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NEW AND LITTLE KNOWN APHIDS FROM MEXICO. 8TH NOTE*: A NEW *CINARA* (HOMOPTERA: APHIDIDAE) LIVING ON *PINUS* WITH A REDESCRIPTION OF *CINARA LOUISIANENSIS* BOUDREAUX

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Abstract.—Two of the many species of *Cinara* collected in Mexico are discussed and illustrated. *C. louisianensis* Boudreaux is redescribed with comments on its status relative to *C. idahoensis* Knowlton and compared with *C. tujafilina* with which it shares the rare character of pale femorotibial joints. *C. brevipilosa* n. sp. is described and distinguished from the morphologically similar *C. glabra* Gillette and Palmer.

Aphids in the genus *Cinara* feed strictly on conifers in Pinaceae and Cupressaceae. They have been found throughout the world where conifers are native (generally the northern hemisphere) and more recently in the southern hemisphere where extensive plantations of conifers have been established for the forest industry. These aphids are relatively large, often with long mouthparts, and feed on twigs, cones, trunks and roots of their hosts. About 175 species are known to occur in North America north of Mexico and, since Mexico not only shares common coniferous species with the United States as well as having its own distinct set of conifers, it would be expected that many species known in the United States might be found there as well as new species. Over the past few years the authors have made many collections of *Cinara* in Mexico. Unfortunately not all could be determined to species primarily because of limited information on the variability within named species. The two species treated in this paper are distinct enough to warrant discussion. One is a new record for Mexico and matches a poorly known aphid previously found only in southeastern United States, the other is a new species.

Cinara louisianensis Boudreaux 1948

Figs. 1A–B, 2

Eastop and Hille Ris Lambers (1976) relegated this species without comment to a new, junior synonym of *C. idahoensis* Knowlton (1935) (see discussion). With

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* Remaudière, G. and F. W. Quednau 1985. Pucerons nouveaux et peu connus du Mexique. 7e note: Deux nouvelles espèces des genres *Myzocallis* et *Stegophylla* (Homoptera: Aphididae). Rev. Fr. Entomol. (N.S.) 7: 118–124.

