

**On the status of “*Prociphilus californicus*”
(Hemiptera: Aphididae)**

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Abstract. The name “*Prociphilus californicus*” has been used for aphids that distort leaves of ash (*Fraxinus* spp.) in the western states. This name is not valid. It is not completely clear which species of *Prociphilus* the name refers to, but we think it is most likely to be *Prociphilus americanus* (Walker). The relevant literature is reviewed.

Key Words. Insecta, *Prociphilus americanus*, *Prociphilus (Meliarhizophagus) fraxinifolii* (Riley), Hemiptera, Aphididae, Pemphiginae, *Fraxinus*.

An aphid that curls the leaves of Oregon ash (*Fraxinus oregona* Nutt. (Oleaceae)) has been called *Prociphilus californicus* in several popular West-coast extension publications (Dreistadt et al. 1994; Koehler 1987; Perry 2002), probably following Johnson and Lyon (1976). *Prociphilus californicus* is not a valid name. The source of the confusion is an article by Davidson (1914) in which he describes the life cycle of *Pemphigus californicus* Davidson: “Close observations on the habits of this species indicate that it migrates towards the end of April from the buttercup to the ash (*Fraxinus oregona* Nutt.). The third generation on the buttercup all become winged lice and forsake the plant in a body. They and their immediate progeny cause the leaves of the ash to curl in a manner similar to that caused by *Pemphigus fraxini-dipetalae* Essig. In May, the shrivelled [sic] migrants may be found in the curled leaves together with the apterous lice of the second and third generations on the ash. These apterous lice have undeveloped eyes, the first generation of them being large bloated individuals. The third, or second apterous, generation on the ash is composed of both winged and wingless individuals.” Essig (1926) stated that “*P[rociphilus] californicus* (Davidson) (Fig. 153) is a California species wintering on Oregon ash and migrating to the buttercup as a summer host.” The second edition (Essig 1958) made no changes to the text or the figure. A search of Agricola and CABI databases turned up no recent references to “*Prociphilus californicus*.”

It is clear that Davidson (1914) was describing a species that overwinters on *Fraxinus* rather than a migrant from *Ranunculus* because he described the fundatrix (“first generation . . . large bloated individuals”). None of the pemphigine aphids with holocycles on *Fraxinus* colonize *Ranunculus*. It is most likely he was confusing *Pemphigus californicus* Davidson, a junior synonym of *Thecabius populiconduplifolius* (Cowen ex Gillette & Baker 1895), with a species of *Prociphilus* that has a holocycle on *Fraxinus*.

Thecabius populiconduplifolius (= *Pemphigus californicus*) is holocyclic on *Populus* and uses *Ranunculus* as a secondary host (Blackman & Eastop 1994). The winged individuals seen in April by Davidson (1914) may have been alate viviparae from anholocyclic colonies that had persisted on *Ranunculus* through the winter. *Thecabius populiconduplifolius* is listed in Remaudière and Remaudière (1997) as a junior synonym of the Old World species *Thecabius affinis* (Kaltenbach); however, *T. populiconduplifolius* probably is a good species because North American forms have only 28 chromosomes, whereas Old World forms have 38 (Blackman & Eastop 1994).

Two species of *Prociphilus* are listed on *Fraxinus* in California *Prociphilus americanus* (Walker) (= *Prociphilus fraxinidipetae* Essig 1911, = *Prociphilus venafuscus* Patch 1909), and *Prociphilus (Meliarhizophagus) fraxinifolii* (Riley in Riley & Monell 1879) (Smith & Parron 1976). The two species are dissimilar insects with different life cycles. *Prociphilus americanus* overwinters as eggs on *Fraxinus*. The eggs hatch in the spring, and the resulting colonies curl terminal leaves of the trees. In late April to early June, the colonies on ash produce numerous spring migrants, large dark aphids (2.8–4.9 mm long) with bluish-tinged wings and trailing flocks of wax. These migrate to form summer colonies on the roots of *Abies*. Fall migrants return to *Fraxinus*, where they give birth to tiny non-feeding sexuales, which mate to produce the overwintering eggs (Blackman & Eastop 1994). Fall migrant *P. americanus* can be extremely numerous in the Pacific Northwest, sometimes creating an “aphid haze” at dusk. *Prociphilus (M.) fraxinifolii* is a smaller, pale green insect that stays on *Fraxinus* throughout the summer. Colonies form both on the leaves, where they cause leaf curling, and on the roots (Blackman & Eastop 1994). *Prociphilus (M.) fraxinifolii* can be damaging to nursery stock on both above- and below-ground parts of the trees.

It is impossible to know for sure which of the two species of *Prociphilus* is meant by “*P. californicus*” in Davidson (1914) and Essig (1926, 1958). Both of the species (*P. fraxinifolii* and *P. americanus*, under synonyms *P. venafuscus* and *P. fraxini-dipetae*) are mentioned as additional species of *Prociphilus* in the text of the Essig (1926, 1958) books, and the diagnostic antennal segment VI is missing from the drawing on p. 262. However, antennal segment III in the figure looks more like *P. americanus* than *P. (M.) fraxinifolii* (Smith 1974). Additionally, Davidson (1914) mentioned that the leaf curls are similar to those of *P. fraxini-dipetae*, a synonym of *P. americanus*. Thus, it seems most likely that references to “*Prociphilus californicus*” can be referred to *P. americanus*.

There never was a formal description of “*Prociphilus californicus*,” so there is no type specimen. Following the recommendation of one of our anonymous reviewers, we contacted the Essig Museum to see if the Essig Aphid Collection contained any clues about the identity of the aphid figured on page 262 of Essig (1926, 1958). The collection has no specimens labeled “*Prociphilus californicus*.” There are 161 specimens of *P. americanus* (154 of them under the synonym *P. venafuscus* (Patch)) and 170 specimens of *P. fraxinifolii* (Riley). There is one slide filed under *T. populiconduplifolius* that is labeled *Thecabius ?californicus* Davidson (Sylvester 2001). Dr. Gordon Nishida kindly checked the slides in question for us and found that no slides had any indication that they had previously been identified as “*Prociphilus californicus*.” Similarly, no slides had labels indicating that they had been used in any illustration. The single slide labeled “*californicus*” was collected from *Taraxacum* in 1942, so it could not possibly have been used in the illustration created by 1926. Additionally, it was not collected from either *Fraxinus* or *Ranunculus*. Thus, the specimens in the Essig collection shed no further light on the identity of the aphid illustrated on page 262 of Essig (1926, 1958).

In conclusion, the name "*Prociphilus californicus*" is not valid and should not be used. It probably came about as the result of confusion about the life cycles of two or more pemphigine aphids. Pemphigine aphids on *Fraxinus* can be identified correctly using Blackman and Eastop (1994) or Smith (1974).

ACKNOWLEDGMENTS

We thank Nancy Stairs, Advanstar Communications, Cleveland, OH, for the attention to detail that brought this problem to our attention. We also thank Gordon Nishida, Essig Museum, for checking slides of *Prociphilus* and *Thecabius* in the Essig Aphid Collection.

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Received 6 October 2003; Accepted 5 October 2004.