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The Genus *Uroleucon* Mordvilko (Insecta, Aphidoidea) in South America, with a key and descriptions of four new species

REGINA CÉLIA ZONTA DE CARVALHO

Centro de Diagnóstico Marcos Enrietti, Rua Jaime Balão 575, 80.040-340, Curitiba, Paraná, Brazil

ROGER L. BLACKMAN FLS AND JENNIFER M. SPENCE

Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD

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Uroleucon is one of only two genera of Aphidinae to have undergone significant speciation in South America, with a group of about 14 endemic, morphologically similar species feeding on native Compositae, especially *Baccharis*. Multivariate morphometrics (canonical variates analysis, CVA) was used to discriminate between these species and compare them with the North American subgenus *Lambersius*, in which most of them have hitherto been placed. It is concluded that they probably form a separate monophyletic group. Four new species are described in this group—***brevisiphon***, ***essigi***, ***petrohuense*** and ***pseudomuermosum***—and five names are placed in synonymy. Of the other species of *Uroleucon* in South America, *U. lizerianum* is widespread and feeds on many species of native and introduced Compositae; it is morphometrically inseparable from the North American species *U. ambrosiae* and is probably an introduced form of that species, but has consistently fewer secondary rhinaria. A key is provided to the 19 available species of *Uroleucon* recorded from South America.

ADDITIONAL KEY WORDS:—multivariate analysis – founder effect – introduced species.

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Correspondence to: R. C. Z. de Carvalho. Email: cjbcarva@bio.ufpr.br

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INTRODUCTION

Aphids are a major component of the phytophagous insect fauna of north temperate regions, but very few species are indigenous to the tropics and southern hemisphere. Both ecological (Dixon *et al.*, 1987) and historical (Heie, 1994) reasons have been advanced for this. South American *Uroleucon* are of special interest because they are one of the very few groups of the main aphid subfamily Aphidinae to have undergone recent speciation on native plants in southern temperate regions.

In addition to endemics, there are also several introduced nearctic and palaearctic *Uroleucon* species in South America; comparison of the ecology and host-plant relationships of native and introduced species may help to explain the low diversity of southern hemisphere aphids. However, this initially requires taxonomic studies in order to redefine the native fauna, and to confirm the identity of the introduced species.

Uroleucon Mordvilko (=*Dactynotus* Rafinesque) has about 160 northern temperate species specializing on Compositae (Blackman & Eastop, 1984), and including pests of chicory, lettuce and safflower. Smith & Cermeli (1979) listed 23 species in this genus from the neotropical region, and two others that they listed under *Macrosiphum* (*chilense* Essig and *macolai* Blanchard) also belong in this genus (Eastop & Hille Ris Lambers, 1976; Remaudière *et al.*, 1991). Of these 25 species, 13 were described from Argentina (Blanchard, 1922, 1932, 1939), Chile (Essig, 1953) and Paraguay (Essig, 1956). Most of these species were originally described in the genus *Macrosiphum*, and many were collected on native *Baccharis*; several have not been collected since their original descriptions, which in some cases are so brief that it is difficult to be certain that the species really belong in *Uroleucon*. Blanchard (1939) keyed the Argentinian species within *Macrosiphum*. Recently, Delfino (1991, 1994) distinguished three new species on native plants in Argentina. Eastop, Costa & Blackman (in press) provide a key to five *Uroleucon* species in Brazil, but probably none of these are endemic.

Two main problems were encountered in revising the South American *Uroleucon*. Firstly, populations of an introduced aphid on numerous genera of Compositae in Central and South America in the BM(NH) collection have been identified as *U. ambrosiae* (Thomas), which in North America is one of a complex of similar-looking species. Aphids identified as *U. ambrosiae* have been reported as pests of chicory and lettuce, and as transmitting sugar cane mosaic and maize dwarf mosaic viruses (Blackman & Eastop, 1984). However, in her revision of the northeastern North American *Uroleucon*, Moran (1985) considered that *ambrosiae sensu stricto* restricts its feeding to just two genera, *Ambrosia* and *Iva*. Blanchard (1922) described an aphid found on various Compositae in Argentina as a new species, *lizerianum*; his description does not discriminate *lizerianum* from *ambrosiae*. Remaudière *et al.* (1991) redescribed *lizerianum* from collections on composite plants of four genera in Bolívia in comparison with paratypes, and compared it with two North American species, but not with *ambrosiae*. It is therefore necessary to establish whether more than one *ambrosiae*-like species has a broad host range and distribution in South America.

Secondly, the endemic group of *Baccharis*-feeding species in Argentina and Chile are not clearly discriminated by their original descriptions. The less pigmented species have been included in the subgenus *Lambersius* by Eastop & Hille Ris Lambers (1976), but this subgenus is not clearly defined and it needs to be reassessed.

Multivariate (canonical variates) analysis was used to solve these two problems. Several samples of South America *Uroleucon* in the Natural History Museum (BMNH) collection did not correspond to any known species, and four new species are described from this material.

MATERIAL AND METHODS

Samples measured for multivariate morphometric analysis of the *U. ambrosiae* group in North and South America, and the South America *Uroleucon* fauna, are listed in Tables 1 and 2 respectively. The North American samples (Table 1) included two from *Iva* and one from *Ambrosia* provisionally identified as *U. ambrosiae sensu stricto*, and 2–5 samples of each of 8 other species in the *ambrosiae* group, including paratype series of three species (*chrysopsidicola* Olive, *hieracicola* Hille Ris Lambers and *nigrotuberculatus* Olive). The South American specimens included 13 samples provisionally identified as *U. ambrosiae* from 10 different genera of Composite (Table 1), and 45 samples tentatively assigned to 10 other species (Table 2), including paratype series of three nominal species (*chilense* Essig, *huantanum* Essig and *tucumani* Essig). Material of 21 other samples was examined, but these contained insufficient complete specimens to be included in the multivariate analysis.

Canonical variates analysis (CVA) was carried out on groups each comprising a sample of 4–10 adult apterous viviparae from the same host, locality and date of collection. The 17 parameters measured on each specimen are shown in Table 3. Measurements were recorded using a Kontron Videoplan image analysis system. Specimens with missing values were not included in the analysis. The CVA programme was an adaptation written in BASIC by Dr Ian White of that published by Blackith & Reyment (1971). The utility of CVA for discriminating between closely related aphid species was reviewed by Blackman (1992).

RESULTS AND DISCUSSION

Multivariate analysis

Multivariate analysis of the Uroleucon ambrosiae *group*

Scores (group means) on the first two canonical variates grouped the samples according to their putatively assigned taxa (Fig. 1). The two North American samples from *Iva* and one from *Ambrosia* ('B' in Fig. 1) grouped apart from the other North American samples, and formed a cluster with all 13 samples from South America that had been provisionally identified as *U. ambrosiae*, although collected from a range of different composite plants (Table 1).

The result of this analysis indicates that only one member of the *ambrosiae* group has been introduced to South America. The specificity of North American populations to two plant genera (Moran, 1985) is supported, but in South America the host

TABLE 1. List of samples of *Uroleucon ambrosiae* group from South and North America. *Number of specimens examined, ( ) number of specimens included in the multivariate analysis, [P] paratypes

*	Host plant	Locality and Collection data	Putative identification	Code letters (see Fig. 1)
11(7)	*Calendra* sp.	Argentina, Mercedes, 7.viii.1976	*ambrosiae*	A
5(4)	unknown	Argentina, Salta, Tabacal, 2.vi.1933	*ambrosiae*	A
36(10)	*Bidens pilosus*	Brazil, MG, Sete Lagoas, 4.x.1962	*ambrosiae*	A
34(10)	*Bidens pilosus*	Brazil, MG, Sete Lagoas, 6.ix.1963	*ambrosiae*	A
10(9)	*Crepsis* sp.	Brazil, PR, Curitiba, 9.xi.1972	*ambrosiae*	A
14(7)	*Taraxacum* sp.	Brazil, PR, Curitiba, 9.xi.1972	*ambrosiae*	A
24(10)	*Hypochoeris brasiliensis*	Brazil, PR, Curitiba, 4.xii.1991	*ambrosiae*	A
8(5)	*Acanthospermum australe*	Brazil, SP, Campinas, 5.iv.1967	*ambrosiae*	A
11(6)	*Agerantum coryzoides*	Brazil, SP, Campinas, 4.viii.1967	*ambrosiae*	A
4(4)	*Ambrosiae psilostachya*	Brazil, SP, Campinas, 30.v.1967	*ambrosiae*	A
16(7)	*Blainvillea biaristata*	Brazil, SP, Campinas, 21.viii.1970	*ambrosiae*	A
3	*Gaillardia*	Brazil, SP, Campinas, 23.xii.1970	*ambrosiae*	
10	*Boerharia diffusa*	Brazil, SP, Campinas, 18.v.1971	*ambrosiae*	
8(6)	*Acanthospermum australe*	Brazil, SP, Divinolândia, 25.ii.1971	*ambrosiae*	A
7(4)	lettuce	Brazil, SP, Piracicaba, 11.vi.1975	*ambrosiae*	A
5(5)	*?Ambrosia* sp.	Canada, Ontario, Harrow, 6.vii.1977	*ambrosiae*	B
10(10)	*Iva xanthifolia*	USA, Utah, Logan Canyon, 4.vii.1962	*ambrosiae*	B
10(10)	*Iva xanthifolia*	USA, Utah, Deep Creek, 15.vii.1969	*ambrosiae*	B
5(5)	*Bidens frondosa*	Canada, Quebec, Ste. Foy 2.vii1971	*chrysanthemi*	M
4(4)	*Bidens frondosa*	Canada, Quebec, Ste. Foy, 14.vii.1970	*chrysanthemi*	M
4(4)	*Bidens cernua*	Canada, Ontario, nr. Alliston, 7.ix.1968	*chrysanthemi*	M
5(5)	*Bidens* sp.	USA, Pennsylvania, Trogh Creek, 31.viii.1962	*chrysanthemi*	M
4(4)	*Chrysopis mariana*	USA, N. Carolina, Mocksville, 4.x.1950	*chrysopsidicola* [P]	C
6(6)	*?Aster concolor*	USA, N. Carolina, Tysonville, 25.vi.1966	*chrysopsidicola*	C
7(7)	Compositae	USA, N. Carolina, Raleigh, 21.iv.1964	*chrysopsidicola*	C
9(9)	*Hieracium canadense*	Canada, Quebec, Lake Temis-Keming, viii.1960	*hieracicola* [P]	H
4(4)	*Solidago canadensis*	Canada, Quebec, Gaspé, 2.viii.1965	*hieracicola*	H
8(8)	*Solidago* sp.	Canada, New Brunswick, Millville, 1.viii.1966	*hieracicola*	H
10(10)	*Solidago* sp.	USA, Maine, Presque Isle, 2.viii.1966	*hieracicola*	H
8(8)	*Solidago* sp.	USA, Oregon, Malheur Co., 25.vi.1980	*hieracicola*	H
5(5)	*Solidago* sp.	USA, Washington, Wenatchee, 7.vi.1983	*hieracicola*	L
7(7)	*S. raminifolia*	Canada, Quebec, Ste. Foy, 4.viii.1971	*lanceolatus*	L
4(4)	*S. raminifolia*	USA, Maine, Ashland, 2.viii.1966	*lanceolatus*	L

