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Two new species of the aphid genus *Uroleucon* (Hemiptera: Aphididae) living on *Grindelia* in the USA

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Abstract. Here, we present descriptions of two new aphid species of the genus *Uroleucon* Mordvilko, 1914 (Hemiptera: Aphididae: Macrosiphini), which are associated with the plant genus *Grindelia* Willd. (Asteraceae). An apterous viviparous female of *Uroleucon* (*Lambersius*) *robinsoni* sp. nov. from Oregon and apterous and alate viviparous females of *Uroleucon* (*Lambersius*) *grindeliae* sp. nov. from Colorado are described and illustrated. Taxonomical notes of the new and other *Grindelia*-feeding taxa of *Uroleucon* are given and an updated key to the apterae of the *Grindelia*-feeding species of *Uroleucon* in the world is provided.

Keywords. Macrosiphini, *Uroleucon*, *Lambersius*, new taxa, North America.

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Introduction

The genus *Uroleucon* Mordvilko, 1914, which comprises 239 aphid species in the world, is one of the most speciose genera in the tribe Macrosiphini Wilson, 1910 (Favret 2020). The genus has six subgenera: *Belochilum* Börner, 1932 (one species), *Divium* Pashtshenko, 2000 (one species), *Lambersius* Olive, 1965 (53 species), *Satula* Olive, 1963 (one species), *Uroleucon* Mordvilko, 1914 (122 species) and *Uromelan* Mordvilko, 1914 (61 species) (Favret 2020). All of the species live on herbaceous plants that belong to the families Asteraceae (more than 160 species) and Campanulaceae (11 species) without any host alternation; only nine species use host plants from other plant families (Blackman 2010; Blackman & Eastop 2020). The coloration of species of *Uroleucon* varies from green to blackish brown (Heie 1995; Blackman & Eastop 2020). The genus is generally characterized by well-developed antennal tubercles with diverging inner sides, the presence of secondary rhinaria on the basal part of antennal segment III in apterae, often a very long processus terminalis, ultimate rostral segments with blunt apices, long

and cylindrical reticulated siphunculi, a finger-shaped cauda with a pointed apex and five setae (a few species have three or four setae) on the first tarsal segments. In many species, the abdominal dorsal setae are located on pigmented scleroites (Blackman & Eastop 2020).

During an examination of the aphid collection in the Natural History Museum of London (BMNH), slides with two undescribed species of *Lambersius*, which had been sampled on *Grindelia hirsutula* Hook. & Arn. and *G. squarrosa* (Pursh) Dunal (Asteraceae) in Oregon and Colorado, respectively, were recognized. In Blackman & Eastop (2006: 496), these species were included in the key to apterae aphids on *Grindelia* Willd. as “*Uroleucon* (*Lambersius*) sp. (on *G. stricta* DC., Oregon)” and “*Uroleucon* (*Lambersius*) sp. (on *G. squarrosa*, Colorado)”. The aim of this paper is to describe these two *Grindelia*-feeding species of *Lambersius* from the USA.

Material and methods

The specimens were examined using a Leica DM 3000 LED light microscope and photographed using a Leica MC 190 HD camera. The measurements were taken according to Ilharco & van Harten (1987). The measurements are given in millimeters. The material examined for each species is given in the review of the species. The host plant names are given according to the most recent edition of The Plant List (2013).

Abbreviations for morphological terms used in the text

ANT	=	antennae or their lengths
ANT I-VI	=	antennal segments I, II, III, IV, V and VI or their lengths (ratios between the antennal segments are simply given as, e.g., ‘VI: III’)
BASE	=	basal part of last antennal segment or its length
BD III	=	basal articular diameter of ANT III
BL	=	body length (from the anterior border of the head to the end of the cauda)
III FEMUR	=	hind femur or its length
HW	=	greatest head width across the compound eyes
HT II	=	second segment of the hind tarsus or its length
LS ANT III	=	length of longest setae of ANT III
PT	=	processus terminalis of the last antennal segment or its length
SIPH	=	siphunculus or its length
SIPH W	=	maximum width of the siphunculus
III TIBIA	=	hind tibia or its length and URS the ultimate segments of the rostrum (IV+V) or their lengths

Abbreviations for depositories for the type material

NHMUK	=	Natural History Museum, London, UK
DZUS	=	Hemiptera Collection of the Department of Zoology, University of Silesia, Katowice, Poland

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Family Aphididae Latreille, 1802
Genus *Uroleucon* Mordvilko, 1914

Uroleucon (Lambersius) robinsoni sp. nov.