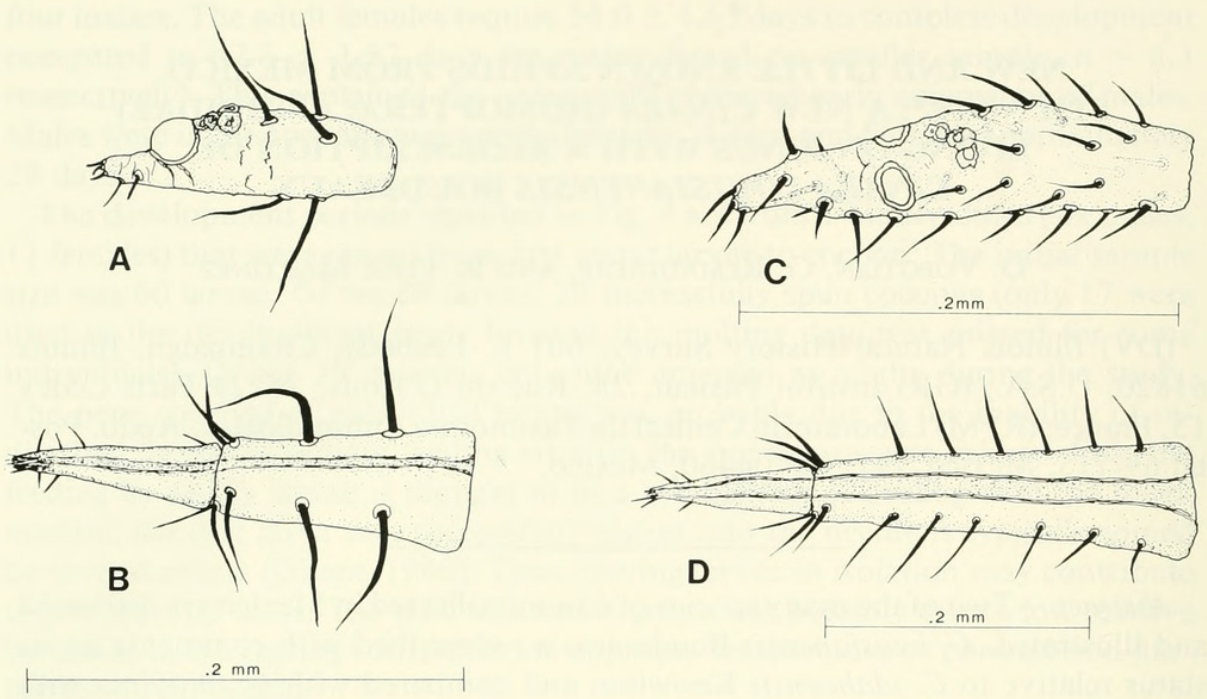

Fig. 1. *Cinara louisianensis.* A, Antennal segment VI. B, Ultimate rostral segment. *Cinara brevipilosa.* C, Antennal segment VI (note separation of satellite and primary sensoria). D, Ultimate rostral segment. Drawn by D. Voegtlin.

additional characters now used to discriminate among species of *Cinara,* a modern description of *C. louisianensis* is provided based on some paratypes and the specimens from Mexico.

Apterous viviparous females (described from 14 specimens).—*Color in life:* No information on the specimens from Mexico was recorded, but Boudreaux (1948) gives the following: "Apterous viviparae similar to alatae except that the first three antennal segments are lighter, the white powdery areas are scattered more widely over the abdomen and the thorax is green."

Color of mounted specimens: Entire body with little discernible sclerotization (Fig. 2A). Tip of antennal (IV), V, distal ½ of VI, rostral segments III–V, tip of tibiae, tarsi (Fig. 2D) and dorsal body setae darker than body; head, legs, siphunculi, cauda, anal, subgenital and spiracular plates, and intersegmental sclerotes slightly darker than body. Joint of femora and tibiae pale.

Morphology: Antennae about ⅓ length of body with 0–1 secondary sensoria on V, 0 on III and IV; rostrum about ⅖ of the body, ultimate rostral segment a little shorter (0.85–0.99) than the 2nd metatarsus. Mesosternum without tubercle. Cauda broadly triangular (Fig. 2H).

Chaetotaxy: Antennal setae stout, 5–6 on II, 11–16 on III (longest 51–86 μm), 6 on base of VI, 2 preapical setae on process terminalis (Fig. 1A); rostral IV with 4 accessory setae (Fig. 1B). Tibiae with dorsal setae much stouter and longer (83–150 μm on metatibia) than those on other sides (Fig. 2G). Dorsal setae on each abdominal segment more or less distributed in two irregular lines, varied in size and shape, from short and fine to long, stout spine-like, the longest often on pale scleroites approximately 5× diameter of base of seta; tergite V with 24–36 setae (the longest 61–102 μm), VIII with 8–13 (length 120–140 μm); siphuncular setae