TABLE 1. *Continued*

*	Host plant	Locality and Collection data	Putative identification	Code letters (see Fig. 1)
6(6)	*Solidago* sp.	USA, Utah, Duchesne, 7.viii.1955	*lanceolatus*	L
7(7)	*Rudbeckia serotina*	Canada, New Brunswick, Millville. 1.viii.1966	*leonardi*	D
6(6)	*Rudbeckia* sp.	Canada, Toronto, Ravine, 10.vi.1972	*leonardi*	D
6(6)	*Solidago* sp.	USA, N. Carolina, Umstead Park, 19.vi.1966	*nigrotibium*	G
6(6)	*Solidago* sp.	USA, N. Carolina, Wilmington Park, 25.iv.1964	*nigrotibium*	G
4(4)	*Solidago* sp.	USA, N. Carolina, Umstead Park, 27.v.1959	*nigrotuberculatus*	N
7(7)	*Aster umbellatus*	USA, Maine, Orono, 3.viii.1966	*nigrotuberculatus*	N
4(4)	*Solidago* sp.	USA, N. Carolina, Fall Creek Rd., 1.vi.1966	*nigrotuberculatus* [P]	N
7(7)	*Spolidago* sp.	Canada, New Brunswick, Fredriction, 30.vii.1966	*nigrotuberculatus*	N
9(9)	*Solidago* sp.	Canada, Ontario, Pickering Lake, 6.viii.1977	*nigrotuberculatus*	N
10(10)	*Aster umbellatus*	Canada, Ontario, Simcoe, 2 & 3.ix.1962	*olivei*	O
10(10)	*A. ?simplex* or *orontarionis*	Canada, Ontario, Alliston, 8.ix.1967	*olivei*	O

TABLE 2. List of samples of *Uroleucon* from South America studied. *Number of specimens examined, ( ) number of specimens included in multivariate analysis; [P], paratypes; for *U. ambrosiae* see Table 1

*	Host plant	Locality and Collection data	Identification	Code letters (see Fig. 3)
29(10)	*Baccharis patagonica*	Chile, Llanquihue, Porte Montt, 24.xi.1974	*brevisiphon* sp. nov.	B
40(10)	*Baccharis*	Chile, Cautin, Pucon and Molco, 19.xi.1974	*brevisiphon*	B
4	*Baccharis*	Chile, Santiago, Puente Alto, 3.xii.1974	*brevisiphon*	
5	?*Grindelia*	Chile, Nuble, San Carlos, 23.xii.1950	*brevisiphon*	
14(4)	*Baccharis*	Chile, Coquimbo, La Serena, 8.xii.1950	*chilense* [P]	C
4(4)	*B. marginalis*	unknown, 8.ii.1958	*chilense*	C
16(10)	Compositae	Chile, Santiago, 2.xii.1974	*chilense*	C
10	*Vernonia scorpoides*	Surinan, Paramaribo, 29.xii.1960	*compositae*	
10	*Vernonia scorpoides*	Surinan, Spieringshoek, 6.i.1960	*compositae*	
3	*Baccharis*	Argentina, Tucuman, 11.ii.1955	*bereticum*	
8(5)	*Erigeron bonariensis*	Brazil, SP, São Roque, 24.ix.1969	*bereticum*	D
3	*Erigeron bonariensis*	Brazil, SP, Valinhos, 19.xi.1969	*bereticum*	
2	*Erigeron bonariensis*	Brazil, SP, Angatuba, 25.xi.1970	*bereticum*	
24(7)	?*Erigeron* sp.	Brazil, RS, Passo Fundo, 28.xi.1972	*bereticum*	D
12(8)	unknown	Brazil, RS, Passo Fundo, 29.xi.1972	*bereticum*	D
6(4)	*Buva origeroides*	Brazil, RS, Santa Maria, 20.x.1971	*bereticum*	D
20(10)	unknown	Chile, Llanquihue, Saltos Petrohue, 24.xi.1974	*bereticum*	D
25(10)	unknown	Chile, Malleco, Victoria, 17.xi.1974	*bereticum*	D
10(10)	?*Baccharis* or *Erigeron*	Brazil, PR, Curitiba, 9.xi.1972	*erigeronensis*	E
9(4)	*Erigeron bonariensis*	Brazil, SP, Campinas, 28.xi.1967	*erigeronensis*	E
11	*Erigeron bonariensis*	Brazil, SP, Campinas, 11.xii.1970	*erigeronensis*	
12(7)	*Erigeron bonariensis*	Brazil, SP, Valinhos, 19.xi.1967	*erigeronensis*	E
8(4)	*Cosmos* sp.	Brazil, SP, Piracicaba, 18.xii.1967	*erigeronensis*	E
14(8)	?*Satureja gilliorsit*	Chile, Santiago, Cerro del Roble, 26.xii.1974	*erigeronensis*	E
22(10)	*Baccharis* sp.	Chile, Santiago, Puente Alto. 3.xii.1974	*erigeronensis*	E
20(10)	?*Haplopoppus*	Chile, Santiago, Puente Alto, 3.xii.1974	*erigeronensis*	E
4(10)	*Baccharis* sp.	Chile, Aconcagua, Nogales, 28.xi.1974	*erigeronensis*	E
6	*Baccharis* sp.	Chile, Coquimbo, Huanta, 4.xii.1950	*essigi* sp. nov.	
4	*Solidago microglosa*	Brazil, Sp. Angatuba, 25.xi.1970	*gravicorne*	
7(5)	*Erigeron bonariensis*	Columbia, Tolima, Armero, 10.vii.1960	*gravicorne*	G
13(4)	*Baccharis* sp.	Chile, Coquimbo, Huanta, 7.xii.1950	*huantanum* [P]	CH
4(4)	*Baccharis*	Chile, Negrete, 30.i.1951	*macolai*	M
14(10)	*Baccharis*	Chile, Nuble, Fray Jorge, 18.ii.1985	*macolai*	M

