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**THE IDENTITY AND REINSTATEMENT OF *HOMALODISCA LITURATA*
BALL AND *PHERA LACERTA* FOWLER (HEMIPTERA: CICADELLIDAE)**

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Abstract.—*Phera lacerta* Fowler, **combination restored**, is transferred back to its original genus. *Homalodisca liturata* Ball, **validity restored**, is removed from synonymy with *P. lacerta*. Recent literature referring to *P. lacerta* as the smoke tree sharpshooter and a close relative of *Homalodisca coagulata* (Say), the glassy-winged sharpshooter, should actually be taken to refer to *H. liturata*.

Key Words: sharpshooter, Cicadellidae, *Homalodisca*, leafhopper

Phera lacerta Fowler, **combination restored**, was described in 1899 from Chilpancingo, Guerrero, in southwestern Mexico (Fowler 1899b). It was transferred to *Homalodisca* Stål by Young (1968) as a senior synonym of *Homalodisca liturata* Ball **validity restored**, which had been described from Phoenix, AZ, Yuma, CA, and Comundu, Baja California Sur, Mexico, in 1901. The synonymy was made without comment or explanation, although he had reviewed both *P. lacerta* (Young 1965) and *H. liturata* (Young 1958) previously in other studies. That synonymy is reversed here, as *P. lacerta* and *H. liturata* represent distinctly different entities belonging to different genera.

Homalodisca liturata (as *Homalodisca lacerta*) has been the subject of much discussion in recent literature (e.g., Nielson 1968, Powers 1973, Gill 1994, Sorensen and Gill 1996, Blua et al. 1999, Costa et al. 2000, Bethke et al. 2001, Rakitov and Dietrich 2001) as a close relative of the glassy-winged sharpshooter, *Homalodisca coagulata* (Say), a major pest of citrus, grapes, and ornamentals. Both *H. liturata* and *H. coagulata* are vectors of various strains of

the phytopathogenic bacterium *Xylella fastidiosa*, which cause the diseases known as Pierce's disease in grapes, oleander leaf scorch, almond leaf scorch, phony peach disease, alfalfa dwarf, and citrus variegated chlorosis depending upon the crop species infected and bacterial strain involved (Blua et al. 1999). *Homalodisca coagulata*, a species from the eastern United States accidentally introduced to the western United States and northern Mexico, is the most important vector of this disease in North American agricultural systems at this time, but *H. liturata* is also of interest as a closely related vector apparently native to southwestern North America.

MATERIALS AND METHODS

The type and other holdings of *Homalodisca liturata*, in the National Museum of Natural History, Smithsonian Institution (USNM), were examined, as well as numerous specimens (over 100) of that species at the University of California, Riverside, Entomology Research Museum (UCRC). Photographs (Figs. 1–2) of the lectotype (female) of *Phera lacerta* were obtained from The Natural History Muse-

um (M. Webb, BMNH), which led to the location of an additional male at UCRC that we assign to *P. lacerta*, collected from Brazil (BRAZIL. São Paulo: Piracicaba, ES-ALQ, 5-IV-1996, Screen. sweep wooden area, J. Pinto). All other photographs are of UCRC specimens, taken using Auto-Montage software (version 4.00.0359 BETA, Synoptics, Ltd., UK 1997, 2001) through a 3-CCD digital videocamera attached to a stereoscope.

