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A NEW APHID ON GUAYULE AND NOTES ON OTHER SPECIES OF CEROSIPHA

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NATURAL SOURCES, HABITATS, AND RESERVOIRS OF INSECTS ASSOCIATED WITH STORED FOOD PRODUCTS

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A NEW APHID ON GUAYULE AND NOTES
ON OTHER SPECIES OF CEROSIPHA¹E. O. ESSIG^{2, 3}

ON JULY 13, 1942, during an investigation of insects attacking guayule, *Parthenium argentatum*, in the United States government nurseries at Salinas, California, W. H. Lange discovered on some slightly wilted seedlings, a new root-infesting species of aphid. In preparing the description of this insect, comparisons had to be made with other known species of the genus *Cerosipha* to which it belongs. Since there is some confusion concerning the relatively few species relegated to this genus, enough descriptive and illustrative material has been included to make possible ready recognition of all the members.

THE GUAYULE APHID

Cerosipha californica n. sp.

Lange found the aphids in small bark and root cavities made by wireworms and other insects. Frequently but a single specimen occupied such a cavity. A thorough search revealed relatively few aphids present and on young nursery stock only. So far no more have been found in the nurseries and none at all in the older field plantings. In all, only 1 alate and 4 apterous mature parthenogenetic females, 12 young, and 7 nymphs were collected on guayule.

In my collection there was also a single balsam slide mount containing 3 alates of a species taken on the leaves of French prune in the orchard of the University of California, Davis, on November 8, 1928. These alates were labeled *Cerosipha* sp. In order to study them better they were cleared and remounted in euparal, a single specimen to a slide. In all respects they appear to be identical with the single alate taken on guayule and are treated as paratypes of the species.

Additional specimens of this species were recently taken on the roots of potatoes at Bakersfield, California, on May 8, 1944, by Gordon L. Smith.

In checking over some mounted specimens collected by W. C. Look on tomato at the Waipaha School Gardens, Waipaha, Oahu, Territory of Hawaii, September 9, 1940, I find that three alate specimens provisionally determined as *Vesiculaphis caricis* (Full.) prove to be this species. An important variation in the wing venation is the frequent extension of the second fork of the media vein to almost the margin of the wings as in one specimen and its omission as

¹ Received for publication June 7, 1943.² Professor of Entomology and Entomologist in the Experiment Station.³ The drawings illustrating this paper were made by Mrs. Frieda Abernathy.

