



Virginia Museum of
NATURAL HISTORY

PUBLICATIONS

JEFFERSONIANA

*Contributions from the
Virginia Museum of Natural History*

Number 17

28 March 2007

A New *Crataegus*-feeding Plant Bug of the Genus
Neolygus from the Eastern United States
(Hemiptera: Heteroptera: Miridae)

Thomas J. Henry

ISSN 1061-1878

A New *Crataegus*-feeding Plant Bug of the Genus
Neolygus from the Eastern United States
(Hemiptera: Heteroptera: Miridae)

THOMAS J. HENRY

Systematic Entomology Laboratory, PSI, ARS, USDA,
c/o P. O. Box 37012, Natl. Mus. Nat. Hist., MRC-0168,
Smithsonian Institution, Washington, DC 20013-7012
(henry@sel.barc.usda.gov)

ABSTRACT

The new species *Neolygus crataegi* is described from two counties in southwestern Virginia where it was collected in June on flowers of hawthorn, *Crataegus* spp. Dorsal and lateral digital images and a habitus illustration of the adult, scanning electron photomicrographs of selected structures, and illustrations of male genitalia are provided to help distinguish *N. crataegi* from other species of the genus.

Key words: Insecta, Hemiptera, Heteroptera, *Neolygus*, new species, *Crataegus*, United States, Virginia

Henry & Wheeler (1988) listed 38 species of *Neolygus* Knight (as a subgenus of *Lygocoris* Reuter) from North America. In his North American monograph, Knight (1917) established *Neolygus* as a subgenus of *Lygus* Hahn for six previously known and 17 new species. Subsequently, Knight (1918, 1919, 1925, 1939, 1941, 1953) added nine new species. Knight (1941) gave *Neolygus* generic status, but Leston (1952) reduced it again to a subgenus of *Lygus*. Kelton (1955), in his revision of the *Lygus* complex, maintained the subgeneric status of *Neolygus*, but transferred it to *Lygocoris*. In the last comprehensive treatment of *Neolygus* (as a subgenus of *Lygocoris*), Kelton (1971) added four new species and provided a key to the Canadian and most species occurring in the United States. Other useful regional treatments containing keys to species of *Neolygus* include Knight's Miridae of Connecticut (1923) and Miridae of Illinois (1941).

Nearly all recent authors have maintained *Neolygus* as a subgenus of *Lygocoris*—see recent catalogs by Schuh (1995) and Kerzhner & Josifov (1999). Clayton (1982), in an unpublished Master's thesis, and Yasunaga et al. (2002) in their study of the Japanese "Lygus complex," however, considered genitalic differences and host preferences compelling enough to warrant generic status for *Neolygus*. More recently, Henry et al. (2005) listed 10 species of *Neolygus* from Kentucky. In conjunction with my own studies, I concur with these investigations and support the elevated status of *Neolygus*.

In this paper, I describe the new species *Neolygus crataegi* found on one or more species of hawthorn (*Crataegus* spp.), in southwestern Virginia to provide a name for a forthcoming catalog of the Heteroptera of Virginia initiated by Dr. Richard Hoffman (Virginia Museum of Natural History, Martinsville). Dorsal and lateral digital images and a dorsal habitus illustration of the male, photomicrographs of selected structures, and illustrations of male genitalia are provided to facilitate recognition of this new species.

Neolygus crataegi, new species

Figs. 1–15

Diagnosis: *Neolygus crataegi* (Figs. 1–4) can be distinguished from all other species of *Neolygus* by the uniformly fuscous to black dorsum, including the head, antennae, pronotum, hemelytra, and apical two thirds of the hind femora.

Neolygus crataegi will key roughly to *N. caryae caryae* in Knight (1941) based on the dark pronotum without distinct rays and the dark hind femora, but differs in having uniformly dark hemelytra, including a dark cuneus that is clear (except for the apex) in *N. caryae*. It also keys to *N. caryae* in Kelton (1971) based on the complete carina between the eyes; the pale or brown tibial spines; the uniformly black or dark brown pronotum, scutellum, and hemelytra; and the black second antennal segment, but differs in having the cuneus, as well as the remainder of the antennal segments and head, uniformly dark brown or black. The left paramere (Fig. 13) is similar to several of the more widespread species, such as *N. atrinotatus* (Knight), *N. fagi* (Knight), *N. invitus* (Knight), *N. inconspicuus* (Knight), *N. univittatus* (Knight), and *N. viburni* (Knight). The right paramere (Fig. 14) is most similar to *N. invitus*, *N. univittatus*, and *N. viburni*. External characters, however, easily distinguish *N. crataegi* from all of these species.

