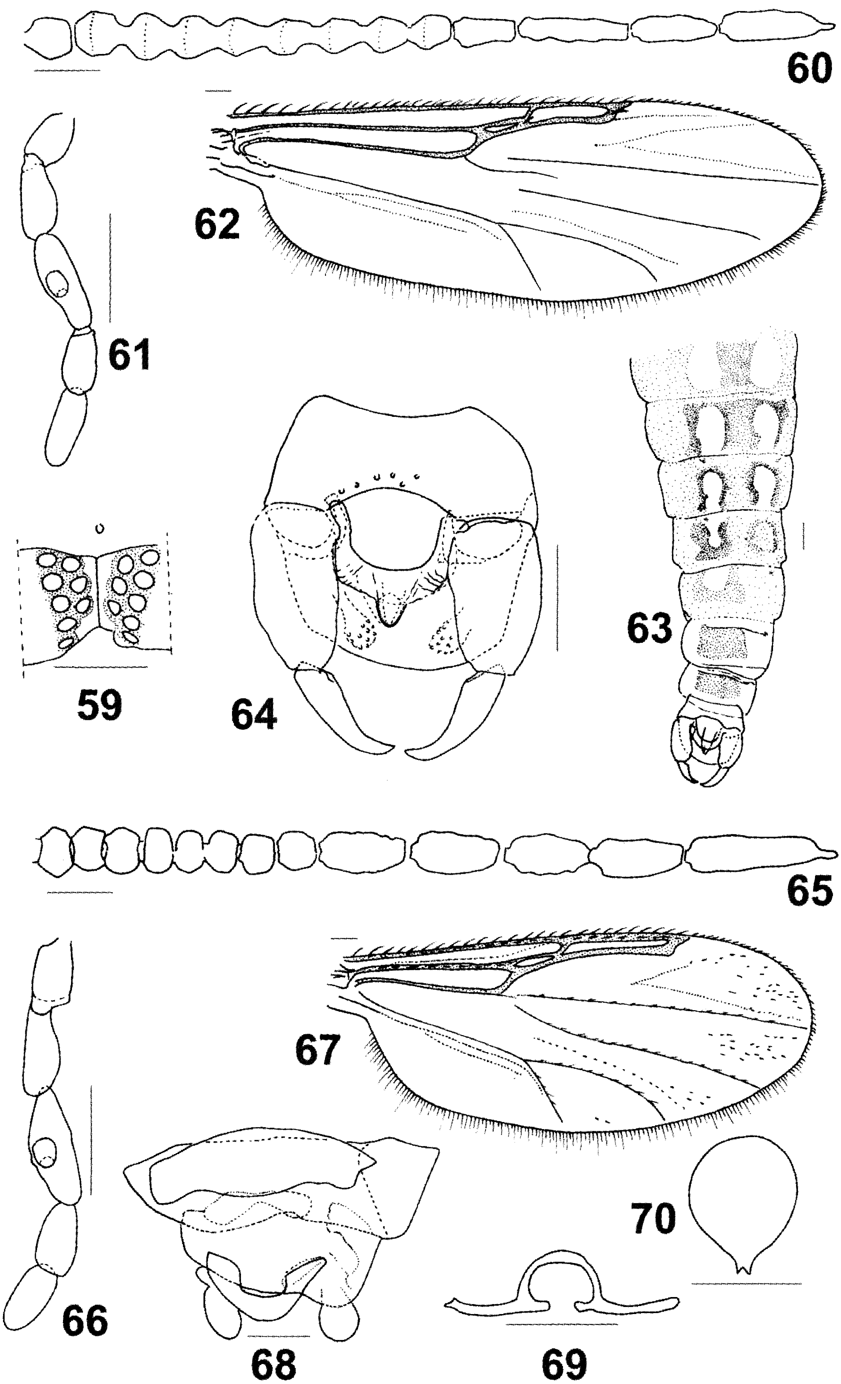
Derivation of specific epithet. – A reference to the strong resemblance of this species to *A. obfuscatus*.