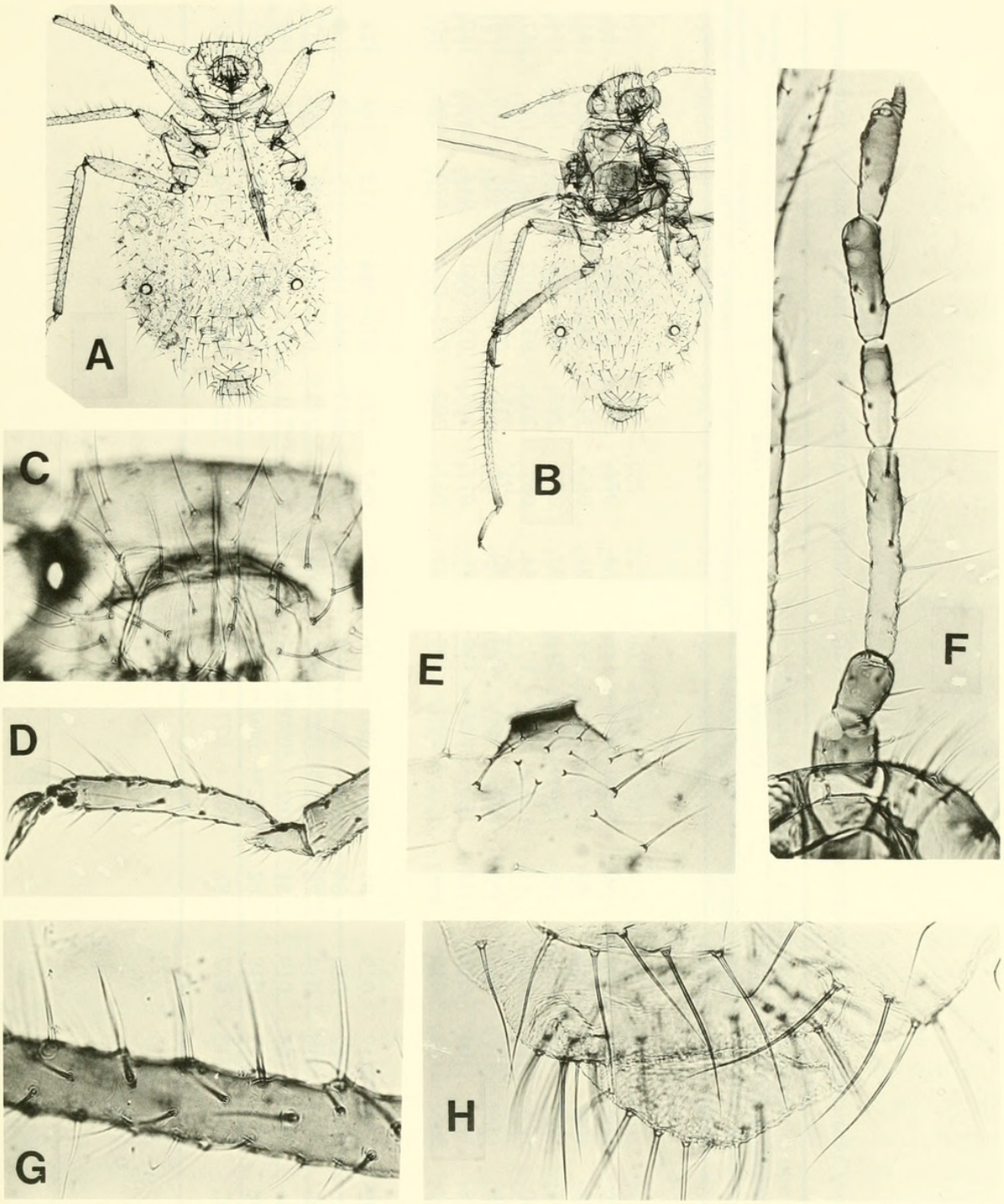

Fig. 2. *Cinara louisianensis.* A, Apterous viviparous female. B, Alate viviparous female. C, Vertex and front of head of aptera. D, First and second segments of metatarsus of aptera. E, Siphuncular cone of aptera. F, Antenna of alate. G, Section of metatibia of aptera. H, Tergite eight and cauda of aptera. Photography by G. Remaudière.

distributed evenly over cone, of uniform shape, but increasing in length near base (Fig. 2E); cauda with 5–6 stout setae plus 4–6 much smaller and finer ones; subgenital plate with about 20 setae. Ventral abdominal setae fine, of near uniform size and shape throughout.

Measurements: Table 1.

Alate viviparous female (described from 34 specimens).

Color in life: No notes made from Mexican material. Boudreaux (1948) gives

Table 1. Morphometric data on *Cinara louisianensis* and *C. brevipilosa*. All measurements are in millimeters; nm means the character could not be measured.