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Figs 1–2, Table 1

Diagnosis

Apterous viviparous females of *Grindelia*-feeding *Lambersius* have the following combinations of characters: PT $4.66\text{--}6.50 \times \text{BASE}$; ANT III with 12–21 secondary rhinaria (Fig. 2a–b); URS 1.06–

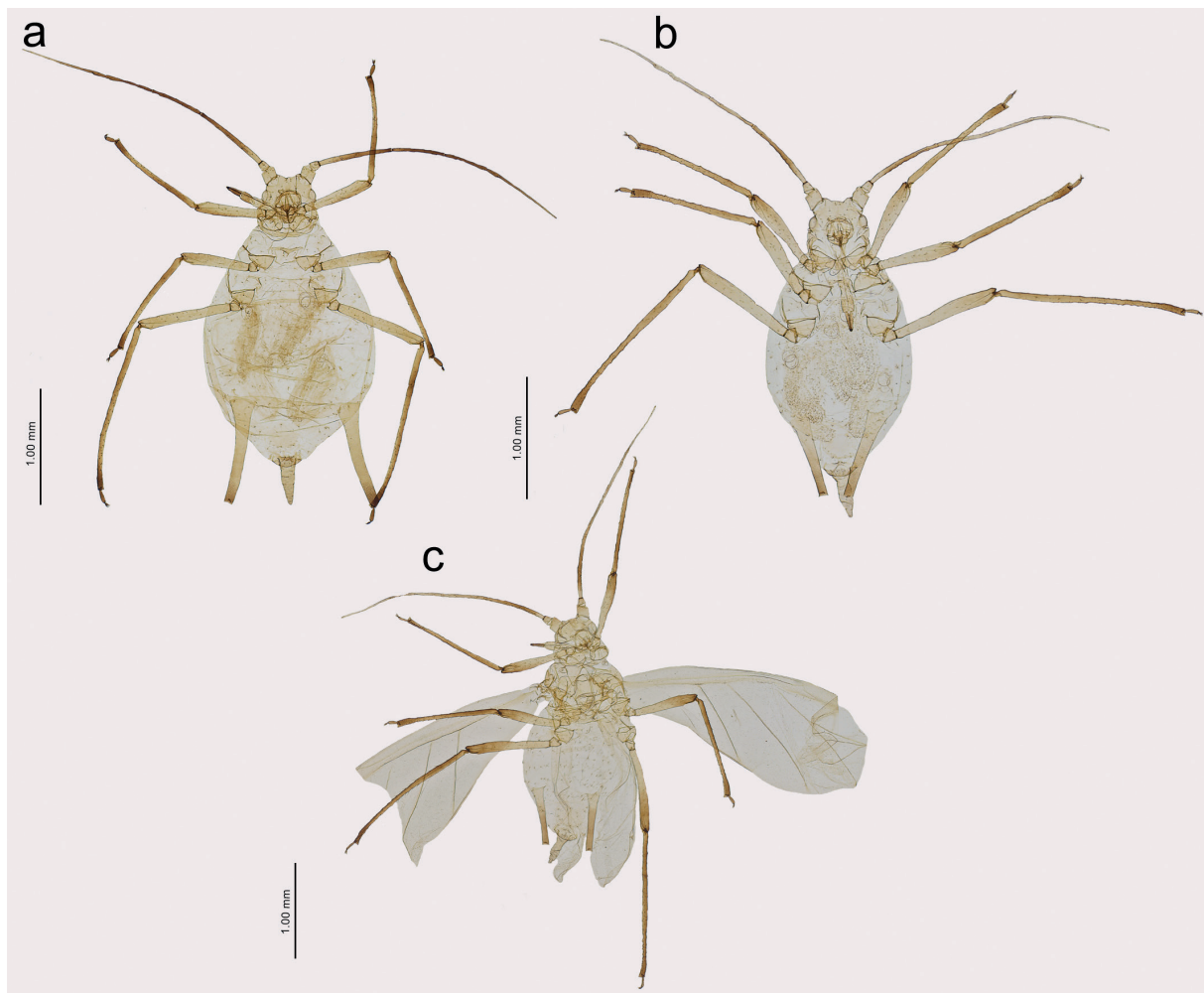


Fig. 1. New species of *Uroleucon* Mordvilko, 1914 feeding on *Grindelia* Willd. **a.** *Uroleucon (Lambersius) robinsoni* sp. nov., holotype, apterous viviparous female (NHMUK 010121495) **b.** *U. (L.) grindeliae* sp. nov., holotype, apterous viviparous female (NHMUK 010121473) **c.** *U. (L.) grindeliae* sp. nov., paratype, alate viviparous female (NHMUK 010121477).

1.33×BASE and 1.18–1.25×HT II with 7–9 short, fine, pointed accessory setae (Fig. 2d); HT I with 5:5:5 setae; SIPH subcylindrical, slightly tapering without a flange (Fig. 2e); its reticulated zone 0.17–0.28×SIPH. SIPH 2.30–2.68×cauda and 0.31–0.41×BL; scleroites on setal bases absent on ABD I–V, while setae on ABD VI–VIII arise from barely visible, rounded scleroites; cauda narrow finger-shaped without constriction and with 7–9 setae (Fig. 2f).

Etymology

We are very pleased to name the new species in honor of A.G. Robinson (University of Manitoba, Canada), who worked on the North American Macrosiphini.

Material examined

Holotype

USA • ♀ apterous viviparous; Colorado, Carson Hole; 38°43' N, 108°36' W; alt. 2348 m; 16 Sep. 1956; Hottes and Hille Ris Lambers leg.; *Grindelia squarrosa*; NHMUK 010121495.