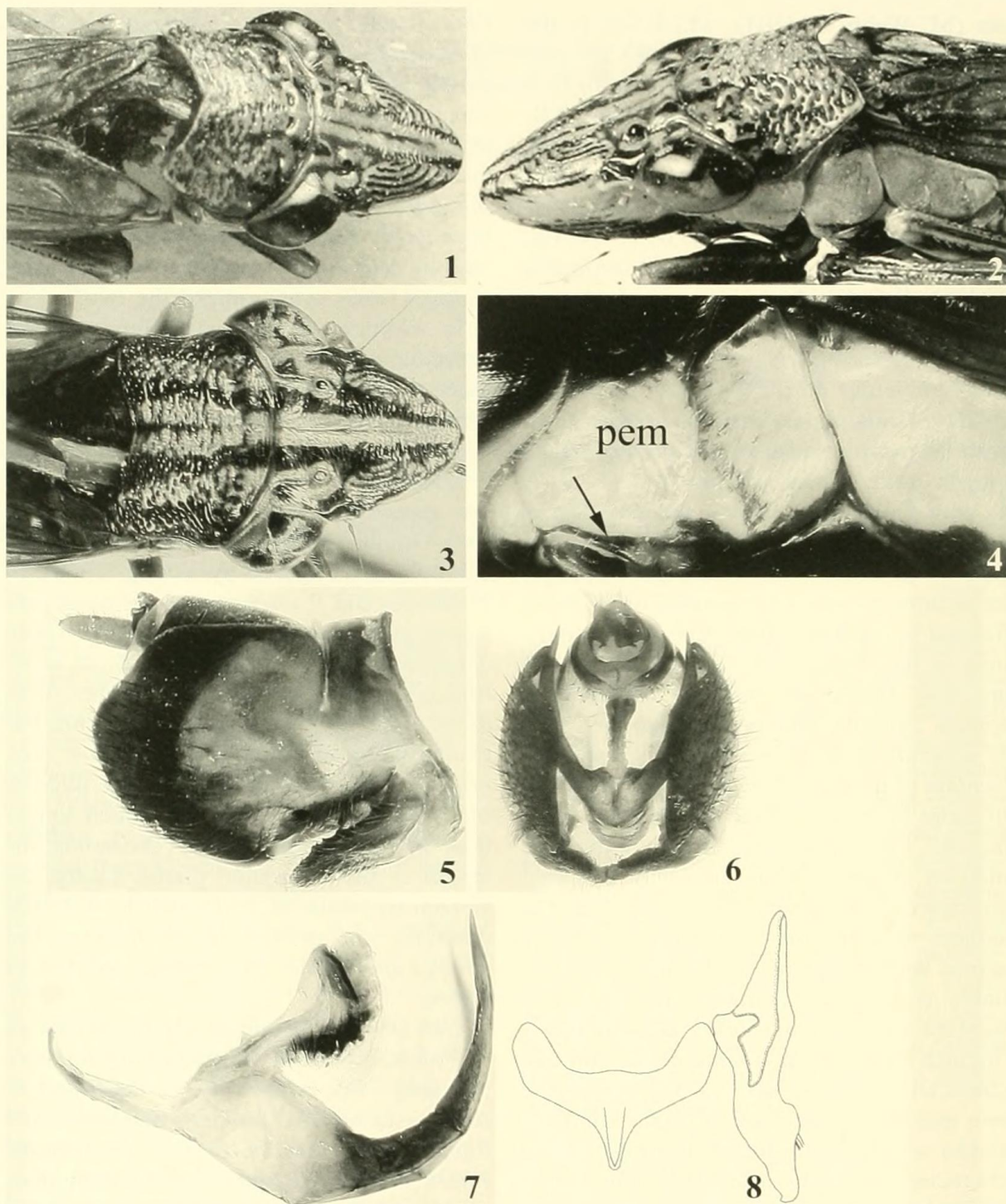
TAXONOMY

Phera lacerta is distinguishable from both *H. liturata* and *H. coagulata* by its longer, more robust proepimeron (Figs. 2, 4) with a flangelike ventral depressed margin, the yellow longitudinal band along the side of its head and thoracic pleuron, and its pronotum with a longitudinal pale band flanked by darker stripes. The linear markings on the vertex of *P. lacerta* (Figs. 1, 3) are also distinctive, but this character is widely variable (but not overlapping with *P. lacerta*) in *H. liturata* (Fig. 9), and we hesitate to treat it as a reliable character until more is known about its variation in *P. lacerta*. The yellow band along the thoracic pleuron (Figs. 2, 4) is an easily assessed character of the genus *Phera* Stål, but it is subject to variation in shape and color across several species, and may not be reliable as a generic character. Young (1968) used the proepimeral shape and form to distinguish *Phera* from *Homalodisca*, and this character is treated here to distinguish the two genera as it appears to be the most reliable and unambiguous morphological character known to date. The central area of the proepimeron is longer than tall in *Phera* (Figs. 2, 4), but not in *Homalodisca* (Fig. 10). *Phera* species also have a large, depressed, flangelike ventral proepimeral margin, but a minute, shorter flangelike margin is present anteriorly (normally hidden by the procoxa) in *Homalodisca*. Nevertheless, both proepimeral shape and the extent of its ventral depressed area appear to be reliable characters for distinguishing

Phera from *Homalodisca*, except for *Homalodisca insolita* (Walker), which was regarded by Young (1968) as an unusual species of dubious generic placement. On strength of proepimeral shape and form, *P. lacerta* certainly belongs in *Phera*, and *H. liturata* in *Homalodisca*. The differences between *P. lacerta* and *H. liturata* are very striking and we are unable to explain why Young (1968) synonymized the two.