Specimen	Length of: Body	Antennal III	Antennal IV	Antennal V	Antennal VI b	Antennal VI pt	Ultimate Rostrum[a]	Ultimate Rostral Segment[b]	Ultimate Metatibia	Tarsal I	Tarsal II	Setae on V	Longest Setae On: Antennal III	Longest Setae On: Metatibiae	Diameter of Siphuncular Cone
Cinara louisianensis Boudreaux															
Apterae															
07975-1b	1.67	.182	.096	.112	.099	.026	.80	.109 + .077 = .186	.84	.074	.218	.035–.093	.083	.125	.154
07975-4b	2.07	.166	.070	.109	.122	.022	.83	.118 + .077 = .195	.81	.067	.211	.026–.067	.051	.083	.141
07975-6tr	2.04	.186	.096	.122	.112	.022	.85	.128 + .083 = .211	.92	.077	.227	.048–.077	.080	.122	.134
07975-7l	1.84	.179	.090	.122	.106	.022	.81	.118 + .077 = .195	.84	.067	.205	.032–.102	.080	.141	.147
07975-9t	2.09	.186	.096	.115	.109	.022	.81	.125 + .080 = .205	.90	.074	.218	.032–.099	.086	.150	.144
L-245-46[c]	1.85	.171	.078	.114	.104	.018	1.07	.125 + .064 = .189	.79	.071	.207	.039–.061	.054	.090	.150
L-245-46[c]	1.89	.160	.102	.096	.102	.019	nm	.122 + .077 = .199	.77	.067	.202	.051–.074	.070	.096	.160
Alatae															
07975-2t	1.91	.208	.102	.115	.112	.019	.81	.096 + .080 = .176	.92	.067	.221	.070–.086	.112	.144	.128
07975-4bl	2.40	.250	.115	.134	.122	.022	.86	.118 + .086 = .204	1.29	.077	.243	.086–.112	.115	.202	.160
07975-8tl	1.96	.205	.109	.115	.115	.019	.78	.102 + .077 = .179	1.03	nm	.218	.058–.090	.106	.163	.102
07975-8br	1.91	.192	.106	.119	.106	.019	.81	.102 + .080 = .182	1.01	.067	.221	.067–.109	.106	.179	.102
07975-2b	1.92	.198	.096	.115	.112	.019	.82	.102 + .080 = .182	1.01	.074	.224	.074–.096	.093	.192	.096
L-245-46[c]	1.81	.218	.102	.115	.112	.022	.88	.102 + .077 = .179	1.05	.067	.205	.067–.096	.083	.173	.141

Table 1. Continued.

Specimen	Length of: Body	Antennal III	Antennal IV	Antennal V	Antennal VI b	Antennal VI pt	Ultimate Rostrum[a]	Ultimate Rostral Segment[b]	Ultimate Metatibia	Tarsal I	Tarsal II	Setae on V	Longest Setae On: Antennal III	Longest Setae On: Metatibiae	Diameter of Siphuncular Cone
Cinara brevipilosa Voegtlin, Remaudière and Peña															
Apterae															
283-1[d]	3.25	.403	.122	.179	.160	.060	1.85	.288 + .134 = .422	1.63	.134	.298	<.009	.058	.064	.147
283-2	3.03	.422	.134	.186	.160	.064	1.89	.275 + .134 = .422	1.72	.134	.304	<.006	.048	.048	.154
283-3tr	2.93	.416	.160	.198	.166	.070	1.82	.275 + .128 = .403	1.56	.125	.288	<.006	.061	.074	.141
283-3tl	2.64	.384	.122	.160	.147	.058	1.76	.262 + .115 = .377	1.52	.125	.282	<.006	.048	.051	.128
283-8	3.19	.416	.147	.192	.160	.064	1.89	.282 + .134 = .416	1.61	.128	.294	<.009	.054	.058	.134
283-4	2.07	.230	.083	.141	.128	.070	1.61	.288 + .109 = .397	.86	.102	.243	<.009	.048	.045	.109
283-10	3.52	.410	.128	.186	.154	.064	1.94	.288 + .128 = .416	1.62	.134	.288	<.009	.064	.060	.160
283-7l	3.19	.365	.134	.173	.141	.051	1.81	.262 + .128 = .390	1.52	.125	.262	<.009	.048	.058	.154
Alatae															
283-9[e]	3.19	.454	.160	.198	.160	.064	1.89	.262 + .134 = .396	1.74	.122	.294	<.006	.054	.070	.154

[a] Rostrum measurement is taken as defined by Bradley (1962).
[b] Ultimate rostral segment used here and in text as a combination of segments IV and V.
[c] Paratype specimens.
[d] Holotype.
[e] Morphotype.

the following: "Alate viviparae green; head dusky green; eyes black; ocelli black-bordered; antennae dusky black, with bases of segments paler; head powdery below; rostrum green, tinged with dusky, black at tip. Thorax dull green to dusky black, brown between lobes; coxae green, femora green at base, becoming dusky brown at apex; tibiae lightly infuscated, dark at tips; tarsi similar in color to tibiae. Abdomen dark green with transverse powdery areas behind cornicles; cornicles light brown; cauda and anal plate lightly infuscated."