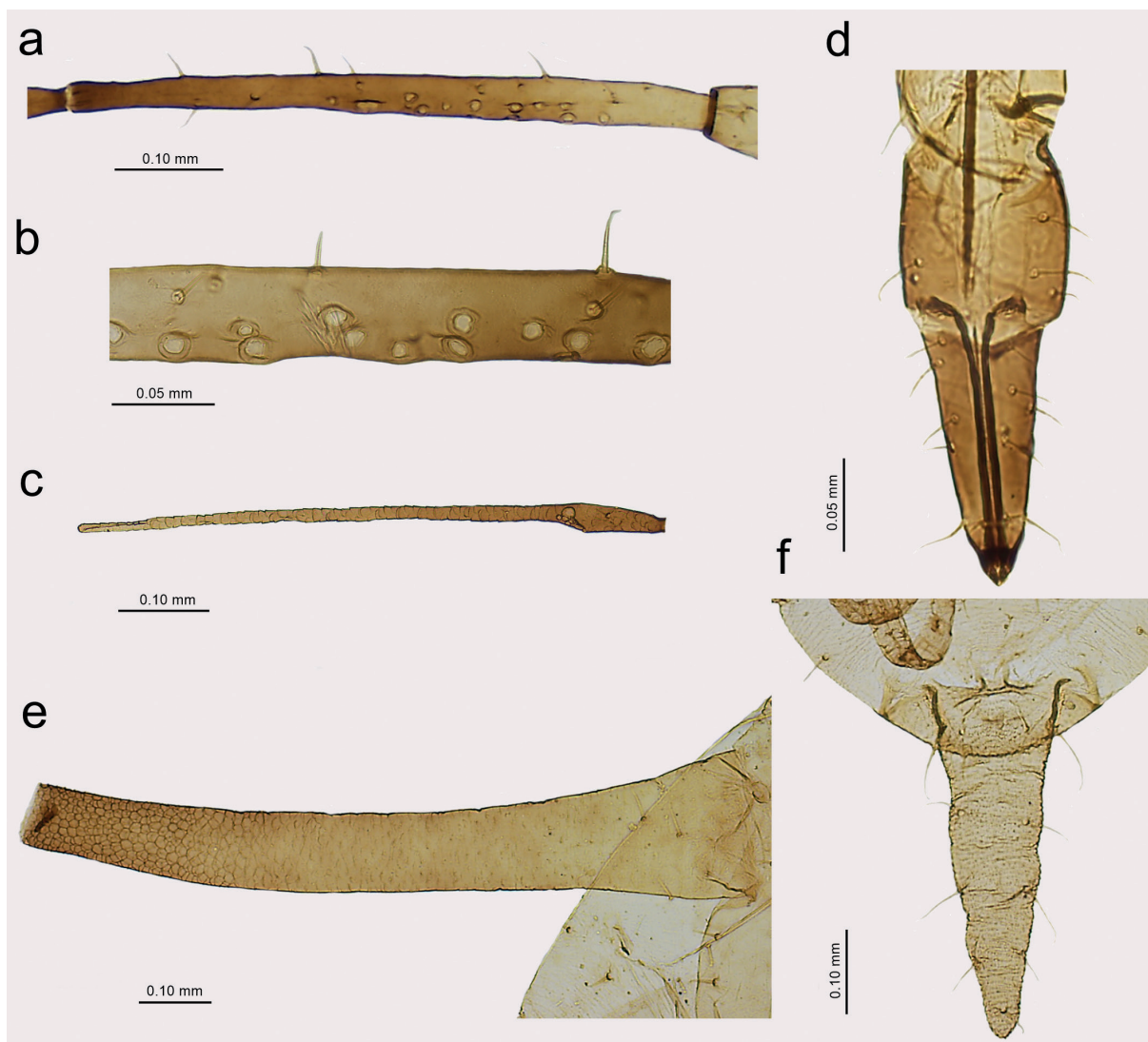


Fig. 2. *Uroleucon (Lambersius) robinsoni* sp. nov., holotype, apterous viviparous female (NHMUK 010121495). **a.** ANT III. **b.** Secondary rhinaria on ANT III. **c.** ANT VI. **d.** Ultimate rostral (III–V) segments. **e.** Siphunculus. **f.** Cauda.

Table 1. Measurements of the known morphs of *Uroleucon (Lambersius) robinsoni* sp. nov. and *U. (L.) grindeliae* sp. nov. Measurements of the holotype are given in parentheses after the ranges.

Character	<i>Uroleucon robinsoni</i>	<i>Uroleucon grindeliae</i>	
	Apterous viviparous female	Apterous viviparous female	Alate viviparous female
BL	2.50–3.20 (2.90)	2.17–3.02 (2.67)	2.02–2.95
HW	0.46–0.50 (0.46)	0.47–0.52 (0.47)	0.46–0.50
ANT	2.39–2.91 (2.43)	1.99–2.48 (2.23)	2.25–2.54
ANT III	0.62–0.75 (0.65)	0.51–0.70 (0.61)	0.64–0.70
ANT IV	0.45–0.57 (0.46)	0.37–0.47 (0.41)	0.42–0.50
ANT V	0.40–0.53 (0.40)	0.32–0.42 (0.38)	0.41–0.46
ANT VI	0.73–0.90 (0.74)	0.55–0.67 (0.62)	0.58–0.70
BASE	0.12–0.15 (0.12)	0.12–0.16 (0.14)	0.12–0.16
PT	0.61–0.78 (0.62)	0.43–0.52 (0.48)	0.46–0.54
URS	0.15–0.16 (0.15)	0.15–0.16 (0.16)	0.15–0.17
FEMORA III	0.80–0.97 (0.80)	0.84–1.05 (0.90)	0.84–0.97
TIBIAE III	1.50–1.87 (1.52)	1.47–1.82 (1.70)	1.52–1.77
HT II	0.12–0.13 (0.12)	0.12–0.13 (0.12)	0.11–0.12
SIPH	0.86–1.10 (0.92)	0.62–0.80 (0.66)	0.58–0.68
CAUDA	0.37–0.44 (0.40)	0.40–0.45 (0.40)	0.37–0.40