Diagnosis. – The only species of *Atrichopogon* from Patagonia with the following combination of characters: male with fifth palpal segment rounded, abdominal terga with pattern of pigmentation; gonostylus clearly shorter than gonocoxite; aedeagal-parameral complex broad, posterodorsal proyection tapering to cap-like tip; striated posteroventrally; with V-shaped, sclerotized, dorsal sclerite reaching cap-like tip. Female: flagellomeres 1-8 slightly broader than long, subspherical; fifth palpal segment rounded, abdominal terga with pattern of pigmentation; wing macrotrichiae in cells r_3, m_1, m_2 and 2-3 in cell cua_1.

Description. – Male. Head: Vertex, frons dark brown; clypeus, proboscis brown. Ommatidia (Fig. 59) with interfacet spicules, abutting medially for length of 2-3 ommatidia. Antenna (Fig. 60) brown with plume setae well developed, flagellomeres 1-8 separated, 10-13 elongated; flagellomeres 9-10 with plume setae, 10 longer than 1-9; flagellomere 13 with apical nipple, basally constricted; AR 0.89 (0.86-0.93, n = 6). Maxillary palpus (Fig. 61) brown; third segment slightly swollen at middle, with shallow sensory pit near midlength, opening by rounded pore; segments 4, 5 separate; segment 5 rounded; PR 2.84 (2.42-3.10, n = 6). Proboscis short, length 0.286 (0.272-0.296, n = 6) mm; P/H ratio 1.09 (1.03-1.13, n = 6).

Thorax: Dark brown. Scutum with setae arising directly from surface, not in pits; with lateral suture. Paratergite with one stout seta. Anepisternum well-developed, sharply bilobed posteriorly. Legs uniformly brown; hindtibia expanded at apex; hindtibial spur length less than width of hindtibia at midlength; hindtibial comb with 8 spines; prothoracic TR 3.23 (2.90-3.55, n = 6), mesothoracic TR 3.05 (2.90-3.10, n = 6), metathoracic TR 2.97 (2.77-3.15, n = 6); claws curved, moderately stout; empodia present. Wing (Fig. 62) plain, without pattern of pigmented membrane; without macrotrichiae on membrane; first and second radial cells well formed, the second narrow, 2.5 times longer than first; wing length 1.37 (1.30-1.44, n = 5) mm; breadth 0.45 (0.44-0.47, n = 6) mm; CR 0.65 (0.64-0.66, n = 5). Halter pale brown.

Abdomen (Fig. 63): Tergites 1-4 brown with lateral patches pale brown, 5-8 entirely brown. Sternites more or less similarly rectangularly shaped. Genitalia (Fig. 64): Segment 9 about equal in width to segment 8. Tergite 9 moderately elongate, extending to level of apex of gonocoxite, posterior margin rounded. Sternite 9 with posterior margin broadly concave, with single row of



Figs 59-70. *Atrichopogon similis*. 59-64, male, 65-70, female. 59, ommatidia; 60, 65, flagellum; 61, 66, maxillary palpus; 62, 67, wing; 63, abdominal terga; 64, genitalia; 68, female genitalia (segments 8-10); 69, genital sclerotization; 70, spermatheca. Scale bars: 0.05 mm.

setae along margin of concavity. Gonocoxite without medial lobe, stout, 2.1 times longer than greatest breadth; gonostylus tapering from base, 0.71 as long as gonocoxite, slender, nearly straight, tip pointed. Aedeagal-parameral complex broad, posterodorsal projection tapering to cap-like tip; deeply striated posteroventrally, with sclerotized median lobe poorly developed; V-shaped, sclerotized, dorsal sclerite reaching cap-like tip; lateral arms strongly sclerotized, directed anterolaterally; basal arch low, extending to 1/2 of total length. Cercus elongate, lobe-like, ventral to tergite 9.

