

***Kleidocerys obovatus* Van Duzee (Hemiptera: Lygaeidae:
Ischnorhynchinae): New Distribution Records and Habits of
an Apparent Seed Specialist on Cypress, *Hesperocyparis* spp.
(Cupressaceae)**

Author(s): A. G. Wheeler, Jr. and Billy A. Krimmel

Source: Proceedings of the Entomological Society of Washington,
116(2):203-207. 2014.

Published By: Entomological Society of Washington

DOI: <http://dx.doi.org/10.4289/0013-8797.116.2.203>

URL: <http://www.bioone.org/doi/full/10.4289/0013-8797.116.2.203>

BioOne (www.bioone.org) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/page/terms_of_use.

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

NOTE

***Kleidocerys obovatus* Van Duzee (Hemiptera: Lygaeidae: Ischnorhynchinae):
New Distribution Records and Habits of an Apparent Seed Specialist
on Cypress, *Hesperocyparis* spp. (Cupressaceae)**

DOI: 10.4289/0013-8797.116.2.203

Kleidocerys Stephens is represented in North America by seven species (Ashlock and Slater 1988). Bionomics of the seed-feeding, Holarctic *K. resedae* (Panzer) are well known in North America (Claassen 1921, Wheeler 1976) and Europe (Jordan 1933, Southwood and Leston 1959, Péricart 1998), and host plants and habits of *K. virescens* F., a mainly Neotropical species known in the United States from Florida and Texas (Ashlock and Slater 1988), have been reported for Mexico (Cervantes and Baez 2010). Only scant information is available on plant associations for other species of *Kleidocerys* found in North America (Scudder 1962).

Kleidocerys obovatus Van Duzee is among the little-known North American species of the genus. Adults are reddish brown, about 4.00 mm long, with the head almost as long as the pronotum and the hemelytral membrane short (Van Duzee 1931, Barber 1953, Scudder 1962). The specific epithet *obovatus* refers to the bug's form—inversely ovate—that is, egg-shaped and broadest anteriorly. It was originally described from Marin County, California, based on 32 specimens taken in May 1919 and April 1922 from the serpentine-endemic Sargent's cypress (*Hesperocyparis sargentii* [Jeps.] Bartel) on Cypress Ridge, near Woodacre (Van Duzee 1931). The type series of *K. obovatus* also contains three specimens taken on Monterey cypress (*H. macrocarpa* [Hartw.] Bartel) in Carmel,

Monterey County, in March of 1918 and 1922 (Van Duzee 1931). Monterey cypress was omitted from Scudder's (1962) list of *Kleidocerys* hosts. Since its original description, this lygaeid has been recorded only from *H. sargentii* in California's Pope Valley, Napa County, by Linsley and Usinger (1936), who implied that this member of a well-documented seed-feeding genus (Sweet 1960, 2000; Wheeler 1976) is associated mainly with leaves of cypress. Specimens in the Snow Entomological Museum, University of Kansas, Lawrence (KU), were collected (1952 to 1962) at Carson Ridge, Marin County, from cones of *H. sargentii* in January, February, July, and November (Z. Falin, pers. comm.).

During our study of the pentatomid *Banasa sordida* (Uhler) on cypress cones in coastal California (Wheeler and Krimmel 2012), we also observed *K. obovatus* and now have obtained more biological information on this little-studied bug. We provide new distribution records for California, the first record for Arizona, associations with additional species of *Hesperocyparis*, and notes on its habits and seasonality on *H. macrocarpa* in California. We suggest that *K. obovatus* is a cypress seed specialist.

We first collected *K. obovatus* in 2011 by beating branches of Monterey cypress (*H. macrocarpa*) and Gowen cypress (*H. goveniana* (Gordon) Bartel) bearing

seed (ovuliferous) cones (Wheeler and Krimmel 2012). In 2012, we found that nymphs and adults often are found within seed cones of cypress and not easily dislodged during beating (ca. 15–20 min/site). We, therefore, began to excise second- or early third-year cones (usually 5–10/site), including those damaged by insects (Frankie and Koehler 1967, Frankie 1973), along with older cones. Old cones can persist on trees for “many” years (Wolf 1948). Cones with surface cracks where once-fused scales had separated were broken apart in the field to detect nymphs and adults, or were placed in plastic bags for later examination. Nymphs were sorted to instar using a stereomicroscope. Nymphal instars and associated cone stages were recorded, as were geo-coordinates of collection sites. Voucher specimens have been deposited in the United States National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM).