Paratypes

USA • 2 ♀♀ apterous viviparous; same collection data as for holotype; NHMUK 010121495 • 2 ♀♀ apterous viviparous; same collection data as for holotype; NHMUK 010121496 • 2 ♀♀ apterous viviparous; same collection data as for holotype; DZUS 010121481 • 2 ♀♀ apterous viviparous; same collection data as for holotype; NHMUK 010121482.

Description

Apterous viviparous female (n = 9)

COLOR IN LIFE. Unknown.

PIGMENTATION OF CLEARED SPECIMENS ON SLIDE. Body generally membranous, pale to yellow; ANT brown with pale ANT I–II and basal part of ANT III; coxae and trochanters pale; femora yellow with light brown distal ends; tibiae brown with paler middle section or pale with only distal part darker; tarsi light brown; SIPH yellow with light brown to brown distal ends; cauda pale (Fig. 1a).

MORPHOMETRIC CHARACTERS. HW $0.17\text{--}0.19 \times \text{ANT}$. Head with thick, rigid setae with blunt or narrowly capitate apices, $0.030\text{--}0.040$ mm long. ANT tubercles each with 2–3 setae. ANT $0.83\text{--}1.04 \times \text{BL}$. ANT III with 12–21 rounded secondary rhinaria of different sizes, with sclerotized rims (Fig. 2a–b), ANT IV longer than ANT V. PT $4.66\text{--}6.50 \times \text{BASE}$ (Fig. 2c). Other antennal ratios: VI:III 1.13–1.28, V:III 0.61–0.70, IV:III 0.70–0.76, PT:III 0.93–1.11, PT:IV 1.22–1.47 and PT:V 1.32–1.69. ANT bearing medium length thick, rigid setae with blunt or narrowly capitate apices. ANT III setae $0.020\text{--}0.045$ mm long, LS ANT III $0.84\text{--}1.13 \times \text{BD III}$. ANT I with 4–5, ANT II with 3–4, ANT III with 12–21, ANT IV with 8–12, ANT V with 7–9 setae. ANT VI with 3 basal, 4 apical and 2–5 setae on PT. Rostrum reaching middle coxae in some specimens to as far as hind coxae in other specimens. URS $0.21\text{--}0.24 \times \text{ANT III}$, $0.17\text{--}0.20 \times \text{ANT VI}$, $0.20\text{--}0.24 \times \text{PT}$, $1.06\text{--}1.33 \times \text{BASE}$ and $1.18\text{--}1.25 \times \text{HT II}$ with 7–9 short, fine and pointed accessory setae (Fig. 2d). Mesosternal furca fused, wide, T-shaped. Hind femora bearing

medium length, thick, rigid setae with narrowly capitate or slightly pointed apices, 0.020–0.040 mm long. Hind tibiae bearing thick, rigid setae, most slightly pointed or blunt, shorter than width of tibiae, 0.025–0.045 mm long. In some specimens, tibiae bearing few pseudosensoria. HT I with 5:5:5 setae, HT II $0.18\text{--}0.19 \times \text{ANT III}$, $0.14\text{--}0.16 \times \text{ANT VI}$, $0.16\text{--}0.20 \times \text{PT}$ and $0.86\text{--}1.08 \times \text{BASE}$. SIPH subcylindrical, slightly tapering and curved externally with distinct zone of subapical reticulation and without flange (Fig. 2e). Reticulated zone $0.17\text{--}0.28 \times \text{SIPH}$. SIPH $2.30\text{--}2.68 \times \text{cauda}$, $0.31\text{--}0.41 \times \text{BL}$, and $1.38\text{--}1.57 \times \text{ANT III}$. Abdomen membranous with medium length, thick rigid setae with narrowly capitate or blunt apices, 0.025–0.040 mm long on ABD I–V and 0.030–0.040 mm long on ABD VI–VIII. ABD VIII with 4 setae. Scleroites on setal bases absent on ABD I–V, while setae on ABD VI–VIII arising from very poorly visible, rounded and pale scleroites. Genital plate with two anterior setae longer than others, 7–10 posterior setae. Cauda narrow finger-shaped without constriction, $2.05\text{--}2.75 \times$ its width at base and $0.13\text{--}0.15 \times \text{BL}$ with 7–9 fine setae (Fig. 2f).

Remarks

Of the six *Grindelia*-feeding aphids of *Uroleucon*, only *U. penderum* Robinson, 1986, *U. robinsoni* sp. nov. and *U. grindeliae* sp. nov. have shared characters: (1) ANT III has the majority of the secondary rhinaria on the basal half and (2) their URS/HT II ratio is 1.15 or more and (3) the coxae and trochanters are pale (Robinson 1986; Blackman & Eastop 2020).