Description: *Male* (n=10; holotype in parentheses): Length 4.90–6.08 mm (6.08 mm), width 2.24–2.50 mm (2.50 mm). *Head:* Width 1.01–1.14 mm (1.10 mm), vertex 0.24–0.25 mm (0.25 mm). *Labium:* Length 1.80–1.92 mm (1.92 mm), extending to bases of hind coxae. *Antenna:* Segment I, length 0.53–0.70 mm (0.67 mm); II, 1.96–2.34 mm (2.34 mm); III, 1.06–1.16 mm (2.34 mm). *Pronotum:* Length 1.15–1.25 mm (1.15 mm), basal width 2.08–2.14 mm (2.08 mm).

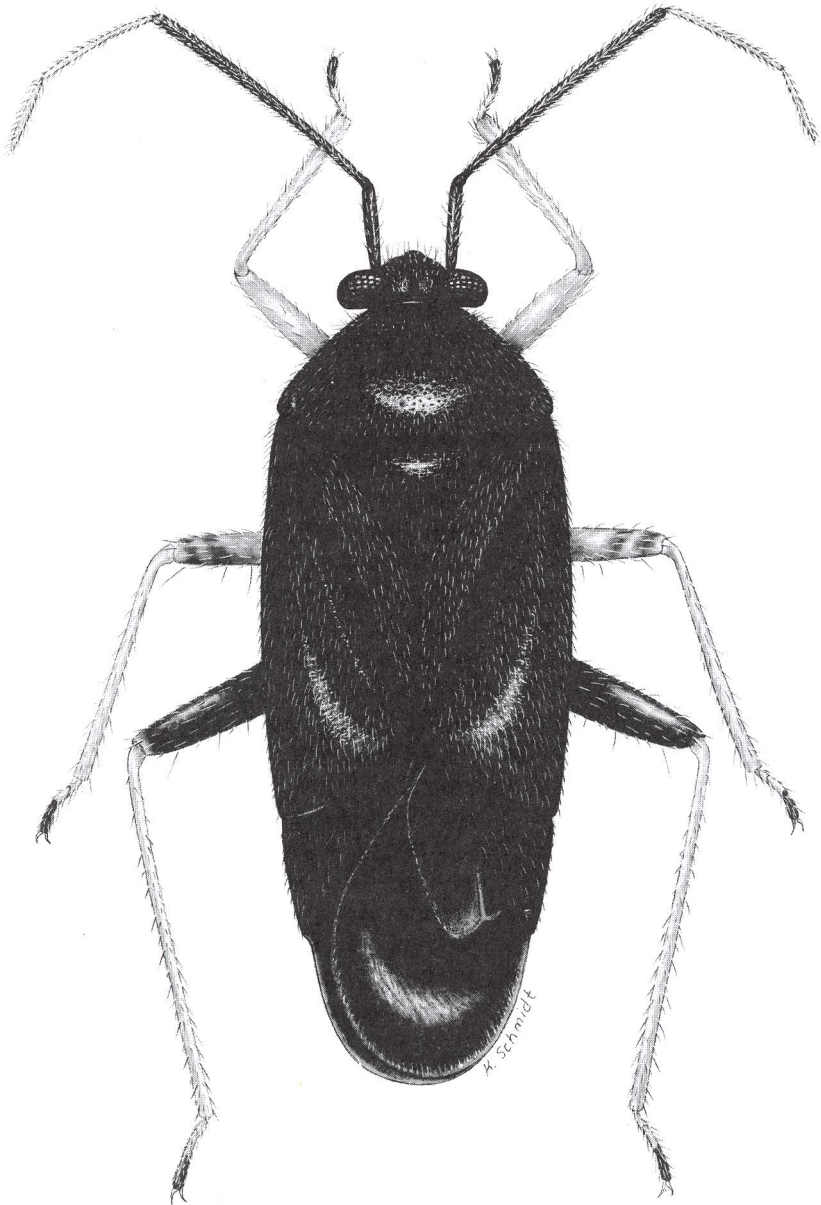
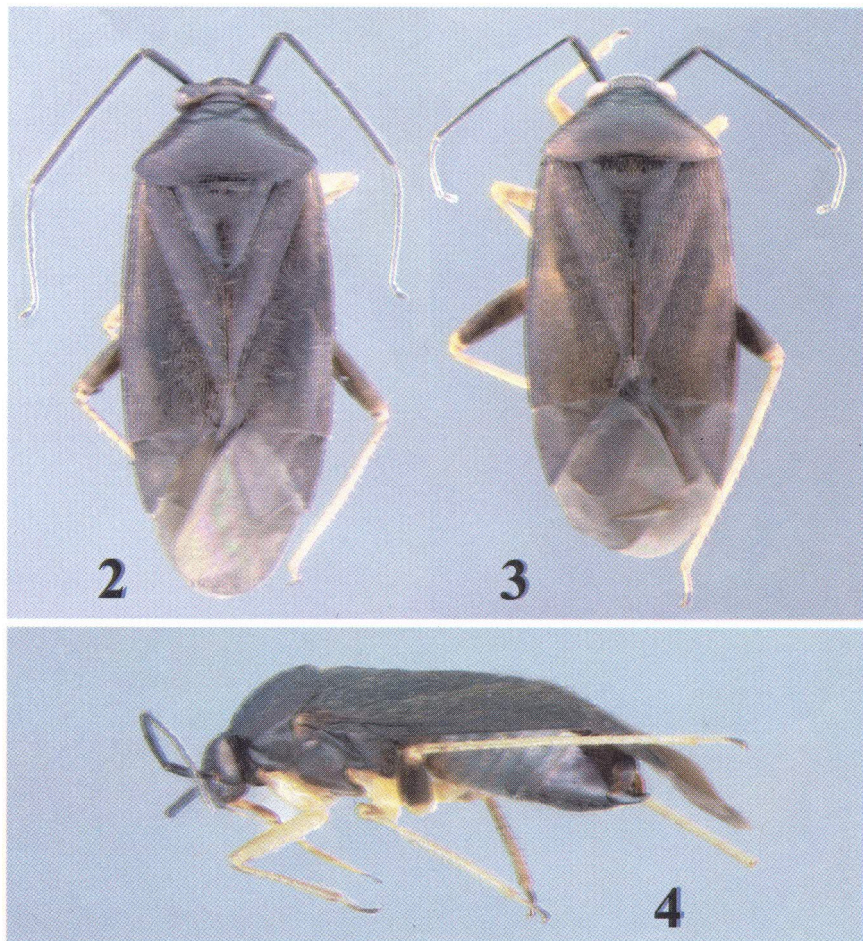