Color of mounted specimen: As in apterae (Fig. 2B), but head more sclerotized, with lateral ocelli surrounded by a dark zone (Fig. 2C), antennal I, II distal ⅓ of III, ½ of IV and V, and ⅔ of VI light brown (Fig. 2F), intersegmental scleroites more distinctly pigmented than in apterae; subgenital and spiracular plates darker than siphunculi; wings with subcostal vein and pterostigma dusky; joint area between femora and tibiae pale.

Morphology: Antennae with 1–3 secondary sensoria on III, (never 0, 1 in 9%, 2 in 68%, 3 in 23% of 68 antennae examined), 0–1 on IV (1 in 94%), 0–1 on V (1 in 50%); rostrum as in apterae but with lower ratio IV/V: 1.20–1.36. Internal side of lateral mesonotal lobes provided with an area slightly granulose, distinct in most sclerotized specimens. Media of fore wings poorly marked, with either 2 or 3 branches (in the latter, the 2nd fork is near the distal wing edge); among 24 specimens, 7 have 3-3 branches on their medias, 15 have 3-2 branches, and only 2 have 2-2 branches: of 48 wings examined, 40% have only 1 fork in the media.

Chaetotaxy: Similar to apterae, but setae a little longer and finer (less spine-like): longest setae on antennal III, 83–115 μm (Fig. 2F); on tibia III, 144–202 μm; on tergite V, 86–112 μm; on tergite VIII, 115–172 μm. Abdominal setae fewer than apterae: 19–24 on tergite V, 9–12 on tergite VIII, none standing on scleroites.

Measurements: Table 1.

First Instar Nymphs (described from 2 specimens).—Body length 1.0–1.1. Antennae 4 segmented (0.37–0.40); rostrum reaching the 5th abdominal tergite, about ½ of the body length with ultimate rostral segment (0.20) 1.3 times longer than the 2nd joint of tarsus III and the ratio of IV/V = 1.5–1.6. Siphuncular cones pigmented, without setae, much lower than their basal diameter.

Chaetotaxy: Antennal segments bearing, respectively, 3 hairs on I and II, 10–12 on III, 5 on VI base, and 2 preapical setae on the conical process terminalis; vertex with about 8–9 pairs of strong setae (35–40 μm); rostral segment IV with 4 accessory setae. Dorsal abdominal setae distributed as follows: 2 spinal pairs of spine-like setae (20–45 μm), the longest ones on pigmented scleroites, accompanied with a few (0–3) shorter additional setae, and in the pleuro-marginal area 3–5 pairs of medium-sized setae; tergite VIII with 8–9 longer setae (90–100 μm) grouped on 2 slightly pigmented band-like sclerites. All 1st tarsal joints with 2 fine setae.

Diagnosis.—*Cinara louisianensis* and *C. tujafilina* (del Guercio) are the only species feeding on Cupressaceae that have pale femorotibial joints. *C. tujafilina* is larger than *C. louisianensis* (about 3 mm compared with about 2 mm) and is distinguishable by sclerotization and setae. Apterae of *C. tujafilina* have 1 pair of sclerites on each thoracic segment; the apex of tibiae and tarsi, siphunculi, intersegmental scleroites, and paired sclerites on tergite VIII are quite dark; and alatae have the thorax and apex of femora very dark. Setal shape, length and number

(all are fine, never spine-like), are more numerous and longer than *C. louisianensis.* Additional characters for distinguishing between these two species are presented in Table 2.

Material examined.—Three paratype slides of *C. louisianensis*; 32 slides containing 14 apterae, 34 alatae and 11 nymphs taken on *Cupressus* sp., Mexico, D.F., 2230 m, Mexico, 3-IX-1982, A. L. Muñoz.