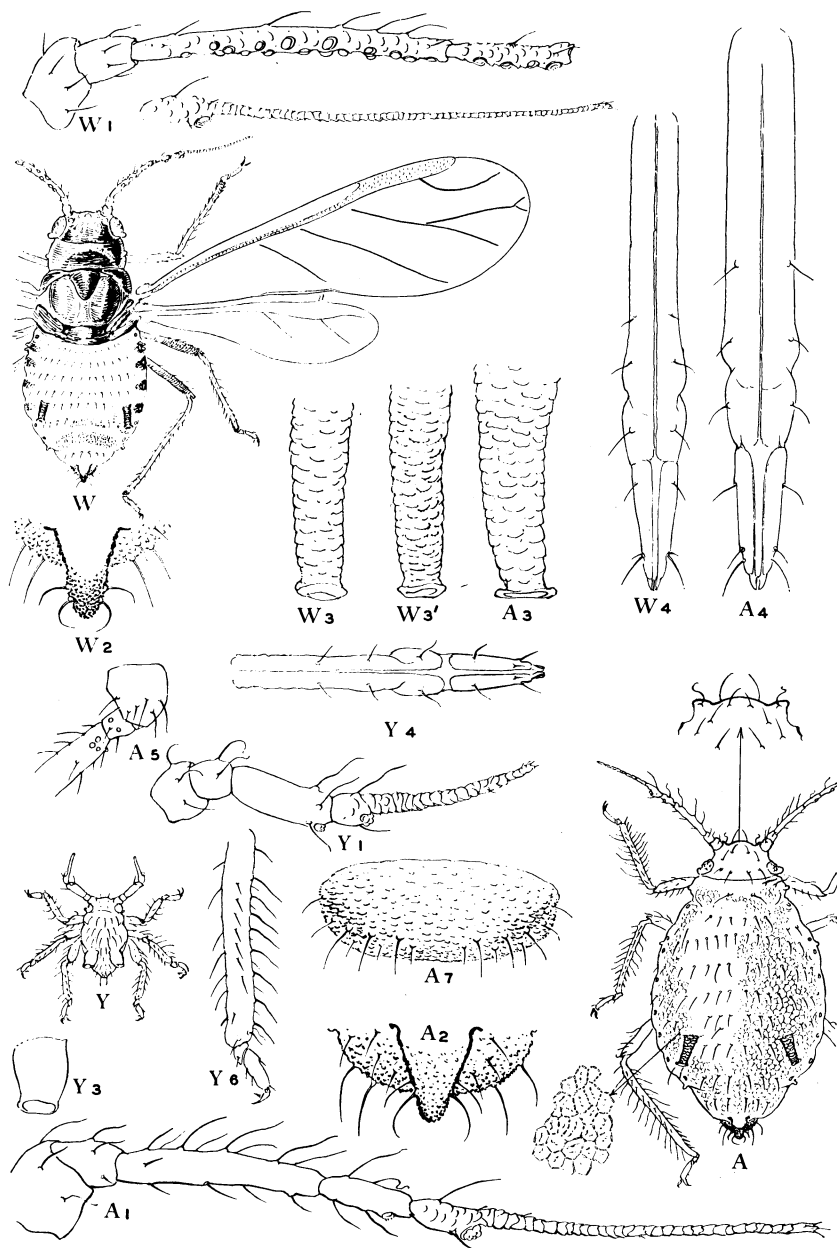


Fig. 1.—The guayule aphid, *Cerosipha californica* n. sp.: A , apterous viviparous females; W , winged or alate viviparous females; Y , young of first instar. 1, Antenna; 2, cauda; 3, cornicle (W_3 , on prune; W_3' , on guayule); 4, rostrum; 5, base of hind leg; 6, hind tibia and tarsus; 7, genital plate.

in the other two specimens. Variations of this sort are confusing and often lead to misidentification.

Color.—According to notes made by Lange, the living forms on the roots of guayule are dark grayish green, not greatly different from the general color of the bark and foliage of the host plant. Mounted specimens show the antennae, legs, cornicles, and cauda to be dusky. Other dark markings on the alates are shown in the accompanying drawings.

Winged Viviparous Female (fig. 1, *W*).—Length 1.8 mm; width 0.8 mm; length of antenna 1.05 mm (I, 0.08 mm; II, 0.05 mm; III, 0.33 mm; IV, 0.09 mm; V, 0.50 mm, the base being 0.10 mm and the filament 0.40 mm); length of forewing 2.50 mm. Body hairs rather fine and mostly curved. Hairs on the antennae may equal the width of the segments; those on the tibiae are stiffer and also nearly equal the width. A pair of small lateral tubercles are present on the prothorax; a double pair on abdominal segment II, and a single pair on segment VIII. Left member of antennal segment III with 18 and right member with 22 large circular secondary sensoria. These sensoria are distributed over most of the length in an irregular row. Left member of segment IV with 3 and right member with 2 large circular secondary sensoria. The permanent large sensoria on IV and V are conspicuously fringed with hairs. Rostrum somewhat blunt and with few short hairs, 0.48 mm long, and extending to the third coxae. Wings normal, with radial sector and second fork of media near tip. Cornicles dusky, cylindrical or slightly swollen with a constriction just before the well-developed distal flange, coarsely imbricated, 2.2 mm long. Cauda dusky, tapering gradually from the wide base to a blunt rounded tip, armed with 2 pairs of curved spines.

Apterous Viviparous Female (fig. 1, *A*).—Length of antenna 0.84 mm (I, 0.7 mm; II, 0.05 mm; III, 0.20 mm; IV, 0.09 mm; V, 0.43 mm, the base being 0.08 mm and the filament 0.35 mm). Body clothed with rather long fine spines or hairs, which are straight, slightly curved, or crooked, and of variable length, those on the tibiae and antennae mostly longer than the width of the segments. Epidermis of cleared specimens reticulated and densely beset with microtrichialike skin elevations. These latter are arranged in lines on dorsum and venter. A pair of simple lateral tubercles on the prothorax and on abdominal segments II and VIII. Antennae 5-segmented; I, noticeably large and almost as wide as long; secondary sensoria absent; a single large circular and fringed primary sensorium present on IV and on V; marginal sensoria were not noted on V, but there appear to be three rather prominent scalelike processes on the lower side of the large sensorium which may correspond to marginal sensoria. These are best seen in the young as illustrated. Rostrum extends to first abdominal segment. Cornicles similar to those of the alate, 0.25 mm long. Cauda, cone-shaped with wide base, 0.10 mm long, and with 2 pairs of curved spines. Genital plate dusky and as illustrated.