In addition to external differences, the genitalia of the male that we have identified as *P. lacerta* from Brazil (Figs. 5–8) differ substantially from those of *H. liturata*, which were accurately figured by Young (1958). The forms of the pygofer, aedeagus, connective, and styles of *P. lacerta* are very similar to those of *Phera carbonaria* (Melichar), as figured by Young (1968). In *P. lacerta* and *P. carbonaria*, the basal processes of the aedeagus are long and arching anteriorly (Fig. 7), as opposed to those of *H. liturata*, which are always straight. Also, there is no projection from the atrium between the bases of the processes in *P. lacerta*, as there is in *H. liturata*. The pygofer of *P. lacerta* (Fig. 5) is also much longer than in *H. liturata*, greatly exceeding the length of the subgenital plates. Lastly, the subgenital plates of *P. lacerta* have lateral denticles not present in *H. liturata*, but which are found in several species of *Phera*.

Ball (1901) was apparently already aware of Fowler's Central American and southern Mexican work at the time he described *H. liturata*, as he cited Fowler's discussion and figure of *H. insolita* in that publication. *Phera lacerta* was figured on the same plate as *H. insolita* (Fowler 1899a: plate XIV) and described only two months afterward (Fowler 1899b). Therefore, Ball was aware of at least the figure, and probably also the description, of *P. lacerta* at the time *H. liturata* was described, and probably was well aware that the two species were different. Melichar (1924) also correctly treated *H. liturata* and *P. lacerta* as two distinct species in his monograph of the Cicadelli-

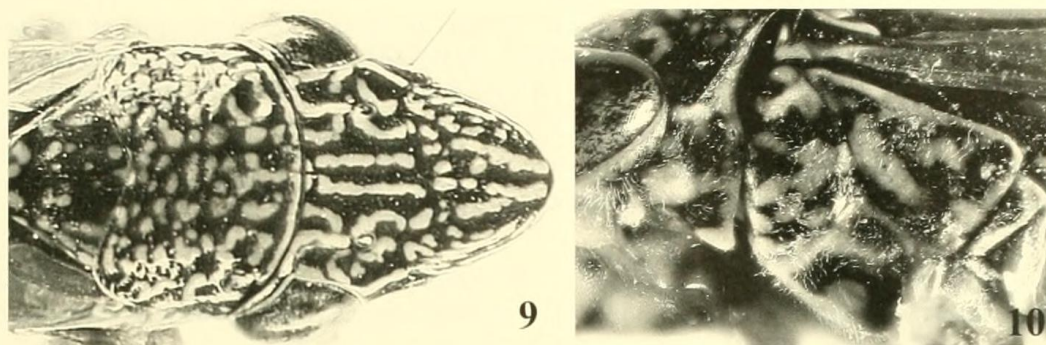


Figs. 1-8. *Phera lacerta*. 1, Head and pronotum (dorsal view) of lectotype female. 2, Head and mesopleuron (lateral view) of lectotype female. 3, Head and pronotum (dorsal view) of male specimen. 4, Mesopleuron (lateral view) of male specimen. Arrow indicates ventral flange; pem = proepimeron. 5, Pygofer with subgenital plate. 6, Genitalia, posterior view. 7, Aedeagus, lateral view. 8, Connective and right style, dorsal view.

nae, although he treated *Homalodisca* and *Phera* as synonymous genera.

Literature records of *Homalodisca lacerta* from northern Mexico and the United

States should be taken to refer to *H. liturata*, which remains distinguishable from the closely related *H. coagulata* using characters given by Young (1958). Aside from its



Figs. 9–10. *Homalodisca liturata*. 9, Head and pronotum (dorsal view). 10, Mesopleuron (lateral view, proleg removed).

original description, *P. lacerta* was correctly characterized only by Melichar (1924), and obviously remains very poorly known in terms of intraspecific variation.

Knowledge of the true identity of *H. liturata*, the probable sister species of *H. coagulata* (Rakitov and Dietrich 2001), is important in planning biological control efforts of *H. coagulata* and in studying the history of its distribution. *Phera lacerta* is apparently a tropical entity, known from southern Mexico to southern Brazil. Conversely, *H. liturata* is known from southwestern United States to central Mexico. The strategy of finding effective biological control agents in the home range of *H. coagulata* by studying the distribution of its apparent sister species needs to be adjusted in light of this new information.

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