Female. Head: Antenna with flagellomeres 1-8 slightly broader than long, subspherical; flagellomeres 9-13 elongated, proportions as shown in Fig. 65, flagellomere 13 with apical nipple, basally constricted; AR 1.73 (1.61- 1.88, n = 6). Maxillary palpus (Fig. 66) with third segment slightly elongated, swollen at midlength; sensory pit well developed located just beyond midlength; segments 4, 5 separate, its combined length slightly longer than third segment; fifth segment slightly longer than fourth; PR 2.28 (1.87- 2.67, n = 6); proboscis length 0.340 (0.312-0.352, n = 6) mm; P/H ratio 1.54 (1.42-1.91, n = 6). Mandible with about 21-22 strong teeth.

Thorax: Legs uniformly brown; prothoracic TR 3.11 (3.10-3.11, n = 6), mesothoracic TR 2.95 (2.90-3.00, n = 6), metathoracic TR 2.79 (2.54-3.00, n = 6); claws curved; empodia present. Wing (Fig. 67) plain, without pattern of pigmented membrane; with macrotrichiae in cells r_3, m_1, m_2, 2-3 in cell cua_1; radial cells narrow, second nearly 2.5 times longer than first; wing length 1.33 (1.24-1.42, n = 5) mm; breadth 0.57 (0.52-0.60, n = 6) mm; CR 0.71 (0.69-0.72, n = 5).

Abdomen: Tergites 1-5 brown with lateral patches paler, 6-10 uniformly brown. Sternites 2-6 sclerotized laterally, sternite 7 sclerotized, sternite 8 without elongate, curved setae. Segments 8-10 as shown in Fig. 68. Genital sclerotization (Fig. 69) open, anterior margin rounded. One spermatheca (Fig. 70) ovoid with short neck, strongly sclerotized, measuring 0.080 by 0.060 mm Cercus brown.

Distribution. – Argentina, in subantarctic forest of Neuquen and Chubut provinces, and Chile (Fig. 71).

Taxonomic Discussion. – Males and females were associated by their similar pigmentation pattern and were collected on the same date at the type-locality.

The female of this new species is nearly identical to the female of *A. obfuscatus*, but differs by having a few macrotrichiae in cell cua_1 and by the conspicuous pattern of pigmentation on the abdominal terga. The male, however, is easily distinguished from the male of *A. obfuscatus* by the following genital characters: gonostylus clearly shorter than gonocoxite, aedeagal-parameral complex broad, striated posteroventrally, with posterodorsal projection tapering to cap-like tip.

This species also resembles *A. endemicus*, by virtue of the similar abdominal pigmentation pattern, but differs from this species by the following characters: female wing with numerous macrotrichiae in cells r_3, m_1, m_2, a few in cua_1, male flagellomeres 1-8 separated, and aedeagal-parameral complex broad with its posterodorsal portion tapering to cap-like tip.

Of the species outside Patagonia, the female of *A. seudoobfuscatus* can be distinguished from the female of *A. similis* by its bare eyes, shorter hind tarsal ratio, and very large spermatheca. The male differs by the strongly concave posterior margin of sternite 9, gonostylus as long as gonocoxite, and the broadly posteroventrally truncate aedeagal-parameral complex.

Biogeographic analysis

The parsimony analysis of endemicity resulted in two equally most parsimonious cladograms (L=39; CI=76; RI=62). Strict consensus of these cladograms (Fig. 75) resulted in the following: ((Monte, Patagonian steppe) (Central Chile, Magellanic Moorland (Magellanic Forest, Maule, Valdivian Forest))).

The cladogram shows low support for most of its nodes as can be seen in Fig. 75, since 17 of the 30 taxa considered here are endemic to only one area, and therefore could not indicate area relationships. Endemic taxa are especially abundant in the Patagonian steppe and Valdivian Forest (Fig. 75). It is important to note that four of the five endemics within the Patagonian steppe are species restricted to the Somuncura plateau (41° 30´S, 67° 15´W). This area has a very distictive biota which includes not only many endemics for several taxa, e.g. fishes (Menni & Gómez 1995), frogs (Cei 1969), insects (Spinelli & Muzón 2000; Muzón, com. pers.) but also northern Brazilian compo-

