Mexican Uroleucon (Hemiptera: Aphididae) from the Collection of the Muséum National D'Histoire Naturelle of Paris with Eleven New Species

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MEXICAN *UROLEUCON* (HEMIPTERA: APHIDIDAE) FROM THE COLLECTION OF THE MUSÉUM NATIONAL D'HISTOIRE NATURELLE OF PARIS WITH ELEVEN NEW SPECIES

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ABSTRACT

Very little is known about the Mexican fauna of *Uroleucon*; only 4 species have been recorded, which is fewer than in Central America and the Caribbean. One hundred ninety two samples collected in 19 Mexican states from the Muséum national d'Histoire naturelle (Paris) collection have been studied and 30 species identified. Four of them are the species previously recorded (*U. ambrosiae*, *U. erigeronense*, *U. pseudoambrosiae* and *U. sonchi*). Fifteen North American species are recorded for the first time from Mexico: *U. astronomus*, *U. brevitarsus*, *U. chani*, *U. eupatoricolens*, *U. gravicorne*, *U. macgillivrayae*, *U. maximilianicola*, *U. nigrotuberculatum*, *U. obscuricaudatum*, *U. paucosensoriatum*, *U. penderum*, *U. reynoldense*, *U. richardsi*, *U. stoetzelae* and *U. zerogutierrezis*. Thirty-three new "aphid/host plant" relationships of these species have been established. Comments about the distribution of the species are made. Eleven new species are described, illustrated and discussed: *U. penae*, *U. mexicanum*, *U. gnaphalii*, *U. sinuense*, *U. munozae*, *U. zacatecense*, *U. queretarense*, *U. tlaxcalense*, *U. latgei*, *U. heterothecae* and *U. remaudiereorum*. An appendix with modifications for 17 keys in Blackman and Eastop's work, "Aphids on the World's Herbaceous Plants and Shrubs", is presented and 3 additional keys are given.

Key Words: *Uroleucon*, aphids, Mexico, host plants

RESUMEN

Se conoce muy poco sobre la fauna mexicana del género *Uroleucon*; sólo se han citado cuatro especies en el país, que son menos que las citadas en América Central y el Caribe. Se han estudiado 192 muestras recogidas en 19 estados Mexicanos de la colección del Muséum national d'Histoire naturelle (Paris), habiéndose identificado 30 especies. Cuatro de ellas son especies previamente citadas (*U. ambrosiae*, *U. erigeronense*, *U. pseudoambrosiae* y *U. sonchi*). Quince especies norteamericanas se citan por primera vez: *U. astronomus*, *U. brevitarsus*, *U. chani*, *U. eupatoricolens*, *U. gravicorne*, *U. macgillivrayae*, *U. maximilianicola*, *U. nigrotuberculatum*, *U. obscuricaudatum*, *U. paucosensoriatum*, *U. penderum*, *U. reynoldense*, *U. richardsi*, *U. stoetzelae* y *U. zerogutierrezis*. Se establecen 33 nuevas relaciones "pulgón / planta hospedadora" y se realizan comentarios sobre su distribución. Once nuevas especies son descritas, ilustradas y discutidas: *U. penae*, *U. mexicanum*, *U. gnaphalii*, *U. sinuense*, *U. munozae*, *U. zacatecense*, *U. queretarense*, *U. tlaxcalense*, *U. latgei*, *U. heterothecae* y *U. remaudiereorum*. Se presenta un apéndice con modificaciones para 17 claves de Blackman e Eastop en "Aphids on the World's Herbaceous Plants and Shrubs" y se establecen tres claves adicionales.

Translation provided by the authors.

The genus *Uroleucon* Mordvilko, 1914 (Aphididae Aphidinae Macrosiphini) is a hyper-diverse genus widely distributed throughout the world, mainly in territories of Laurasic origin. Based on data from Remaudière & Remaudière (1997), Eastop & Blackman (2005), Blackman & Eastop (2006), Nieto Nafría et al. (2007), Mier Durante & Ortego (2008) and Jensen et al. (2010), *Uroleucon* comprises 226 species plus 14 subspecies, some of which are of doubtful validity. It is subdivided into 6 subgenera: the nominotypical one, *Uromelan* Mordvilko, 1914 and *Lambersius* Olive, 1965, which together contain 223 species, plus *Belochilum* Börner, 1931, *Satula* Olive, 1963, and *Divium* Pashchenko, 2000 (not accepted by Blackman & Eastop 2006), containing one species each.

In America 112 species have been recorded, 102 of which are native (46% of the species in the genus) and 10 exo-American, mainly European, belonging to the subgenera *Uroleucon*, *Uromelan*, *Lambersius* and *Satula*. Ninety species, the 10 exo-American and 80 native ones, are known in North America. Nine species have been recorded in Central America and the Caribbean, 1 exo-American, 6 Nearctic and 2 native species not known in other parts of the world. Twenty-nine species have been recorded in South America, 4

exo-American, 4 Nearctic, and 21 Neotropical—the latter restricted to the southern half of the subcontinent.

Very little is known about the Mexican fauna of *Uroleucon*. Only 4 species have been recorded (Peña-Martínez 1985; Holman et al. 1991; Yáñez-Morales & Peña-Martínez 1991; Trejo-Loyo et al. 2004), which is fewer than in Central America and the Caribbean, despite the fact that the latitude, altitude and vegetation in Mexico are favorable for the existence of a large diversity within the genus.

In the aphid collection of the *Muséum national d'Histoire naturelle* in Paris (France) the genus *Uroleucon* is very well represented, with approximately 60% of the species in the genus, including paratypes of 42 species, and the samples from Mexico are abundant. To widen our knowledge of *Uroleucon* fauna in Mexico, a study of the specimens in this genus from Mexico present in the collection was carried out.

Materials and Methods

One hundred and ninety-two samples collected in 19 Mexican states (including the Federal District) were studied, a sample being the group of specimens collected on the same species of plant in a locality on a specific date. The names of those who collected most of the samples are abbreviated as follows: ALMV for Ana-Lilia Muñoz Viveros, GR for Georges Remaudière, JPL for Jean-Paul Latgé, and RPM for Rebeca Peña Martínez.

Most of the studied specimens have been mounted on microscopic slides since the 1980s, some of which had to be remade due to damage caused by air entering the slide. Specimens preserved in 70% alcohol were also mounted on slides.

The voucher specimens reside in the collection of the Muséum national d'Histoire naturelle (Paris, France) [henceforth *CMNHN*] with some duplicates in the zoological collection of the Universidad de León (Leon, Spain) [henceforth *CZULE*].

The keys by Blackman & Eastop (2006), Robinson (1985, 1986), Nieto Nafría et al. (2007) and Mier Durante & Ortego (2008), the original descriptions, and some later ones were used to identify the specimens. Also, comparisons were made with species from other parts of the world, using specimens deposited in *CMNHN* and *CZULE*.

Three species are missing from the keys by Robinson (1985, 1986), because their presence in North America was detected after 1986: *U. solidaginis* (Fabricius, 1779), *U. floricola* Robinson, 1988 and *U. stoetzelae* Robinson, 1988. *U. solidaginis* is an introduced European species; in the corresponding key (1985), it would be placed with *U. simile*, from which it is differentiated in that the primary rhinarium of the antennal segment V is protuding in *U. solidaginis*. *U. floricola* and *U. stoetzelae* are native Nearctic species, placed together in the corresponding key with *U. paucosensoriatum* (Hille Ris Lambers, 1960) and *U. gravicorne* (Patch, 1919), respectively; Robinson (1988) defined the characteristics differentiating them. *U. vernonicola* (Holman 1974) and *U. zayasi* (Holman 1974) are native American species known in Central America and the Caribbean; Holman (1974) defined the characteristics that differentiate them from *U. ambrosiae* (Thomas 1878) and *U. luteolum* (Williams 1911) respectively, being these last two species included in the mentioned keys (Robinson 1985, 1986).

Results and Discussion

Thirty species of the genus, *Uroleucon,* have been identified, as follows: 4 species previously mentioned in the country, 15 species recorded for the first time in Mexico, and 11 new ones; but this does not include all the species present in the country, because further collecting would probably turn up more species.

An asterisk before a plant genus name indicates that the corresponding aphid species is not included in the key by Blackman & Eastop (2006) for the identification of aphids living on plants in this genus.

The records refer to states (including the Federal District) or to the "Valle de México"; this valley is a natural region and the Federal District and parts of the states of Hidalgo, Mexico and Tlaxcala are located there.

Species Previously Recorded in Mexico

The species are presented in alphabetic order. The localities of *U. ambrosiae*, *U. erigeronense* and *U. sonchi*, are not indicated because they are relatively common frequent species.

Uroleucon ambrosiae (Thomas, 1878)

Previous Records.—Guanajuato, Morelos, San Luis Potosi, Tamaulipas and Veracruz plus "Valle de México".

New Records (from 79 samples).—Aguascalientes, Baja California, Coahuila, Durango, Federal District, Guanajuato, Guerrero, Hidalgo, Jalisco, Mexico, Michoacan, Morelos, Queretaro, Zacatecas. *Ageratum* sp., *A. corymbosum*; *Ambrosia* sp., *A. artemisifolia*; *Baccharis* sp.; *Bidens* sp., *B. pilosa*; *Chrysanthemum* µm*axim*um; **Erigeron* sp.; *Eupatorium* sp., *E. aschenbornianus*, *E. morfolina*; *Gnaphalium* sp., *G. brachypterum*, *G. inornatum*; *Helianthus* sp., *H. annuus*; *Lactuca sativa*; *Melampodium perfoliatum*; *Parthenium* sp., *P. bipinnatifidum*; *Senecio* sp., *S. heracleifolius*, *S. salignus*; **Simsia* sp., *S. amplexicaulis*; *Sonchus oleraceus*; *Tithonia tubaeformis*;

Verbesina sp., *V. virgata*; *Xanthium* sp.; *Zinnia multiflora*; vagrant on *Epilobium* sp.

U. ambrosiae is of Nearctic origin and has spread throughout America as far as Argentina; the North American records refer to the nominotypical subspecies, the South American ones to *U. ambrosiae lizerianum* (Blanchard, 1922). Quirós et al. (2009) and Villalobos Muller et al. (2010) do not specify the subspecies in the Central American records. It has a large number of host plant species. It is the best represented species in the studied collection, accounting for 41.1% of all the samples. Previous records and new ones, together with the fact that the species is known to be very widely dispersed in America, would indicate that *U. ambrosiae* is the largest, most frequent and abundant species of the genus in Mexico, with a large number of host plant species.

Uroleucon erigeronense (Thomas, 1878)

Previous Records.—Guanajuato and "Valle de México".

New Records (from 19 samples).—AGUASCALIENTES, BAJA CALIFORNIA, DISTRITO FEDERAL, DURANGO, GUANAJUATO, GUERRERO, HIDALGO, MEXICO, ZACATECAS; **Artemisia* sp., *A. tridentata*; *Brickellia veronicaefolia*; *Conyza* sp.; *Erigeron* sp., *E. canadense*; *Eupatorium glabratum*; **Gnaphalium* sp.; **Gymnosperma glutinosum*; *Haplopappus* sp.; **Senecio* sp.

U. erigeronense is of Nearctic origin, with records from Canada to southern Argentina; it has spread to Europe and the Palearctic area of Asia. It has a relatively wide range of host plants. It has the second largest number of samples in the collection, 9.9% of the total, which also indicates that it is widely dispersed and frequent in Mexico.

Uroleucon pseudambrosiae (Olive, 1863)

Previous Records.—San Luis Potosi, Tamaulipas and Veracruz.

New Record.—CHIAPAS, **Pinaropappus roseus*, Ocosingo, 1100 m (GR *leg.*).

U. pseudambrosiae has a disjointed distribution in North America: British Columbia, Manitoba, the eastern strip of the Canada and USA as far as Florida (Robinson 1985; Blackman & Eastop 2006). It is relatively strict in host-plants, as can be seen in Mexico according to existing records (previous and new). Although not very frequent, it is widely distributed in the country.

Uroleucon sonchi (Linnaeus, 1767)

Previous Records.—Guanajuato and Morelos

New Records (from 9 samples).—BAJA CALIFORNIA, DISTRITO FEDERAL, QUERETARO; *Sonchus* sp., *S. oleraceus*.

Recorded in Europe and a large part of Asia and Africa. Its host plant species are quite restricted. Judging from existing data, it does not appear to be frequent or abundant in Mexico.

SPECIES RECORDED THE FIRST TIME FROM MEXICO (PRESENTED IN ALPHABETIC ORDER)

Uroleucon astronomus (Hille Ris Lambers, 1962)

AGUASCALIENTES: **Perymenium* sp., Pabellón, 1800 m (A. Adame *leg.*). DISTRITO FEDERAL: Asteraceae, Ajusco, 2700 m (GR *leg.*), Xochimilco, 2200 m (JPL *leg.*); **Erigeron* sp., Sierra de Milpa Alta, 2600 m (GR *leg.*); **Solidago* sp., Desierto de los Leones, 3000 m (GR *leg.*). MEXICO: **Achillea* sp. and *Aster* sp., Ríofrío de Juárez (West), 3000 m (GR *leg.*). MORELOS: *Erigeron* sp., Cuernavaca (42 km North), 3000 m approx. (GR *leg.*); *Achillea* sp., Acajete, 2500 m (JPL *leg.*). Asteraceae, Huilitlán, 850 m, and Jalapán (South), 2200 m (GR & RPM *leg.*); **Stevia* sp., Jalapán (South), 2200 m (GR & RPM *leg.*); **Zaluzania augusta*, Queretaro, 2100 m. approx. (GR & RPM *leg.*).

U. astronomus has been recorded on *Aster macrophyllus* in areas in the east of Canada and northeast USA. It seems to be relatively frequent in Mexico (13 samples, 6.8% of the total), colonizing compositae of several genera, none of which is the only known host of the species in northern Mexico.

Uroleucon brevitarsus (Robinson, 1974)

MEXICO: **Erigeron* sp., Chapingo, 2000 m (GR *leg.*).

Only known from Manitoba on an unidentified species of *Solidago*.

Uroleucon chani (Robinson, 1985)

DURANGO: **Gnaphalium* sp., El Salto (West), 2600 m (GR & RPM *leg.*).

Only recorded from British Columbia on *Grindelia nana*.

Uroleucon eupatoricolens (Patch, 1919)

AGUASCALIENTES: *Eupatorium inuloides*, Pabellón, 1800 m (A. Adame *leg.*). BAJA CALIFORNIA: **Sonchus* sp., Ensenada to Observatorio Astronómico San Pedro Mártir road (km 74), 1800 m (ALMV *leg.*).

It is known on *Eupatorium* spp. in the western strip of Canada and USA from Pennsylvania.

Uroleucon gravicorne (Patch, 1919)

BAJA CALIFORNIA: **Sonchus* sp., Ensenada to Observatorio Astronómico San Pedro Mártir road

(km 74), 1800 m (ALMV *leg.*). CHIAPAS: *Erigeron* sp., Palenque, 100 m approx. (GR *leg.*).

U. gravicorne lives on plants of several genera. It has been recorded in most of Canada and USA, and various countries in Central and South America. Its wide distribution area does not correspond with its limited presence in the studied collection.

Uroleucon macgillivrayae (Olive, 1966)

BAJA CALIFORNIA: Asteraceae, Ojos Negros (Sierra Juárez), 1600 m (ALMV *leg.*).

On species of the genera *Aster*, *Conyza* and *Erigeron*, and recorded in provinces in eastern Canada and in states of northeastern USA.

Uroleucon maximilianicola Robinson, 1985

DURANGO: **Viguiera dentata*, El Salto (West), 2600 m (GR & RPM *leg*.) MEXICO: **Lagascea* sp., Riofrío de Juárez, 2600 m (GR *leg.*).

U. maximilianicola has only been recorded on *Helianthus maximiliani* in Manitoba. Blackman & Eastop (2006) suggest that it could be synonymous of *U. ambrosiae*. The southern records from Mexico on Compositae of other genera reinforce this; alternatively, the hypothesis that there are 2 or more cryptic species under the name of *U. ambrosiae* could be put forward.