Figure 1. *Neolygus crataegi*. Adult male, dorsal aspect.



Figures. 2-4. *Neolygus crataegi*. 2) adult male, dorsal aspect. 3) adult female, dorsal aspect. 4) adult male, lateral aspect.

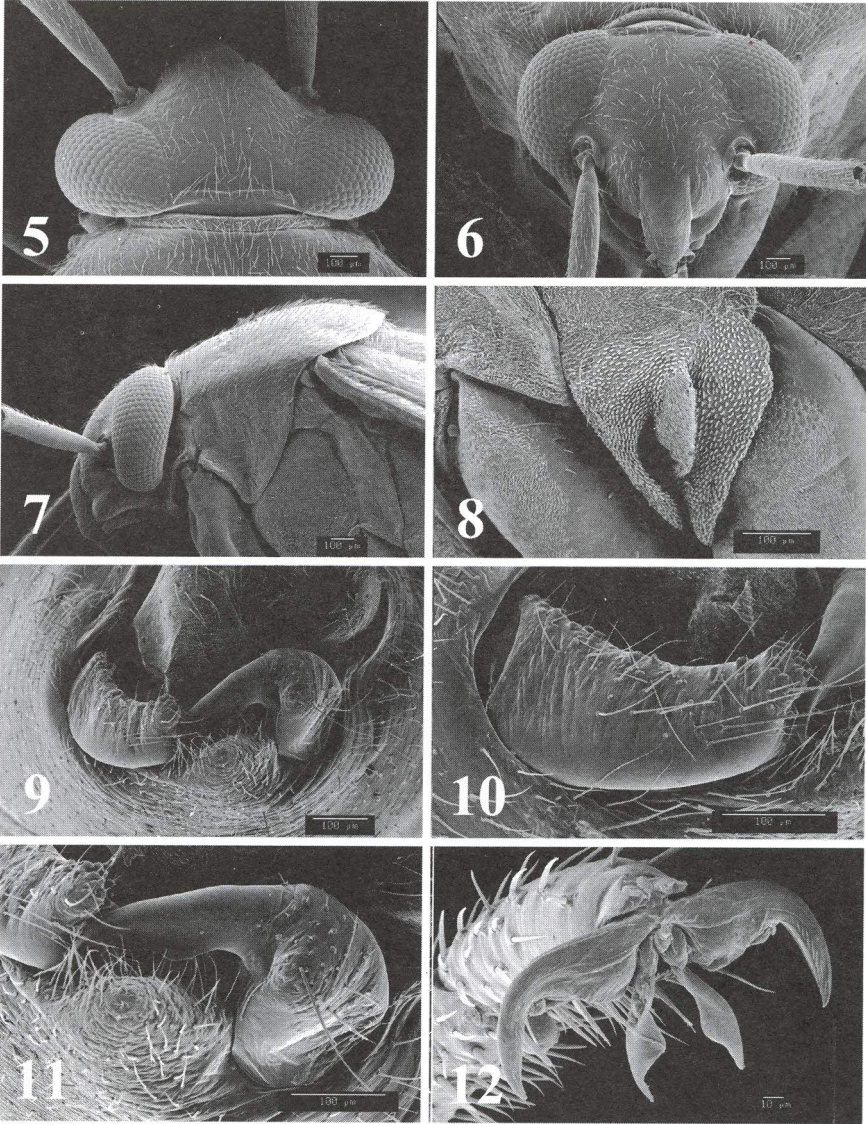
Female (n = 10): Length 5.70–6.27 mm, width 2.37–2.75 mm. *Head*: Width 1.10–1.12 mm, vertex 0.42–0.44 mm. *Labium*: 1.90–2.00 mm, extending to bases of hind coxae. *Antenna*: Segment I, Length 0.64–0.70 mm; II, 1.80–2.06 mm; III, 1.00–1.20 mm; IV, 0.62–0.70 mm. *Pronotum*: Length 1.12–1.26 mm, basal width 2.00–2.24 mm.

Overall coloration: dark brown to black; densely clothed with relatively short, recumbent, brown, simple setae, especially on hemelytra. *Head* (Figs. 5–7): shiny, impunctate, uniformly dark brown, with fine, scattered, simple brown setae; base of vertex with a complete, narrow, transverse carina. *Antenna*: segments I–IV uniformly dark brown to black. *Pronotum*: weakly punctate to finely shagreened, shiny, uniformly dark brown to black, with relatively dense, recumbent, simple, brown setae. *Scutellum and mesoscutum*: uniformly dark brown to black, impunctate, thickly clothed with recumbent, simple, brown setae, scutellum transversely and finely rugose. *Hemelytron*: uniformly dark brown to black, including cuneus; densely clothed with recumbent, simple, brown setae; membrane uniformly dark brown, including veins. *Ventral surface*: uniformly dark brown, including ostiolar auricle and evaporative area (Fig. 8); occasionally paler on auricle and dorsal edges of pleural areas. *Legs*: generally pale yellowish brown; front femur pale yellowish brown; middle femur yellowish brown with apical fourth weakly embrowned; apex and sometimes narrow band through brown area (forming two narrow dark bands) pale yellow; hind femur fuscous or dark brown; narrowly pale at apex and on basal one fourth; all tibiae pale yellowish brown, tibial spines brown, sometimes with small, indistinct, brown spots at bases; tarsal segments I and II yellowish brown, segment III dark brown; pretarsus (Fig. 12) dark brown, parempodia fleshy, divergent.