Discussion.—We have not been able to locate the holotype nor any specimens of the type series of *idahoensis.* Although Eastop and Hille Ris Lambers synonymized *louisianensis* with *idahoensis,* neither had seen any specimens of the Knowlton material (pers. comm., V. F. Eastop) and based their decision on measurements provided in the descriptions. We believe that *C. idahoensis* is not the same species as *C. louisianensis* for the following reasons. The illustrations in Knowlton (1935) seem to concern two distinct species: the antenna of the alate form (fig. 7) has only a few short setae on III and that of the apterous form (fig. 10) has many long setae on the same segment. Palmer (1952) examined a cotype aptera and wrote "indistinguishable from *winonkae*" (now considered a synonym of *tujafilina*), thus confirming the long antennal setae of this last form. Also, Knowlton's (1935) description of *C. idahoensis* ("alate with cauda and anal plate blackish, apterous with cornicles dusky to black") differs from that of *C. louisianensis* with its pale siphunculi, cauda and anal plate. Finally, Knowlton (1935) quoted for *idahoensis,* "0 secondary sensoria on antennal III of alatae." In our 34 alatae of *louisianensis,* none have 0 sensoria on III and only 8 antennae have a single sensorium on this segment. The most common number was 2.

Cinara brevipilosa New Species

Figs. 1C–D, 3

Apterous viviparous females (described from 14 specimens).—*Color in life:* No color notes made on living material.

Color of mounted specimens: Head medium to dark amber; antennal segments I, II and III slightly lighter than head, apex of (IV), V and whole of VI dark to almost black; rostrum with scleroites on the median part of II, apex of II and ultimate rostral segment dark to black. Pronotum uniformly sclerotized, mesonotum with 2 pairs of spinopleural sclerites, metanotum with a single pair; coxae, trochanters, proximal $\frac{1}{5}$–$\frac{1}{3}$ of femora pale, apical part of femora gradually darker to tip; proximal joint of tibiae dark, then a pale region of approximately $\frac{1}{5}$ length followed by a gradual darkening to the tip which is as dark as the tarsus (Fig. 3A). Dorsum of abdomen, dominated by a large dark central sclerite (Fig. 3B) extending from tergite IV–VII and often joined to paired sclerites on III; this dorsal sclerite does not include the siphunculi nor the marginal area; tergite VIII with a sclerotized band extending laterally to the venter (Fig. 3E); subgenital plate incised anteriorly and posteriorly; abdomen with 4 pairs of black intersegmental scleroites ventrally.

Morphology: Antennae about $\frac{1}{3}$–$\frac{2}{5}$ length of body; with 0 secondary sensoria on III, 0 on IV and 0–1 on V; satellite sensoria on VI not adpressed around the primary sensorium (Fig. 1C); rostrum 0.55–0.62 length of body (exceptionally .078 in a small specimen), ultimate rostral segment 1.3–1.7 times the 2nd metatarsus, ratio IV/V = 1.9–2.6 (Fig. 1D). Mesosternum without tubercle. Siphuncular cones short (Fig. 3F). Cauda broadly rounded (Fig. 3B).