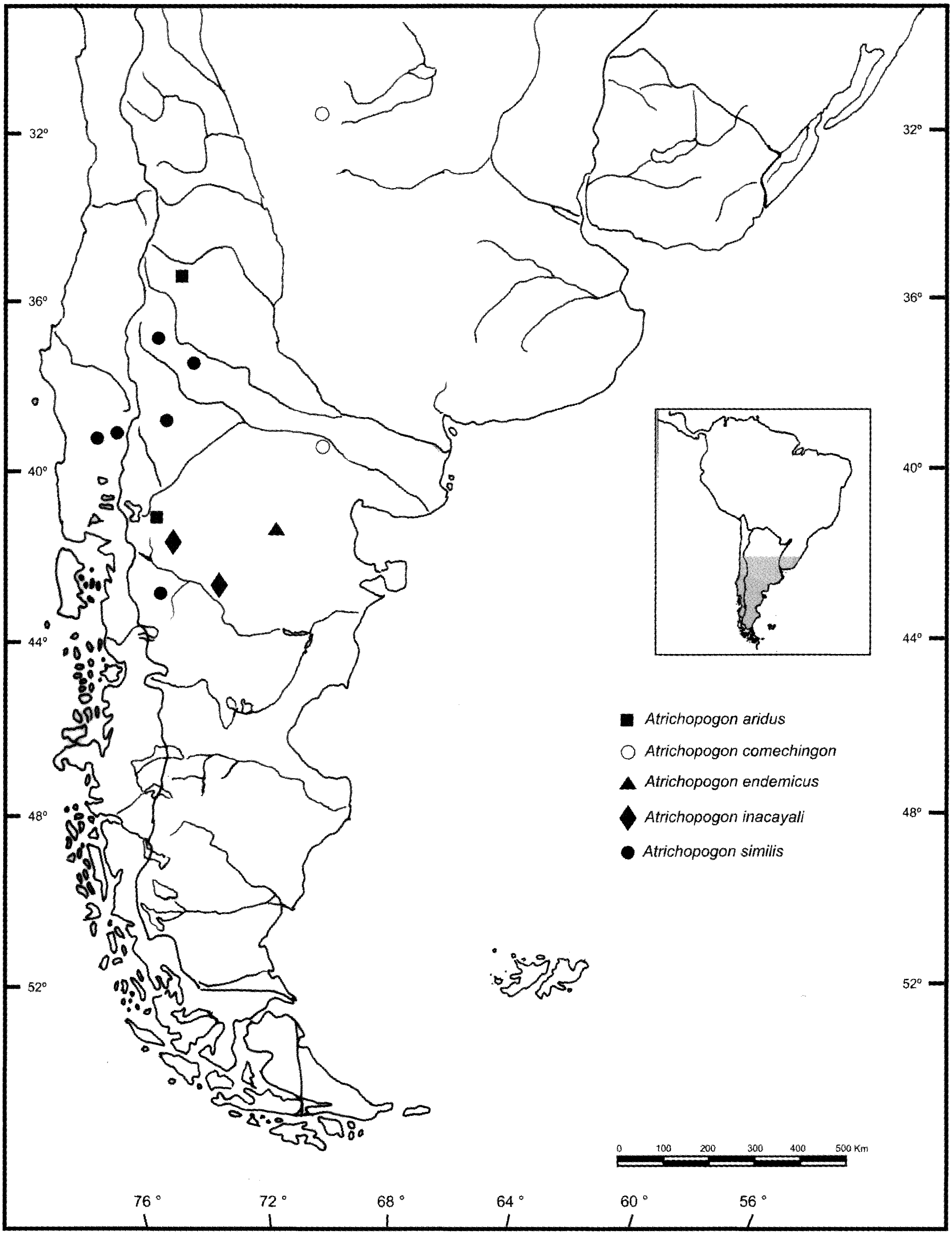


Fig. 71. Known localities for *Atrichopogon aridus, A. comechingon, A. endemicus, A. inacayali, and A. similis.*