TABLE 2. *Continued*

*	Host plant	Locality and Collection data	Identification	Code letters (see Fig. 3)
34(10)	*Baccharis* sp.	Chile, Nuble, Ninhue, 16.xi.1974	*macolai*	M
10(8)	*Baccharis* sp.	Chile, Nuble, Ninhue, 16.xi.1974 (ref. 888)	*macolai*	M
10(10)	*Baccharis* sp.	Chile, Nuble, Fundo Borges, 7.xi.1974	*macolai*	M
31(10)	*Baccharis* sp.	Chile, Nuble, Valle Atacalco, 9.vi.1974	*macolai*	M
12(10)	*Baccharis* sp.	Chile, Nuble, El Marchant, 3.ii.1975	*macolai*	M
15(10)	*Baccharis* sp.	Chile, Nuble, San Fabian, 13.i.1975	*macolai*	M
6(5)	*Baccharis* sp.	Chile, Valparaiso, Limache, 19.x.1967	*macolai*	M
10	Compositae	Chile, Llanquihue, Los Muermos, 18.i.1951	*muermosum* [P]	
9	*Senecio yegna*	Chile, Bahia Mansa, 2.ii.1985	*muermosum*	
5	*Baccharis* sp.	Chile, Llanquihue, San Andres, 15.i.1951	*pseudomuermosum* sp. nov.	
1	*Baccharis* sp.	Chile, Llanquihue, Los Muermos, 18.i.1951	*pseudomuermosum*	
9	Wild Lettuce Paraguay	Col. Vollendam, 26.ix.1955	*nickeli* [P]	
5(4)	unknown	Chile, Llanquihue, Saltos del Prohue, 24.ix.1974	*petrohuens e* sp. nov.	P
3	*Lactuca sativa*	Argentina, Mendoza, La Consulta, ?.xii.1970	*sonchi*	
5(4)	*Sonchus* sp.	Brazil, PR, Curitiba, 9.xi.1972	*sonchi*	S
12(7)	*Sonchus* sp.	Brazil, PR, Curitiba, 11.xi.1972	*sonchi*	S
7(4)	*Sonchus* sp.	Brazil, PR, Salto Ozório, 10.xii.1972	*sonchi*	S
10(6)	*S. laevis*	Brazil, RS, Santa Maria, 26.viii.1970	*sonchi*	S
10(5)	*S. oleraceus*	Brazil, SP, Campinas, 2.xii.1966	*sonchi*	S
10(8)	*Sonchus* sp.	Brazil, Sp. Piedade, 9.x.1968	*sonchi*	S
18(10)	*S. oleraceus*	Chile, J. Fernandes Is., 22.i.1955	*sonchi*	S
3	*Sonchus* sp.	Colombia, Pasto, 15.i.1976	*sonchi*	
4	*Sonchus*	Colombia, Cauca, Papayan, 19.vi.1986	*sonchi*	
16(10)	*S. oleraceus*	Uruguay, San José, 2.xii.1970	*sonchi*	S
12(9)	*Sonchus* sp.	Uruguay, Colonia, 6.i.1973	*sonchi*	S
6(5)	*Sonchus*	Uruguay, Montevideo, 4.i.1973	*sonchi*	S
10(6)	*Baccharis*	Argentina, Tucuman, 11.ii.1951	*tucumani* [P]	T
5(5)	*B. melastomaefolia*	Argentina, Concordia E. R., 21.xi.1935	*tucumani*	T
10	unknown	Brazil, PR, Ponta Grossa, 13–19.i.1973	*tucumani*	
4(4)	*Baccharis* sp.	Brazil, RS, Passo Fundo, 28.xi.1972	*tucumani*	T
8(6)	unknown	Brazil, RS, Passo Fundo, 28.xi.1972	*tucumani*	T

TABLE 3. List of characters used in the morphometric analysis

Length of antennal segment III + IV
Length of antennal segment V
Length of base antennal segment VI
Length of hind femur
Length of hind tibia
Length of segment II of hind tarsus
Length of siphunculi
Length of cauda
Measurement of antennal segment III from base to most distal secondary rhinaria
Length of longest hair on antennal segment III
Length of longest cephalic hair
Length of ultimate rostral segment (rostral segments IV + V)
Length of longest hair on abdominal tergite III
Length of longest hair on abdominal tergite VIII
Length of longest ventral hair on hind femur
Length of longest dorsal hair on hind tibiae
Length of reticulated zone on siphunculi

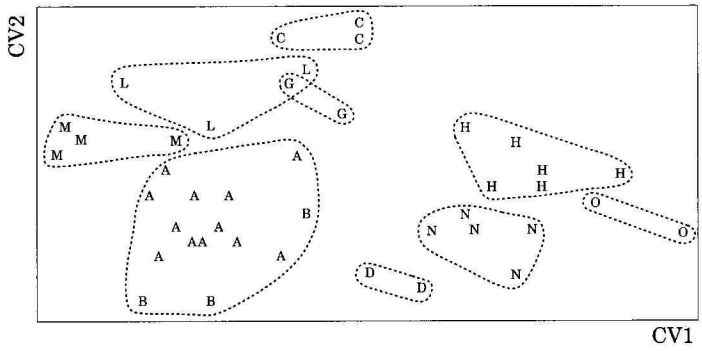


Figure 1. Plot of the scores (group mean CVs) on the first and second canonical variates for 42 samples of apterous viviparous females of the *Uroleucon ambrosiae* group, comprising 13 samples from South America (A), and 30 samples from North America, (B) *ambrosiae*, (M) *chrysanthemi*, (C) *chrysopsidicola*, (H) *hieracicola*, (L) *lanceolatus*, (D) *leonardi*, (G) *nigrotibius*, (N) *nigrotuberculatus* and (O) *olivei*.

range is much wider. This could be due to the absence of competition, or because Compositae in South America have not hitherto needed to develop resistance to this aphid.

The available type material of *lizerianum* is insufficient to test the identity of this species with *ambrosiae* by multivariate analysis, but the raw morphometric data for South American samples in the BM(NH) collection identified as *U. ambrosiae* matches that provided by Remaudière *et al.* (1991) for *lizerianum* so closely that there can be little doubt that only one taxon is involved. However, the ranges of numbers of secondary rhinaria on the third antennal segment in both apterae and alatae are

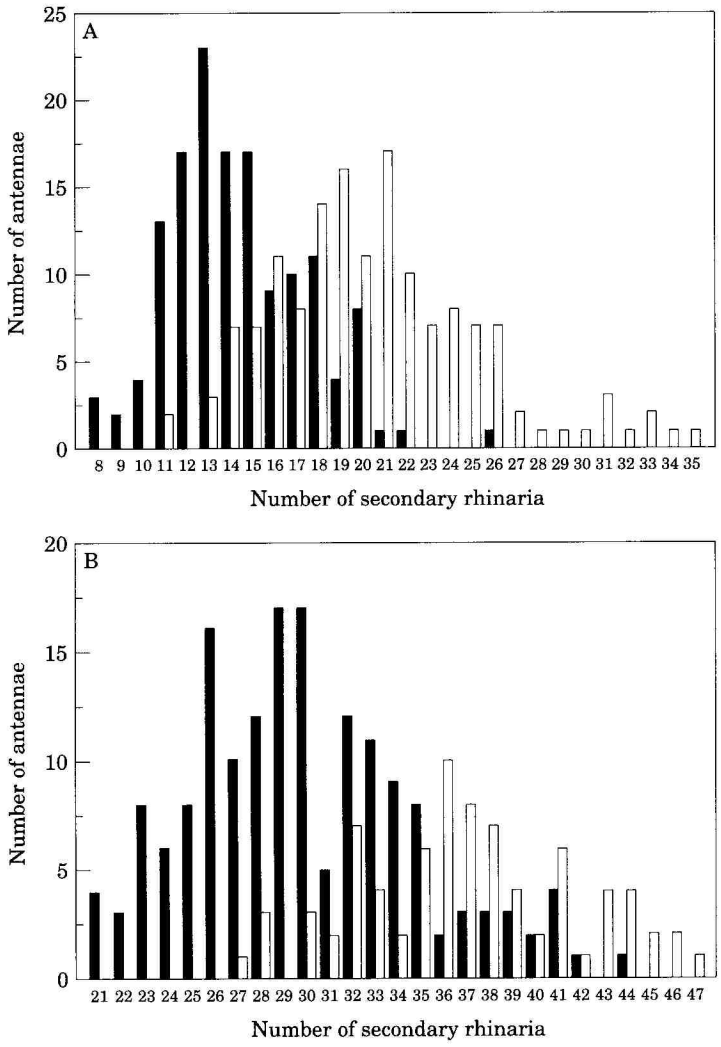


Figure 2. Distribution of numbers of secondary rhinaria on antennal segment III of apterae (A) and alatae (B) of specimens of *Ureoleucon ambrosiae* (*s. l.*) from North (□) and South (■) America.

lower in South American populations than in North American *ambrosiae* (Fig. 2), and the tibiae also tend to be darker in South American specimens. The most probable explanation is that these are founder effects, and that *lizerianum* is best treated as a South American race or form of *ambrosiae*.

Multivariate analysis of South American Uroleucon *species*

Scores (group means) on the first three canonical variates (CV1, CV2 and CV3) grouped the samples according to their nominal species (Fig. 3), except that paratypes of *U. huantanum* grouped with *U. chilense*. *U. erigeronensis* (Thomas), a nearctic aphid which is the type species of subgenus *Lambersius*, was clearly the most distinct species, with wide separation from all other species as a result of its scores on CV2. *U.*

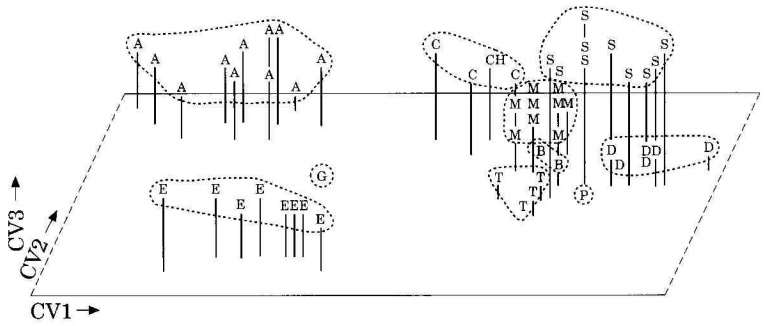


Figure 3. Plot of the scores (group mean CVs) on the first three canonical variates for 57 samples of apterous viviparous females of *Uroleucon* from South America; (A) *ambrosiae* (form *lizerianum*), (B) *brevisiphon*, (C) *chilense* (paratypes), (CH) *huantanum* (paratypes), (D) *bereticum*, (E) *erigeronensis*, (G) *gravicorne*, (M) *macolai*, (P) *petrohuense*, (S) *sonchi*, (T) *tucumani* (paratypes).

ambrosiae (form *lizerianum*), and the introduced palaearctic aphid *U. sonchi* (L.), were separated from all the endemic taxa by their scores on CV2 and CV3 respectively, and the single sample of a third introduced nearctic species, *U. gravicorne* (Patch), was also well separated from the South American endemics and closest to *erigeronensis*, in agreement with its placement in the subgenus *Lambersius*.