Uroleucon nigrotuberculatum (Olive, 1963)

AGUASCALIENTES: **Eupatorium* sp., Pabellón, 1800 m (A. Adame *leg.*). COAHUILA: Asteraceae, Saltillo, 1600 m (R. Carapia *leg.*). FEDERAL DISTRICT: Asteraceae, Ajusco, 3000 m (GR *leg.*). HIDALGO: **Montanoa* sp., Pachuca (10 km South), 1650 m (GR & RPM *leg*.). OAXACA: Asteraceae, Oaxaca, 1550 m (JPL *leg.*).

U. nigrotuberculatum has quite a wide host range. It has been recorded in eastern Canada and USA and has been introduced into Japan. This, together with the fact that it is widely dispersed in Mexico leads us to believe that it is under-represented in the studied collection, despite being represented by 5 samples, or by 2.6% of the total.

Uroleucon obscuricaudatum (Olive, 1965)

AGUASCALIENTES: **Eupatorium inuloides*, Pabellón, 1800 m (A. Adame *leg.*). HIDALGO: Asteraceae, Molango (East), 1600 m (GR & RPM *leg*.).

Recorded in eastern Canada and USA on species of *Helianthus* and *Heliopsis*.

Uroleucon paucosensoriatum (Hille Ris Lambers, 1960)

FEDERAL DISTRICT: **Brickellia nutarticips*, Ajusco, 3000 m (GR *leg.*). DURANGO: **Baccharis* sp. and **Kuhnia* sp., Victoria de Durango, 1900 m approx. (GR & RPM *leg*). GUANAJUATO: **Heterotheca inuloides*, Dolores Hidalgo to Ojuelos road (GR & RPM *leg*); **Stevia serrata* and **Viguiera linearis*, San Miguel de Allende (East), 2300 m (GR & RPM *leg*). Asteraceae, Huilitlán, 850 m (GR & RPM *leg*). ZACATECAS: Asteraceae, Fresnillo to Sombrerete road, 2300 m (GR & RPM *leg*); vagrant, Zacatecas, 2500 m (GR & RPM *leg*).

U. paucosensoriatum has been recorded in eastern Canada and USA from North Carolina on species of *Aster* and *Erigeron*. It is one of the most represented first-recorded species from Mexico in the collection, with 9 samples collected from a wide spectrum of host plant species.

Uroleucon penderum Robinson, 1986

AGUASCALIENTES: **Heterotheca inuloides*, Pabellón, 1800 m (A. Adame *leg.*).

It is known from British Columbia on *Grindelia integrifolia*.

Uroleucon reynoldense (Olive, 1965)

DURANGO: Asteraceae, **Viguiera cordifolia*, Victoria de Durango, 1940 m (GR & RPM *leg*). GUERRERO: Asteraceae, Chilpancingo (Ojitos de Agua), 1700 m (ALMV *leg.*). ZACATECAS: **Kuhnia* sp., and *Viguiera linearis*, Fresnillo to Sombrerete, 2300 m (GR & RPM *leg*.).

U. reynoldense has been recorded in some eastern states in the USA, on *Coreopsis* sp., and in Jamaica. Although there are various samples of this species in the collection (2.6% of the total), all of them were collected at only 3 localities.

Uroleucon richardsi (Robinson, 1964)

AGUASCALIENTES: Asteraceae, Pabellón, 1800 m (A. Adame *leg.*). DURANGO: **Viguiera* sp., Victoria de Durango, 1900 m approx. (RPM *leg.*).

Recorded from Manitoba, Oregon, Utah and Colorado on *Grindelia* spp.

Uroleucon stoetzelae (Robinson, 1988)

SAN LUIS POTOSI: Asteraceae, Tamazunchale, 140 m approx. (JPL *leg.*). VERACRUZ: **Erigeron* sp., Alvarado, 50 m (GR *leg.*).

Recorded from Pennsylvania on *Achillea millefolium*.

Uroleucon zerogutierrezis (Smith & Knowlton, 1946)

BAJA CALIFORNIA: *Gutierrezia sarothrae*, P.N. Sierra de Juárez, 300 m, Tecate (West), 400 m (GR & ALMV *leg.*)

It is known in several western seacoast states of the USA on *Gutierrezia* sp.

Discussion on Previously Known Species and Those Recorded for the First Time in Mexico

The classical separation of the subgenera *Uroleucon*, *Uromelan* and *Lambersius* is based on the pigmentation of the siphunculi and cauda (considered separately and compared), and secondly on the color of the body when alive and the dorsal sclerites of the abdomen; also, *Lambersius* is restricted to America, except for certain anthropic introductions. Using molecular data from a few North American and European *Uroleucon* and *Uromelan* species, and *Lambersius* species, Moran et al. (1999), questioned the taxonomic extension of the subgenera; indicating that they should be restructured with the possibility of establishing other subgenera to group the species more according with the phyletic molecular relationships that they had found. Based on morphometric-statistical analyses, Carvalho et al. (1996) concluded that native South American species (some placed in *Uroleucon* and others in *Lambersius*) form an inseparable unit; and they did not indicate which subgenus included the new species that they had described. Nieto Nafría et al. (2007) placed all the native South American species in the subgenus *Lambersius* because their coxae are pale, as in the type species of the subgenus, *U. erigeronense*, and also in the other North American species in that subgenus, and in many species in the subgenus *Uroleucon*; whereas in *Uroleucon* (*U. sonchi* is the type species) and *Uromelan*, the coxae are as dark as the other more pigmented parts of the body. As far as we know, no morphometric-statistical or genetic-molecular studies of a sufficiently large and representative sample of Eurasian, North American or South American species have been carried out that could be considered to be better than the two indicated ones.

If the classical criterion were used *U. ambrosiae*, *U. astronomus*, *U. chani*, *U. eupatoricolens*, *U. maximilianicola*, *U. nigrotuberculatum*, *U. obscuricaudatum*, *U. paucosensoriatum* and *U. pseudoambrosiae* would be placed into subgenus *Uroleucon* with *U. sonchi*; and *U. brevitarsus, U. gravicorne, U. macgillivrayae, U. penderum, U. reynoldense, U. richardsi, U. stoetzelae* and *U. zerogutierrezis* into *Lambersius* with *U. erigeronense*.

But if the criterion followed is the one used by Nieto Nafría et al. (2007), only *U. sonchi* would remain in the nominotypical subgenus, all of the other species listed in the previous paragraph would be placed in the subgenus *Lambersius*.

The presence of *U. gravicorne*, *U. zerogutierrezis*, *U. richardsi*, *U. obscuricaudatum*, *U. reynoldense* and even *U. nigrotuberculatum* in Mexico is not surprising. *U. gravicorne* has been extensively recorded in America, even south of Mexico. *U. zerogutierrezis* was already known in western USA and is recorded in California Baja on the same plant genus. *U. richardsi* has been recorded as far as Colorado and now central Mexico. *U. nigrotuberculatum* and *U. reynoldense* have also been recorded in other parts of America or the world. *U. obscuricaudatum* is widely distributed in eastern USA.

The presence of *U. chani, U. maximilianicola, U. brevitarsus* and *U. penderum*, with northern distributions in the central or western strips of North America, is not entirely surprising, and can be explained by the altitude of the capture localities, 1800 and 2600 m.

The presence of *U. astronomus, U. paucosensoriatus*, *U. stoetzelae, U. eupatoricolens* and *U. macgillivrayae* in Mexico is more surprising, as they are typical of the eastern strip of the USA and Canada. The explanation must also be the altitude of the capture localities, which was over 1500 metres. There are also records for *U. eupatoricolens* and *U. macgillivrayae* in localities in western Mexico; thus these species occur on both coasts of North America.

A more thorough and meticulous exploration of selected areas in Mexico could reveal the presence of other species known in Canada and/or USA, which are not in the studied collection.

Effectively 33 new "aphid/host plant" relationships have been established. For 10 of these relationships the aphid species are: *U. ambrosiae* (2 new relationships), *U. erigeronense* (4 new relationships), *U. nigrotuberculatum* (2 new relationships), *U. pseudambrosiae* (1 new relationship), and *U. gravicorne* (1 new relationship); and all of these aphid species are more or less oligophagous. In the other 23 new relationships, the involved aphid species have an even narrower host range. No new relationship was found either for *U. sonchi,* or for *U. zerogutierrezis*. Thus the 23 new relationships are of considerable interest because the aphids involved (all the recorded species except *U. sonchi*, *U. zerogutierrezis* and the 5 abovementioned ones) were only known on plants belonging to 1 (most of them) or 2 genera (*U. obscuricaudatum*). It can, therefore, be said that these species, in particular species such as *U. astronomus*, have a wider host range than was first thought, and that, perhaps, only the northern populations of each of these species are monophagous.

Logically, the keys by Blackman & Eastop (2006) for aphids living on plants of the genera forming part of these new relationships are now incomplete. Amendments to 18 of their keys are presented in the Appendix, as well as 2 additional keys; which address the deficiencies to a degree.

New Species

The descriptions below are presented in a simplified way, and characteristics repeated in all or

part of them have been eliminated. The following must be taken into account to interpret the species descriptions properly.

Pigmentation (Figs. 1, 2 and 3). Some parts of the body, for example the ventral surface of the abdomen, are entirely pale, whereas others are pigmented; they can be: yellowish brown, light brown, brown, dark brown, brownish black; also, in some cases the pigmentation is not continuous but diffuse, as if "smoked". The pigmentation on the head is usually quite uniform on its dorsal and ventral faces, clypeus included. The rostrum is always pigmented, more so towards its apex. The pigmentation of the coxae is indicated in each description. The trochanters are yellowish brown to light brown. The femora are yellowish brown to light brown in the proximal part and become darker towards their apexes, particularly on the dorsal faces. The pigmentation on the tibiae is more variable: (1) 'bicolored' if they have a proximal part and a distal part (at least s length) noticeably more pigmented than the intermediate part, normally yellowish or light brown in the viviparous apterae and light brown to brown in the viviparous alatae; (2) 'progressively pigmented', if they become progressively darker towards the distal extreme, close to the tarsus; and (3) 'homogeneously pigmented', if the pigmentation is similar the entire length.

Sclerites (Figs. 1, 2 and 3). The dorsum of the abdomen presents setiferous, pre- and postcornicular sclerites. Also, the alate viviparous females have marginal sclerites on segments II to IV, each one bearing several setae. However, they are not

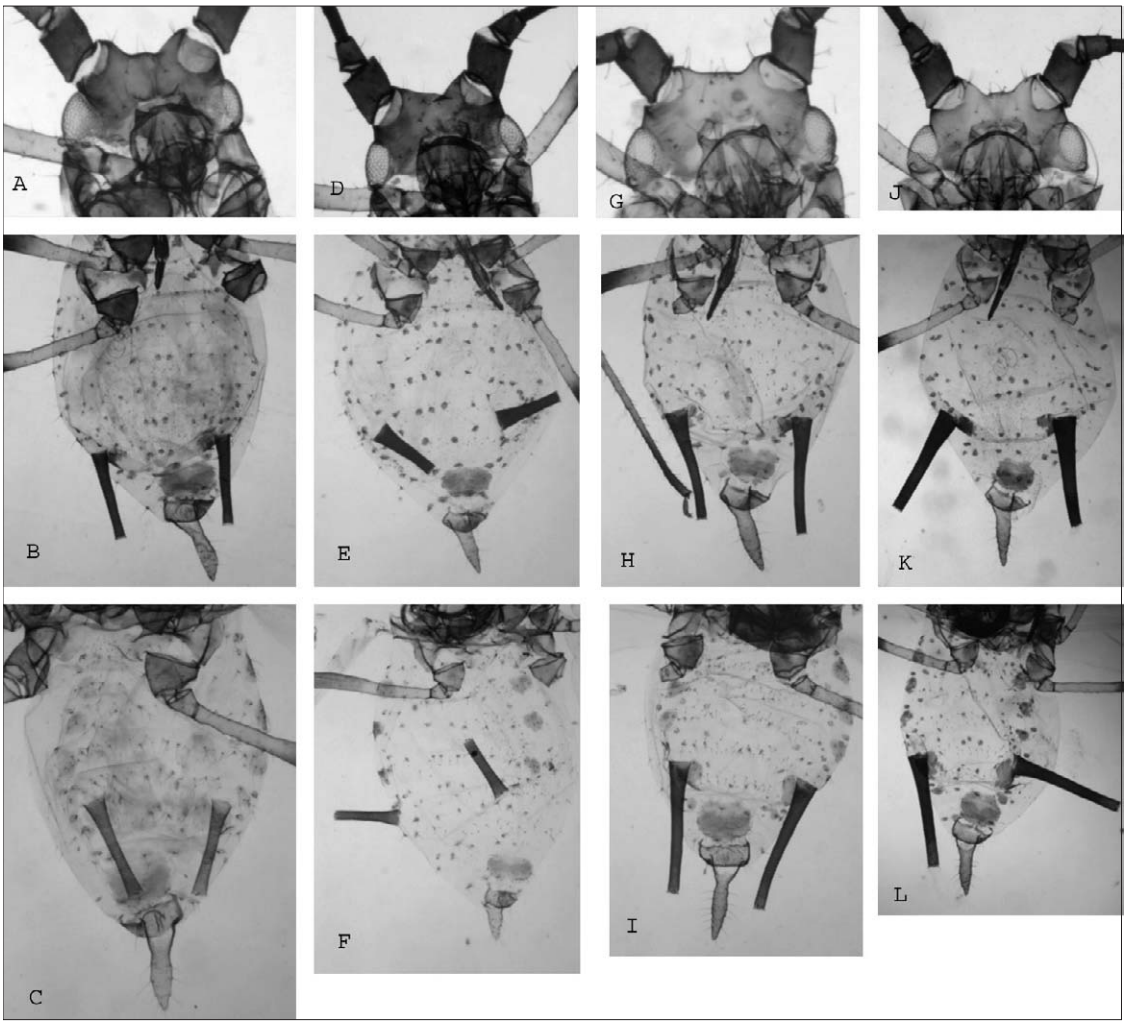

Fig. 1. Habitus, in part. A, B, C: *Uroleucon penae* **sp. nov.**; D, E, F: *Uroleucon mexicanum* **sp. nov.**; G, H, I: *Uroleucon gnaphalii* **sp. nov.**; J, K, L: *Uroleucon sinuense* **sp. nov.** A, B, D, E, G, H, J, K: apterous viviparous females; C, F, I, L alate viviparous females.