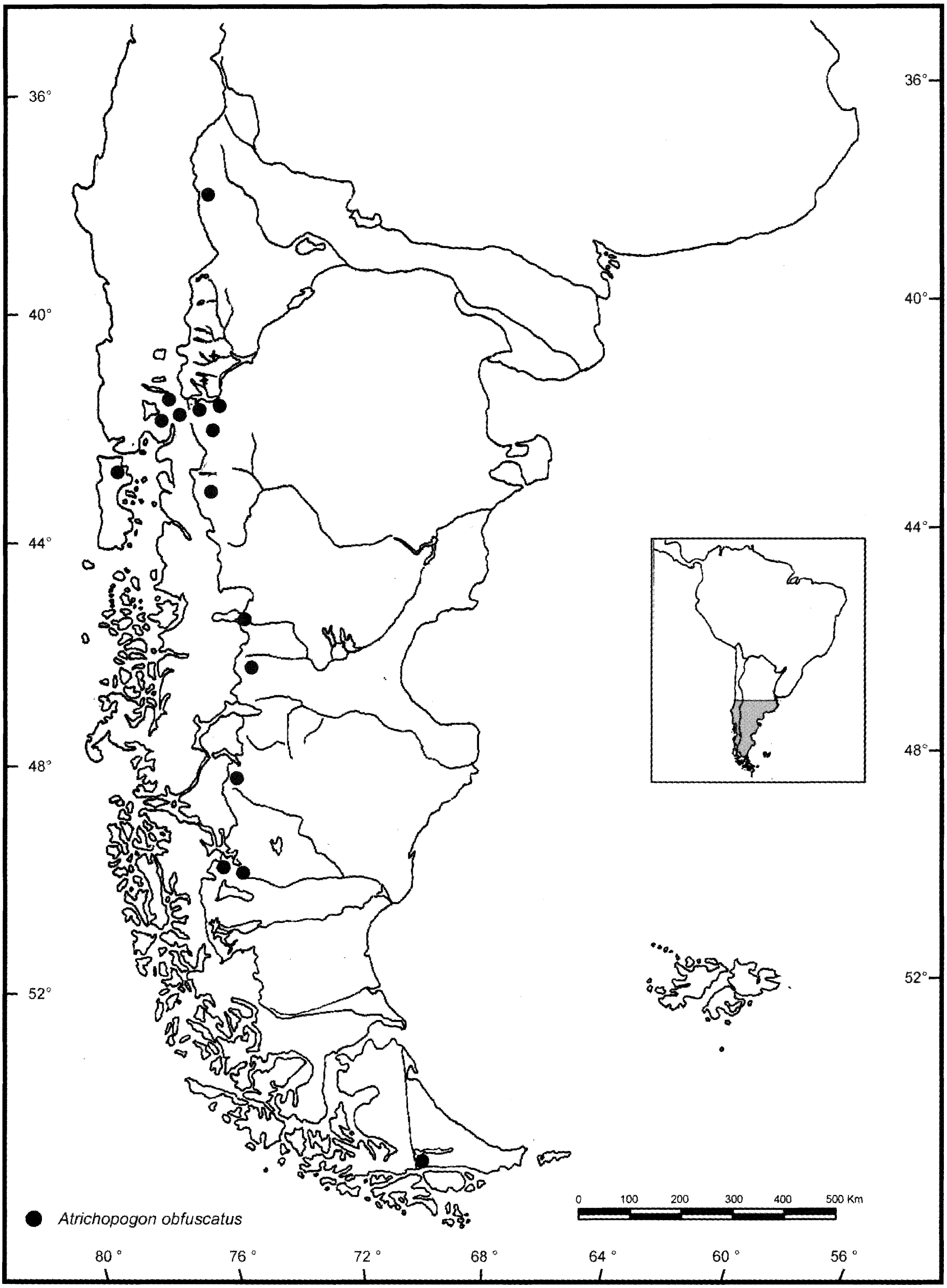


Fig. 72. Known localities for *Atrichopogon obfuscatus*.