This analysis suggests that the pale green species *chilense* and *bereticum* Blanchard may not belong in the subgenus *Lambersius*, as represented by its type species *erigeronesis* (and by *gravicorne*). Possibly these and the other endemic South American species form a monophyletic group on their own, specializing on *Baccharis* and other shrubby Compositae in dry habitats. Firmer conclusions on this point will require more studies of North American *Lambersius* species.

DESCRIPTIONS OF NEW SPECIES

Four new species are described here from material in the Natural History Museum (BMNH) collection, and from the Essig collection in the University of California, Berkeley.

Uroleucon brevisiphon Carvalho, **sp. nov.**
(Table 4; Figs 4–11)

Apterous viviparous female. Colour in life not mentioned by collector. Cleared specimens with head brown to black; antennae black, except that the base of segment III and sometimes the segment II are paler. Rostrum dark, especially segments III and IV + V. Thorax and abdomen colourless, except for brown spots around bases of the dorsal abdominal hairs, spiracular and post-siphuncular sclerites and wax plates. Coxae brown to dark brown; weakly sclerotized specimens with coxae brown especially at base. Distal halves of the femora, tarsi and siphunculi black. Tibiae light brown, sometimes colourless, but with apical portion and articulation with femora black. Cauda, anal and posterior margin of genital plates brown like coxae.

TABLE 4. Morphometric data for *Uroleucon brevisiphon* new species, apterous and alate viviparous females

Character	Apterae (range of 20 specimens + holotype)	Alatae ($n=5$)
Body length	1.83–2.45 (2.06)	1.99–2.21
Hind tibia	1.25–1.72 (1.53)	1.51–1.77
Hind femur	0.68–0.92 (0.85)	0.79–0.89
Siphunculi	0.36–0.54 (0.42)	0.37–0.47
Cauda	0.36–0.51 (0.42)	0.36–0.42
Extent of reticulation on siphunculus	0.08–0.14 (0.09)	0.10–0.12
Antennal segment III	0.52–0.69 (0.59)	0.58–0.71
Antennal segment IV	0.37–0.54 (0.51)	0.48–0.55
Antennal segment V	0.35–0.49 (0.43)	0.40–0.52
Base of antennal segment VI	0.130–0.163 (0.150)	0.160–0.170
Processus terminalis	0.58–0.85 (0.72)	0.85–0.99
Ultimate rostral segment	0.130–0.151 (0.150)	0.140–0.153
Hind tarsus segment II	0.120–0.147 (0.136)	0.128–0.140
Longest hair on antennal segment III	0.019–0.032 (0.028)	0.026
Longest cephalic hair	0.034–0.055 (0.048)	0.026–0.048

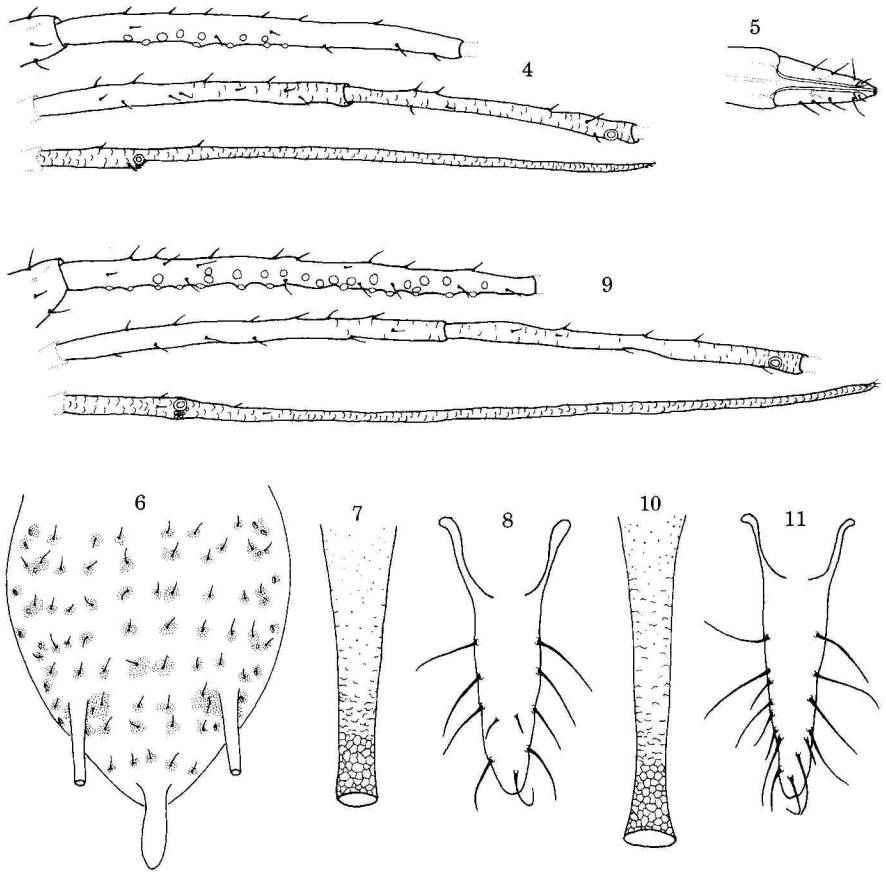
Measurements in mm.

Morphological characters: head smooth with antennal tubercles little developed and median frontal tubercle inconspicuous. Antennae smooth on segments I, II and III, faintly imbricated on distal half of IV, more strongly imbricated on segments V and VI. Secondary rhinaria 5–17, circular, variable in size, distributed on basal 1/2–2/3 of antennal segment III. Processus terminalis 4.0–5.7 times as long as base of antennal segment VI. Rostrum extends to the base of the third coxae; ultimate rostral segment 0.95–1.19 and 0.83–1.12 times as long as hind tarsus segment II and the base of antennal segment VI, respectively, with 6–8 accessory hairs almost as long as longest apical hairs. Post-siphuncular sclerites distinct, ante-siphuncular sclerites not developed. Lateral abdominal tubercles presents always in dark sclerites on abdominal segments II–IV. Eighth abdominal tergite with 4–5 hairs. Siphunculi cylindrical with base about two times width of apex, distinctly shorter (0.70–0.80 times) than antennal segment III and 0.95–1.13 times as long as cauda, reticulated over distal 23–26% of length. First tarsal segments with 4–5 hairs. Cauda bearing 10–17 hairs.

Alate viviparous female. Colour in life not mentioned by collector. Cleared specimens with head, antennal segments I, II and base of III, coxae, marginal abdominal sclerites, spots around of base of the abdominal hairs, anal and genital plates, and cauda light brown. Antennal segment I–III, except the base of the segment III, rostrum, thorax, distal one-half of femora, distally ends of tibiae, siphunculi and tarsi brown.

Morphological characters: secondary rhinaria 23–33, distributed irregularly on whole length of antennal segment III. Processus terminalis 5.30–5.94 times as long as base of antennal segment VI. Ultimate rostral segment 1.00–1.20 times as long as hind tarsus segment II and 0.87–0.94 times as long as base of antennal segment VI. Lateral abdominal tubercles always present on marginal abdominal sclerites II–IV. Siphunculi 1.00–1.16 times as long as cauda, reticulated over distal 25–32% of length. Cauda bearing 11–15 hairs. Otherwise like apterous viviparous female.

Material examined. HOLOTYPE: apterous viviparous female, CHILE, Llanquihue Province (5 km W. of Porte Montt), 24.xi.1974, *Baccharis patagonica* (D. Hille Ris



Figures 4–11. ***Uroleucon brevisiphon* sp. nov.** Figs 4–8 apterous viviparous female: 4, antenna; 5, apical rostral segment; 6, dorsal view of abdomen; 7, siphunculus; 8, cauda. Figs 9–11 alate viviparous female: 9, antenna; 10, siphunculus; 11, cauda.

Lambers) (mounted alone on slide, BMNH collection). PARATYPES: 27 apterous viviparous females, +immatures, on 11 slides, same data as holotype; 39 apterous and 5 alate viviparous females, on 10 slides, CHILE, Cautin Province (between Pucon and Molco, 250 m), 19.xi.1974, on *Baccharis* sp. (D. Hille Ris Lambers); 2 apterous and 2 alate viviparous females, CHILE, Puente Alto 800 m, Santiago, 3.xii.1974, on *Baccharis* sp. (BMNH collection).

Comments. This species differs from other species feeding on Compositae from South America by the short siphunculi, almost the same length as the cauda, and the brown coxae (especially dark at their base) and cauda.