The apterous viviparous females of *Uroleucon robinsoni* sp. nov. differ from the same morphs of *U. penderum*: (1) their SIPH/CAUDA L ratio is 2.30–2.68 in *U. robinsoni* sp. nov., while it is 1.65–1.95 in *U. penderum*, (2) their URS/HT II ratio is 1.18–1.25 in *U. robinsoni* sp. nov., while it is 1.3–1.6 in *U. penderum*, (3) the pigmentation of the tibiae is dusky or dark for most of their length in *Uroleucon robinsoni*, while their tibiae are pale except at the apices in *U. penderum* (Blackman & Eastop 2020).

The apterous viviparous females of the two new species differ from each other in the following characters: (1) their ANT PT/BASE ratio is 4.66–6.50 in *U. robinsoni* sp. nov., while it is 3.31–3.61 in *U. grindeliae* sp. nov., (2) their SIPH/CAUDA ratio is 2.30–2.68, while it is 1.37–1.77 in *U. grindeliae* sp. nov. and (3) their cauda is finger shaped with no constriction in *U. robinsoni* sp. nov. (Fig. 2f), while it is tongue shaped with an evident constriction near the base in *U. grindeliae* sp. nov. (Fig. 3f).

Biology and distribution

The species was collected from *Grindelia squarrosa* in Colorado, USA. Other morphs and the life cycle of the new species are unknown.

Uroleucon (Lambersius) grindeliae sp. nov.

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Figs 1, 3, Table 1

Diagnosis

Apterous viviparous females of *Grindelia*-feeding *Lambersius* share the following combinations of characters: PT $3.31\text{--}3.61 \times \text{BASE}$; ANT III with 7–16 secondary rhinaria (Fig. 3a–b); URS $1.03\text{--}1.37 \times \text{BASE}$ and $1.19\text{--}1.37 \times \text{HT II}$ with 6–9 short, fine, pointed accessory setae (Fig. 3d); HT I with 5:5:5 setae; SIPH subcylindrical, slightly tapering without a flange (Fig. 3e); its reticulated zone $0.27\text{--}0.31 \times \text{SIPH}$. SIPH $1.37\text{--}1.77 \times \text{cauda}$ and $0.24\text{--}0.30 \times \text{BL}$; scleroites on setal bases absent on ABD I–V, while the setae on ABD VI–VIII arising from barely visible, rounded scleroites; cauda tongue-shaped with evident constriction near its base and with 9–12 setae (Fig. 3f).

Etymology

The name of the new species is derived from the host plant genus *Grindelia*.

Material examined

Holotype

USA • ♀ apterous viviparous; Oregon, Salt Marsh, near Newport; 44°39' N, 124°1' W; alt. 113 m; 19 Apr. 1980; Hille Ris Lambers leg.; *Grindelia stricta* (= *G. hirsutula*); NHMUK 010121473.

Paratypes

USA • 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121473 • 2 ♀♀ apterous, 2 ♀♀ alate viviparous; same collection data as for holotype; NHMUK 010121465 • 1 ♀ apterous viviparous, 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121476 • 1 ♀ apterous viviparous, 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121478 • 1 ♀ apterous viviparous, 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121474 • 1 ♀ apterous viviparous, 1 ♀ alate viviparous; same collection data as for holotype;