The numbers of nymphs, especially first and second instars, beaten from cypresses generally were fewer than those detected by breaking apart cones. Adults, however, were beaten from branches in numbers similar to those found by opening excised cones. Nymphs and adults occupied cones of several stages, ranging from those with soft, whitish seeds and occupied by lepidopteran larvae to older cones with ripened (brown) seeds and old lepidopteran damage and frass. In all cases it appeared that *K. obovatus* occupied only cones with existing openings, either the result of cone maturation or lepidopteran damage. The bug’s ingress of cypress cones might be facilitated by lepidopteran larvae, whose mandibulate mouthparts create holes on cone surfaces (scales). Similarly, tunneling by lepidopteran larvae into fruiting spikes, or heads, of cattails (*Typha* spp.)

is thought to facilitate entry by *Chilacis typhae* (Perris), a lygaeoid bug of the family Artheneidae (Wheeler and Fetter 1987).

Based on label data from specimens (KU), *K. obovatus* overwinters as adults. On the central California coast, we observed nymphs of all instars in late April in second-year cones of Monterey cypress in Seaside (Monterey County), first through fourth instars in mid-May near Marina (Monterey County), and third through fifth instars in late May in Santa Cruz and San Mateo counties. The fourth and fifth instars observed in Monterey County in late July might have represented a second generation. A congener, *K. resedae*, is at least bivoltine in Pennsylvania (Wheeler 1976). *Kleidocerys virescens* apparently has more than one generation in Mexico, but *K. punctatus* might be only univoltine (Cervantes and Baez 2010), as Scudder (1962) suggested for species of *Kleidocerys* in north temperate regions.

The native range of Monterey cypress (*H. macrocarpa*) is restricted to rocky, granitic soils at two sites of the Monterey Peninsula on California’s central coast, but it has been planted extensively along the coast as an ornamental and for windbreaks. Natural populations of Gowen cypress (*H. goveniana*) also are precinctive to a nearby area of the Monterey Peninsula (Jepson 1923, Wolf 1948, Eckenwalder 1993, Barbour 2007, Bartel 2012). We found *K. obovatus* on native Gowen and Monterey cypress in Point Lobos State Natural Reserve and in ornamental plantings of Monterey cypress from southern San Mateo County south to northern San Luis Obispo County. The range of *K. obovatus*, previously known only from California, is extended to Arizona based on specimens (1♂, 2♀) collected at Dry Creek, Yavapai County, from smooth Arizona cypress

(*H. glabra* (Sudw.) Bartel) in December 1946 (USNM).

Unlike the pentatomid *Banasa sordida*, which feeds externally on cypress cones in coastal California (Wheeler and Krimmel 2012), *K. obovatus* is found mainly within cones. Its habits thus resemble those of the Eurasian and North African orsilline lygaeids *Orsillus depressus* (Mulsant & Rey) and *O. maculata* (Fieber), which feed within cypress (*Cupressus* spp.) cones and damage seeds (Bouaziz and Roques 2006). It is not known if feeding by *K. obovatus* damages cypress seeds. Although the pentatomid *B. sordida* can be found on other cupressaceous genera (*Chamaecyparis*, *Juniperus*; Wheeler and Krimmel 2012), *K. obovatus* is known only from *Hesperocyparis* [formerly *Cupressus*; Adams et al. 2009]: *H. glabra*, *H. goveniana*, *H. macrocarpa*, and *H. sargentii*. We found this lygaeid at eight sites, including consecutive years at several and all instars at one site. Our observations indicate that cypresses support nymphal development and can be considered host plants of the bug. We propose that *K. obovatus* is a seed specialist on cypresses, its host range contrasting with the polyphagous *K. resedae*, which develops on a few conifers (*Chamaecyparis*, *Thuja*) but feeds primarily on seeds of numerous angiosperms of diverse families (Wheeler 1976). More extensive fieldwork is needed to test our host-plant hypothesis and to determine if *K. obovatus* develops on seeds of the seven other species of *Hesperocyparis* known from California (Bartel 2012). Ecological studies could confirm or reject our hypothesis that lepidopteran larvae facilitate the lygaeid's colonization of cypress cones.