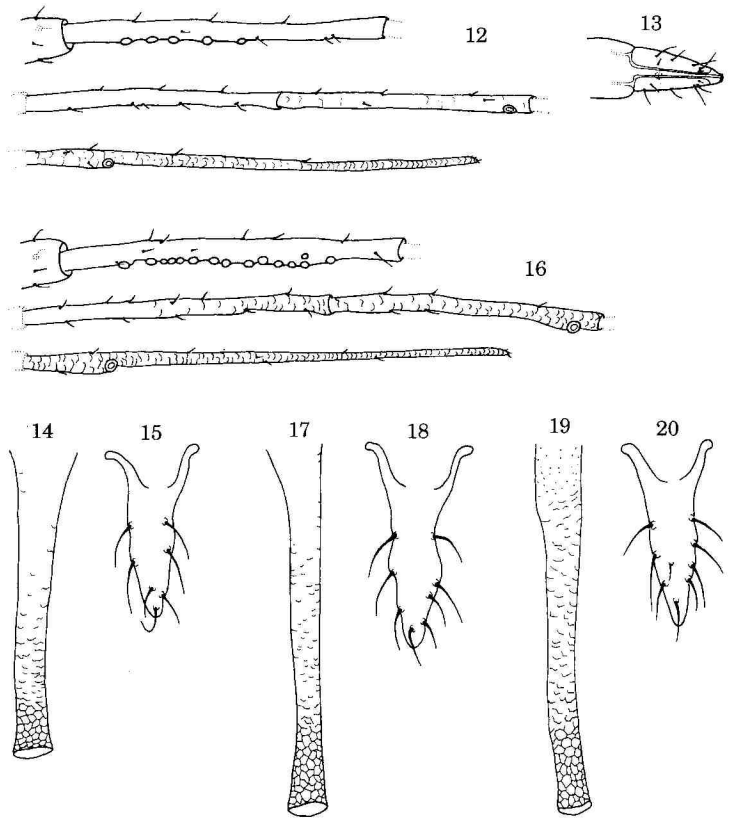
Uroleucon essigi Carvalho, **sp. nov.**
(Table 5; Figs 12–18)

Apterous viviparous female. Colour in life unknown. Cleared specimens with head, thorax, genital and anal plates and cauda pale. Antennal segments, I, II and

TABLE 5. Morphometric data for *Uroleucon essigi* new species, apterous and alate viviparous females

Character	holotype	Apterae				Alatae
		1	2	3	4	
Body length	1.97	1.97	2.16	1.97	2.06	2.43
Hind tibia	1.32	1.28	?	1.28	1.29	1.52
Hind femur	0.71	0.69	?	0.69	0.67	0.79
Siphunculi	0.48	0.47	0.45	0.47	0.43	0.53
Cauda	0.27	0.27	0.29	0.27	0.25	0.29
Extent of reticulation on siphunculus	0.092	0.106	0.092	0.092	0.088	0.128
Antennal segment III	0.47	0.45	0.47	0.45	0.43	0.53
Antennal segment IV	0.39	0.37	0.36	0.39	0.36	0.47
Antennal segment V	0.36	0.34	0.32	0.34	0.36	0.42
Base of antennal segment VI	0.140	0.140	0.140	0.140	0.136	0.140
Processus terminalis	0.57	0.53	0.52	0.53	0.53	0.59
Ultimate rostral segment	0.136	0.136	0.140	0·140	0.140	0.140
Hind tarsus segment II	0.160	0.160	?	0.160	?	0.160
Longest hair on antennal segment II	0.020	0.020	0.024	0.022	0.024	0.022
Longest cephalic hair	0.032	0.040	?	0.038	0.032	0.032

Measurements in mm.



Figures 12–20. Figs 12–18. ***Uroleucon essigi* sp. nov.** Figs 12–15 apterous viviparous female: 12, antenna; 13, apical rostral segment; 14, siphunculus; 15, cauda. Figs 16–18 alate viviparous female: 16, antenna; 17, siphunculus; 18, cauda. Figs 19, 20 *U. tucumani* Essig, apterae viviparous female: 19, siphunculus; 20 cauda.

base of III pale, remaining segments and apical rostral segment light brown to brown. Coxae, trochanters and femora pale; apices of tibiae and tarsi brown, as brown as antennal flagellum. Siphunculi dusky with bases as pale as coxae. Spots around bases of dorsal abdominal hairs weakly pigmented. Morphological characters: head smooth with antennal tubercles little developed and median frontal tubercle inconspicuous. Antennae smooth on segments I, II and III; faintly imbricated on IV and more strongly so on segments V and VI. Secondary rhinaria 3–6, circular and small, usually distributed in a row on basal half of segment III. Processus terminalis 3.7–4.1 times as long as base of antennal segment VI. Rostrum extends to the base of third coxae; ultimate rostral segment 0.85–0.88 and 0.97–1.00 times as long as hind tarsus segment II and base of antennal segment VI, respectively, with 7–8 accessory hairs. First tarsal segments with 3 hairs. Lateral abdominal tubercles usually present on segments II–IV. Eighth abdominal tergite with 4 hairs. Post-siphuncular sclerites not distinct. Siphunculi subcylindrical, 0.95–1.05 times as long as antennal segment III, 1.56–1.74 times as long as cauda, distally reticulated on 19–22%, and imbricated basad of reticulations. Cauda bearing 7–8 hairs.

Alate viviparous female. Colour in life unknown. Cleared specimens have head, rostrum, thorax, distal half of femora, tibiae and tarsi brown. Antennal flagellum brown, except the basal part of antennal segment III, which is paler. Coxae and trochanters as pale as bases of femora. Abdomen pale with marginal sclerites, a few spots around the base of the dorsal abdominal hairs and genital plate light brown. Siphunculi brown, paler than apices of femora and with base as light brown as anal plate and cauda.

Morphological characters: secondary rhinaria 12–15, distributed in a row over whole length of the antennal segment III. Lateral abdominal tubercles present on marginal sclerites II–IV. Siphunculi 1.83 times as long as cauda, with reticulation over distal 24%. Otherwise like apterous viviparous female.

Material examined. HOLOTYPE: apterous viviparous female, CHILE, Coquimbo Province, Huanta (on the Rio Turbia which flows into the Rio Elqui), 4.xii.1950; on *Baccharis* sp. (A. E. Michelbacher). The holotype is the upper right-hand specimen on a slide with 4 other apterae and 1 alata that are the paratypes. (BMNH).

Comments. Delfino (1991) studied material from the type series of *U. tucumani*, and suggested that Essig's "paratypes of *tucumani*" from Chile were a distinct species, with longer hind tarsi, fewer secondary rhinaria and a shorter processus terminalis than the type and paratypes from Tucuman. This is the material described here as *essigi*. In addition to the differences give by Delfino, *essigi* has only 3 hairs on the first tarsal segments, whereas *tucumani* and the very similar *U. garnicai* both have 4–5 first tarsal hairs. The siphunculi of *essigi* are paler basally and lack imbrication on the basal half (Figs 14 and 17), whereas the siphunculi of *tucumani* have imbrication extending to their bases (Fig. 19). (See key couplet 13 for discussion of Fig. 20).

Uroleucon petrohuense Carvalho, **sp. nov.**
(Table 6; Figs 21–26)

Apterous viviparous female. Colour in life not mentioned by collector, but probably pale. Cleared specimens have head, thorax, abdomen, genital and anal plates,

TABLE 6. Morphometric data for *Uroleucon petrohuense* new species, apterous viviparous females

Character	holotype	Apterae			
		1	2	3	4
Body length	1.98	2.06	2.02	1.93	2.00
Hind tibia	1.68	1.58	1.68	1.33	?
Hind femur	0.82	0.79	0.87	0.68	?
Siphunculi	0.53	0.54	0.57	0.43	0.60
Cauda	0.31	0.33	0.33	0.25	0.35
Extent of reticulation on siphunculus	0.11	0.13	0.13	0.09	?
Antennal segment III	0.69	0.67	0.71	0.60	0.73
Antennal segment IV	0.45	0.42	0.47	0.32	0.49
Antennal segment V	0.42	0.42	0.43	0.35	0.43
Base of antennal segment VI	0.166	0.162	0.165	0.143	0.160
Processus terminalis	0.87	0.79	0.85	0.69	0.85
Ultimate rostral segment	0.141	0.126	0.140	0.138	0.140
Hind tarsus segment II	0.113	0.123	0.115	0.114	?
Longest hair antennal segment III	0.032	0.034	0.029	0.028	0.034
Longest cephalic hair	0.040	0.042	0.032	0.032	0.040

Measurements in mm.