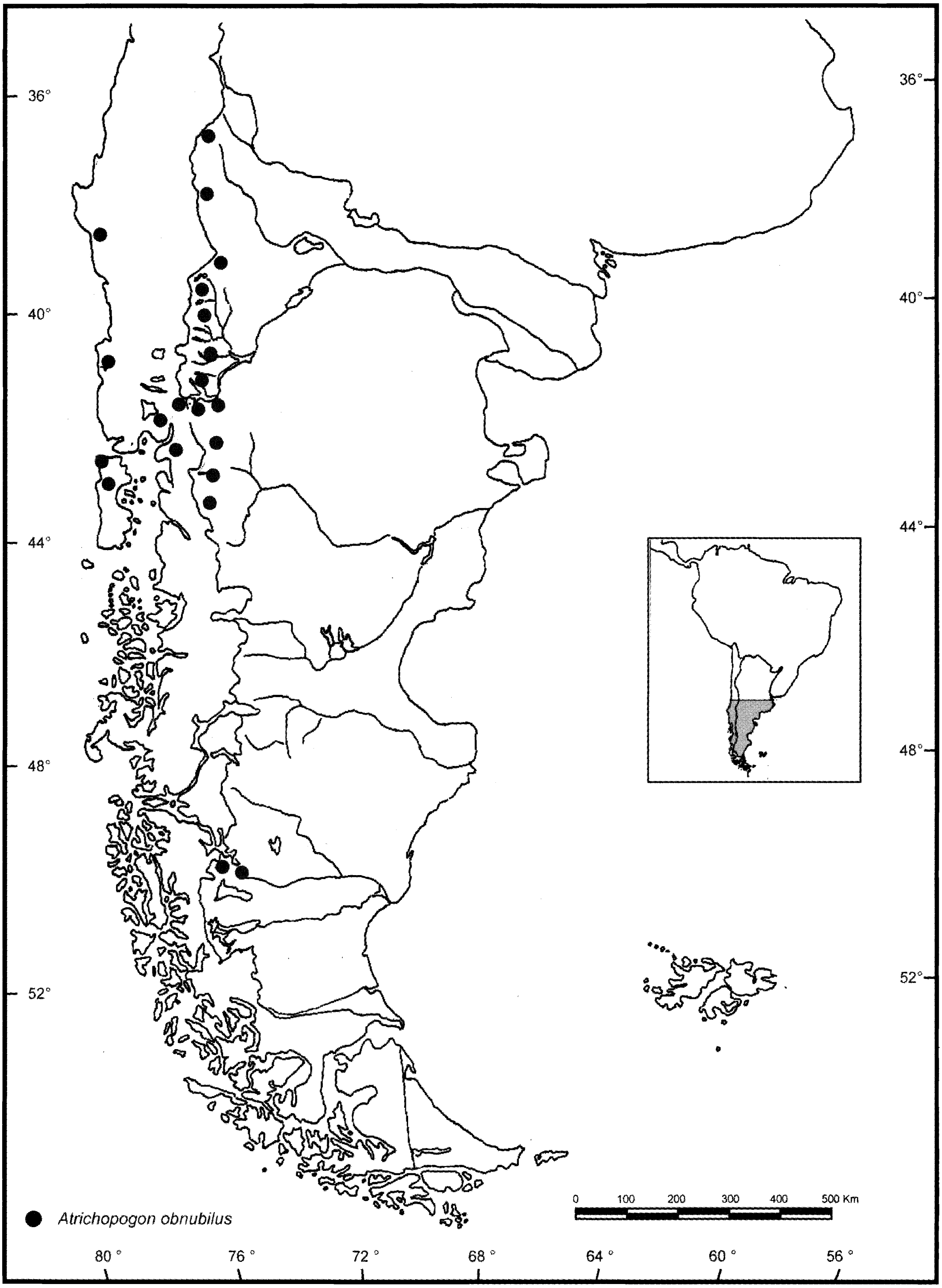


Fig. 73. Known localities for *Atrichopogon obnubilus*.