Young, 1st instar, is noticeably hairy or spiny, with 5-segmented antennae of which the first segment is conspicuously large. Rostrum extending to the middle of the abdomen, with slightly tapering cornicles. Legs stout and hairy.

This species has been compared with other members of the genus and relationships are indicated in the key and illustrations. The winged forms superficially resemble *Rhopalosiphum prunifoliae* (Fitch), but the 5-segmented antennae, the close proximity of the second fork of the media to the marginal tip of the wing, and the shape and spination of the cauda readily separate the two.

A single alate viviparous female collected on guayule has been designated as the type. The three alates taken on prune at Davis and the mature apterous viviparous females and young feeding on guayule are designated as paratypes in my collection. Paratypes, alate (on prune) and apterous, have been deposited in the collections of the United States Bureau of Entomology and Plant Quarantine, Washington, D. C.

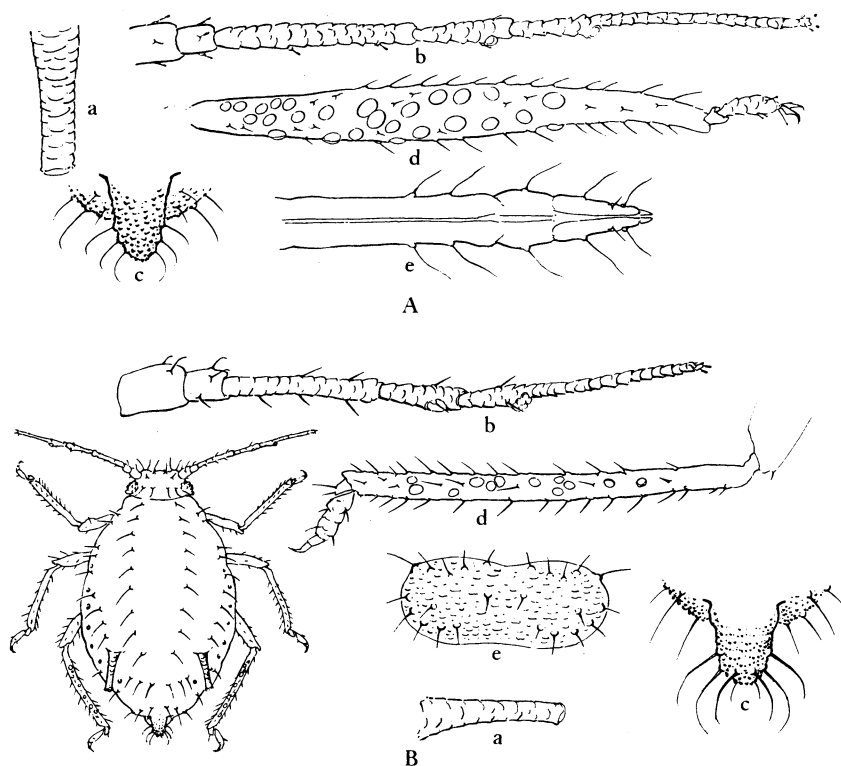


Fig. 2.—The raspberry aphid, *Cerosiphia rubifolii* (Thomas): A, oviparous female from Ohio: a, cornicle; b, antenna; c, cauda; d, hind tibia; e, rostrum. B, oviparous female from California: a, cornicle; b, antenna; c, cauda; d, hind tibia; e, genital plate.

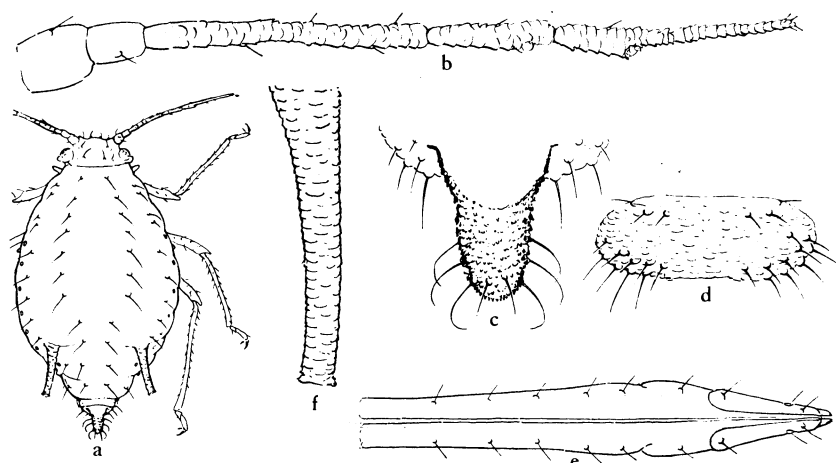


Fig. 3.—The raspberry aphid, *Cerosiphia rubifolii* (Thomas) (?), apterous viviparous female from California: a, adult; b, antenna; c, cauda; d, genital plate; e, rostrum; f, cornicle.