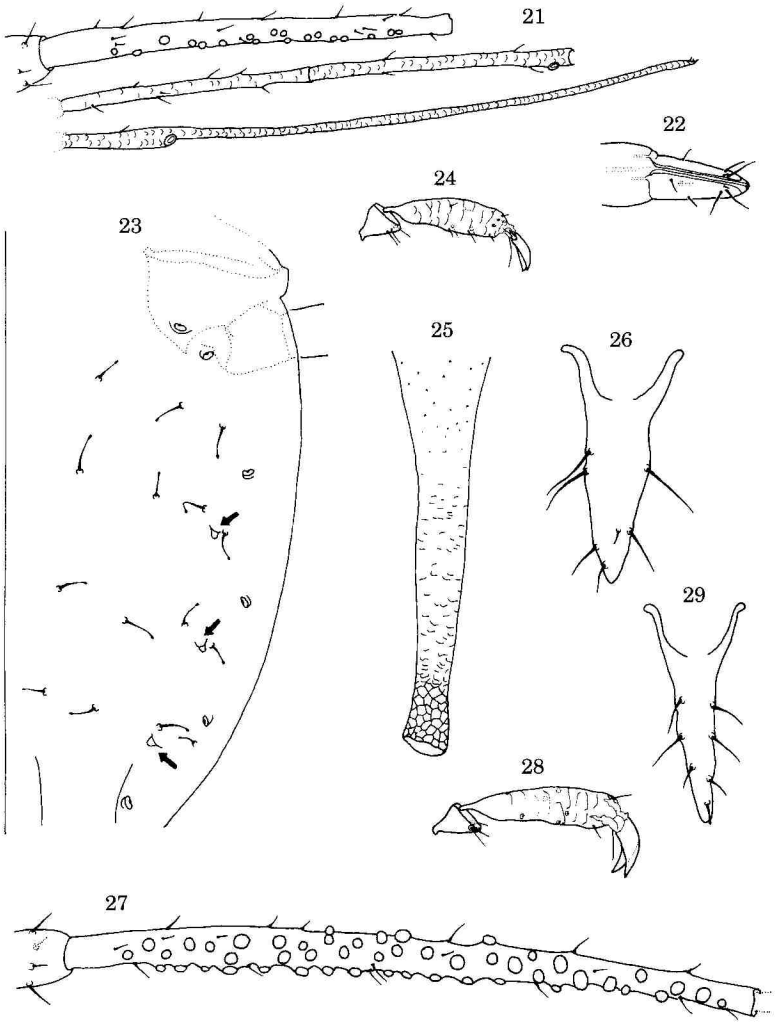
siphunculi and cauda pale. Antennae pale, dusky near their articulations. Rostrum pale with ultimate rostral segment dark. Legs pale, except by tarsi distal parts of tibiae.

Morphological characters: head smooth. Antennal tubercles little developed and median frontal tubercles inconspicuous. Antennal segment I–III smooth, faint imbrications on V, stronger imbrications on segments VI. Secondary thinaria 14–26 distributed in a row over nearly the whole length of antennal segment III. Processus terminalis 4.9–5.3 times as long as base of antennal segment VI. Rostrum extends to third coxae; ultimate rostral segment 1.02–1.25 times as long as hind tarsus segment II and 0.78–0.96 times base of antennal segment VI, with 4–5 accessory hairs. First tarsal segments with 3 hairs. Lateral abdominal tubercles present on abdominal segment III–V, larger than tubercular bases of the dorsal hairs (Fig. 23). Eighth abdominal tergite with 4 hairs. Post-siphuncular sclerites not distinct. Siphunculi 1.64–1.76 times as long as cauda, reticulated over distal 20–25% of length, with strong imbrications basad of reticulations. Genital plate with 2 long hairs on anterior margin and 6–9 shorter ones on posterior margin. Cauda short bearing 7–9 hairs.

Alate viviparous female. Unknown.

Material examined. HOLOTYPE: apterous viviparous female, CHILE, Llanquihue Province, Saltos del Petrohue, 24.xi.1974, host plant unknown (D. Hille Ris Lambers). Mounted in one slide (BMNH). PARATYPES: 4 apterous viviparous females, mounted on 3 slides, same data as holotype (BMNH).

Comments. The characters that distinguish this species from congeners are short cauda, ultimate rostral segment with 4–5 hairs, and relatively large papilliform lateral abdominal tubercles present on segments III–V. (See key couplets 5 and 6 for discussion of Figs 27–29).



Figures 21–29. Figs 21–26. ***Uroleucon petrohuense* sp. nov.,** apterous viviparous female: 21, antenna; 22, apical rostral segment; 23, lateral tubercles on abdominal segments III–V; 24, hind tarsus; 25, siphunculus; 26, cauda. Figs 27, 28 *U. gravicorne* (Patch). 27, antennal segment III of alate viviparous female; 28, hind tarsus of apterous viviparous female. Fig. 29 *U. erigeronensis* (Thomas), cauda of apterous viviparous female.

Uroleucon pseudomuermosum Carvalho, **sp. nov.**

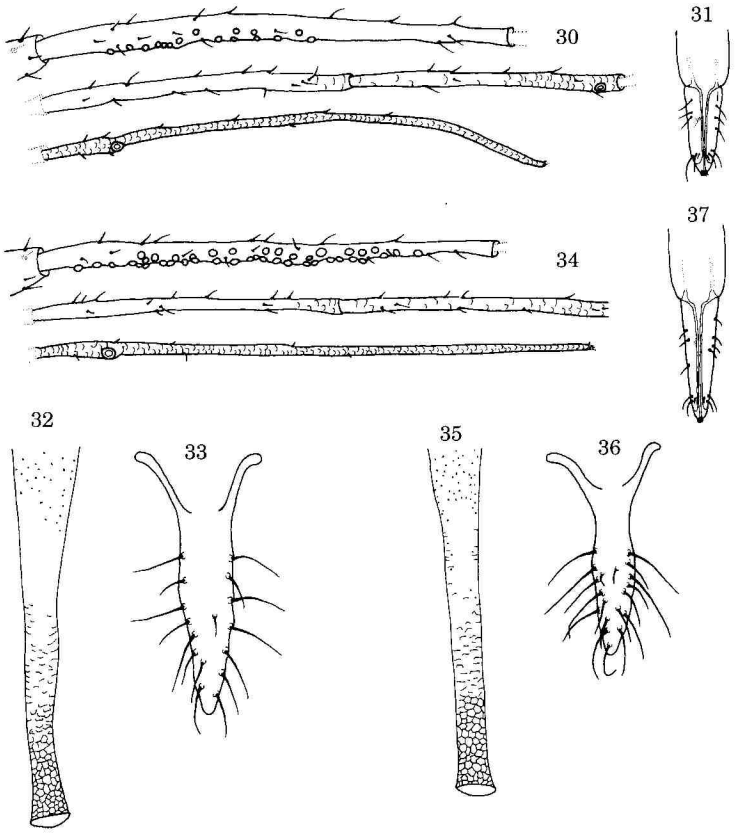
(Table 7; Figs 30–36)

Apterous viviparous female. Colour in life not mentioned by collector. Cleared specimens with head, large sclerites around bases of dorsal abdominal hairs, rostrum, post-siphuncular sclerites, apices of the femora and tibiae, tarsi, genital and anal plates, siphunculi and cauda dark brown. Antennal segments I, II and base of the segment III light brown, remainder of the antennal flagellum dark brown. Coxae dusky.

TABLE 7. Morphometric data for *Uroleucon pseudomuermosum* new species, apterous and alate viviparous females

		Aptera			Alatae			
Character	holotype	1	2	3	1	2	3	4
Body length	2.75	2.75	2.95	2.65	2.95	2.95	3.23	2.29
Hind tibia	2.06	2.16	?	2.01	2.06	?	2.28	2.02
Hind femur	1.10	1.18	?	1.10	1.02	?	1.24	1.08
Siphunculi	0.69	0.79	0.77	0.69	0.65	0.61	0.69	0.61
Cauda	0.45	0.56	0.52	0.45	0.40	0.40	0.48	0.42
Extent of reticulation on siphunculus	0.16	0.19	0.16	0.17	0.17	0.15	0.16	0.15
Antennal segment III	0.88	1.01	1.00	0.83	0.95	0.99	0.99	0.89
Antennal segment IV	0.63	0.67	0.75	0.63	0.65	0.65	0.79	0.65
Antennal segment V	0.43	0.49	0.55	0.49	0.53	0.59	0.67	0.53
Base of antennal segment VI	0.160	0.180	0.180	0.160	0.170	0.160	0.200	0.160
Processus terminalis	0.85	0.79	0.79	0.85	0.89	0.83	0.95	0.85
Ultimate rostral segment	0.168	0.170	0.164	0.170	0.168	0.170	0.168	0.160
Hind tarsus segment II	0.140	0.150	?	0.140	?	?	0.140	0.140
Longest hair on antennal segment VI	0.040	0.040	0.040	0.040	0.040	0.038	0.040	0.040
Longest cephalic hair	0.058	0.054	0.050	0.058	0.050	0.050	0.054	0.050

Measurements in mm.



Figures 30–36. ***Uroleucon pseudomuermosum* sp. nov.** Figs 30–33, apterous viviparous female: 30, antenna; 31, apical rostral segment; 32, siphunculus; 33, cauda. Figs 34–36 alate viviparous female: 34, antenna; 35, siphunculus; 36, cauda. Fig. 37, *U. muermosum* Essig, apical rostral segment of apterous viviparous female.