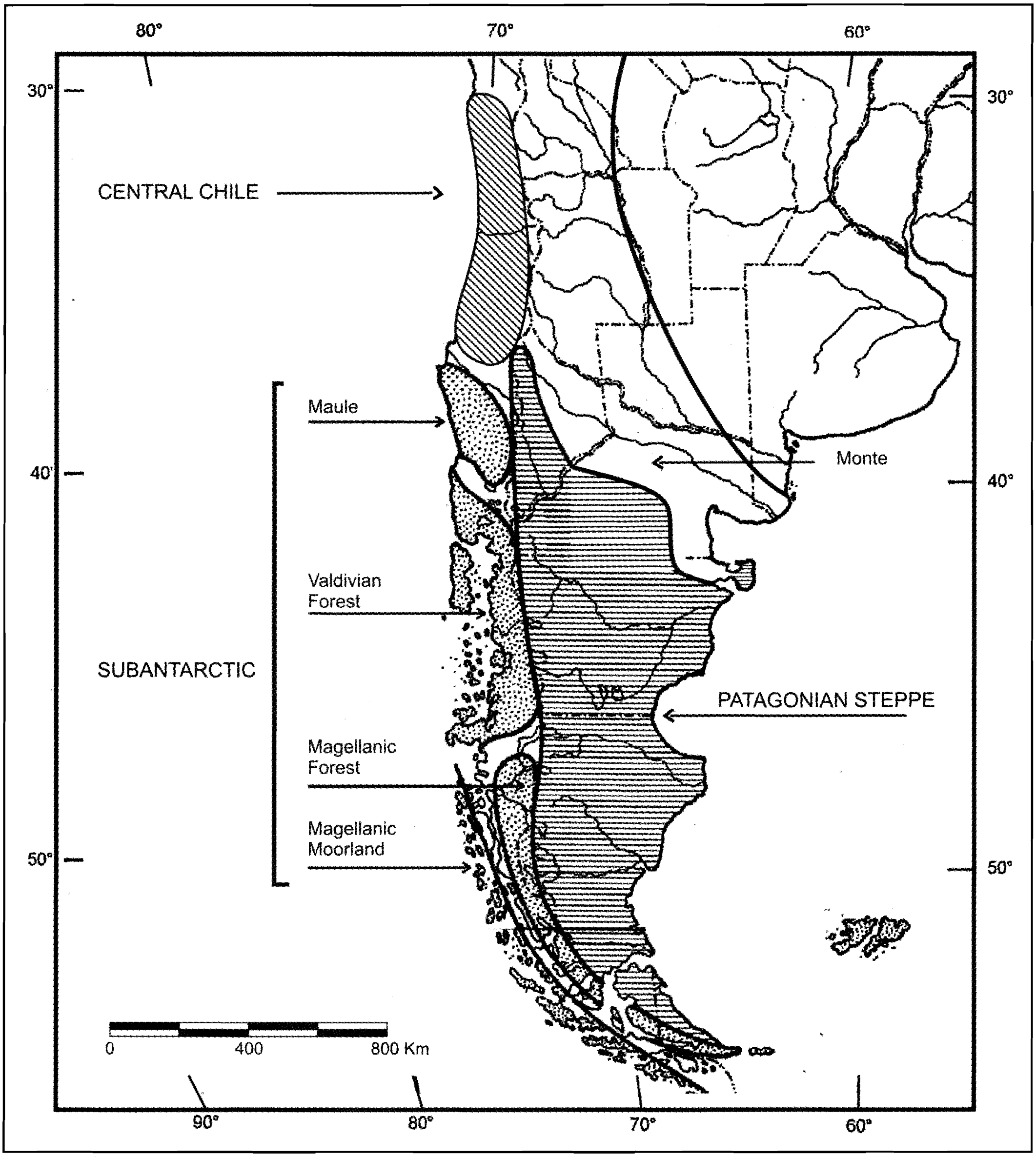


Fig. 74. Map of southern South America showing biogeographic units

nents (e.g., the ceratopogonids *Bezzia brevicornis* and *Amerohelea pseudofasciata*) and southern andean-patagonian elements (e.g., *Forcipomyia setosicrus* and *Macrurohelea* sp.).

Although the biogeographic pattern depicted by PAE for Forcipomyiinae is consistent with the one obtained previously by Marino et al. (2001), it exhibits less resolution. This could be due to the present analysis being based on a more restricted set of species than that by Marino et al. (2001), since it only includes species of Forcipomyiinae.