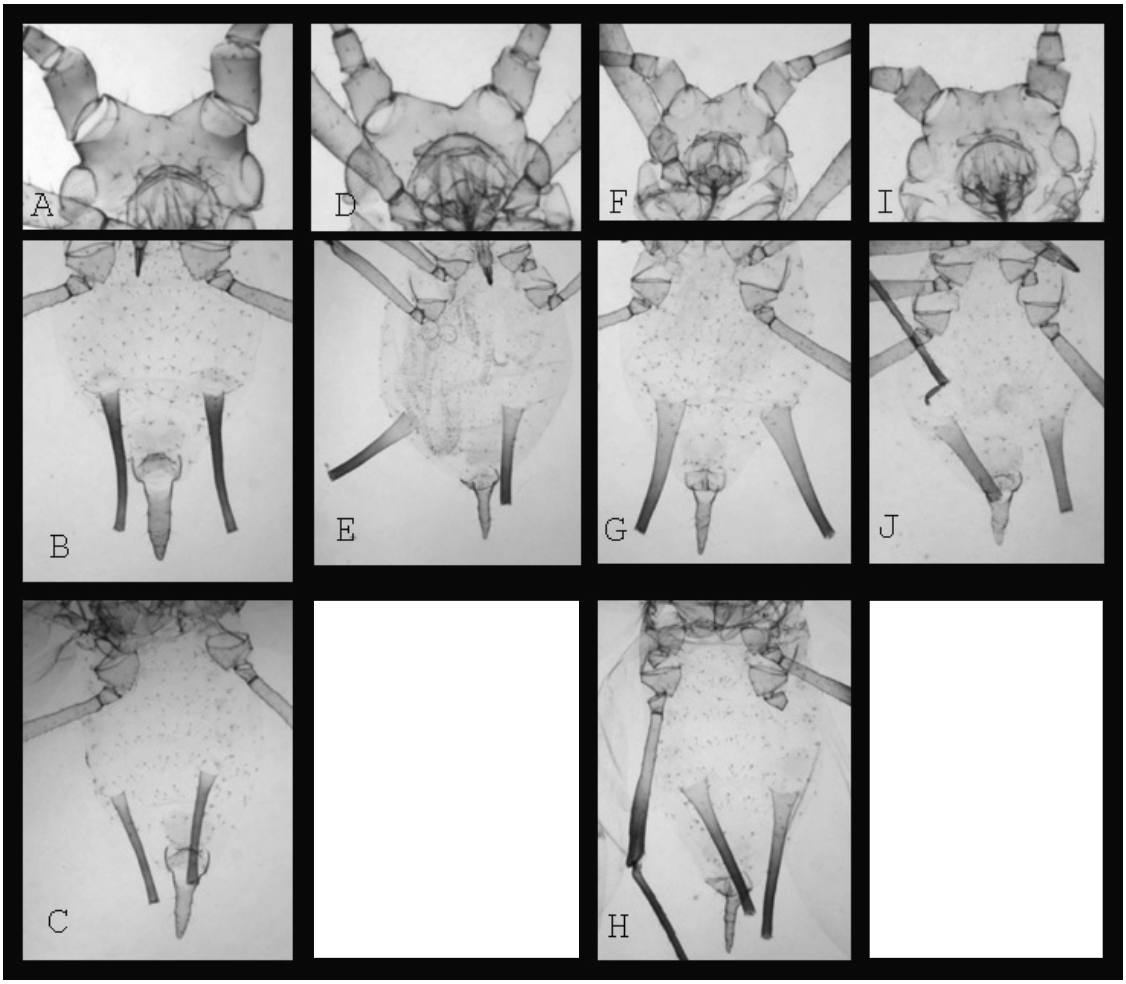

Fig. 2. Habitus, in part. A, B, C: Uroleucon *munozae* **sp. nov.**; D, E: *Uroleucon zacatecense* **sp. nov.**; F, G, H: *Uroleucon queretarense* **sp. nov.**; I, J: *Uroleucon tlaxcalense* **sp. nov.** A, B, D, E, F, G, I, J: apterous viviparous females; C, H: alate viviparous females.

always pigmented and appear to be absent (the depigmented sclerites are detected by the different texture in comparison with the immediate membranous area). In the descriptions, their presence or absence refers to the pigmented sclerites.

Cuticular Ornamentation. The ornamentation on some parts of the body is shown in detail in each description, but the *Uroleucon*'s habitual ornamentation on fourth to sixth antennal segment, tarsi, anal and genital plates and cauda, as well as on the abdominal-marginal sclerites in the alatae, is not reiterated in the descriptions of new species. In all of the species described the head is smooth with slight striae on its dorsum. Most of species exhibit smooth or almost smooth first and second antennal segments and the ornamentation (spinulae) on the third antennal segment only appears on a small proximal portion (Figs. 4, 5 and 6); specific information is given on the ornamentation if it differs from what is indicated. The ornamentation on SIPH is of marked taxonomic importance and is described in detail (Figs. 7, 8 and 9).

Setae. Most of the body dorsal setae, and all or almost all the setae on the antennae and legs have weakly defined tips, which change according to specimen preservation and the position of the setae; they are sometimes almost imperceptible, evanescent, and varied in all cases: truncate, spherical, spatulate, frayed, exploded and filiform. This character will be referred to only in exceptional cases. All of the new species have ventral setae on the second tarsal segment. The measured dorsal cephalic seta is the longer of the two in the row posterior to the inter-antennal space

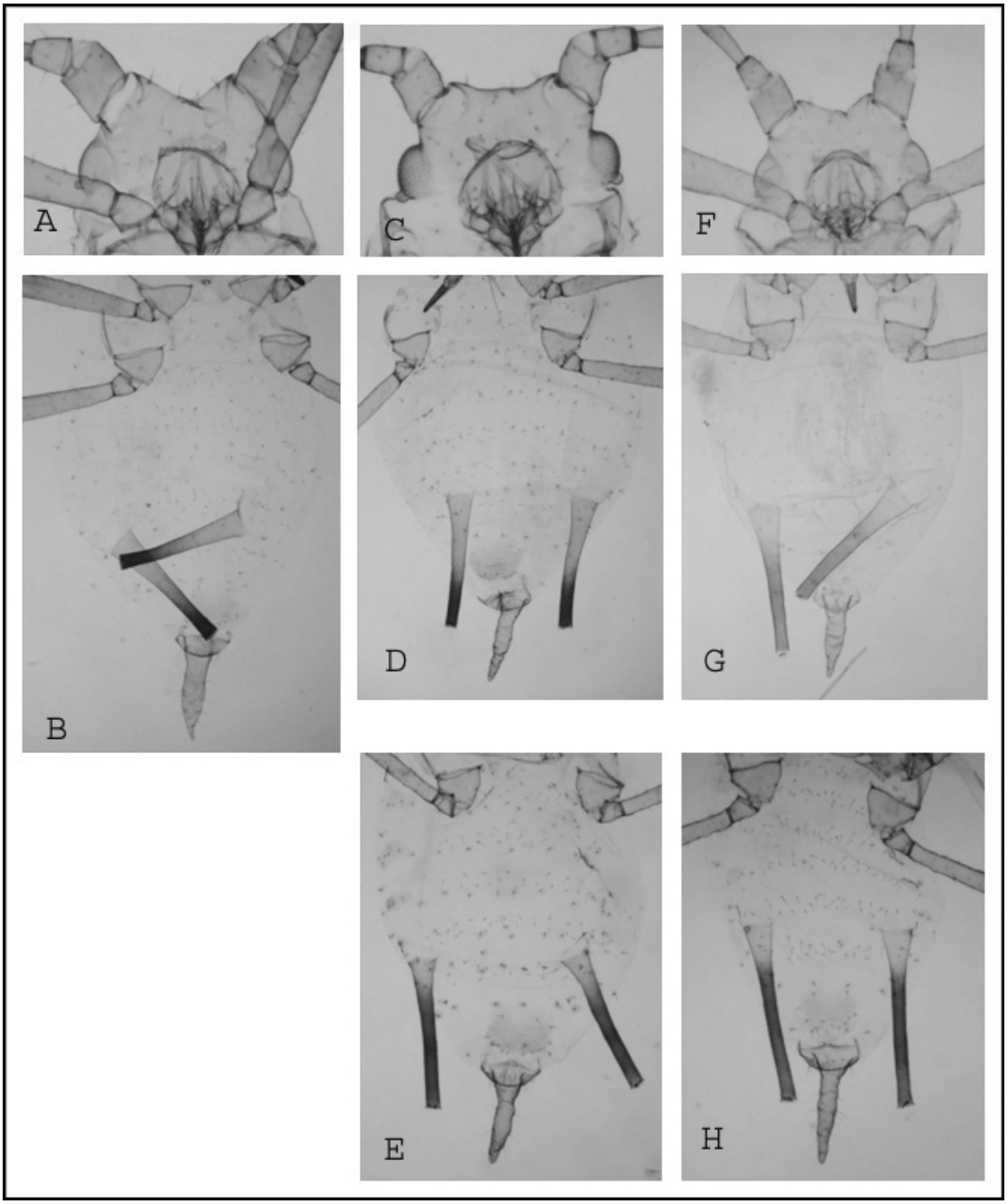

Fig. 3. Habitus, in part. A, B: *Uroleucon latgei* **sp. nov.**; C, D, E: *Uroleucon heterothecae* **sp. nov.**; F, G, H: *Uroleucon remaudiereorum* **sp. nov.**: A, B, C, D, F, G: apterous viviparous females; E, H: alate viviparous females.

(there is a row of 4 setae immediately behind it, between the eyes). The measured seta of the third antennal segment is the longest of the external seta on the apical third of the segment. The measured seta on the ultimate rostral segment is one of the accessories lateral to the sulcus (the description states whether the other complementary setae of the segment, or those on the anterior segment, are not similar in length). The measured dorsal seta of the abdominal segments was either the spinal or the pleural one, whichever appeared to be the longest.

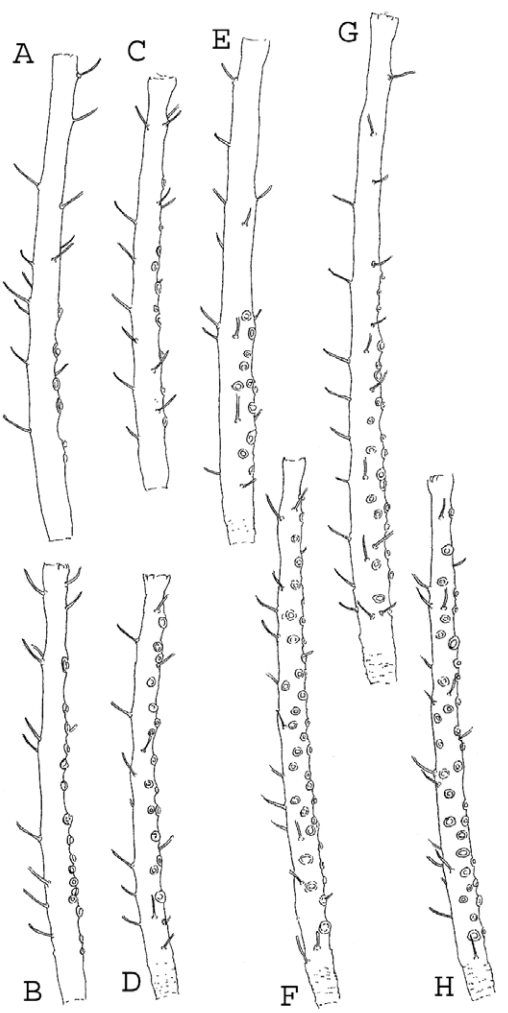

Fig. 4. AntIII (without pigmentation). A, B: *Uroleucon penae* **sp. nov.**; C, D: *Uroleucon mexicanum* **sp. nov.**; E, F: *Uroleucon gnaphalii* **sp. nov.**; G, H: *Uroleucon sinuense* **sp. nov.** A, C, E, G: apterous viviparous females; B, D, F, H: alate viviparous females.

Frons (Figs. 1, 2 and 3). The species of *Uroleucon* have a frontal margin and a frontal medial tubercle varying in shape; the following terms are used to describe the frontal margin: (1) V-shaped if it is deep with a small frontal medial tubercle that does not alter the profile of the frons; (2) subrectangular, if it is well-defined though not very deep and the frontal medial tubercle is low; and (3) sinuate, if the frontal margin is not very deep and the frontal medial tubercle is almost as high as the frontal lateral ones delimiting the margin.

Secondary Sensoria (Figs. 4, 5 and 6). All of the described species have secondary sensoria on the

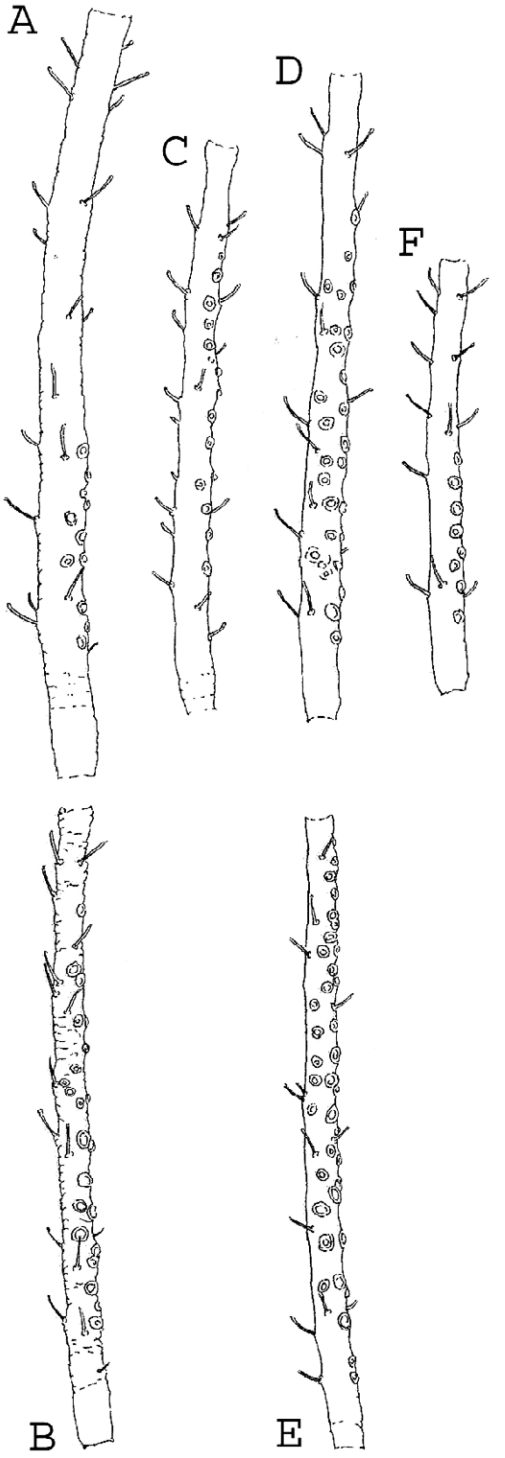

Fig. 5. AntIII (without pigmentation). A, B: *Uroleucon munozae* **sp. nov.**; C: *Uroleucon zacatecense* **sp. nov.**; D, E: *Uroleucon queretarense* **sp. nov.**; F: *Uroleucon tlaxcalense* **sp. nov.** A, C, D, F: apterous viviparous females; D, E: alate viviparous females.

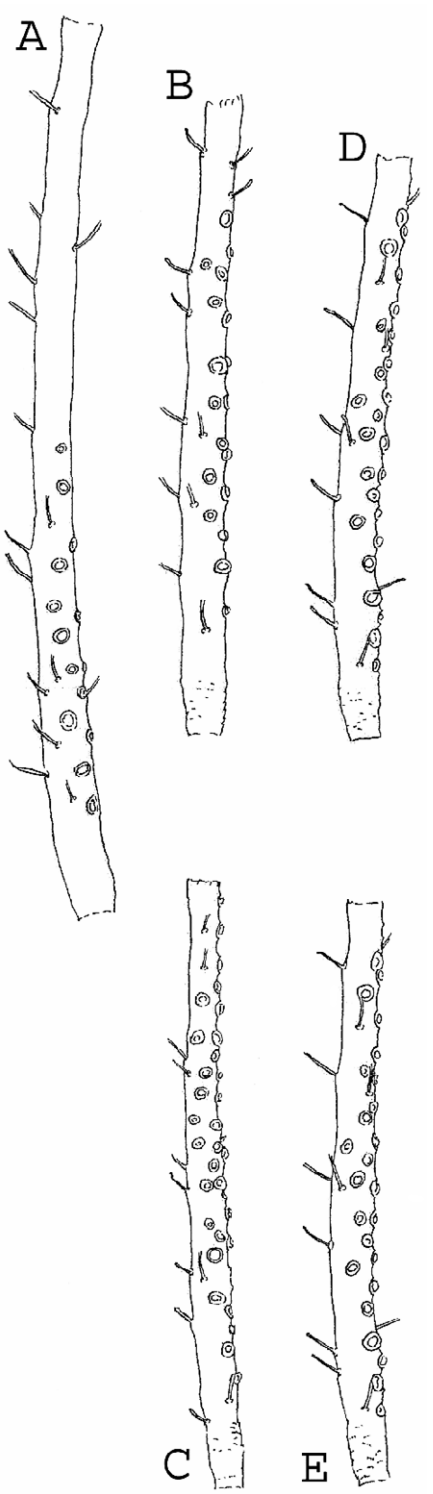

Fig. 6. AntIII (without pigmentation). A: *Uroleucon latgei* **sp. nov.**; B, C: *Uroleucon heterothecae* **sp. nov.**; D, E: *Uroleucon remaudiereorum* **sp. nov.** A, B, D: apterous viviparous females; C, E: alate viviparous females.