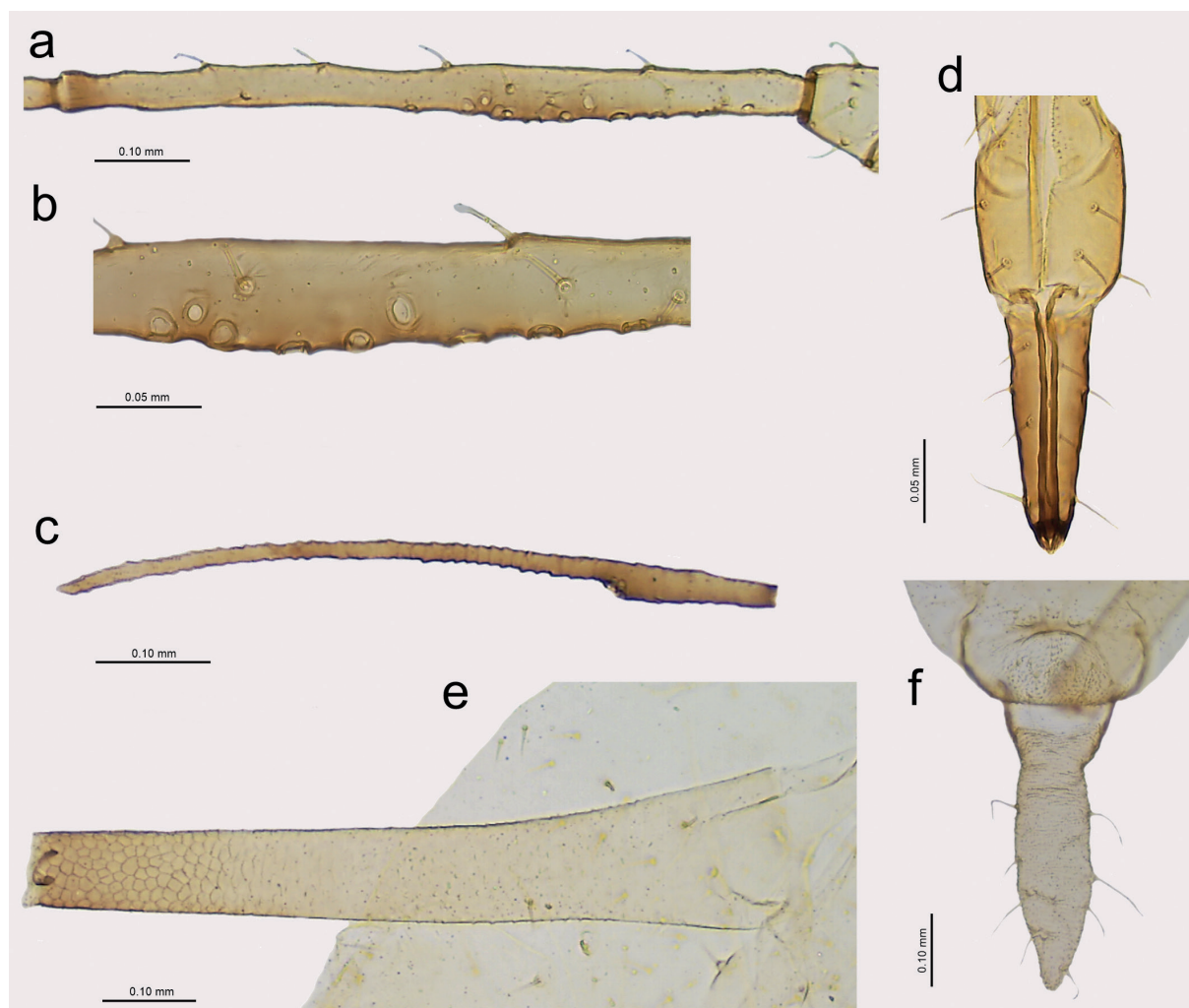


Fig. 3. *Uroleucon (Lambersius) grindeliae* sp. nov., paratype, apterous viviparous female (NHMUK 010121474). **a.** ANT III. **b.** Secondary rhinaria on ANT III. **c.** ANT VI. **d.** Ultimate rostral (III–V) segments. **e.** Siphunculus. **f.** Cauda.

NHMUK 010121475 • 1 ♀ apterous viviparous, 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121477 • 3 ♀♀ apterous viviparous, 2 ♀♀ alate viviparous; same collection data as for holotype; DZUS 010121479 • 1 ♀ apterous, 1 ♀ alate viviparous; same collection data as for holotype; NHMUK 010121480.

Description

Apterous viviparous female (n = 12)

COLOR IN LIFE. Unknown.

PIGMENTATION OF CLEARED SPECIMENS ON SLIDE. Body generally yellow to pale brown; ANT yellow with light brown ANT III (very basal part pale) or ANT yellow with darker apices of ANT III–V; coxae and trochanters pale; femora of legs yellow with very distal part light brown or uniformly yellow; tibiae yellow to light brown with slightly darker distal ends; tarsi light brown; SIPH pale to yellow with darker distal half; cauda pale (Fig. 1b).

MORPHOMETRIC CHARACTERS. HW $0.20\text{--}0.25 \times \text{ANT}$. Head with thick, rigid setae with flat or narrowly capitate apices, $0.035\text{--}0.049$ mm long. ANT tubercles each with 3 setae. ANT $0.82\text{--}0.96 \times \text{BL}$. ANT III with 7–16 rounded secondary rhinaria of different sizes with sclerotized rims (Fig. 3a–b), ANT IV longer than ANT V. PT $3.31\text{--}3.61 \times \text{BASE}$ (Fig. 3c). Other antennal ratios: VI:III $0.90\text{--}1.18$, V:III $0.57\text{--}0.66$, IV:III $0.65\text{--}0.72$, PT:III $0.70\text{--}0.92$, PT:IV $1.07\text{--}1.35$ and PT:V $1.22\text{--}1.35$. ANT chaetotaxy: ANT bearing thick, rigid setae with blunt or narrow capitate apices. ANT III setae $0.020\text{--}0.042$ mm long, LS ANT III $1.00\text{--}1.20 \times \text{BD III}$. ANT I with 4–6, ANT II with 3–4, ANT III with 12–15, ANT IV with 6–10 and ANT V with 5–8 setae. ANT VI with 3–4 basal, 3–4 apical and 3–5 setae on PT. Rostrum reaching hind coxae. URS $0.22\text{--}0.31 \times \text{ANT III}$, $0.23\text{--}0.30 \times \text{ANT VI}$, $0.29\text{--}0.38 \times \text{PT}$, $1.03\text{--}1.37 \times \text{BASE}$ and $1.19\text{--}1.37 \times \text{HT II}$ with 6–9 short, fine, pointed accessory setae (Fig. 3d). Mesosternal furca fused, wide, T-shaped. Hind femora bearing medium length, thick, rigid setae with narrow capitate or slightly pointed setae, $0.020\text{--}0.040$ mm long. Hind tibiae bearing thick, rigid setae with mostly slightly pointed or blunt, shorter than width of tibiae, $0.025\text{--}0.050$ mm long. HT I with 5:5:5 setae, HT II $0.18\text{--}0.23 \times \text{ANT III}$, $0.18\text{--}0.21 \times \text{ANT VI}$, $0.23\text{--}0.27 \times \text{PT}$ and $0.80\text{--}1.00 \times \text{BASE}$. SIPH subcylindrical, slightly tapering, straight with distinct zone of subapical reticulation and without a flange (Fig. 3e). Reticulated zone $0.27\text{--}0.31 \times \text{SIPH}$. SIPH $1.37\text{--}1.77 \times \text{cauda}$, $0.24\text{--}0.30 \times \text{BL}$ and $1.08\text{--}1.33 \times \text{ANT III}$. Abdomen membranous with medium length, thick rigid setae with narrowly capitate or blunt apices, $0.035\text{--}0.045$ mm long on ABD I–V and $0.035\text{--}0.050$ mm long on ABD VI–VIII. ABD VIII with 4 setae. Scleroites on setal bases absent on ABD I–V, while setae on ABD VI–VIII arising from very poorly visible, rounded and pale scleroites. Genital plate with two anterior setae longer than others, 7–10 posterior setae. Cauda tongue-shaped with evident constriction near base, $1.55\text{--}2.52 \times \text{its width at base}$ and $0.14\text{--}0.19 \times \text{BL}$, with 9–12 long and fine setae (Fig. 3f).