Morphological characters: head smooth with antennal tubercles developed, divergent, and median frontal tubercle small. Antennal segments III and IV smooth, faint imbrication on V, stronger imbrication on segment VI. Secondary rhinaria 18–29 distributed on basal two-thirds of the antennal segment III. Processus terminalis 4.3–5.3 times as long as base of antennal segment VI. Rostrum reaching the base of the hind coxae; ultimate rostral segment 1.1–1.2 times as long as segment II of hind tarsus, and bearing 7–8 accessory hairs. First tarsal segments with 4–5 hairs. Dorsal abdominal hairs strong, somewhat curved, with apices slightly enlarged, arising from large dark sclerites; ventral abdominal hairs long and more slender than dorsal, with the bases light brown, and sometimes arising from small dark sclerites, especially on sternite VII. Lateral abdominal tubercles located on dark sclerites on segments II–IV. Ante-siphuncular sclerites fragmented. Abdominal tergite VIII with 4 hairs. Genital plate rounded with 2 long hairs on anterior margin and 9–12 on hind margin. Siphunculi subcylindrical, 1.40–1.53 times as long as cauda, reticulated over distal 21–25% of length, with a few dispersed imbrications basad of the reticulation. Cauda bearing 15–20 hairs.

Alate viviparous female. Colour in life unknown. Cleared specimens with head,

antennae, rostrum, thorax, distal halves of femora, tibiae, tarsi, siphunculi and genital plate dark brown. Marginal sclerites, spots around bases of dorsal abdominal hairs, post-siphuncular sclerites, genital plate and cauda brown. Wings hyaline.

Morphological characters: secondary rhinaria 24–39, irregularly distributed over nearly the whole length of antennal segment III. Siphunculi 1.4–1.6 times as long as cauda, reticulated on distal 23–26% of the length. Cauda bearing 15–22 hairs. Otherwise like apterous viviparous female.

Material examined. HOLOTYPE: apterous viviparous female, CHILE, Llanquihue Province, Hacienda San Andres (20 Km W. of Purrangue), 15.i.1951, on *Baccharis* sp. (A. E. Michelbacher). The holotype is the upper left hand specimen on a slide with one other aptera and two alatae (BMNH). PARATYPES: 3 apterae and 4 alatae of same data as holotype; 1 apterae and 6 alatae, CHILE, Llanquihue Province, Los Muermos, 18.i.1951, on ?*Baccharis* sp. (A. E. Michelbacher) (BMNH and Essig collection).

Comments. This species somewhat resembles *U. muermosum*, but differs mainly by the length of the ultimate rostral segment, which is like that of *U. ambrosiae*, whereas that of *U. muermosum* is very long (0.23–0.27 mm) and slender (Fig. 37). The specimens were listed as *U. ambrosiae* by Essig (1953:115).

KEY TO SPECIES OF *UROLEUCON* IN SOUTH AMERICA

1 Coxae wholly dark, as dark or nearly as dark as distal apices of femora and tibiae; siphunculi wholly dark or at least dark at back and apex. (Introduced Old World species) 2
— Coxae pale, as pale as proximal area of femora or if darker, then siphunculi may be dark or have a pale base or be entirely pale, but are never dark at base and apex and pale in the middle 4
2 Siphunculi dark at base and apex, but in apterae often paler in the middle; cauda pale; ultimate rostral segment 0.70–0.97 times as long as hind tarsus segment II. Apterae with 13–32 and alatae with 31–65 secondary rhinaria on antennal segment III. Dark bronze-brown in life, in colonies on flower stems of *Sonchus*. A palaeartic species, widely distributed in South America ..... *sonchi*
— Siphunculi and cauda both black; ultimate rostral segment 1.1–1.6 times as long as hind tarsus segment II. Apterae with 22–86 and alatae with 57–118 secondary rhinaria on antennal segment III 3
3 Lateral abdominal tubercles usually present on segments II–IV. Apterae with 23–54 secondary rhinaria usually confined to basal 60% of antennal segment III. Tibiae dusky to dark over entire length. Hind femur with basal 50–60% pale, distal part contrasting black, with a rather abrupt transition between. Dark bronze-black in life, on *Cirsium* or *Carduus*. A palearctic species, recorded from *Cirsium* in Argentina (coll. L. Bahamondes) ..... *aeneum*
— Lateral abdominal tubercles absent. Apterae with 33–86 secondary rhinaria extending over 70–95% of antennal segment III. Tibiae with markedly paler middle section. Hind femora with about the basal 20–30% pale, distal part dark, and a gradual transition between. Shining very dark red to almost black in life, on *Vernonia* and other Compositae. A Palearctic species, introduced to

Central and South America (Argentina, Chile, Surinam and Venezuela) .... *compositae*

4 Siphunculi of apterae long and thin, 2.3 or more times longer than cauda, basally pale, with distal reticulation limited to less than 15% of total length. Terminal process of antenna more than 1.3 mm long. (Based on one apterae only: alatae unknown). Probably pale green in life, on an unidentified composite in Chile ..... *nuble*

— Siphunculi of apterae pale or dark, usually less than 2.3 times longer than cauda, if longer then with distal reticulation extending over at least 20% of length. Terminal process of antenna less than 1.3 mm long 5

5 Distal caudal hairs usually short and blunt or capitate (Fig. 29); siphunculi pale at base; dorsal cephalic hairs 18–35 μm long; processus terminalis 3.2–5.0 times longer than base of antennal segment VI. Yellow-green in life, on *Baccharis*, *Cosmos*, *Erigeron*, ?*Haplopoppus*, ?*Satureja*. Probably of nearctic origin, recorded in South America from Brazil, Chile, Colombia and Venezuela (BMNH collection data) ..... *erigeronensis*

— Distal caudal hairs long and pointed; siphunculi variably pigmented; cephalic hairs 30–75 μm long; processus terminalis 3.2–7.5 times as long as base of antennal segment VI 6

6 Second segment of hind tarsus with ventral hairs on proximal two-thirds small or atrophied (Fig. 28); siphunculi pale at base, 1.06–1.19 times as long as cauda; lateral abdominal tubercles present on segment II–V (easier to see in alate); apterae with 6–13 secondary rhinaria on antennal segment III; secondary rhinaria of alatae tuberculate, with a raised thickened rim (Fig. 27). Green in life, on *Erigeron* and *Solidago*. Probably of Nearctic origin, now also recorded from Brazil, Colombia and Venezuela (BMNH collection data) ..... *gravicorne*

— Second segment of hind tarsus with ventral hairs on proximal two-thirds developed; siphunculi pale or variably pigmented, 0.95–2.13 times as long as cauda; lateral abdominal tubercles present or absent; apterae with 4–37 secondary rhinaria on antennal segment III, secondary rhinaria of alatae with a thickened rim, but not so protuberant 7

7 Lateral abdominal tubercles well developed, papilliform, on segments II–V or III–V (Fig. 23); ultimate rostral segment with 4–5 accessory hairs (Fig. 22); aptera with 14–26 secondary rhinaria distributed on nearly the whole length of the antennal segment III (Fig. 21); first tarsal segment with 3 hairs (Fig. 24). Host plant unknown, Chile ..... ***petrohuense* sp. nov.**

— Lateral abdominal tubercles absent or present but not papilliform, and never on segment V; ultimate rostral segment with 6–10 accessory hairs; aptera with 3–37 secondary rhinaria variably distributed on antennal segment III; first tarsal segment with 3–5 hairs 8

8 Ultimate rostral segment 0.23–0.27 mm long (Fig. 37), 1.5–1.7 times as long as hind tarsus segment II. Dark reddish to brown or black in life, on *Senecio*, Chile ..... *muermosum*

— Ultimate rostral segment 0.12–0.22 mm long, 0.8–1.4 times as long as hind tarsus segment II 9

9 Processus terminalis of aptera 3.17–3.70 times as long as base of antennal segment VI. (Alatae unknown). Dark green in life, with black head, on *Gochnatia glutinosa*, Argentina ..... *gochnatiae*

— Processus terminalis of both apterae and alatae more than 4 times longer than

base of antennal segment VI 10

10 Siphunculi usually more than 1.6 times as long as cauda, which is 0.24–0.45 mm long and bears 7–12 hairs 11

— Siphunculi usually less than 1.6 times as long as cauda, which is 0.32–0.83 mm long and bears 9–31 hairs 14

11 First tarsal segments with 3 hairs; processus terminalis 3.7–4.2 times longer than base of antennal segment VI; antennal segment III of aptera with 3–6 secondary rhinaria, on basal half. On *Baccharis*, Chile ..... ***essigi* sp. nov.**

— First tarsal segments with 3–5 hairs; processus terminalis 4.1–6.6 times longer than base of antennal segment VI; antennal segment III with 4–15 secondary rhinaria extending over most of length of segment 12

12 Processus terminalis 5.5–6.6 times as long as base of antennal segment VI. Lateral abdominal tubercles usually present on segments II–IV. Pale green in life, on *Tessaria absinthioides*, Argentina ..... *tessariae*

— Processus terminalis 4.1–5.3 times as long as base of antennal segment VI. Lateral abdominal tubercles usually absent 13

13 Cauda 0.31–0.38 mm long; ultimate rostral segment 0.8–1.0 times as long as hind tarsus segment II, which is 0.14–0.17 mm long; longest hairs on antennal segment III 30–40 μm long. Brown in life, on *Eupatorium buniifolium*, Argentina ..... *garnicai*

— Cauda 0.24–0.34 mm long (Fig. 20); ultimate rostral segment 1.0–1.2 times as long as hind tarsus segment II, which is 0.12–0.14 mm long; longest hairs on antennal segment III 17–30 μm long. Red-brown in life, on *Baccharis*, Argentina and Brazil ..... *tucumani*