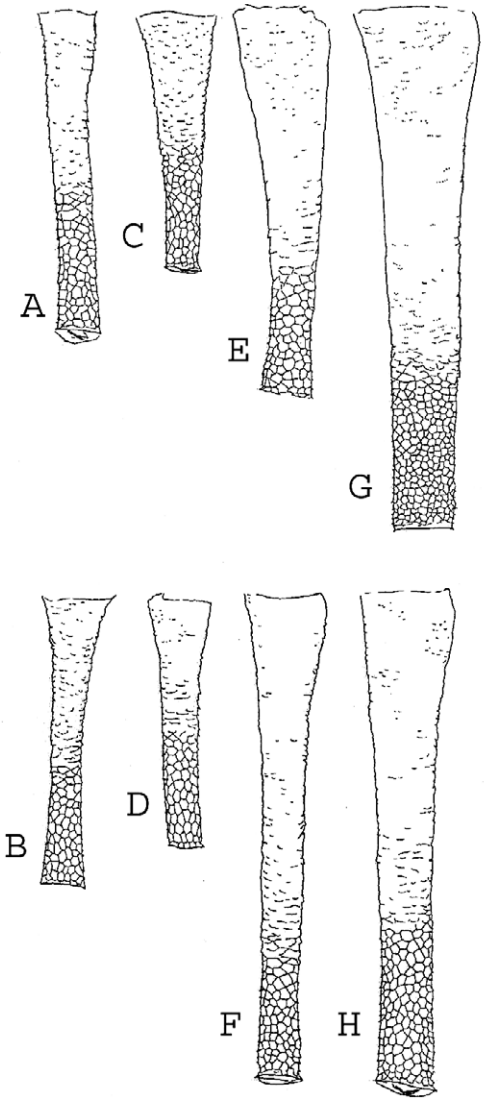

Fig. 7. SIPH (without pigmentation). A, B: *Uroleucon penae* **sp. nov.**; C, D: *Uroleucon mexicanum* **sp. nov.**; E, F: *Uroleucon gnaphalii* **sp. nov.**; G, H: *Uroleucon sinuense* **sp. nov.** A, C, E, G: apterous viviparous females; B, D, F, H: alate viviparous females.

third antennal segment, always set out in a disordered way on the ventral face of a more or less long part of the segment. The percentage of occupation specified in each description refers to the distance between the beginning of the segment and the sensorium furthest away from it, though there is always a small proximal portion lacking sensoria. The alate viviparous females of some species also have sensoria on the fourth antennal segment, as specified when necessary. The margin of the secondary sensorium is double in the zenithal view, and it is separated from the pale dome-shaped central part in profile.

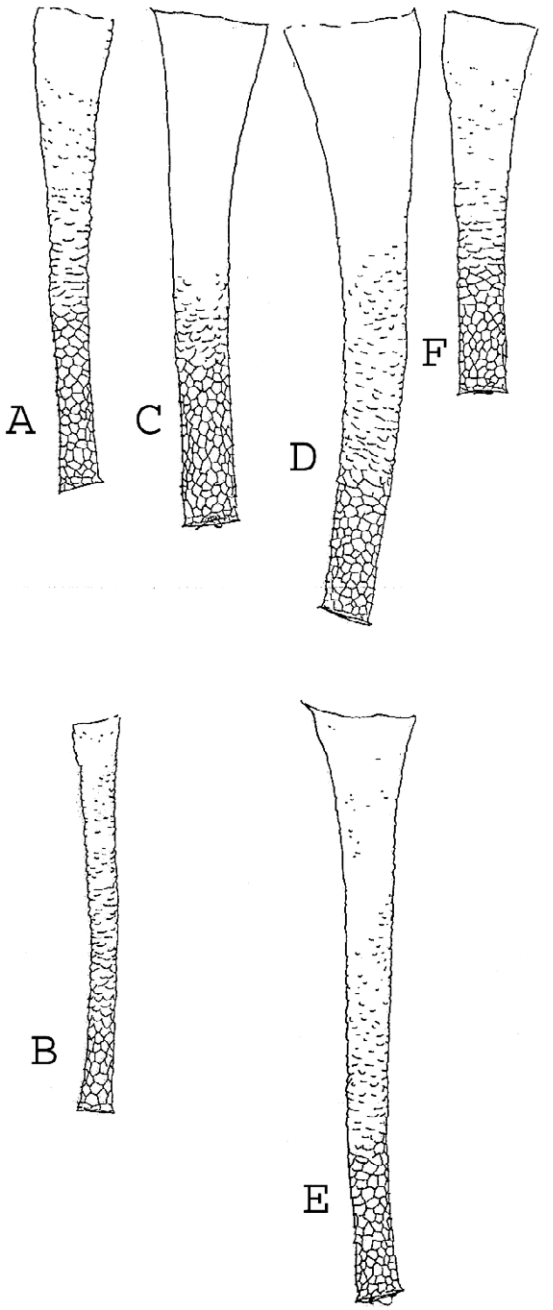

Fig. 8. SIPH (without pigmentation). A, B: *Uroleucon munozae* **sp. nov.**; C: *Uroleucon zacatecense* **sp. nov.**; D, E: *Uroleucon queretarense* **sp. nov.**; F: *Uroleucon tlaxcalense* **sp. nov.** A, C, D, F: apterous viviparous females; D, E: alate viviparous females.

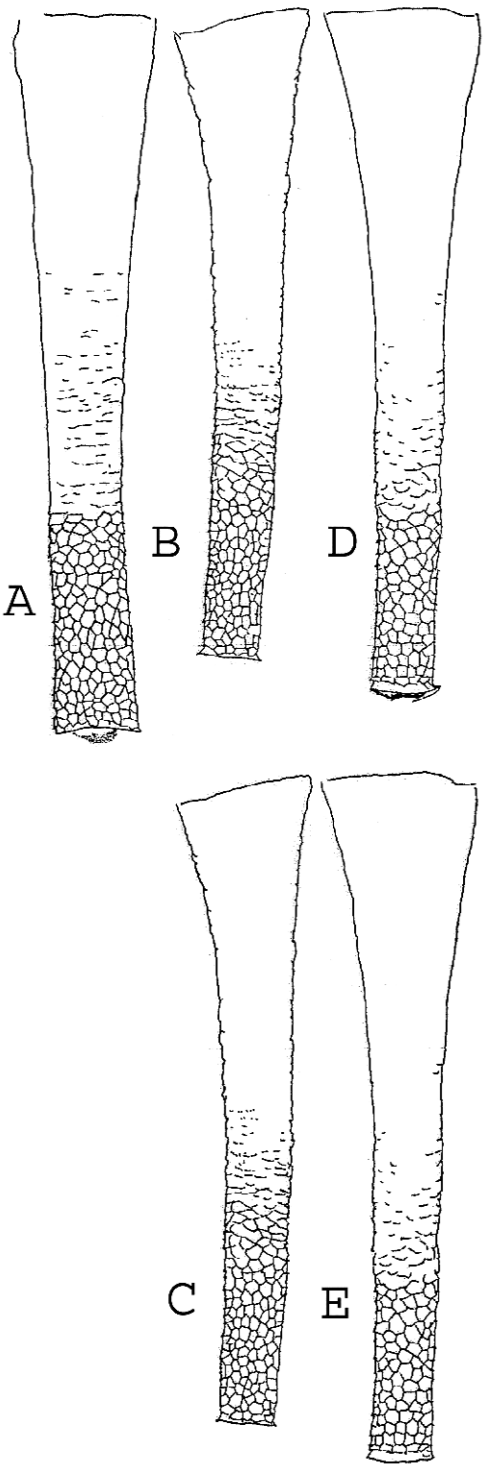

Fig. 9. SIPH (without pigmentation). A: *Uroleucon latgei* **sp. nov.**; B, C: *Uroleucon heterothecae* **sp. nov.**; D, E: *Uroleucon remaudiereorum* **sp. nov.** A, B, D: apterous viviparous females; C, E: alate viviparous females.

Rostrum (Figs. 1, 2 and 3). The rostrum reaches the posterior coxae in practically all of the species; but indicated in the description if this is not the case. The ultimate segment can be: (a) subrectangular, if the edges are almost parallel and converge rapidly at the end, or (b) triangular.

Marginal Papillae. When present, the marginal papillae of the prothorax and intermediate abdominal segments (second, third, fourth) are small or very small and nearly always flat. The description indicates whether they are absent or not, and also their shape when not flat.

Siphunculi (Figs. 1, 2, 3, 7, 8 and 9). Two types are present in the described species: (a) "cylindrical", if the margins are parallel or subparallel in almost their entire length (they can be somewhat narrower or wider at the base and apex); or (b) "subcylindrical", if they have a wide base, are tapered in the proximal portion and more or less cylindrical in the distal part (at least 1/3 of their length); they can be somewhat widened at the tip or even trumpet-shaped.

Cauda (Figs. 1, 2 and 3). In most of the species of *Uroleucon* the cauda is long and lanceolate, with a tightening at the end of the first third of its length. The shape of the cauda will be specified only if it differs from the general model. The lateral setae are usually longer than the dorsal ones; the description will refer more specifically to whether the setae are uneven amongst each other.

Alatae (Figs. 1, 2 and 3). The wing venation is typical of the genus, with 3 branches in the medial vein of the anterior wings. The description of the alate viviparous females is limited to differences observed with the apterae, without referring to the shape of the thorax or the presence of marginal sclerites on AbdII-AbdIV.

Measurements were taken according to Nieto Nafría & Mier Durante (1988) with a calibrated small ruler mounted in the ocular of a light field microscope. A camera lucida fitted to the microscope was used for the drawings and the microphotographs were taken with a Leica DC digital camera with IM 1000 version 1.10 software.

The measurements are lengths, except when indicated that they are a width or diameter. Abbreviations used in the text and figure captions of descriptions are as follows: AbdII, AbdIV, AbdV, AbdVIII are abdominal second, fourth, fifth and eighth respectively; AntI, AntII, AntIII, AntIV, AntV, AntVIb, AntVIpt are antennal segments I to V plus base and processus terminalis of antennal segment VI, respectively; B is body; *D* is basal diameter of antennal segment III; HF is the hind femur; HT is hind tibia; Ht2 is second segment of hind tarsus; SIPH is siphunculus and siphunculi; URS is the ultimate rostral segment; *WR* is the siphunculus width at beginning of the reticulated part. In the metric and meristic data, a value in parenthesis before or after another one is an exceptional value.

The 11 species are in order according to their characteristics: in *U. penae*, *U. mexicanum*, *U. ganaphalii* and *U. sinuense*, SIPH are entirely dark; in *U. munozae*, *U. zacatecense, U. tlaxcalense* and *U. queretarense* the proximal part of SIPH are less pigmented than the rest, the URS is 0.16 mm at most (if 0.16 mm, the cauda has 10 setae at most); and in *U. latgei, U. heterothecae* and *U. remaudiereorum* the proximal part of SIPH is less pigmented than the rest and the URS is at least 0.15 mm (if 0.15 mm, the cauda has 10 or more setae). The corresponding taxonomic discussion will follow the description of the last species in each group and it is completed with the amendments to each key by Blackman & Eastop (2006) which are-included in the Appendix.

Uroleucon penae Nieto Nafría & Remaudière, **sp. nov.**

Type Material. Holotype: apterous viviparous female 7 of sample 08465: *Erigeron* sp., Mexico to Cuernavaca road km 45 (Morelos), 2950 m, 12-viii-1981 (R.P. *leg.*); *CMNHN*, slide "(EH) 7418". Paratypes: 7 apterous and 1 alate viviparous females [*CMNHN*] from the same sample as the holotype.

Etymology. The specific name is dedicated to our colleague and friend Mrs. Rebeca Peña Martínez (PhD), who has studied the Mexican aphidfauna and collected the type specimens.

Description. Apterous viviparous females (Figs. 1A, 1B, 4A and 7A). Based on 8 specimens, 2.475-2.775 mm. Head dark brown, like coxae, and darker than trochanters; frontal margin subrectangular; dorsal setae 58-70 µm, 1.8-2.3 times *D*. Antennae 2.190-2.815 mm, 0.9-1.1 times B, as dark as head. AntIII 0.48-0.66 mm, 0.5-0.7 times HF, 0.6-0.8 times AntIV+AntV (respectively 0.39-0.58 and 0.35-0.58 mm); its proximal portion is poorly ornamented and paler than the rest of segment; with setae 38-53 µm, 1.2-1.8 times *D*; it carries 6-14 secondary sensoria on 46-68(88)% of segment. AntVIb 0.12-0.15 mm; AntVIpt 0.52-0.80 mm, 4.3-5.3 times AntVIb, 0.9-1.2 times AntIII. URS subrectangular and narrow, 0.16-0.18 mm, 1.2-1.4 times AntI, 1.4-2.3 times AntVIb, 1.2-1.3 times Ht2, 2.4-3.1 times its basal width; thinner than former segment; with 6-10 accessory setae, 30-35 µm, 1.0-1.1 times *D*. Prothoracic papillae absent. Dark brown coxae, not as dark as SIPH; tibiae bicolored. Leg setae shorter than dorsal-abdominal ones, stiff and with a delicate apical prolongation. HF and HT respectively 0.870-0.970 and 1.575-1.800 mm. First tarsal segments with (3)4-5 setae. Ht2 0.13-0.15 mm. Dorsal-abdominal pigmented sclerites present; marginal papillae absent. AbdII-AbdV with 12-20 dorsal setae each, 63-80 µm, 0.9-1.2 times *D*. AbdVIII with 4 setae (5 on one specimen), 62-83 µm, 0.9-1.4 times *D*. SIPH cylindrical with base (1.6-2.2 times *WR*) and apex both little enlarged; homogeneously very dark

brown to black; 0.39-0.47 mm, 0.16-0.18 times B, 0.7-0.8 times AntIII, 7.8-10.0 times *WR*; pre-reticulated part densely covered in strong spinules and scales, with imbricate margin; reticulated over 37-43% of its length, with more or less 8 cells per row; flange small or absent. Genital plate brown, sometimes darker than anal plate and cauda; with 2-4(7) discal and 10-16 long and pointed marginal setae. Cauda smoked brown, noticeably paler than SIPH; 0.38-0.45 mm, 0.9-1.0 times SIPH, 2.1-2.7 times its basal width; it carries 11-14 slightly curved pointed setae.

Description. Alate viviparous females (Figs. 1C, 4B and 7B). Based on 1 specimen, 2.625 mm. AntIII with 16-17 secondary sensoria on 77% of segment; marginal abdominal sclerites present; tibiae dark bicolored; SIPH progressively enlarged in its half distal part.

Uroleucon mexicanum Nieto Nafría & Mier Durante, **sp. nov.**

Type Material. Holotype: apterous viviparous female 4 of sample 06114: *Eupatorium* sp., Mexico [East] (Distrito Federal), 2600 m, 27-ix-1979 (GR & RPM *leg.*); *CMNHN*, slide "(EH) 6114". Paratypes: 62 apterous and 76 alate viviparous females (GR & RPM *leg.*) [*CMNHN* and *CZULE*] from the same sample as the holotype and from: (1) *Eupatorium* sp., El Salto [West] (Durango), 2600 m, 18-x-1980; Riofrío de Juárez (Mexico), 2600 m, 23-x-1980; (2) *Ageratum* sp., Morelia [East] (Michoacan), 1900 approx., 22-x-1980; (3) *Brickellia nutanticeps*, Dolores Hidalgo to Ojuelos road (Guanajuato), 2240 m, 8-x-1980; (4) *Perymenium* sp., Pachuca [10 km South] (Hidalgo), 1650 m, 1-x-1980; (5) *Senecio heracleifolius* Morelia [East] (Michoacan), 22-x-1980; (6) *Stevia* spp., Victoria de Durango [10 km West] (Durango), 2200 m, 17-x-1980; (7) *Stevia salicifolia*, Morelia [26 km West] (Michoacan), 1900 approx., 21-x-1980; (8) *Viguiera dentata*, El Salto [West] (Durango), 2600 m, 18-X-1980; (9) *Zaluzania augusta*, San Miguel de Allende [East] (Guerrero), 2300 m, 7-x-1980.

Etymology. The specific name is the epithet for the inhabitants of Mexico (latinization from the name of the Catholic Diocese of Mexico).