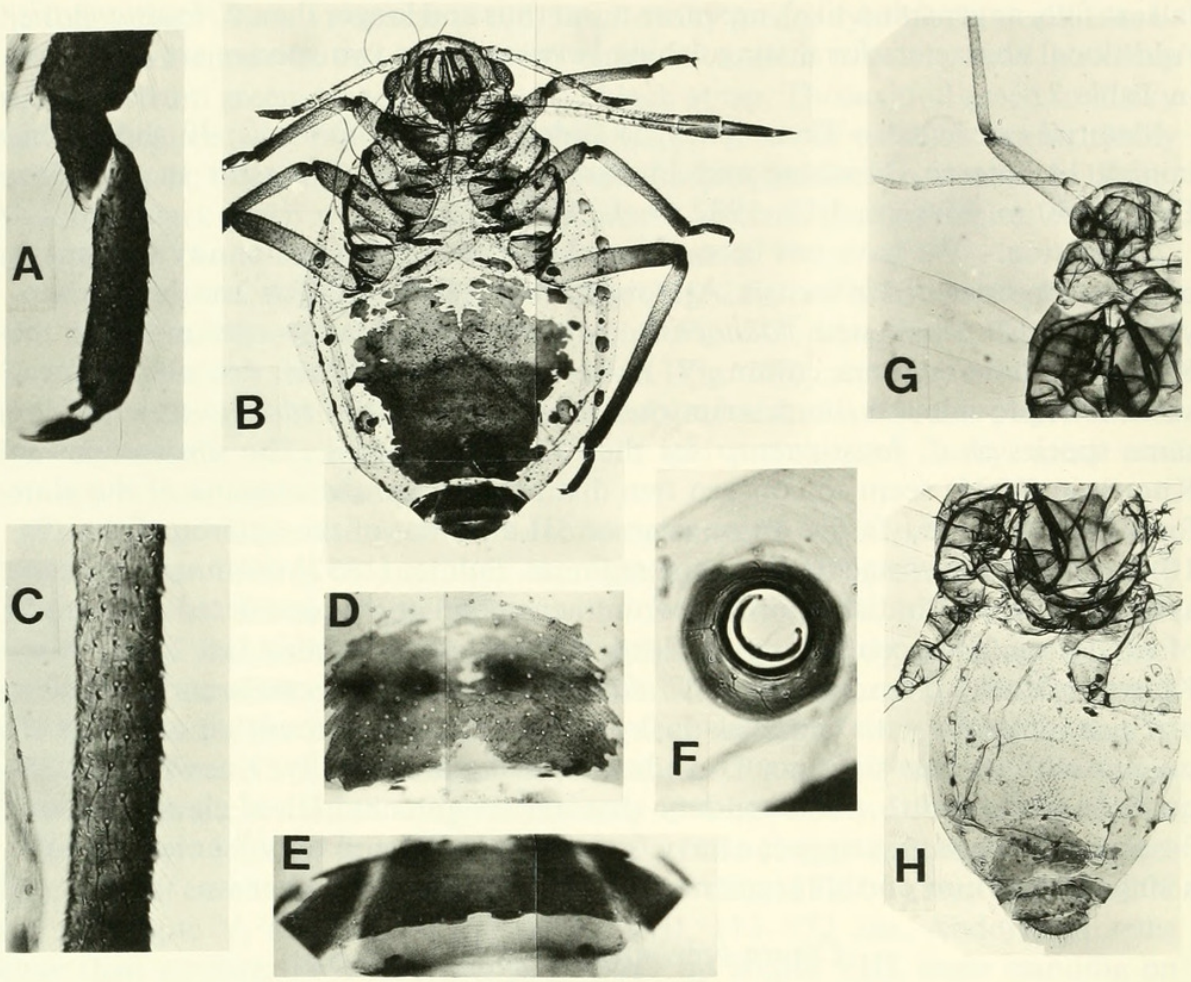

Fig. 3. *Cinara brevipilosa.* A, First and second segments of metatarsus of aptera. B, Apterous viviparous female showing extensive sclerotic plate on dorsum of abdomen. C, Section of metatibia of aptera. D, Subgenital plate of aptera. E, Wide sclerotized band on tergite eight of aptera. G, Head and antenna of alate. H, Pterothorax and abdomen of alate. Photography by G. Remaudière.

Chaetotaxy: Antennae with 8–12 setae on II, 22–29 on base of VI and 6–8 preapical setae on process terminalis (one with 3); rostral segment IV with 11–15 accessory setae (often 7 pairs) along sides of stylet groove (Fig. 1D); dorsocephalic setae very short (7–8 μm) and with parallel sides. Dorsal setae on thorax and abdomen I–VIII short or shorter than on head, those located on membranous areas are each on a small pigmented scleroite; tergite V with 41–54 setae; siphuncular setae fine but rarely exceeding 40μm, scattered over the upper half of cone, in some specimens some additional very short setae are located on base of cones; tergite VIII with 26–35 setae, those of the center short (15–20 μm), lateral ones longer (up to 80 μm) and finer, subgenital plate with 90–100 setae (Fig. 2E) (one specimen with 66); ventral abdominal setae long (55–70 μm) with acute tip. Setae on tibiae are at 30–60 degrees, similar all around the tibiae and shorter (60–70 μm) than diameter of tibia, with a very fine and hardly distinguishable apex (Fig. 3C).

Measurements: Table 1.

Alate viviparous female (described from one specimen).—*Color of mounted specimen:* Figs. 3G, H. The single available specimen appears slightly teneral.

Table 2. A comparison between *C. louisianensis* and *C. tujafilina*, the only two species feeding on Cupressaceae that have pale femortibial joints.