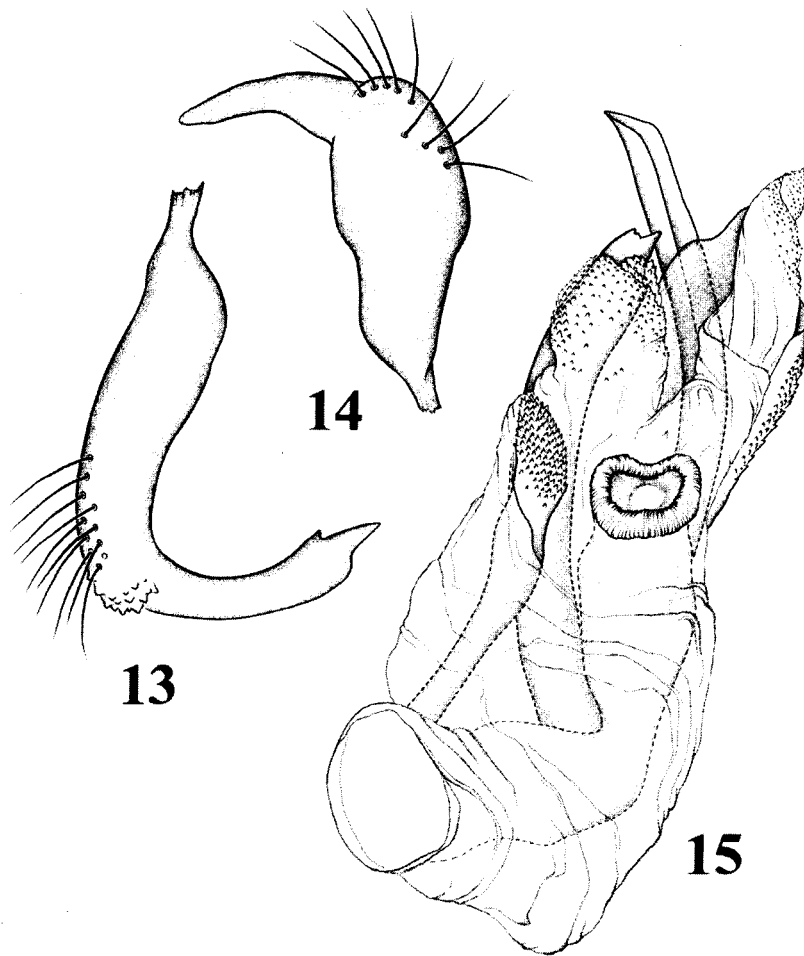
Male genitalia: left paramere (Figs. 9, 10, 13) L-shaped in dorsal aspect, with knob at angle short and weakly crenulate. Right paramere (Figs. 9, 11, 14) with main lobe relatively stout, elongate oval, with apical spine short, stout, and distally acute. Vesica (Fig. 15) with three spiculi, two large, thick, distally pointed (one slightly longer than other) and one short, distally pointed, with fine crenulations and/or spicules near apex; secondary gonopore large, distinct, with a wide, ribbed rim.

Name: The specific epithet is taken from the generic name of the host plant.

Host: Adults were common on the flowers of one or more species of *Crataegus* [Rosaceae] growing in high-mountain meadows of the localities listed below. Unfortunately, because of the season and lack of fruits, the species of *Crataegus* was not determined. According to botanist Thomas Wieboldt (Massey Herbarium, Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg), *C. macrosperma* Ashe, *C. pruinosa* (Wendl) K. Koch, and *C. punctata* Jacq. occur in and around the localities where *N. crataegi* was



Figures. 5–12. Scanning electron photomicrographs of *Neolygus crataegi*. 5) head, dorsal aspect. 6) head, frontal aspect. 7) head and pronotum, lateral aspect. 8) ostiolar evaporative area. 9) genital capsule, caudal aspect. 10) left paramere, caudal aspect. 11) right paramere, caudal aspect. 12) pretarsus.