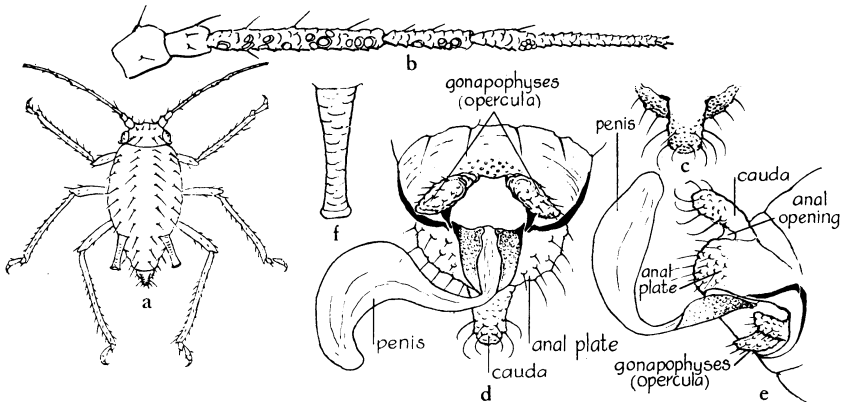


Fig. 4.—The raspberry aphid, *Cerosipha rubifolii* (Thomas) (♀), male from California: *a*, adult; *b*, antenna; *c*, cauda; *d*, posterior tip of abdomen (pygidium), ventral aspect; *e*, same, lateral aspect; *f*, cornicle.

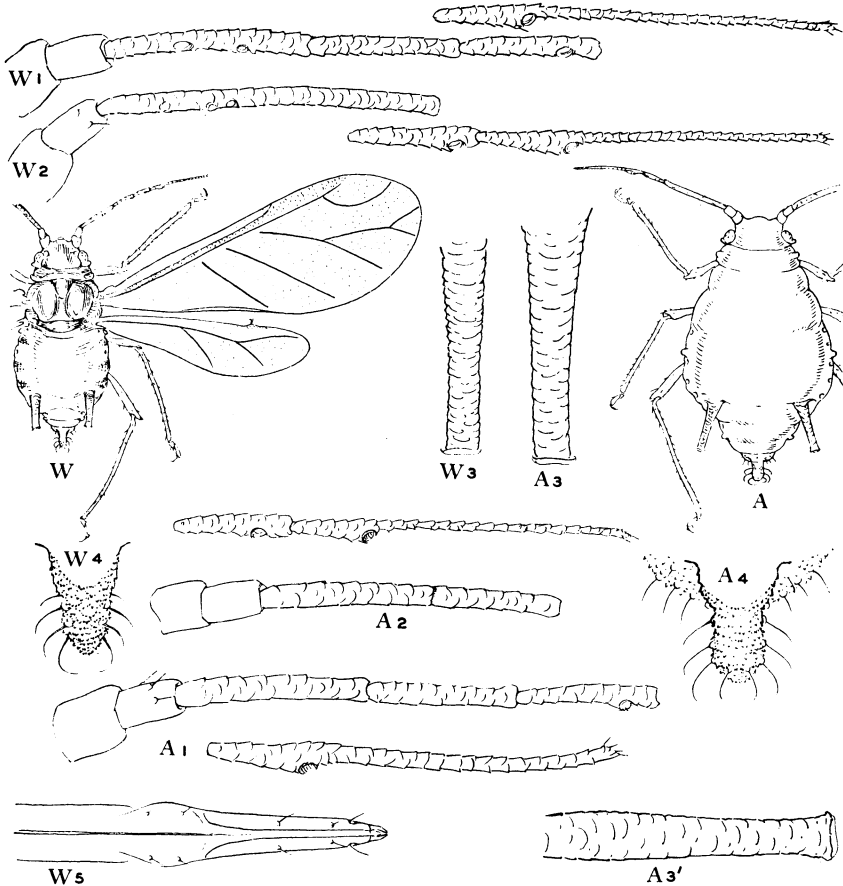


Fig. 5.—The strawberry root aphid, *Cerosipha forbesi* (Weed): *A*, apterous viviparous female; *W*, winged viviparous female: 1, 6-segmented antenna; 2, 5-segmented antenna; 3, cornicle; 3', cornicle from California apterous female; 4, cauda; 5, rostrum.