Description. Apterous viviparous females (Figs. 1D, 1E, 4C and 7C). Based on 63 specimens (53 measured), 1.800-3.150 mm. Head brown to dark brown, near black in more pigmented specimens, darker than trochanters; frontal margin V-shaped; dorsal setae 30-65(70) µm, 1.0-2.0(2.3) times *D*. Antennae 2.120-3.310 mm, 0.9-1.5 times B, frequently as dark as SIPH and darker than head. AntIII 0.48-0.77 mm, 0.6-0.8 times HF, 0.5-0.8 times AntIV+AntV (respectively 0.34-0.62 and 0.35-0.66 mm); with setae 30-63 µm, 1.0-2.1 times *D*; it carries (3)7-14 secondary sensoria placed on 32-70(85)% of segment. AntVIb 0.12-0.16(0.19) mm; AntVIpt (0.50)0.70-0.90(1.10) mm, 3.8-7.3(8.5) times AntVIb, (0.8)1.0-1.6 times AntIII. URS narrow subrectangular, 0.14-0.20 mm, 1.0-1.8 times AntI, 0.8-1.6 times AntVIb, 1.1-1.8(2.1) times Ht2, (2.3)2.7-3.8 times its basal width; with 7-18 accessory setae, 18-40 µm, 0.6-1.2 times *D*. Prothoracic papillae present or absent. Coxae light brown to brown, sometimes with darker spots, pigmented like trochanters or darker than them, but paler than SIPH. Tibiae homogeneously brown to dark brown. Leg setae much shorter than dorsal-abdominal ones. HF and HT 0.720-1.090 and 1.275-1.950 mm, respectively. First tarsal segments with (3)4-5 setae. Ht2 0.09-0.14 mm. Dorsal abdominal pigmented sclerites present; marginal papillae absent. AbdII-AbdIV with 10-15(18) dorsal setae each, 45-75(88) µm, 1.5-2.5 times *D*. AbdVIII with 4-6 setae, 50-75(83) µm, 1.7-2.3 (2.8) times *D*. SIPH subcylindrical (basal width 1.5-2.3 times *WR*); homogeneous dark brown to black; 0.31-0.43 mm, 0.14-0.19 times B, 0.5-0.8 times AntIII, (4.7)5.0-8.0(8.9) times *WR*; pre-reticulated part with disperse spinules and scales, and slightly imbricate margin; reticulated over 41-60% of its length, with 10 cells per row more or less; flange absent. Genital plate yellowish brown to brown, darker than cauda, with 2-7 discal and (4)7-15 pointed and unequal in length. Cauda triangular; yellowish brown; 0.22-0.39 mm, 0.6-1.0 times SIPH, 1.6-2.5 times its basal width; it carries 7-11(14) slightly curved and pointed setae.

Description. Alate viviparous females (Figs. 1F, 4D and 7D). Based on 76 specimens (24 measured), 2.000-3.080 mm. AntIII with 13-20 secondary sensoria on 64-96% of segment; marginal abdominal sclerites present. Antenna up to 3.650 mm, AntIII up to 0.9 times HF; AntIV up to 0.70 mm; AbdII-AbdV with 1-3 marginal papillae on each side; URS up to 1.9 times AntI and 1.7 times AntVIb; SIPH 0.30-0.46 mm, down to 0.13 times B and up to 9.8 times *WR*, and cauda to 0.18 mm and 0.5 times SIPH.

Uroleucon gnaphalii Mier Durante and Nieto Nafría, **sp. nov.**

Type Material. Holotype: apterous viviparous female 4 of sample 6038: *Gnaphalium inornatum*, Toluca (Mexico), 2900 m, 25-ix-1979 (GR *leg.*); *CMNHN*, slide "(EH) 7421". Paratypes: 64 apterous and 14 alate viviparous females [*CMNHN* and *CZULE*] from the same sample as the holotype (GR *leg.*) and from: (1) *G. inornatum*, Cuernavaca road (Morelos), 2600 m, 26-ix-1979 (GR *leg.*); (2) *Gnaphalium* sp., Ajusco (Distrito Federal), 2600 m, 1-v-1979 (GR *leg.*); Cuernavaca road (Morelos), 2600 m, 26-ix-1979 (GR *leg.*); Jalapán (Querétaro), 2200 m, 6-x-1980 (GR & RPM *leg.*); Pachuca [East] (Hidalgo), 2500 m, 1-x-1980 (GR & RPM *leg.*).

Other Examined Material. Specimens that have not been included in the type series (see the taxonomic discussion): 14 apterous and 1 alate viviparous females from Asteraceae, Riofrío de Juárez (Mexico), 2500 m, 31-X-1980 (GR *leg.*); *Gnaphalium* sp., El Corazón (Riofrío de Juárez, Mexico), 2750 m, 27-ix-1979 (GR *leg.*), and Toluca (Mexico) 3000 m, 25-ix-1979 (GR *leg.*); *Senecio salignus* (vagrant!), El Salto [West] (Durango) 2600 m, 18-X-1980 (GR *leg.*).

Etymology. The specific name is the genitive of *Gnaphalium*, the name of the plant-host genus.

Description. Apterous viviparous females (Figs. 1G, 1H, 4E and 7E). Based on 65 specimens (51 measured), 2.250-3.875 mm. Head brown, darker than trochanters; frontal margin subrectangular; dorsal setae 45-55(58) µm, 1.2-1.8 times *D*. Antennae brown to dark brown, habitually darker than head and as pigmented as distal part of femora and SIPH, 2.750-3.640 mm, 0.8-1.2 times B. AntIII 0.65-0.94 mm, 0.6-0.8 times HF, 0.6-0.8 times AntIV+AntV (respectively 0.44-0.74 and 0.46-0.60 mm); with setae 38-53 µm, 0.9-1.6 times *D*.; it carries 12-37 secondary sensoria placed on 46-78% of segment. AntVIb 0.15-0.19 mm; AntVIpt (0.71)0.76-1.00 mm, 4.4-5.8 times AntVIb, 0.9-1.3 times AntIII. URS long, narrow triangular, 0.19- 0.23 mm, 1.3-1.8 times AntI, 1.1-1.4 AntVIb, 1.6-2.1 times Ht2, 2.7-3.8(4.0) times its basal width; with 20-32 accessory setae, 32-50 µm, 0.9-1.6 times *D*. Prothoracic papillae habitually absent. Coxae yellowish to light brown, sometimes partially brown. Tibiae bicolored, prothoracic ones sometimes almost homogeneously pigmented. Leg setae much shorter than dorsal-abdominal ones. HF and HT respectively 0.850-1.250 and 1.650-2.250 mm. First tarsal segments with (4)5 setae. Ht2 0.10-0.13 mm. Pigmented abdominal setiferous sclerites present, sometimes coalescent on AbdVIII; marginal papillae habitually absent (8 specimens with 1-3 present). AbdII-AbdV with 11-18 dorsal setae each, 42-63 µm, 1.2-1.9 times *D*. AbdVIII with 4 setae, (50)55-80 µm, (1.3)1.7-2.3 times *D*. SIPH subcylindrical (basal width (1.7)2.0-3.0 times *WR*), sometimes with progressively enlarged distal portion; homogeneous dark brown to black; 0.59-0.90 mm, 0.20-0.28 times B, 0.8-1.1 times AntIII, (7.5)10.0-14.2 times *WR*; pre-reticulated part with disperse spinules and scales, and with slightly imbricated margin; reticulated over 21-35% of its length, with 10 cells per row more or less; flange present. Genital plate light brown to brown, paler than cauda, with 2-4(8) discal and 7-19 long and habitually pointed marginal setae. Cauda smoked, noticeably paler than SIPH; 0.44-0.58 mm, 0.6-0.8 times SIPH, (2.0)2.3-3.1 times its basal width; with 12-16(19) setae, which are delicate, slightly curved and pointed.

Description. Alate viviparous females (Figs. 1I, 4H, 7H). Based on 14 specimens, 2.575-3.675 mm. AntIII carries 38-51 secondary sensoria on 89-95% of its length; marginal abdominal sclerites present; tibiae homogeneous brown to dark brown. Dorsal setae down to 35 µm and 0.9 times *D*; antenna up to 3.685 mm; AntVIb up to 0.20 mm; AbdII-AbdIV with 1-3 marginal papillae; SIPH down to 0.57 mm, 0.19 times B and 0.7 times AntIII.

Comments. The description of the species does not include data on 14 apterous viviparous and 1 alate female assigned to the species despite there being some differences with the type series that we do not consider sufficient to establish a subspecies. They are: AntIII bearing 8-21 secondary sensoria occupying 33-58%; URS 1.4-1.5 times Ht2 and with 11-18 accessory setae; abdominal marginal papillae always present (3-7); and decreases in the lower limit of the ranges of: antenna, 2.570 mm; AntIII, 0.60 mm; AntIV, Ant V and Ant VIpt respectively, 0.42, 0.42 and 0.66 mm; HT, 1.625 mm; SIPH, 0.54 mm; and cauda, 0.44 mm.

Uroleucon sinuense Mier Durante & Nieto Nafría, **sp. nov.**

Type Material. Holotype: apterous viviparous female 18 of sample 07061: *Gnaphalium* sp., La Bufadora, Ensenada (Baja California), sea level, 18-iv-1981 (GR & ALMV *leg.*); *CMNHN*, slide "(EH) 16449". Paratypes: 186 apterous and 26 alatae viviparous females [*CMNHN*, *CZULE*] from the same sample as the holotype.

Etymology. The specific name is the Latin epithet for the inhabitants of Ensenada, city of Baja California state, from the name of its Catholic Diocese.

Description. Apterous viviparous females (Figs. 1J, 1K, 4G and 7G). Based on 187 specimens (40 measured), 2.750-4.150 mm. Head light brown, more or less pigmented like coxae and trochanters; frontal margin V-shaped; dorsal setae 45-68 µm, 1.0-2.0 times *D*. Antennae brown to dark brown, darker than head and as dark as the pigmented part of HF and SIPH, 2.940-4.030 mm, 0.9-1.3 times B. AntIII 0.68-0.98 mm, 0.7-0.9 times HF, 0.5-0.7 times AntIV+AntV (respectively 0.52-0.83 and 0.48-0.88 mm); with setae 32-50 µm, (0.7)1.0-1.7 times *D*; carrying 10-28 secondary sensoria on 38-58(72)% of segment. AntVIb 0.16-0.21 mm. AntVIpt (0.78)0.88-1.08 mm, 4.6-5.9 times AntVIb, 1.0-1.2 times AntIII. URS long, narrow subrectangular, 0.25-0.27 mm, 1.6-2.1 times AntI, 1.3-1.6 AntVIb, 1.6-2.2 times Ht2, 3.6-4.5 times its basal width; with 12-19 accessory setae, 22-35 µm, 0.5-1.1 times *D*, and approximately 2-3 times other setae on this and next segments. Prothoracic papillae absent. Coxae light yellowish to light brown. Leg setae shorter than the dor-

sal-abdominal ones. Tibiae bicolor. HF and HT respectively 0.920-1.300 and 1.900-2.500 mm each. First tarsal segments with 5 setae. Ht2 0.12-0.16 mm. Abdominal sclerites present. AbdII-AbdIV with (1)3-5(6) very small marginal papillae; and with 12-14 dorsal setae, 40-65 µm and 0.8-2.0 times *D*. AbdVIII with 4 setae, (47)55-78(83) µm, (1.0)1.4-2.5 times *D*. Siphunculus subcylindrical (basal width (1.2)1.6-2.4 times *WR*); homogeneous dark brown; (0.70)0.76-0.95 mm, 0.2-0.3 times B, 0.9-1.1 times AntIII, (6.2)6.9-10.6 times *WR*; pre-reticulated part with disperse and very small spinules and scales, and with margin near straight; reticulated over 30-41% of its length, with small cells (12-16 per row); small flange if present. Genital plate yellowish brown to brown, habitually paler than cauda, with 4-7 discal and 7-16 marginal setae, which are short and blunt or pointed. Cauda smoked, noticeably paler than SIPH; with small constriction, 0.45-0.60(0.68) mm, 0.6-0.8 times SIPH, 2.1-3.1 times its basal width; carrying (14)17-22 delicate, slightly curved and pointed setae.

Description. Alate viviparous females (Figs. 1L, 4H, 7H). Based on 26 specimens (21 measured), 2.725-3.550 mm. AntIII with 40-48 secondary sensoria on 84-96% of segment; marginal abdominal sclerites present. Tibiae homogeneously dark. Ant IV up to 0.88 mm; URS down to 1.2 times AntVIb.

Taxonomic discussion for *U. penae*, *U. mexicanum*, *U. gnaphalii* and *U. sinuense*

If the classical criteria of definition of each of the subgenera *Uroleucon*, *Uromelan* and *Lambersius* are used, these 4 new species should be placed in the subgenus *Uroleucon*, because the SIPH are pigmented in their entire length and the cauda is much paler than the SIPH. However, if the criterion of the pigmentation of the coxae and genital and anal plates is used (see "Discussion on previously known species and those recorded for the first time in Mexico") *U. gnaphalii* and *U. sinuense* should undoubtedly be placed in *Lambersius*; and also *U. mexicanum* because the dark pigmentation of the coxae is not homogenous nor constant, and neither does it reach the intensity of SIPH, tarsi or the distal part of the tibiae and femurs. On the other hand, *U. penae* should be placed in the nominotypical subgenus. This species is crucial for an in-depth study of phylogenetic relations in North American species in the genus, although it is possibly an introduced exotic species that could be unrecorded from its native country.

Using the same characteristics for species differentiation as Robinson (1985) *U. penae* resembles *U. lanceolatus* (Patch, 1919), but the latter has pale coxae. *U. malarguense* Ortego & Nieto Nafría, 2007, is the only native South American species with slightly pigmented coxae (Nieto Nafría et al. 2007, place it in the subgenus *Lambersius*), but AntIII has 4 secondary sensoria and 25.5% of the length of SIPH is reticulated.

U. mexicanum can be differentiated from *U. gnaphalii* and *U. sinuense* due to several characteristics, the length and reticulation of SIPH being very evident: 0.43 mm at most and 41% at least in *mexicanum*; 0.59 mm at least and 35% at most in *gnaphalii* and 0.70 mm at least and 40% at most in *sinuense*. It does not resemble any of the native South American species. It is slightly similar to the North American species *U. obscuricaudatum* and *U. paucosensoriatum*, but the cauda of *U. obscuricaudatum* is brown to dark brown and SIPH of *U. paucosensoriatum* are longer and less reticulated.

Uroleucon gnaphalii and *U. sinuense* are similar to *U. astronomus* (Hille Ris Lambers, 1962) and *Uroleucon zinzalae* (Hottes & Frisson, 1931), and to the South American *U. muermosum* (Essig, 1953) and *U. eumadiae* Delfino & González, 2005, due to the relative length of URS (1.5 times Ht2 at least) and its accessory setae (conspicuous), but are easily differentiated from them by the shape, size and ornamentation of SIPH.

U. gnaphalii can be separated from *U. sinuense* by the different shape and reticulation of SIPH and presence/absence of marginal papillae on the abdomen and by several characters of URS: shape, absolute and relative lengths, number and length of the accessory setae.

Uroleucon munozae Nieto Nafría & Remaudière, **sp. nov.**

Type Material. Holotype: apterous viviparous female 11 of sample 07197: Asteraceae, Ensenada to Observatorio Astronómico San Pedro Mártir road, km 74 (Baja California), 1800 m, 17-vi-1981 (ALMV *leg.*); *CMNHN*, slide "(EH) 7408". Paratypes: 22 apterous viviparous and 2 alatae viviparous females [*CMNHN*] from the same sample as the holotype and from Asteraceae, San Telmo 50 m (Baja California), 17-vi-1981 (ALMV *leg.*).

Etymology. The specific name is dedicated to our colleague and friend Mrs. Ana-Lilia Muñoz Viveros (PhD), who collected the type specimens.