14 Siphunculi 0.36–0.54 mm long, 0.9–1.1 times as long as cauda, which is 0.36–0.51 mm long; ultimate rostral segment shorter than base of antennal segment VI. On *Baccharis*, Chile ..... ***brevisiphon* sp. nov.**

— Siphunculi 0.47–1.00 mm long, 1.1–1.6 times as long as cauda, which is 0.32–0.83 mm long; ultimate rostral segment longer or shorter than base of antennal segment VI 15

15 Cauda pale, contrasting with dark brown-black siphunculi and distal quarter to half of hind femur; siphunculi 1.1–1.5 times as long as cauda, which is 0.40–0.75 mm long; ultimate rostral segment longer than both base of antennal segment VI and hind tarsus segment II 16

— Cauda somewhat pigmented, not contrastingly pale in comparison with siphunculi or, if the siphunculi are rather dark, then in comparison with distal part of hind femur; siphunculi 1.3–1.6 times as long as cauda, which is 0.32–0.64 mm long; ultimate rostral segment longer or shorter than base of antennal segment VI and hind tarsus segment II..... 17

16 Basal 30–50% of siphunculi clearly paler than rest. Bright orange-red in life, on *Rudbeckia*. A nearctic species recorded from Brazil (no host given) ..... *rudbeckiae*

— Siphunculi wholly dark, or only paler at extreme base. Dull red to red-brown in life, on numerous Compositae ..... *ambrosiae* (form *lizerianum*)

17 Ultimate rostral segment 0.163–0.193 mm long, 1.1–1.3 times as long as hind tarsus segment II 18

— Ultimate rostral segment 0.123–0.173 mm long, 0.8–1.1 times as long as hind tarsus segment II 19

18 Cleared specimens with antennal segments I and II dark, and dark post-

siphuncular sclerites and sclerites at bases of dorsal hairs; processus terminalis 4.3–5.4 times as long as base of antennal segment VI; apterae with 18–29 and alatae with 24–39 secondary rhinaria on antennal segment III. On *Baccharis*, Chile ..... ***pseudomuermosum* sp. nov.**

— Cleared specimens with antennal segments I and II pale, and dorsal abdominal sclerites pale and inconspicuous; processus terminalis more than 6 times as long as base of antennal segment VI; apterae with 7–19 and alatae with 14–22 secondary rhinaria on antennal segment III. On *Baccharis*, Chile ..... *chilense*

19 Cleared specimens with all antennal segments dusky, and with dark sclerites round bases of dorsal hairs; siphunculi wholly dark brown; apterae with 7–15 secondary rhinaria on antennal segment III, restricted to basal half of segment, and alatae with 11–24 secondary rhinaria at a density of 13–31 per mm. Brown in life, on *Baccharis*, *Buva* and *Erigeron*, Argentina, Chile (BMNH collection data) and Bolívia ..... *macolai*

— Cleared specimens with antennal segment I pale, and with sclerites around bases of dorsal hairs pale and inconspicuous; apterae with 15–32 secondary rhinaria on antennal segment III, distributed over nearly the whole length of segment, and alatae with 21–35 secondary rhinaria at a density of 28–53 (mostly more than 35) per mm. Green in life, on *Baccharis*, *Buva*, *Erigeron* and *Tanacetum* (cultivated), Argentina, Brazil, Chile and Peru (BMNH collection data) .... *bereticum*

OTHER *UROLEUCON* SPECIES RECORDED FROM SOUTH AMERICA

A check-list of South American *Uroleucon* is provided in Table 8. The following were not included in the key, due to unavailability or insufficiency of material, or because we are placing them in synonymy.

Uroleucon aaroni (Knowlton, 1949)

This is a little-known North American species recorded from Chile by Smith & Cermeli (1979). They give no collection data, and we could not locate the Chilean material, so the presence of this species in South America requires confirmation. Only the alatae, collected from *Chrysothamnus nauseosus* (Pall.) are known from North America, and they are doubtfully distinct from *U. ambrosiae.*

Uroleucon cocoense (Blanchard, 1932)

The five syntype alatae, collected on cultivated *Tanacetum* in Córdoba, Argentina, are all mounted on one slide, and are in very poor condition. Measurements of all possible characters correspond closely to those of alatae of *U. bereticum*, and the original description does not provide any discriminating features. We therefore place *U. cocoense* as a synonym of *U. bereticum.*

TABLE 8. Checklist of South American species of *Uroleucon*

Name and synonymy	Genus of original description	Host plant	South American distribution	Origin if non-endemic	References
aaroni (Knowlton)	*Macrosiphum*	*Chrysothamnus*	Chile	Nearctic	Smith & Cermeli, 1979
aeneum (Hille Ris Lambers)	Dactynotus	Carduus, Cirsium	Argentina	Palaearctic	this paper
ambrosiae (Thomas)	*Siphonophora*	*Ambrosia*,	widespread	Nearctic	this paper
(form *lizerianum* Blanchard)		*Iva*, etc			
bereticum (Blanchard)	*Macrosiphoniella*	*Baccharis*, *Buva*,	widespread	—	Blanchard, 1922
syn. *cocoense* Blanchard		*Erigeron*,			this paper
syn. *cordobense* Blanchard		*Tanacetum*			this paper
***brevisiphon* sp. nov.**	—	*Baccharis*	Chile	—	this paper
chilense (Essig)	*Macrosiphum*	Baccharis	Chile	—	Essig, 1953
syn. *huantanum* Essig					this paper
compositae (Theobald)	*Macrosiphum*	various Compositae	widespread	Palaearctic	this paper
syn. *griersoni* Blanchard					
erigeronensis (Thomas)	*Siphonophora*	*Erigeron*	widespread	Nearctic	this paper
***essigi* sp. nov.**	—	*Baccharis*	Chile	—	this paper
garnicai Delfino	—	*Eupatorium*	Argentina	—	Delfino, 1991
gochnatiae Delfino	—	*Gochnatia*	Argentina	—	Delfino, 1994
gravicorne Patch	*Macrosiphum*	*Solidago*	Brazil, Colombia, Venezuela	Nearctic	Smith & Cermeli, 1979
littorale (Blanchard)	*Macrosihum*	*Baccharis*	Argentina	—	Blanchard, 1939
macolai (Blanchard)	Macrosiphum	*Baccharis*	Argentina, Chile	—	Remaudière *et al.*, 1991
muermosum (Essig)	*Macrosiphum*	unidentified composite	Chile	—	Essig, 1953 this paper
nuble (Essig)	*Macrosiphum*	unidentified composite	Chile	—	Essig, 1953 this paper
***petrohuense* sp. nov.**	—	unknown	Chile	—	this paper
***pseudomuermosum* sp. nov.**	—	*Baccharis*	Chile	—	this paper
rudbeckiae (Fitch)	*Aphis*	*Rudbeckia*, *Solidago*	Brazil	Nearctic	Smith & Cermeli, 1979
sonchi (L.)	*Aphis*	*Sonchus*	widespread	Palaearctic	Smith & Cermeli, 1979
syn. nickeli Essig					this paper
tessariae Delfino	—	*Tessaria*	Argentina	—	Delfino, 1994
tucumani (Essig)	*Macrosiphum*	*Baccharis*	Argentina, Chile	—	Essig, 1953 Delfino, 1991

Uroleucon cordobense (Blanchard, 1932)

Described as pale green in life with dusky siphunculi, feeding on a wild *Erigeron* species in Sierras de Córdoba. The syntype series includes two apterae of *U. erigeronensis*. The other type specimens (9 apterae, 7 alatae, and immatures) were compared morphometrically to the 8 syntype apterae of *U. bereticum*. Although the *bereticum* types were somewhat smaller no other differences could be found, and the original description does not discriminate between the two species, so we place *cordobense*, along with *cocoense*, as a synonym of *bereticum*.

Uroleucon griersoni (Blanchard, 1932)

From the original description *U. griersoni* is dark reddish brown in life, and cleared specimens have dark cauda, siphunculi and legs, except bases of femora and proximal two-thirds of tibiae, which are paler. Having examined and measured syntypes (7 apterae, 9 alatae, and immatures from *Cynara scolymus*, and 2 apterae from *Vernonia*), we place it in synonymy with the introduced palaearctic species *U. compositae*.

Uroleucon huantanum (Essig, 1953)

Essig (1953) described *Macrosiphum huantanum* and *M. chilense* both feeding on *Baccharis* in Chile. Both species have long siphunculi (usually more than 0.80 mm long) and a ultimate rostral segment that is longer than (1.1–1.3 times) segment II of hind tarsus. Paratype samples of both species included in the canonical variate analysis (Table 2) had similar scores on canonical variates 1 and 2 (Fig. 2); examination of the specimens also failed to reveal any significant differences. Therefore we place *huantanum* as a synonym of *chilense*.

Uroleucon littorale (Blanchard, 1939)

U. littorale, collected on *Baccharis melastomaefolia* Gris. at Concórdia, Argentina, was described as dark green in life, and the morphological description does not discriminate it from the Argentinian paratypes of *U. tucumani*. We have been unable to examine the type of *U. littorale*, so reserve judgment on whether this is an earlier name for *tucumani*.

Uroleucon nickeli (Essig, 1956)

We have examined paratypes of *U. nickeli* from the Essig collection, and considered this to be a synonym of *U. sonchi* (L.)

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