Alate viviparous female (n = 11)

COLOR IN LIFE. Unknown.

PIGMENTATION OF CLEARED SPECIMENS ON SLIDE. Head and thorax slightly sclerotized, pale to pale yellow; ANT yellow with light brown ANT III (except base) and brown basal part of ANT IV; coxae and trochanters pale; femora of legs yellow with very distal ends light; tibiae brown with paler middle section; tarsi yellow to light brown; SIPH yellow to brown with paler bases; cauda pale (Fig. 1c).

MORPHOMETRIC CHARACTERS. HW $0.18\text{--}0.20 \times \text{ANT}$. Head with thick rigid setae with blunt or narrow capitate apices, $0.020\text{--}0.035$ mm long. ANT tubercles each with 2–4 setae. ANT $0.81\text{--}1.13 \times \text{BL}$. ANT III with 20–26 rounded secondary rhinaria of different sizes with sclerotized rims, ANT IV longer than ANT V. PT $3.33\text{--}3.83 \times \text{BASE}$. Other antennal ratios: VI:III $0.89\text{--}1.09$, V:III $0.62\text{--}0.68$, IV:III 0.65--

0.76, PT:III 0.70–0.84, PT:IV 1.06–1.11 and PT:V 1.09–1.22. ANT bearing medium length thick and rigid setae with blunt or narrowly capitate apices. ANT III setae 0.020–0.040 mm long, LS ANT III 0.94–1.33 \times BD III. ANT I with 5–6, ANT II with 3–4, ANT III with 12–16, ANT IV with 7–10, ANT V with 7–8 setae. ANT VI with 3–4 basal, 4–5 apical and 3–4 setae on PT. Rostrum reaching mesosternum. URS 0.23–0.26 \times ANT III, 0.23–0.28 \times ANT VI, 0.31–0.35 \times PT, 1.03–1.37 \times BASE and 1.29–1.41 \times HT II with 7–9 fine-pointed accessory setae. Hind femora bearing medium length, thick rigid setae with narrowly capitate or slightly pointed setae, 0.020–0.037 mm long. Hind tibiae bearing thick, rigid setae with most slightly pointed or blunt, shorter than width of tibiae, 0.025–0.050 mm long. HT I with 5:5:5 setae, HT II 0.17–0.19 \times ANT III, 0.18–0.20 \times ANT VI, 0.23–0.25 \times PT and 0.78–0.97 \times BASE. SIPH subcylindrical, slightly tapering, straight with distinct zone of subapical reticulation and without a flange. Reticulated zone 0.32–0.40 \times SIPH. SIPH 1.55–1.71 \times cauda, 0.22–0.29 \times BL and 0.89–1.00 \times ANT III. Abdomen membranous with medium length thick, rigid setae with narrowly capitate or blunt apices, 0.025–0.045 mm long on ABD I–V and 0.030–0.052 mm long on ABD VI–VIII. ABD VIII with 4 setae. Scleroites on setal bases absent on ABD I–V, while setae on ABD VI–VII arising from very poorly visible, rounded scleroites. Genital plate with two anterior setae longer than others, 8–10 posterior setae. Cauda tongue-shaped with evident constriction near base, 1.95–2.92 \times its width at base and 0.12–0.18 \times BL with 9–12 long, fine setae.

Remarks

Of the six *Grindelia*-feeding aphids of *Uroleucon*, only *U. penderum*, *U. robinsoni* sp. nov. and *U. grindeliae* sp. nov. have shared characters: (1) ANT III has the majority of the secondary rhinaria on the basal half, (2) their URS/HT II ratio is 1.15 or more and (3) the coxae and trochanters are pale (Robinson 1986; Blackman & Eastop 2020).