Description. Apterous viviparous females (Figs. 2A, 2B, 5A and 8A). Based on 23 specimens, 1.675-2.925 mm. Head light brown, with brown spots in front of eyes; frontal margin deep V-shaped; dorsal setae 35-50 µm,1.3-1.7 times *D*. Antennae brown in general, as pigmented as tibiae, with AntI, AntII and a proximal portion of AntIII paler than the rest; 2.290-3.490 mm, 1.0-1.5 times B. Ant III (0.48)0.60-0.73 mm, 0.7-0.8 times HF and 0.5-0.6 times AntIV+AntV (respectively 0.44-0.82 mm and 0.37-0.60 mm); spinules and scales dorsally and ventrally present on all

its length; setae 28-38 µm, 0.9-1.3 times *D*; it carries 2-12 (more frequently 4-9) secondary sensoria on 33-61% of segment. AntVIb 0.17-0.23 mm. AntVIpt 0.65-0.90 mm, 3.6-4.4 times AntVIb, 1.2-1.4 times AntIII. URS long triangular with broader proximal half, 0.11-0.15 mm, 0.8-1.0 times AntI, 0.6-0.7 AntVIb, 0.8-0.9 times Ht2, 2.6-3.1 times its basal width; with 4-8 accessory setae, 32-48 µm, 1.0-1.6 times *D*. Marginal papillae habitually present on both sides of prothorax. Coxae yellowish brown to light brown. Tibiae homogeneous in color or progressively brown to dark brown. Leg setae shorter than the dorsal-abdominal ones. HF and HT respectively 0.630-1.100 and 1.160-2.000 mm. First tarsal segments with 3 setae. Ht2 0.13-0.17 mm. Dorsal-abdominal pigmented sclerites present or absent. Marginal papillae absent (exceptionally 1 or 2). AbdII-AbdIV with 9-12 dorsal setae each, 35-45 µm, 1.2-1.5 times *D*. AbdVIII with 4 setae, 38-55 µm, 1.0-1.8 times *D*. Siphunculus cylindrical curved outside and with apically and a little bit basally enlarged (basal width 1.2-2.4 times *WR*); brown (or dark brown) with a very short proximal portion yellowish brown; 0.33-0.79 mm, 0.20-0.28 times B, 0.7-1.1 times AntIII, (10.2)13.2-18.7(19.8) times *WR*; pre-reticulated part strongly ornamented, with spinules and scales, and with imbricate margins; reticulated over 29-42% of its length, with small 6-7 cells per row; flange absent. Genital plate as pale as the ventral abdominal surface, with 2 discal and 4-8 long and blunt marginal setae. Cauda finger-like, smoked light brown to brown, paler than SIPH and as pigmented as anal plate; (0.24)0.28-0.40 mm, 0.5-0.8 times SIPH, 2.2-2.9 times its basal width; with 8-15 pointed setae.

Description. Alate viviparous females (Figs. 2C, 5B, 8B). Based on 2 specimens, 1.675-2.925 mm. AntIII with 20-29 secondary sensoria on 75-83% of segment. Marginal abdominal sclerites present, but very pale. Pale proximal portion of the SIPH longer than in aptera, but yet short. AntVIpt up to 1.4 times AntIII.

Uroleucon zacatecense Nieto Nafría & Pérez Hidalgo **sp. nov.**

Type Material. Holotype: apterous viviparous female 8 of sample 06420: *Gymnosperma glutinosum*, Fresnillo to Sombrerete road (Zacatecas), 10-xi-1980 (GR & RPM *leg.*); *CMNHN*, slide "(EH) 7427". Paratypes: 10 apterous viviparous females from the same sample (06420) of the holotype [*CMNHN*].

Etymology. The specific name is the Latin epithet for the inhabitants of Zacatecas, from the name of its Catholic Diocese.

Description. Apterous viviparous females (Figs. 2D, 2E, 5C and 8C). Based on 11 specimens (9 measured), 2.175-2.750 mm. Head light brown; frontal margin subrectangular; dorsal setae 20-23 µm and 0.7-0.8 times *D*. Antennae in general brown to dark brown, as dark as distal part of tibiae, but AntI, AntII and a small proximal portion of AntIII light brown; 2.090-2.360 mm, 0.8-1.1 times B. Ant III 0.51-0.61 mm, 0.8-1.0 times HF, 0.7-0.8 times AntIV+AntV (respectively 0.35-0.42 mm and 0.32-0.42 mm); with setae 28-30 µm, 1.0-1.1 times *D*; carrying 11-23 secondary sensoria on 71-93% of segment. AntVIb 0.12-0.14 mm. AntVIpt 0.55-0.61 mm, 3.9-4.6 times AntVIb and 1.0-1.1 times AntIII. Rostrum extends to intermediate coxae. URS triangular, broad in proximal half and with concaves margins distally; 0.12-0.13 mm, 1.1-1.3 times AntI, 0.9-1.0 both AntVIb and Ht2, 2.0-2.3 times its basal width; with 6-10 accessory setae, 27-33 µm, 1.0-1.2 times *D*. Prothoracic marginal papillae habitually present on 1 or both 2 sides. Coxae yellowish brown, as pale as trochanters. Tibiae progressively pigmented from light brown or brown at proximal part to dark brown at apex. Femoral setae long like the dorsal-abdominal ones and shorter than the tibial ones. HF and HT, respectively 0.610-0.700 and 1.175-1.325 mm. First tarsal segments with 3 setae (one leg of one specimen has 4 setae). Ht2 0.12-0.13 mm. Pigmented dorsal-abdominal sclerites absent. AbdII-AbdIV with 2-5 marginal papillae (0-3 per side). AbdII-AbdV with 8-12 dorsal setae, 20-25 µm, 0.8-0.9 times *D*. AbdVIII with 2-4 setae, 25-35 µm, 1.0-1.6 times *D*. SIPH subcylindrical (basal width 1.9-2.3 *WR*), yellowish brown to light brown on its proximal half, and distally brown; 0.56-0.70 mm, 0.26-0.29 times B, 1.0-1.2 times AntIII, 8.0-10.0 times *WR*; pre-reticulated part with few and pale spinules and scales, and undulated margins; reticulated in 35-44%, 12-16 cells per row, mostly of them are elongated; with a small flange. Genital plate as pale as the ventral abdominal surface, with 2(3) discal, and 5-8 marginal short and blunt setae. Cauda light brown to brown, 0.32-0.40 mm, 0.5-0.6 times SIPH, 2.1-2.4 times its basal width; with 4-8 setae, the dorsal and apical are blunt are shorter than the lateral ones, which are pointed.

Uroleucon queretarense Pérez Hidalgo y Nieto Nafría, **sp. nov.**

Type Material. Holotype: apterous viviparous female 19 of sample 06308: *Aphanostephus ramosissimus*, Caderyeta (Queretaro), 2100 m, 7-x-1980 (GR *leg.*); *CMNHN*, slide "(EH) 7414". Paratypes: 40 apterous viviparous and 14 alatae viviparous females [*CMNHN*, *CZULE*] from the same sample as the holotype.

Etymology. The specific name is the Latin epithet for the inhabitants of Queretaro, from the name of its Catholic Diocese.

Description. Apterous viviparous females (Figs. 2F, 2G, 5D and 8D). Based on 41 specimens (32

measured), 1.650-2.500 mm. Head light brown; frontal margin V- shaped; dorsal setae 25-35 µm, 1.0-1.4 times *D*. Antennae in general brown, as dark as tibiae, with AntI, AntII and a proximal portion of AntIII paler than the rest; 2.030-2.540 mm, 0.9-1.2 times B. Ant III 0.51-0.67 mm, 0.8-0.9 times HF, 0.7-0.9 times AntIV+AntV (respectively 0.35-0.48 mm and 0.33-0.43 mm); with setae 25-38 µm, 1.0-1.6 times *D*; it carries 17-34 secondary sensoria on 62-94% of segment. AntIV of 2 specimens carries 1 sensorium. AntVIb 0.09-0.12 mm. AntVIpt 0.53-0.69 mm, 4.4-6.3 times AntVIb, 0.8-1.0 times AntIII. URS triangular with a enlarged proximal half, 0.12-0.16 mm, 1.3-1.6 times AntI, 1.1-1.4 AntVIb, 1.0-1.3 times Ht2, 2.2-3.1 times its basal width; with 6-9 accessory setae, 15-25 µm, 0.6-1.0 times *D*. Prothorax habitually with marginal papillae. Coxae yellowish brown. Tibiae homogeneous or progressively pigmented, varying from light brown to dark brown. Leg setae longer than the dorsal-abdominal ones. HF and HT respectively 0.580-0.760 and 1.150-1.500 mm. First tarsal segments with 3-5 setae, exceptionally 5 on one leg. Ht2 0.12-0.13 mm. Abdomen without dorsal pigmented sclerites. Marginal papillae absent or present (0-4 at all, 0-2 per side). AbdII-AbdIV with 8-12 dorsal setae each, 25-40 µm, 0.9-1.6 times *D*. AbdVIII with 3-4 setae, 27-48 µm, 1.1-1.8 times *D*. SIPH subcylindrical (basal width 1.7-3.2 times *WR*); yellowish or light brown at proximal half and dark brown distally, the reticulated part as dark as tibiae; 0.53-0.80 mm, 0.29-0.33 times B, 1.0-1.3 times AntIII, 10.0-15.0 times *WR*; pre-reticulated part with pale spinules and scales, and with tenuous imbricate margins; reticulated over 23-32% of its length, with 10 cells per row approximately; flange inconspicuous. Genital plate as pale as ventral-abdominal surface, with 2 discal and 6-9 short and blunt marginal setae. Cauda light brown to brown, like anal plate and proximal part of SIPH; 0.27-0.41 mm, 0.4-0.6 times SIPH, 2.0-3.4 times its basal width; with 6-10 setae, those placed on its distal third are blunt and shorter than the other one, which are pointed and long.

Description. Alate viviparous females (Figs. 2H, 5E, 8E). Based on 14 specimens (12 measured), 2.000-2.500 mm. Pigmented marginal abdominal sclerites very pale if present. AntIII and AntIV with 29-39 (on 88-97% of segment) and (0)1-6 secondary sensoria, respectively. Dorsal-cephalic setae down to 18 µm, 0.7 times *D*; Ant, AntIV and AntV up to respectively 2.560, 0.51 and 0.44 mm; hind HT up to 1.525 mm; Abd3 setae up to 48 µm and 1.9 times *D*; SIPH down to 0.26 times B, up to 15.3 times *WR*, and 39% reticulated.

Uroleucon tlaxcalense Nieto Nafría & Pérez Hidalgo, **sp. nov.**

Type Material. Holotype: apterous viviparous female 1 of sample 05914: Asteraceae, Candelaria (Puebla), 6-ix-1979 (GR *leg.*); *CMNHN*, slide "(EH) 7426". Paratypes: 1 apterous viviparous female from the same sample as the holotype [*CMNHN*].

Etymology. The specific name refers to the "poblano-tlaxcalteca" valley, latinization from the name of the Catholic Diocese of Tlaxcala.

Description. Apterous viviparous females (Figs. 2I, 2J, 5F and 8F). Based on 2 specimens, 1.875 and 2.000 mm. Head light brown; frontal profile undulated; dorsal setae 20-23 µm, 0.7-0.9 times *D*. Antennae 1.780-1.820 mm, 0.9 times B, in general brown to dark brown, as dark as distal part of tibiae, but AntI, AntII and a small proximal portion of AntIII pigmented like the head. Ant III 0.40-0.41 mm, 0.7 times HF and 0.6 times AntIV+AntV (respectively 0.30 and 0.33-0.35 mm); with setae 25-28 µm, as long as *D*; it carries 7-10 secondary sensoria on 57-61% of segment. AntVIb 0.12 mm. AntVIpt 0.49 mm, 4.1 times AntVIb, 1.2 times AntIII. URS triangular, with straight margins; 0.13-0.14 mm, 1.5-1.6 times AntI, 1.1 times AntVIb, 1.2 times Ht2, 2.2-2.3 times its basal width; with 5-7 accessory setae, 28 µm, as long as *D*. Prothoracic marginal papillae present on one or both two sides. Coxae yellowish brown, like trochanters. Tibiae homogeneously brown or progressively pigmented from light brown base to brown apex. Femoral setae long as long as dorsal-abdominal ones and shorter than ones on tibiae. HF and HT respectively 0.560-0.570 and 1.075-1.100 mm. First tarsal segments with 3-4 setae (4.4.3 and 3.3.3-4). Ht2 0.11 mm. Abdomen without pigmented sclerites or marginal papillae. AbdII-AbdIV with 10-16 dorsal setae each, 15-23 µm, 0.6-0.8 times *D*. AbdVIII with 2-4 setae, 25 µm, 0.9-1.0 times *D*. SIPH subcylindrical (basal width 2.2 *WR*), yellowish brown on its proximal half, light brown or brown distally; 0.44-0.45 mm, 0.23-0.24 times B, 1.1 times AntIII, 8.0-9.0 times *WR*; pre-reticulated part with pale spinules and scales, and imbricate margins; reticulated in 33-34%, 13-14 cells per row; inconspicuous flange. Genital plate pale like the ventral abdominal surface, with 2 discal and 7-8 very short and blunt marginal setae. Cauda smoked light-brown, as pigmented as anal plate and paler than SIPH; 0.26 mm, 0.6 times SIPH, 1.7-1.9 times its basal width; with 5 setae, the dorsal-apical one blunt and shorter than the others, which are pointed.

Taxonomic discussion for *U. munozae*, *U. zacatecense*, *U. queretarense* and *U. tlaxcalense*

The 4 species under discussion are placed in the subgenus *Lambersius*, following both classical criteria and those used by Nieto Nafría et al. (2007) (see the previous discussions).

U. munozae can be differentiated from the other species in this group by the shape, ornamentation and pigmentation of SIPH. This is also a useful character for separating it from the rest of the species of *Uroleucon* known in America, including the others described in this paper, except *U. crepusisiphon* (Olive, 1965) and *U. manitobense* Robinson, 1986. Some of the characters it shares with *U. crepusisiphon* differentiate it from *U. manitobense*: number of secondary sensoria on AntIII (11 at most, 14 at least in *manitobense*), reticulated part of SIPH (42% at most, 40% at least in *manitobense*), flange of SIPH (absent, present in *manitobense*); it is differentiated from *U. crepusisiphon* by: AntVIpt (1.0 mm at least, 0.90 mm at most in *munozae*), abdominal marginal papillae (present, absent in *munozae*) and caudal pigmentation (as dark as SIPH, paler than SIPH in *munozae*).

The frontal margin and the shape of caudal setae (unequal) enable *U. queretarense* to be separated from *U. zacatecense* and *U. tlaxcalense*. The shape of the setae brings it close to *U. erigeronense* and other similar species, but the shape of SIPH, number of caudal setae and the length of setae on head, antennae and abdomen are very different.

U. zacatecense cannot be mistaken for *U. tlaxcalense* due to the shape of the frontal margin and the length and ornamentation of SIPH (see the descriptions). With regard to the other American species in the genus, only *U. macgillivrayae* has some characters in common with *U. zacatecense* (general pigmentation, presence of marginal papillae, short URS, shape of SIPH and cauda); they can be differentiated by the number of caudal setae and URS accessory setae (respectively: 4-8 and 6-10 in *zacatecense*; 7-17 and 6 at most in *macgillivrayae*), AntVIpt (0.61 mm at most in *zacatecense*, 0.70 mm at least in *macgillivrayae*), and length, reticulation and the pre-reticulated part ornamentation of SIPH (1.7-1.9 times cauda, 35-44% reticulated and rich ornamented in *zacatecense*; 0.9-1.6 times cauda, 20% reticulated at most and poor ornamented in *macgillivrayae*).

Uroleucon latgei Nieto Nafría & Remaudière, **sp. nov.**

Type Material. Holotype: apterous viviparous female 5 of sample 05735: Asteraceae, Acajete (Puebla), 2550 m, 28-viii-1978 (JPL *leg.*); *CMNHN*, slide "(EH) 7425". Paratypes: 4 apterous viviparous females [*CMNHN*] from the same sample as the holotype.

Etymology. The specific name is dedicated to our friend Jean-Paul Latgé (PhD), collector of the type specimens and, at that time, researcher on the aphid pathology.