KEY TO KNOWN SPECIES OF THE GENUS CEROSIPHA

ALATES

1. Forewing with radial sector present..... 2
Forewing with radial sector usually absent..... *araliae-radicis*
2. Secondary sensoria present only on antennal segment III..... 3
Secondary sensoria on both antennal segments III and IV..... *californica*
3. Antennae rarely more than 5-segmented..... 4
Antennae 5-segmented or 6-segmented; from 1 to 4 secondary sensoria on antennal segment III..... *forbesi*
4. Antennal segment III with 4 to 7 secondary sensoria..... *rubifolii*
Antennal segment III with 10 to 19 secondary sensoria..... *roripae*

APTERAE

1. Body hairs short and relatively few..... 2
Body hairs long and prominent, especially on the legs..... *californica*
2. Filament of apical antennal segment at least five times the length of the base..... *araliae-radicis*
Filament of apical antennal segment less than five times the length of the base..... 3
3. Antennal segment III without sensoria..... 4
Antennal segment III normally with sensoria..... *roripae*
4. Rostrum very long and slender throughout, segment III only slightly swollen; cornicles about twice as long as the cauda..... *forbesi*
Rostrum with segment III noticeably swollen; cornicles only slightly longer than the cauda..... *rubifolii*

NOTES ON OTHER SPECIES

The Raspberry Aphid.—Named in the genus *Sipha* by Thomas in 1879, the raspberry aphid, *Cerosipha rubifolii* (Thomas) (figs. 2 to 4), appears to be a leaf-feeding species, which has been widely reported from North America. Judging from specimens examined, either the species is quite variable in structure, or there are two or even three species confused under the one name. For instance, the species occurring in California has unusually long cornicles; again, a considerable number of the specimens furnished by G. F. Knowlton from Oregon, Washington, and Utah are so extremely small and otherwise different from eastern material as to be questionable. Lacking an adequate amount of material of the various forms, I am unable to settle this matter now.

Alate viviparous females usually have 5-segmented antennae, and in a single apterous viviparous female one member was 5-segmented and the other 6-segmented. This species is much more consistent in having 5-segmented antennae than is *Cerosipha forbesi*. Secondary circular sensoria occur on segment III and vary from 3 to 7 in number; the average was 5 for 23 antennae examined.

Sexuals, especially the apterous females, are apparently rather common. These have numerous large, nearly circular sense-pits over the entire hind tibiae except the apical portions. These sensoria vary considerably in size, and in numbers from 13 to 26 or more. A single apterous male taken on raspberry at Palo Alto, California, November 1, 1928, by L. M. Smith, has 10 and 11 small circular sensoria on antennal segment III and 3 and 6 on segment IV.

The Strawberry Root Aphid.—Named in the genus *Aphis* and later transferred to the genus *Cerosipha*, the strawberry aphid, *Cerosipha forbesi* (Weed) (fig. 5), might appropriately be placed in either genus because of the division of the antennae into either 5 or 6 segments. An examination of 27

alates collected in California revealed that 7 had 6-segmented antennae, 13 had 5-segmented antennae, and 7 had one member 6-segmented and the other 5-segmented. In many of those with 5-segmented antennae there is a distinct distortion in the middle region of segment III indicating the place of division to form the extra segment, and in practically all cases segment III in the 5-