One of the major two clades obtained is made up of the Monte area plus the Patagonian steppe, supported by the presence of *Atrichopogon aridus*

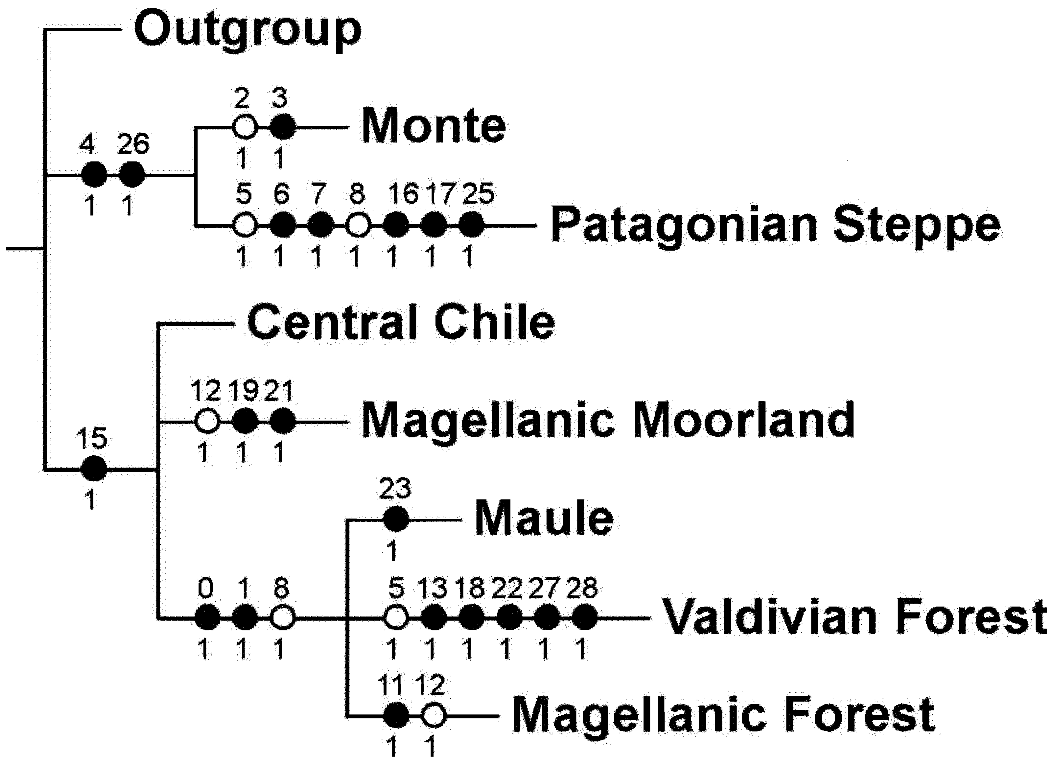


Fig. 75. Cladogram obtained applying PAE based in areas of endemism.

and *Forcipomyia riojana*. This sister relationship contrasts somewhat with broadly accepted biogeographic schemes (e.g., Cabrera & Willink 1973; Morrone 2001) which includes these areas in separated domains or regions (i.e., Chacoan domain or Neotropical region for Monte, and Andean Patagonian domain or Andean region for Patagonian steppe).

Another major clade is only supported by the presence of *Forcipomyia multipicta*, including the areas from Central Chile to Magellanic Moorland (Fig. 75). Within this broader area, there are three northern Subantarctic provinces (i.e., Maule, Valdivian Forest and Magellanic Forest) which circumscribe the distribution of two species: *Atrichopogon obnubilus* and *A. obfuscatus*. The strict consensus could not resolve the position of Central Chile and Magellanic Moorland, probably due to both areas having so few Forcipomyiinae species present. This fact could be explained on one hand for Central Chile by the poverty of collections of Forcipomyiinae, and on the other hand, for Magellanic Moorland, by the low diversity which characterizes this area for many taxa (Tuhkanen et al. 1990). Its worth remarking that the Museo de La Plata houses a very good collection of Malaise trap samples from Wollaston and Deceit islands, both located in the Magellanic Moorland.

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