Description. Apterous viviparous females (Figs. 3A, 3B, 6A and 9A). Based on 5 specimens, 2.475-3.450 mm. Head light brown; frontal margin deep V-shaped; dorsal setae 42-53 µm, 1.3-1.7 times *D*. Antennae 2.740-3.520 mm, 1.0-1.1 times B; in general brown to dark brown, darker than tibiae; AntI, AntII and a small proximal portion of AntIII light brown; Ant III 0.66-0.90 mm, 0.7-0.8 times HF and 0.7 times AntIV+AntV (respectively 0.52-0.69 and 0.44-0.59 mm); with setae 42-50 µm, 1.1-1.3 times *D*; it carries (7)14-21 secondary sensoria on 42-48% of segment. AntVIb 0.12-0.16 mm. AntVIpt 0.72-0.95 mm, 5.4-6.1 times AntVIb, 0.9-1.2 times AntIII. Rostrum extends to intermediate coxae. URS subrectangular, 0.15-0.17 mm, 1.0-1.3 times AntI, 0.9-1.3 AntVIb, 1.1-1.3 times Ht2, 3.0 times its basal width; with 5-8 accessory setae, 25-28 µm, 0.7-0.8 times *D*. Prothoracic marginal papillae present. Coxae yellowish brown, like trochanters. Tibiae progressively pigmented from light brown or homogeneous brown (in well pigmented specimens). Leg setae much longer than dorsal-abdominal ones and scarce. HF and HT respectively 0.800-1.120 and 1.575-2.125 mm. First tarsal segments with 3 setae. Ht2 0.12-0.14 mm. Abdomen not pigmented. Marginal papillae present, 3-6 in all and 0-4 per side. AbdII-AbdV with 8-13 dorsal setae each, 40-48 µm, 1.1-1.3 times *D*. AbdVIII with 4 setae, 50-63 µm, 1.2-1.7 times *D*. SIPH thin subcylindrical (basal width 2.5-2.8 *WR*) trumpet-shaped on distal third; yellowish brown on proximal third and progressively pigmented to dark brown apex; 0.50-0.77 mm, 0.20-0.22 times B, 0.8-0.9 times AntIII, 11.2-13.6 times *WR*; pre-reticulated part near smooth with straight margins; reticulated in 33-34%, 17-20 cells per row; and without flange. Genital plate pale, like the ventral abdominal surface, with 2-4 discal and 6-10 marginal setae, which are unequal in length and shape (pointed or blunt). Cauda pointed, light brown as anal plate, and the proximal third of SIPH; 0.43-0.63 mm, 0.7-0.9 times SIPH and 2.7-3.5 times its basal width; with pointed 12-21 setae.

Uroleucon heterothecae Pérez Hidalgo & Nieto Nafría, **sp. nov.**

Type Material. Holotype: apterous viviparous female 4 of sample 06354: *Heterotheca inuloides*, Dolores Hidalgo to Ojuelos road (Guanajuato), 2249 m, 8-x-1980 (GR *leg.*); *CMNHN*, slide "(EH) 7405". Paratypes: 42 apterous viviparous females and 2 alatae viviparous females [*CMNHN*, *CZULE*] from the same sample as the holotype and from San Francisco del Rincón (Guanajuato), 1750 m, 15-x-1981 (R.P.M.), and at Fresnillo to Sombrerete road (Zacatecas), 2300 m, 10-x-1980 (GR & RPM *leg.*).

Etymology. The specific name is the genitive of *Heterotheca*, the genus of its host plant.

Description. Apterous viviparous females (Figs. 3C, 3D, 6B and 9B). Based on 67 specimens (51 measured), 2.175-3.200 mm. Head light brown; frontal

margin undulated; dorsal setae 27-35 µm, 0.9-1.3 times *D*. Antennae 1.625-2.320 mm, 0.6-0.9 times B, in general brown, like tibiae, but with paler AntI, AntII and a proximal portion of AntIII. Ant III 0.42-0.70 mm, 0.7-0.8 times HF, 0.6-1.0 times AntIV+AntV (respectively 0.23-0.54 and 0.24-0.44 mm); with setae 25-35 µm, 0.8-1.1 times *D*; carrying (11)17-30(37) secondary sensoria placed on 66-97% of segment. AntVIb 0.09-0.14 mm. AntVIpt 0.33-0.49 mm, 3.1-4.4 times AntVIb, 0.5-1.0 times AntIII. URS long subrectangular, 0.17-0.21 mm, 1.6-2.4 times AntI, 1.4-2.1 AntVIb, 1.3-1.7 times Ht2, 3.0-4.0 times its basal width; with 8-15 accessory setae, 15-25 µm, 0.5-0.8 times *D*. Marginal papillae habitually present on both sides of prothorax. Coxae yellowish brown. Tibiae light brown to dark brown, homogeneously or progressively pigmented. Leg setae shorter than the dorsal-abdominal ones. HF and HT respectively 0.660-0.940 and 1.250-1.950 mm. First tarsal segments with 3-4 setae. Ht2 0.11-0.15 mm. Abdomen without pigmented sclerites and with 2-6 protuberant and sometimes geminated marginal papillae. AbdII-AbdIV with 14-20 strong dorsal setae each, 27-43 µm, 0.8-1.5 times *D*. AbdVIII with 4-6 setae, 32-48 µm, 1.1-1.5 times *D*. SIPH subcylindrical (basal width 1.7-2.7 times *WR*); yellowish to light brown on 1/2-1/3 its length, light to dark brown on the distal part; 0.52-0.77 mm, 0.21-0.30 times B, 1.0-1.3 times AntIII, 8.0-12.0 times *WR*; pre-reticulated part slightly rugose, practically without spinules, margins slightly undulate; reticulated over 32-45% of its length, with 8-12 depressed cells per row on proximal ones and 12-16 more or less regular cells per row on the distal part. Genital plate as pale as the ventral-abdominal surface, with 2-6 discal setae, and 8-13 strong, short and blunt marginal ones. Cauda with irregular margins; yellowish to light brown, like anal plate, darker than the genital plate and paler than SIPH; 0.34-0.51 mm, 0.5-0.7 times SIPH, 2.2-2.9 times its basal width; with 8-13 setae, dorsal and distal ones blunt and shorter than others that are pointed or truncated.

Description. Alate viviparous females (Figs. 3E, 6C, 9C). Based on 2 specimens, 2.350 and 2.650 mm. AntIII with 25-26 secondary sensoria on 95-96% of segment. AntIV of one specimen with 1 rhinarium. Abdominal marginal and several setiferous sclerites present. AntVIpt up to 4.6 times AntVIb; cauda down up 0.31 mm.

Uroleucon remaudiereorum Nieto Nafría & Mier Durante, **sp. nov.**

Type Material. Holotype: apterous viviparous female 14 of sample 06352: *Conyza* sp., Dolores Hidalgo (Guanajuato), 2000 m, 8-x-1980 (GR & RPM *leg*.); *CMNHN*, slide "(EH) 16448". Paratypes: 35 apterous viviparous females and 2 alate viviparous females from the same sample as the holotype [*CMNHN*, *CZULE*].

Etymology. The species is dedicated to our friends Georges Remaudière, eminent aphidologist, Colette Remaudière, his wife, who has supported his work for years, and Marc Remaudière, their son, who is co-author of the well-known Catalogue of the World's Aphididae.

Description. Apterous viviparous females (Figs. 3F, 3G, 6D and 9D). Based on 36 specimens, 2.275-3.200 mm. Head light brown; frontal margin subrectangular; dorsal setae 27-40 µm, 1.0-1.4 times *D*. Antennae 1.810-2.505 mm, 0.7-0.9 times B, with yellowish or light brown AntI, AntII and proximal part of AntIII and AntIV, and brown to dark brown on the rest. Ant III 0.45-0.61 mm, 0.6-0.9 times HF and 0.6-0.8 AntIV+AntV (respectively 0.30-0.51 and 0.28-0.43 mm); with setae 27-40 µm, 1.0-1.5 times *D*. AntVIb 0.11-0.14 mm; carrying 9-19(25) secondary sensoria placed on enlarged 56-83% of segment. AntVIpt 0.50-0.69 mm, 4.4-5.3 times AntVIb, 1.0-1.2 times AntIII. Rostrum extends to intermediate coxae. URS more or less subrectangular, with straight margins; 0.15-0.18 mm, 1.4-1.7 times AntI, 1.2-1.5 AntVIb, 1.6-1.9 times Ht2, 2.5-3.2 times its basal width; with 12-19 accessory setae, 22-30 µm, 0.8-1.1 times *D*. Prothoracic marginal papillae present on one or both two sides. Coxae yellowish brown, like trochanters. Tibiae progressively pigmented from yellowish or light brown to brown or dark brown. Setae on femora shorter than tibial setae, which are longer than dorsal-abdominal ones. HF and HT respectively 0.630-0.870 and 1.025-1.600 mm. First tarsal segments with 5 setae. Ht2, 0.09-0.11 mm. Abdomen without pigmented sclerites or marginal papillae. AbdII-AbdV with 10-14 dorsal setae each, 22-43 µm, 0.8-1.6 times *D*. AbdVIII with 4(5) setae, 30-45 µm, 1.0-1.7 times *D*. SIPH subcylindrical (basal width 2.1-3.0 times *WR*); yellowish brown on its proximal half and brown or dark brown distally; 0.65-0.89 mm, 0.25-0.32 times B, 1.3-1.6 times AntIII, 10.4-14.5 times *WR*; pre-reticulated part with scarce pale spinules and scales, and irregular margins; reticulated in 25-40%, 10-12 cells per row; without flange. Genital plate as pale as the ventral abdominal surface and paler than the anal plate, with 2(3) discal and 7-12 long and pointed or truncate marginal setae. Cauda light brown, sometimes darker, always paler than distal part of SIPH and darker than anal plate; 0.36-0.48 mm, 0.5-0.6 times SIPH and 2.2-2.8(3.2) times its basal width; with 10-14 setae, the dorsal-apical one blunt and shorter than lateral ones, which are pointed.

Description. Alate viviparous females (Figs. 3H, 6E, 9E). Based on 2 specimens, 2.450 and 2.700 mm. AntIII with 25-29 secondary sensoria on 94% of segment. AntIV of one specimen with 1 rhinarium. Abdominal marginal sclerites present. Pigmentation more extended and/or darker on antennae, legs, SIPH, anal plate and cauda than those of apterous viviparous females.

Taxonomic discussion of *U. latgei*, *U. heterothecae* and *U. remaudiereorum*

These 3 species can definitely be placed in the subgenus *Lambersius*, whatever the criterion used, and they can be differentiated from the 4 species dealt with in the previous group because the URS measures at least 0.15 mm - and if less than 0.16 mm, then the cauda has 10 or more setae.

U. latgei, *U. heterothecae* and *U. remaudiereorum* can be differentiated from each other by the frontal margin, shape of SIPH, tarsal formula, presence or absence of marginal papillae on AbdII and number of setae on the cauda (see descriptions).

U. latgei is easily separated from all the American species of *Uroleucon* by the shape of SIPH.

U. heterothecae and *U. remaudiereorum* are separated from all the species recorded in South America by the shape of the setae on the cauda and the short length of the dorsal setae on the head. Following the key by Robinson (1986) *U. heterothecae* resembles *U. luteolum* (Williams, 1911), and *U. remaudireorum* resembles *U. zymozionense* (Knowlton, 1946) and *U. brevitarsus* (Robinson, 1974). *U. heterothecae* can be easily differentiated from *U. luteolum* by the frontal margin. *U. remaudiereorum* can be differentiated from *U. zymozionense* and *U. brevitarsus* (Robinson, 1974) because in the latter two, AntVIpt is shorter than AntIII, and also *U. zymozionense* has a triangular cauda, and *U. brevitarsus* has at least 5 setae on AbdVIII and 3-4 setae on the first tarsal segment.

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Appendix

Additions to the Keys by Blackman and Eastop (2006)

Blackman & Eastop (2006) presented a taxonomic compendium of the world'aphids living on shrubs and herbaceous plant species in which they organized identification keys to aphid species living on each genus of host plant. This work immediately became an indispensable tool for the identification of aphids, and in particular for those who do not have access to the same sources of information (collections and literature) as specialists. It is therefore advisable that new "aphid/host plant" relationships be accompanied by the appropriate modifications to these keys.

Accordingly we present modifications for 17 keys, namely those corresponding to *Achillea*, *Ageratum*, *Artemisia*, *Baccharis*, *Brickellia*, *Conyza*, *Erigeron*, *Eupatorium*, *Gnaphalium*, *Heterotheca*, *Lagascea*, *Montanoa*, *Senecio*, *Solidago*, *Sonchus*, *Stevia*, and *Viguiera*, in which species recorded for the first time on plants in these genera are added, and also *U. chilense* (Essig, 1953), *U. mendocinum* Mier Durante & Ortego, 2007 and *U. tucumani* (Essig, 1953), recorded by Nieto Nafría et al. (2007) on *Eupatorium candolleanum*, *Baccharis juncea* and *Conyza* sp. Keys for species living on *Gymnosperma*, *Perymenium* and *Zaluzania* are given. Another 3 plant genera referred to here as plant host for one aphid species do not have identification keys in the aforementioned work, and they are: *Aphanostephus* (host for *U. queretarense*), *Pinaropappus* (host for *U. pseudambrosiae*) and *Simsia* (host for *U. ambrosiae*).

In these modifications, we have used the usual terminology (for example 'rhinaria' instead of 'sensoria' and 'hair' instead of 'seta'), abbreviations and expressions, so that they can be easily understood by those accustomed to them.

Modification of the key to aphids on *Achillea* for addition of *Uroleucon astronomus*

35. Presiphuncular sclerites present. SIPH 1.7-2.9× cauda 36

— Presiphuncular sclerites absent. If SIPH longer than 1.6, R IV+V bearing 17 accessory hairs at least 36B

36. Cauda less than 0.35 mm long and less than twice its basal width. ANT III with 7-24 rhinaria . . . . . *Uroleucon achilleae*

— Cauda more than 0.4 mm long and more than twice its basal width. ANT III with 30-36 rhinaria . . . . . *Uroleucon ptarmicae**

36B. R IV+V bearing 17 accessory hairs at least. . . . . *Uroleucon astronomus*

— R IV+V with 10 hairs at most 37

Modification of the key to aphids on *Ageratum* for addition of *Uroleucon mexicanum*

2. SIPH dark, reticulated on less than 0.30 of length. Dorsal hairs without basal scleroites. Coxae dark, cauda pale. . . . . *Uroleucon sonchi afghanicum*

— SIPH dark, reticulatd on more than 0.40 of length. Dorsal hairs with basal sclerites. Coxae variably pigmented, but lighter than SIPH, cauda pale. . . . . *Uroleucon mexicanum*

— Without this combination of characters . . . . . key to polyphagous aphids, p. 1020

Modification of the key B to aphids on *Artemisia* for addition of *Uroleucon erigeronensis*

15. First tarsal segments with 3-5 hairs, 3 subapical and 0-2 lateral. SIPH distally pigmented and basally pale, and more than 2× cauda, which has 1 or more distal hairs short and blunt or capitate. ANT III with 5-17 rhinaria. R IV+V longer than HT II. Dorsal cephalic hairs 1836µm . . . . . *Uroleucon erigeronense*

— Without this combination of characters 15B

15B. [previous disjunctive 15.]