Species examined (Roman numerals = nymphal instars).—CALIFORNIA: *Monterey*

Co., Point Lobos State Natural Reserve, Cypress Grove Trail, 36°31.249–260'N 121°57.041–089'W, 29 July 2011, “adults” and “nymphs” ex native *Hesperocyparis macrocarpa*; Point Lobos State Natural Reserve, Lobos Ranch, 36°30.597'N 121°55.808'W, 29 July 2011, 3♂, 1♀, 1–V ex native *H. goveniana*; Rt. 1 S of jct. with Struve Rd. N of Moss Landing, 36°49.302'N 121°47.062'W, 28 July 2011, 2 adults, 1–IV & 28 April 2012, 4♂, 1♀ ex *H. macrocarpa*; Seaside, NE of Rt. 1 exit 404, 36°37.780'N 121°50.190'W, 9 April 2011, 1 adult, 1–V & 28 April 2012, 1♀, 4–I, 2–II, 4–III, 2–IV, 2–V ex *H. macrocarpa*; Imjin Rd. 0.3 km S of Imjin Pky E of Marina, nr California State University Monterey Bay, 36°39.588'N 121°47.708'W, 11 May 2012, 1♂, 3–I, 1–II, 3–III, 1–IV & 31 May 2013, 2♂, 3♀, 2–IV, 2–V ex *H. macrocarpa*. *San Luis Obispo Co.*, Rt. 1, Ragged Point, 35°46.826'N 121°19.922'W, 30 April 2012, 2♀ ex *H. macrocarpa*. *San Mateo Co.*, Rt. 1, 2.5 km S of jct. Rt. 84, nr Pescadero State Beach, 37°14.602'N 122°25.082'W, 29 May 2013, 1♂, 2♀, 4–V ex *H. macrocarpa*. *Santa Cruz Co.*, Rt. 1, Davenport, 37°00.793'N 122°11.911'W, 30 May 2013, 2♂, 2♀, 4–IV, 2–V ex *H. macrocarpa*.

We thank Chuck Bancroft and Amy Palkovic (California State Parks, Department of Parks and Recreation) for their helpfulness and hospitality when we visited Point Lobos State Natural Reserve, Zachary Falin (Entomology, University of Kansas Biodiversity Institute, Lawrence) for providing data on specimens of *K. obovatus* housed at KU, and Thomas Henry (Systematic Entomology Laboratory, USDA, ARS, Washington, DC) for verifying the identification of *K. obovatus* and providing data from Arizona specimens housed in the USNM.