	Apterae		Alatae	
	C. louisianensis	*C. tujafilina*[a]	*C. louisianensis*	*C. tujafilina*[a]
Number of setae on:				
Antennal segm. VIb	4–6	8–14	4–6	9–13
Process terminalis (subapical)	(1) 2	3	(1) 2	(3) 4
IVth rostral segm. (accessory)	4	5–8	3–5	4–8
Abd. tergite V	24–36	50–70	19–24	38–60
Abd. tergite VIII	8–13	19–26	9–12	17–24
Maximum length of setae on:				
Antennal segm. III	.051–.086	.120–.140	.093–.115	.130–.160
Abd. tergite V	.061–.102	.100–.150	.086–.121	.140–.180
Abd. tergite VIII	.140–.140	.150–.190	.115–.172	.160–.200
Ratio rostral segm. IV/V	1.40–1.58	1.80–2.00	1.20–1.36	1.65–1.85
Secondary sensoria on:				
Antennal segm. III	0	0	1–3 (4)	2–8
Antennal segm. IV	0	(0) 1–2 (3)	(0) 1	1–2
Antennal segm. V	0–1	(0) 1 (2)	0–1	(0) 1

[a] Data for *C. tujafilina* taken from Eastop (1972).

Head and pterothorax dark, prothorax lighter. Abdomen lacking large central sclerite of apterae, only tergite VII with irregularly shaped sclerites (Fig. 3H); tergite VIII with sclerotic band extending laterally to venter as in apterae. Siphuncular cones and appendages patterned as in apterae.

Morphology and Chaetotaxy: Antennae with 5–7 secondary sensoria on III, 0 on IV and V. All dorso-abdominal setae with very small sclerites at their base. Subgenital plate with over 100 setae evenly distributed over the entire plate. Other characters similar to those described for apterae.

Measurements: Table 1.

Diagnosis.—Three other species of *Cinara* in North America have a large dorsal sclerite on the abdomen: *Cinara osborni* Knowlton (1942), which lives on *Pseudotsuga menziesii* (Mirb.) Franco; *Cinara canatra* Hottes and Bradley (1953), on *Pinus contorta* Dougl. ex Loud. and *P. banksiana* Lamb; and *Cinara glabra* Gillette and Palmer (1924), on *Pinus ponderosa* Dougl. ex P. & C. Lawson.

Cinara osborni has the entire dorsum sclerotized including the siphuncular cones (not included in *brevipilosa*); ultimate rostral segment much shorter (0.7) than 2nd metatarsus (much longer 1.3–1.7 in *brevipilosa*); siphuncular cones bearing some long setae interspersed with more numerous short, fine setae (only a few fine setae in *brevipilosa*); body setae abundant and long, 80–95 μm against 6–10 μm in *brevipilosa.*

Cinara canatra also has the siphuncular cones included in a large sclerite which is less extensive than the sclerite in *osborni.*

In *glabra,* the dorsal abdominal sclerite does not include the siphuncular cones but is usually wider than in *brevipilosa,* extending laterally past the muscle attachment plates, whereas the sclerite in *brevipilosa* is limited to the region delin-

eated by the muscle attachment plates (Fig. 2B). The two species are very similar morphologically. Using the key to *Cinara* in Palmer (1952), *brevipilosa* runs to *glabra*. Besides their different extension of the dorsal shield, the two *Cinara* can be easily discriminated by setal density as follows. Numbers for *brevipilosa* followed by those for *glabra*. Number of setae on: base of antenna VI 22–29, 11–13; process terminalis (3) 6–8, 4–6; antennal II (8) 10–12, 6–9; .2 mm mid hind tibia 61–79, 30–40; tergite V 41–50, 24–34; subgenital plate (66) 93–108, 49–64; siphuncular cones 11–17, 13–27.

In most cases *brevipilosa* has more setae, except on the process terminalis and the siphuncular cones. The slightly larger sclerotized area of the siphuncular cones of *glabra* makes this difference.

Types.—Holotype apterous viviparous female on slide #283-1. Morphotype, alate viviparous female, slide 283-9. Paratypes, 14 apterous viviparae. Collection #283 taken by R. Peña/Garcia Calderon on *Pinus* sp., Timgambato, Michoacan, Mexico, 21-X-1981. Holotype deposited at the Illinois Natural History Survey. Paratypes are distributed in the collections of the coauthors' respective institutions and in the National Museum of Natural History (Washington), Canadian National Collection (Ottawa) and British Museum of Natural History (London).

Etymology.—The name is based on the very short dorsal abdominal setae.

Acknowledgments

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