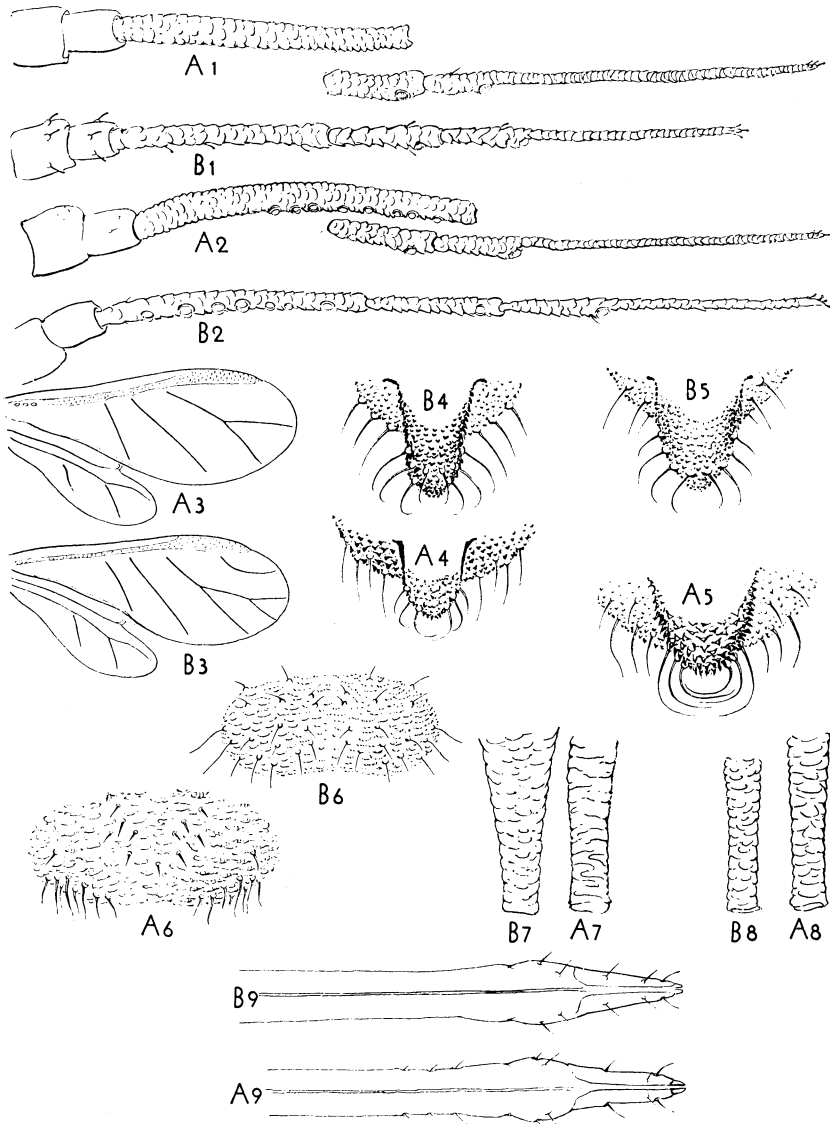


Fig. 6.—A, Structural parts of the aralia-root aphid, *Cerosipha araliae-radialis* Strom; B, same for the raspberry aphid, *C. rubifolii* (Thomas), from Illinois: 1, antenna of apterous viviparous female; 2, antenna of alate viviparous female; 3, wings; 4, cauda of apterae; 5, cauda of alates; 6, genital plates; 7, cornicles of apterae; 8, cornicles of alates; 9, rostrums.

segmented antennae equals or nearly equals in length the combined segments III and IV in the 6-segmented forms. Of 15 apterous adults examined all had 5-segmented antennae except one, which had both members 6-segmented. If the segment is not divided (5-segmented antenna) the sensoria are distributed over the basal half; if it is divided (6-segmented antenna) they occur over the whole shorter, basal segment as illustrated. Antennal segment III may have from 0 to 4 circular secondary sensoria which vary considerably in size but are usually equal in diameter to about half that of the segment.

The number of sensoria on segment III in 5-segmented antennae differ little, often not at all, from those with 6-segmented antennae. In 22 individuals there was but 1 without sensoria; there were 5 with 1 sensorium on both members; 7 with 1 sensorium on 1 member and 2 on the other; 2 with 3 sensoria on both members; 4 with 2 sensoria on one and 3 on the other; 2 with 3 on one member and 4 on the other; 1 with 5 on one member and 1 on the other.

The Aralia-Root Aphid.—The aralia-root aphid, *Cerosipha araliae-radici* Strom (fig. 6, A), is a very distinct and interesting species described by L. S. Strom (1938) from the roots of wild sarsaparilla, *Aralia nudicaulis*, collected at Milwaukee, Wisconsin, on July 2, 1935. A distinctive character is that in 92 out of 104 forewings examined the radial sector is absent. The short cauda and overlapping curved caudal spines are also pronounced.

The Watercress Aphid.—The watercress aphid, *Cerosipha roripae* Palmer, is a green and brown species easily characterized by the numerous quite large circular sensoria on antennal segment III of the alates and also by the presence of up to 9 similar sensoria on antennal segment III of the apterae. It has been taken only on watercress, *Roripa hispida*, by M. A. Palmer in Colorado.

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