Modification of the key to aphids on *Baccharis* for addition of *Uroleucon mendocinum*, *U. paucosensoriatum*

8. [without modification] 8B

— [without modification] 9B

8B. Dorsal abdomen with dark post-siphuncular sclerites and variably pigmented sclerites at bases of dorsal hairs. ANT PT/BASE 4.3-6.0 9

— [second proposition of the previous disjunctive 9 without modification] . . . . . *Uroleucon chilense*

9. ANT III with 18-29 rhinaria (al. with 24-39). ANT PT/BASE 4.35.4. Sclerites at bases of dorsal abdominal hairs as dark as the postsiphuncular sclerites . . . . . *Uroleucon pseudomuermosum*

— ANT III with 4-16 rhinaria (al. with 33-50). ANT PT/BASE 5.06.1. Sclerites at bases of dorsal abdominal hairs paler than the postsiphuncular sclerites . . . . . *Uroleucon paucosensoriatum*

9B. ANT III 15-32 rhinaria distributed over nearly whole of segment. Green when alive. . . . *Uroleucon bereticum*

— ANT III 7-29 rhinaria (habitually less of 23) extended at most on 0.66 of segment. Brown or reddish brown when alive 10

10. ANT III with 7-15 rhinaria extended at most on 0.50 of segment (al. with 11-24). ANT I, ANT II and ANT III more or less smooth . . . . . *Uroleucon macolai*

— ANT III with 12-29 rhinaria extended at most on 0.66 of its length (al. with 20-36, habitually more than 25). ANT I and ANT II corrugated and more proximal portion of ANT III wrinkly . . . *Uroleucon mendocinum*

Modification of the key to aphids on *Brickellia* (incl. *Kuhnia*) for addition of *Uroleucon mexicanum*, *U. paucosensoriatum* and *U. reynoldense*

2. SIPH pale at base 2B

— SIPH wholly dark 3

2B. SIPH 4.0-6.0× cauda, which is short. Tibiae black. BL 1.1-1.25 mm . . . . . *Uroleucon nevadense*

— SIPH 1.8-2.4× cauda, which is long. Tib1ae with a intermediate portion pale . . . . . *Uroleucon erigeronense*

3. SIPH 1.0-1.6× cauda. R IV+V 1.1-2.1× HT II . . . . . *Uroleucon mexicanum*

— SIPH 1.8-2.4× cauda. R IV+V 1.1-1.3× HT II 3B

3B. ABD TERG 25 with marginal tubercles. SIPH 1.3-1.7× cauda which has 18-31 hairs, all pointed and of similar length. Tibiae black . . . . . *Uroleucon atripes*

— ABD TERG 25 without marginal tubercles 3C

3C. ABD TERG 8 with 4 hairs. SIPH near smooth basad of apical reticulated area . *Uroleucon paucosensoriatum*

— ABD TERG 8 with 2 hairs. SIPH evenly spiculated basad of apical reticulated area . . *Uroleucon reynoldense*

Modification of the key to aphids on *Conyza* for addition of *Uroleucon remaudiereorum* and *U. tucumani*

6. [Without modification] 7

— [Without modification] 7B

7B. SIPH usually at least 1.6× cauda, which is 0.24-0.35 mm and carries 7-12 hairs . . . . . *Uroleucon tucumani*

— SIPH usually at more 1.6× cauda, which is 0.30-0.83 mm and carries 9-31 hairs 8

11. SIPH 1.9-2.5× cauda. MTu absent on some of ABD TERG 1-5 . . . . . 11B

— [Without modification] 12

11B. ANT III with 15-25 rhinaria extending over 0.6-0.8 of length. R IV+V with 12-17 accessory hairs . . . . . *Uroleucon remaudiereorum*

— ANT III with 8-20 placed on basal half of segment. R IV+V with 6-9 accessory hairs. . *Uroleucon erigeronense*

Modification of the key to aphids on *Erigeron* for addition of *Uroleucon ambrosiae*, *U. astronomus*, *U. brevitarsus*, *U. penae* and *U. stoetzelae*

4. [Without modification] . . . . . *Macrosiphoniella erigeronis**

— SIPH with reticulation over about distal 0.150.45 of length. ANT III with more than 5 rhinaria 5

8. [Without modification] 9

— [Without modification] 9C

9. Cauda paler than SIPH. First tarsal segments with 35 hairs 9B

— Cauda dark like siphunculi. First tarsal segments with 5 hairs 10

9B. ANT III with more than 30 rhinaria. URS with 45 accessory hairs. SIPH with reticulation over about 0.25 of length . . . . . *Uroleucon simlaense*

— ANT III with less than 15 rhinaria. URS with 610 accessory hairs. SIPH with reticulation over 0.370.43 of length . . . . . *Uroleucon penae*

9C. URS about 0.23 mm long, with 1724 accessory hairs. . . . . *Uroleucon astronomus*

— URS shorter than 0.20 mm, with less of 15 accessory hairs 11

13. [Without modification] . . . . . *Uroleucon paucosensoriatum*

— Hind tibiae with paler section. ANT I and II pale. ANT III with 750 rhinaria. 14

14. Cauda yellow, contrasting with dark brown to black SIPH and distal 1/41/2 of hind femora. ANT III with rhinaria usually restricted to more swollen basal half of segment 14B

— Cauda light brown and not contrasting with dark brown SIPH and distal portion of femur. ANT III with 1535 rhinaria distributed nearly whole length of segment . . . . . *Uroleucon bereticum*

14B. SIPH almost smooth basad of apical reticulated area. ANT III with 717 rhinaria . . . . . *Uroleucon olivei*

— SIPH evenly spiculated basad of apical reticulated area. ANT III with 10 50 rhinaria. . *Uroleucon ambrosiae*

15. Marginal abdominal tubercles absent. 15B

— Marginal abdominal tubercles usually present 15C

15B. SIPH 1.8-2.4× cauda, which has 6-10 hairs, the most distal 3-4 of which are shorter than the more proximal (lateral) hairs, and often blunt. HT II 0.15 mm at least . . . . . *Uroleucon erigeronense*

— SIPH 1.6-1.7× cauda, which has 1317 long hairs. HT II 0.11 mm at most . . . . . *Uroleucon brevitarsus*

15C. Second tarsal segments with proximal ventral hairs normally developed 16

— Second tarsal segments with proximal ventral hairs atrophied or minute. 17

16. [Without modifications] . . . . . *Uroleucon macgillivrayae*

— [Without modifications] . . . . . *Uroleucon luteolum*

17. ANT III with 1132 rhinaria distributed nearly whole length of segment. . . . . *Uroleucon gravicorne*

— ANT III with 521 rhinaria restricted to 0.80 of the length of segment. . . . . *Uroleucon stoetzelae*

Modification of the key to aphids on *Eupatorium* for addition of *Uroleucon chilense*, *U. mexicanum*, *U. nigrotuberculatum* and *U. obscuricaudatum*

3. [Without modification] . . . . . *Uroleucon eupatorifoliae*

— Cauda pale to dusky, paler than SIPH. Hairs on ANT III usually not exceeding BD III 4

4. [Without modification] 4B

— [Without modification] 8

4B. Abd II-V habitually with marginal tubercle, conical dusky to black. SIPH mostly smooth basad of reticulated area . . . . . *U. nigrotuberculatum*

— Abd II-V with or without marginal tubercles; if present not conical and pigmented 5

5. [Without modification] 6

— R IV+V 1.14-2.14× HT II 7

7. [Without modification] . . . . . *Uroleucon eupatoricolens*

— SIPH shorter than ANT III 7B

7B. Cauda elongated triangular without constriction, pale and with 714 hairs. R IV+V 1.14-2.14× HT II . . . . . *U. mexicanum*

— Cauda with a constriction, pale or pigmented, with 1232 hairs. R IV+V 1.15-1.60× HT II 7C

7C. Cauda pale contrasting with dark brown to black SIPH, with 12-20 hairs . . . . . *Uroleucon ambrosiae*

— Cauda dusky to brown with a basal pale area, with 2232 hairs . . . . . *Uroleucon obscuricaudatum*

9. ANT III with 7-20 rhinaria 9B

— [Without modifications] 10

9B. Cauda usually with one or more of subapical hairs blunt or with slightly expanded apices. SIPH with reticulation on distal 0.25-0.35. . . . . *Uroleucon erigeronense*

— Cauda with all hairs pointed. SIPH with reticulation on distal 0.13-0.24 of length . . . . . *Uroleucon chilense*

Modification of the key to aphids on *Gnaphalium* for addition of *Uroleucon chani*, *U. erigeronense*, *U. gnaphalii* and *U. sinuense*

14. [Without modification] . . . . . *Macrosiphoniella olgae*

— SIPH 1.1-2.3× cauda and reticulated over distal 0.23-0.40 15

15. [Without modification] . . . . . *Uroleucon compositae* (or *gobonis*?)

— Cauda wholly pale or faintly smoky on apical half. 16

16. [Without modification] . . . . . *Uroleucon sonchi*

— Coxae pale 16B

16B. SIPH distally pigmented and basally pale, and more than 2× cauda, which has 1 or more distal hairs short and blunt or capitate. ANT III with 5-17 rhinaria. R IV+V longer than HT II. Dorsal cephalic hairs 1836 µm . . . . . *Uroleucon erigeronense*

— SIPH wholly dark 16C

16C. R IV+V with 11 accessory hairs at least 19

— R IV+V with 10 accessory hairs at most 16D

16D. Cauda faintly dusky to brown on apical half . . . . . *Uroleucon chani*

— Cauda pale or dusky on entirely length 17

17. R IV+V 1.8-2.3× HT II. SIPH 1.5-1.8 cauda, which is dusky . . . . . *Uroleucon russellae*

— [Without modification] 18

19. RIV+V 0.250.27 mm, with accessory hairs 22-35 µm . . . . . *Uroleucon sinuense*

— RIV+V 0.140.23 mm, with accessory hairs 32-50 µm . . . . . *Uroleucon gnaphalii*

Key to aphids on *Gymnosperma* for *Uroleucon erigeronense* and *U. zacatecense*

— ABD TERG 25 without marginal tubercles. ANT III rhinaria on basal half. . . . . *Uroleucon erigeronense*

— ABD TERG 25 with marginal tubercles. ANT III rhinara extending to 0.71-0.983 from base . . . . . *Uroleucon zacatecense*

Modification of the key to aphids on *Heterotheca* for addition of *Uroleucon heterothecae*, *U. paucosensoriatum* and *U. penderum*

2. SIPH pale at base . . . 3

— SIPH wholly dark . . . 5

3. Marginal papillae on Abd IIV present, conical and protuberant . . . *Uroleucon heterothecae*

— Marginal papillae on Abd IIV absent . . . 4

4. URS with less than 69 accessory hairs. Cauda, which bears 6-10 hairs, the most distal of these being short and blunt . . . *U. erigeronense*

— URS with less than 1013 accessory hairs. Cauda, which bears 10-16 long and pointed hairs. . . . *Uroleucon penderum*

5. Tibiae pigmented for entire length, usually darkening progressively from base to apex. Cauda smoky on distal half . . . *U. paucosensoriatum*

— Tibiae with pale section. Cauda entirely pale . . . *U. ambrosiae*

Key to aphids on *Lagascea* for addition of *Uroleucon maximilianicola*

— SIPH with distal polygonal reticulation . . . *Uroleucon maximilianicola*

— SIPH without distal polygonal reticulation . . . *Acyrthosiphon bidenticola*

Modification of the key to aphids on *Carpesium*, which is valid for aphids on *Montanoa* for addition of *Uroleucon nigrotuberculatum*

1. [First proposition of previous without number disjunctive, without modification] . . . . *Aleurodaphis blumeae*

— Body not flattened, segments not fused, no crenulate margin of wax glands. Cauda not knobbed, anal plate entire . . . 2

2. SIPH with polygonal reticulation on distal 0.3 of length, completely dark pigmented, darker than cauda. ANT III with 15-38 rhinaria, usually extending onto distal half. R IV+V 0.85-1.1× ANT BASE VI. ANT PT/BASE 4.7-5.6. Cauda with 19-32 hairs (usually more than 23 . . . *Uroleucon nigrotuberculatum*

— [Second proposition of no modified previous disjunctive, without modification]. . . . key to polyphagous aphids, p. 1020

Key to aphids on *Perymenium* and *Zaluzania* for *Uroleucon astronomus* and *U. mexicanum*

— Coxae pale like trochanters. Tibiae with a basal portion and an apical part brown contrasting with the pale intermediate part . . . *Uroleucon astronomus*

— Coxae dusky and darker than trochanters, at least in part. Tibiae homogeneously pigmented . . . *Uroleucon mexicanum*

Modification of the key to aphids on *Senecio* for addition of *Uroleucon erigeronense* and *U. mexicanum*

33. Cauda almost as dark as SIPH, which are entirely pigmented . . . 34

— Cauda paler than the pigmented part of SIPH . . . 36B

36B. SIPH distally pigmented and basally pale and more than 2× cauda, which has 1 or more distal hairs short and blunt or capitates. . . . *Uroleucon erigeronense*

— SIPH entirely pigmented or with a section in middle less dark than the proximal and distal sections 37

39. SIPH (1.01.7× cauda) with reticulation on distal 0.41-0.60 of length. Coxae pale or dusky, if pigmented less dark than SIPH . . . *Uroleucon mexicanum*

— SIPH (1.11.5× cauda) with reticulation on distal 0.25-0.36 of length. Coxae pale 40

— SIPH (1.42.1× cauda) with reticulation on distal 0.16-0.27 of length. Coxae pale, dusky or dark. 41

Modification of the key to aphids on *Solidago* for addition of *Uroleucon astronomus*

17. R IV+V longer than 1.65× HTII, with 17 accessory setae at least . . . . . *Uroleucon astronomus*

— R IV+V 0.86-1.55× HTII 7B

17B. [previous disjunctive 17]

Modification of the key to aphids on *Sonchus* for addition of *Uroleucon eupatoricolens* and *U. gravicorne*

5. [Without modification] . . . . . *Macrosiphum euphorbiae*

— SIPH mostly black, with reticulation of numerous rather small polygonal cells on distal 0.16-0.43 of length . 5B

5B. SIPH pale on basal 0.20.3. Second tarsal segments with proximal ventral hairs atrophied. R IV+V 1.1-1.4× HT II. . . . . *Uroleucon gravicorne*

— SIPH entirely dark 6

13. R IV+V 1.10× HT II at more. ANT III with 16-39 rhinaria. ANT PT/BASE 5.18-6.67. Cauda with 15-29 hairs . . . . . *Uroleucon pseudambrosiae*

— R IV+V 1.15× HT II at least 13B

13 B. SIPH longer than ANT III . . . . . *Uroleucon eupatoricolens*

— SIPH shorter than ANT III . . . . . *Uroleucon ambrosiae*

Modification of the key to aphids on *Stevia* for addition of *Uroleucon astronomus*, *U. mexicanum* and *U. paucosensoriatum*

1. SIPH with distal polygonal reticulation 2

— SIPH without distal polygonal reticulation 3

2. [First proposition of previous without number disjunctive, without modification] . . . . . *Hyperomyzus niger*

— [First proposition of previous without number disjunctive, without modification] . . . . . *Aphis solitaria*

3. SIPH reticulated over distal 0.41-0.60 of length. Cauda with 7-14 hairs (usually less than 10). URS with 715 accessory hairs. . . . . *Uroleucon mexicanum*

— SIPH reticulated on less than 0.40 of length. Cauda with more than 11 hairs 4

4. URS with 1824 accessory hairs. Cauda with 1724 hairs. SIPH reticulated on more than 0.32 of length. . . . . *Uroleucon astronomus*

— URS with 58 accessory hairs. Cauda with 1218 hairs. SIPH reticulated on less than 0.33 of length. . . . . *Uroleucon paucosensoriatum*

Modification of the key to aphids on *Viguiera* for addition of *Uroleucon maximilianicola*, *U. mexicanum*, *U. paucosensoriatum*, *U. reynoldense* and *U. richardsi*

2. [Without modification] . . . . . *Acyrthosiphon bidenticola*

— SIPH with distal polygonal reticulation 3

3. SIPH distally pigmented and basally pale. ANT III with 12-31 rhinaria extending to 0.80-0.98 from base, with the majority on distal half . . . . . *Uroleucon richardsi*

— SIPH entirely pigmented. ANT III with the majority of rhinaria on basal half 4

4. Tibiae with pale intermediate section 5

— Tibiae homogeneously or progressively pigmented 6

5. SIPH with spinules basad of apical reticulated section. ANT III with 1050 rhinaria on 0.70 of length at most . . . . . *Uroleucon ambrosiae*

— SIPH near smooth basad of apical reticulated section. ANT III with 1228 rhinaria on 0.50 of length at most . . . . . *Uroleucon maximilianicola*

6. ABD VIII habitually with 2 hairs. ANT III with 837 rhinaria . . . . . *Uroleucon reynoldense*

— ABD VIII habitually with 4 hairs. ANT III with 316 rhinaria 7

7. SIPH reticulated on more than 0.40 of length. Cauda with 7-14 hairs (usually less than 10). URS with 715 accessory hairs . . . . . *Uroleucon mexicanum*

— SIPH reticulated on less than 0.33 of length. Cauda with 1218 hairs. URS with 58 accessory hairs . . . . . *Uroleucon paucosensoriatum*