LITERATURE CITED

- Adams, R. P., J. A. Bartel, and R. A. Price. 2009. A new genus, *Hesperocyparis*, for the cypresses of the Western Hemisphere (Cupressaceae). *Phytologia* 91: 160–185.
- Ashlock, P. D. and A. Slater. 1988. Family Lygaeidae Schilling, 1829 (= Infericornes Amyot and Serville, 1843; Myodochidae Kirkaldy, 1899; Geocoridae Kirkaldy, 1902). The seed bugs and chinch bugs, pp. 167–245. *In* T. J. Henry and R. C. Froeschner, eds. *Catalog of the Heteroptera, or True Bugs, of Canada and the Continental United States*. E. J. Brill, Leiden. 958 pp.
- Barber, H. G. 1953. A revision of the genus *Kleidocerys* Stephens in the United States (Hemiptera, Lygaeidae). *Proceedings of the Entomological Society of Washington* 55: 273–283.
- Barbour, M. G. 2007. Closed-cone pine and cypress forests, pp. 296–312. *In* M. G. Barbour, T. Keeler-Wolf, and A. A. Schoenherr, eds. *Terrestrial Vegetation of California*, 3rd Ed. University of California Press, Berkeley. 712 pp.
- Bartel, J. A. 2012. Gymnosperms, Cupressaceae, cypress family: *Hesperocyparis*, Western cypress, pp. 136–138. *In* B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, eds. *The Jepson Manual*, 2nd Ed. University of California Press, Berkeley. 1568 pp.
- Bouaziz, K. and A. Roques. 2006. Biology of the chalcid wasp, *Megastigmus wachtlei*, and its relationship to colonization of cypress seeds by the tortricid moth, *Pseudococcyx tessulatana*, in Algeria. *Journal of Insect Science* 6: 48. 16 pp.
- Cervantes Peredo, L. and M. B. Baez. 2010. Life histories of the seed bugs, *Kleidocerys punctatus* and *Kleidocerys virescens*. *Journal of Insect Science* 10: 91. 9 pp.
- Claassen, P. W. 1921. *Typha* insects: their ecological relationships. Cornell University Agricultural Experiment Station Memoir 47: 463–509.
- Eckenwalder, J. E. 1993. *Cupressus Linnaeus*, Sp. Pl. 2: 1002. 1753; Gen. Pl. ed. 5, 435. 1754. Cypress, pp. 405–408. *In* *Flora of North America* Editorial Committee, ed. *Flora of North America North of Mexico*. Vol. 2. Pteridophytes and Gymnosperms. Oxford University Press, New York. 475 pp.
- Frankie, G. W. 1973. Feeding habits and seasonal history of *Ernobius conicola* in cones of Monterey cypress with notes on cohabiting insects (Coleoptera: Anobiidae). *Pan-Pacific Entomologist* 49: 102–109.
- Frankie, G. W. and C. S. Koehler. 1967. Cypress bark moth on Monterey cypress. *California Agriculture* 21(1): 6–7.
- Jepson, W. L. 1923. *The Trees of California*, 2nd Ed. Sather Gate Book Shop, Berkeley, CA. 240 pp.
- Jordan, K. H. C. 1933. Beiträge zur Biologie Heimischer Wanzen (Heteropt.). *Stettiner Entomologische Zeitung* 94: 212–236.
- Linsley, E. G. and R. L. Usinger. 1936. Insect collecting in California—II. Foothill regions. *Pan-Pacific Entomologist* 12: 49–55.
- Péricart, J. 1998. Faune de France et régions limitrophes. Hémiptères Lygaeidae Euro-Méditerranéens. Vol. 1. Généralités Systématique: Première Partie. Faune de France 84A: 1–468.
- Scudder, G. G. E. 1962. The Ischnorhynchinae of the world (Hemiptera: Lygaeidae). *Transactions of the Royal Entomological Society of London* 114: 163–194. doi:10.1111/j.1365-2311.1962.tb01078.x
- Southwood, T. R. E. and D. Leston. 1959. *Land and Water Bugs of the British Isles*. Frederick Warne, London. 436 pp.
- Sweet, M. H. 1960. The seed bugs: a contribution to the feeding habits of the Lygaeidae (Hemiptera: Heteroptera). *Annals of the Entomological Society of America* 53: 317–331.
- Sweet, M. H. 2000. Seed and chinch bugs (Lygaeoidea), pp. 143–264. *In* C. W. Schaefer and A. R. Panizzi, eds. *Heteroptera of Economic Importance*. CRC Press, Boca Raton, FL. 828 pp.
- Van Duzee, E. P. 1931. A new *Ischnorrhynchus* (Hemiptera: Lygaeidae). *Pan-Pacific Entomologist* 7: 110.
- Wheeler, A. G., Jr. 1976. Life history of *Kleidocerys resedae* on European white birch and ericaceous shrubs. *Annals of the Entomological Society of America* 69: 459–463.
- Wheeler, A. G., Jr. and J. E. Fetter. 1987. *Chilacis typhae* (Heteroptera: Lygaeidae) and the subfamily Artheneinae new to North America. *Proceedings of the Entomological Society of Washington* 89: 244–249.
- Wheeler, A. G., Jr. and B. A. Krimmel. 2012. *Banasa sordida* (Uhler) (Hemiptera: Pentatomidae): Monterey and Gowen cypress (*Cupressus macrocarpa*, *C. goveniana*; Cupressaceae) as host plants in coastal California. *Proceedings of the*

- Entomological Society of Washington 114: 263–268.
- Wolf, C. B. 1948. Taxonomic and distributional studies of the New World cypresses. *Aliso* 1: 1–250.
- A. G. Wheeler, Jr. and Billy A. Krimmel, (AGW) *School of Agricultural, Forest, and Environmental Sciences, Clemson University, Clemson, South Carolina 29634-0310, U.S.A. (e-mail: awhlr@clemson.edu); (BAK) Department of Entomology, University of California, Davis, California 95616, U.S.A. (e-mail:wkrimmel@gmail.com)*