The apterous viviparous females of *U. grindeliae* sp. nov. differ from the same morphs of *U. penderum* and *U. robinsoni* sp. nov. in the following characters: (1) their ANT PT/BASE ratio is 3.31–3.58 in *U. grindeliae*, while it is 3.6–6.5 in *U. penderum* and *U. robinsoni* and (2) their ANT PT/CAUDA ratio is 1.00–1.20 in *U. grindeliae*, while it is 1.5–2.0 in *U. penderum* and *U. robinsoni* (Blackman & Eastop 2020).

Biology and distribution

Representatives of this species live on *Grindelia hirsutula* in Oregon, USA. Other morphs and the life cycle of the new species are unknown.

Discussion

The subgenus *Lambersius* is a Nearctic group of yellowish-green or green aphids that have a pale cauda and dark siphunculi with pale or almost pale bases or completely pale siphunculi (Robinson 1986; Heie 1995; Nieto Nafria *et al.* 2007). Robinson (1986) prepared an annotated list of the species of *Lambersius* that are known north of Mexico in North America, provided a key for 29 species and described seven new taxa. At present, 26 species of the subgenus *Lambersius* have been reported from the USA (Blackman & Eastop 2020).

There are six species of *Uroleucon* living on *Grindelia* spp. in North and South America: *Uroleucon* (*Uroleucon*) *brevisiphon* de Carvalho, 1998 on *Baccharis* L. spp. and *Grindelia* sp. in Chile; *Uroleucon* (*Uroleucon*) *chani* Robinson, 1985 on *Grindelia hirsutula* and *Gnaphalium* L. sp. in Canada and Mexico; oligophagous *Uroleucon* (*Lambersius*) *erigeronense* (Thomas, 1878) on *Grindelia* in the USA; *Uroleucon* (*Lambersius*) *payuniense* Ortego & Nieto Nafria, 2007 on *Grindelia chiloensis* (Cornel.) Cabrera in Argentina; *Uroleucon* (*Lambersius*) *penderum* on *Grindelia integrifolia* DC., *Grindelia* sp. and *Heterotheca inuloides* Cass. in Canada, the USA and Mexico and *Uroleucon* (*Lambersius*) *richardsi*

(Robinson, 1964) on *Grindelia* spp. and *Viguiera* Kunth sp. in Canada, the USA and Mexico (Robinson 1964, 1985, 1986; Nieto Nafria *et al.* 2007, 2011, 2019; Jensen *et al.* 2010; Blackman & Eastop 2020).

The apterous viviparous females of *U. brevisiphon* and *U. chani* have a completely dark SIPH and pale cauda and belong to the subgenus *Uroleucon*, while the remaining four species have dark siphunculi with pale or almost pale bases or completely pale siphunculi, pale coxae and trochanters and belong to the subgenus *Lambersius*. *Uroleucon brevisiphon* is listed in square brackets in the list of *Grindelia*-associated aphids as a dubious record (Blackman & Eastop 2020). Two *Grindelia*-feeding species fit the diagnosis of the genus *Uroleucon* well and are members of the genus *Lambersius* based on the pigmentation of the siphunculi, coxae and trochanters. After our investigation, the number of species of *Lambersius* increased from 53 to 55 species. It would be interesting to conduct combined morphological, morphometric and molecular (DNA barcoding) investigations of species of the subgenus *Lambersius* in the future.

Key to the apterae of *Uroleucon* on *Grindelia* spp.

Note: the key is modified from that of Blackman & Eastop (2020)

7. SIPH entirely dark *Uroleucon chani* Robinson, 1985
 – SIPH pale, at least on basal part (Figs 2e, 3e) 8
8. ANT III with 12–31 rhinaria extending to 0.80–0.98 from base with majority on distal half
 *Uroleucon richardsi* (Robinson, 1964)
 – ANT III with 5–26 rhinaria extending to 0.4–0.8 from base with majority on the basal half (Figs 2a, 3a) 9
- 9 R IV+V $0.9–1.2 \times$ HT II, with 6–10 accessory hairs. SIPH $1.85–2.5 \times$ cauda. ANT PT/BASE 3.2–5.7 10
 – R IV+V $1.15–1.5 \times$ HT II with 7–13 accessory hairs (Figs 2d, 3d). SIPH $1.5–2.6 \times$ cauda. ANT PT/BASE 3.0–5.2 11
10. Siphunculi pale at base, dark over most of their length. Distal caudal hairs usually short and blunt or capitate. Dorsal cephalic hairs 18–35 μ m long *Uroleucon erigeronense* (Thomas, 1878)
 – Siphunculi pale. Distal caudal hairs pointed. Dorsal cephalic hairs 45–55 μ m long
 *Uroleucon payuniense* Ortego & Nieto Nafria, 2007
11. ANT PT/BASE 3.31–3.58. ANT PT $1.0–1.2 \times$ cauda .. *Uroleucon (Lambersius) grindeliae* sp. nov.
 – ANT PT/BASE 3.6–5.2. ANT PT $1.5–2.0 \times$ cauda 12
12. SIPH $2.30–2.68 \times$ cauda. R IV+V $1.18–1.25 \times$ HT II. Tibiae dusky/dark for most of their length (Fig. 1a) *Uroleucon (Lambersius) robinsoni* sp. nov.
 – SIPH $1.65–1.95 \times$ cauda. R IV+V $1.3–1.6 \times$ HT II. Tibiae pale except at apices
 *Uroleucon penderum* Robinson, 1986

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