Figures. 13-15. Male genitalia of *Neolygus crataegi*. 13) left paramere. 14) right paramere. 15) vesica.

collected. In November of 2006, Richard Hoffman obtained fruits, leaves, and thorns of the trees from which I collected many of the type specimens. From these samples, the trees were identified by Wieboldt as *C. punctata*, thus pinning down at least one of the possible three hosts of this new plant bug. All of the hawthorns at the site appeared to be this species.

Distribution: Grayson and Smyth counties, Virginia. The type locality, Elk Garden, is an open meadow, elevation about 4800 feet, between Mount Rogers and Whitetop Mountain, and is bisected by the boundary between these two counties. The two samples from Whitetop Mountain were collected on the south side in Grayson County, along Forest Service Road 89.

Discussion: *Neolygus crataegi* is only the second species of the genus associated with hawthorn. *Neolygus univittatus*, known only from New York, Ontario, and Quebec, apparently also feeds exclusively on *Crataegus* (Knight 1919, Kelton 1971). All specimens of *N. crataegi* were taken at relatively high elevations (above 3,000 ft) for the eastern United States. Only further collecting will determine the extent of its range, although it can be speculated that this species will eventually be found at other high-elevation locations along the Blue Ridge Highlands in North Carolina, Tennessee, and other areas of Virginia, wherever its hosts occur.

Although the specific habits of *N. crataegi* are unknown, the relationship of its host genus, *Crataegus*, with fruit crops makes this species of potential concern in commercial orchards. Other species of *Neolygus* have been implicated as important pests of fruit crops. Certain species, such as *N. caryae* (Knight), *N. omnivagus* (Knight) and *N. quercalbae* (Knight), may migrate from their normal hosts (*Carya* spp. and *Quercus* spp.) to cause severe injury to peaches similar to that caused by plum curculio (Smith 1950). Kelton (1982), in his treatment of the mirids on fruit crops in Canada and Alaska, listed eight species of *Neolygus* damaging or feeding on Canadian fruits, including *N. caryae* on apricots and peaches; *N. inconspicuus* on cultivated grape; *N. belfragii* on cranberry, blueberry, current, and gooseberry; and *N. viburni* on plum. The pear plant bug, *Neolygus communis* (Knight), may cause malformation and abscission of pear fruits (Brittain 1916a), and damage from this plant bug has been mistaken for fire blight (Brittain 1916b). More recently, *N. communis* has again become a problem in unsprayed Canadian apple orchards where it causes fruit scarring and deformation (Boivin & Stewart 1982), and Kelton (1982) reported it common on nearly all fruit crops surveyed. Wheeler (2001) summarized the information on injury caused by these and other species of *Neolygus* associated with fruits and ornamentals.

Type specimens: Holotype ♂, USA: Virginia, Smyth County, Appalachian Trail, Elk Garden, near Mt. Rogers, 16 June 1988, T. J. Henry coll., taken on flowers of *Crataegus* sp. (USNM [National Museum of Natural History,

Washington, DC]. Paratypes: 13 ♂♂, 10 ♀♀, same data as for holotype (USNM, VMNH [Virginia Museum of Natural History, Martinsville]); 1 ♂, 4 ♀♀, USA: Virginia, Grayson County, Whitetop Mountain., 17 June 1988, T. J. Henry coll., taken on flowers of *Crataegus* sp. (USNM); 1 ♂, USA: Grayson County, DF site off FS 89, Whitetop Mountain, 5,000 ft., beechwoods, 11-25 June 1993, VMNH Survey (VMNH).

ACKNOWLEDGMENTS

I am grateful to Kathleen A. Schmidt (Hillsdale, New York) for the mixed-medium male habitus illustration; Michele A. Touchet (Systematic Entomology Laboratory, ARS, USDA [SEL], c/o USNM, Washington, DC) for the dorsal and lateral photographs; Karolyn Darrow (Washington, DC) for the final rendering of the male genitalia illustrations; Richard L. Hoffman (Virginia Museum of Natural History, Martinsville) for lending additional material from Whitetop Mountain and assistance with the plant identification; and Thomas F. Wieboldt (Virginia Polytechnic Institute and State University, Blacksburg) for information on local species of *Crataegus*, including the identification of *C. punctata*. Michael G. Pogue (SEL), Alfred G. Wheeler, Jr. (Clemson University, Clemson, South Carolina), and Norman E. Woodley (SEL) kindly reviewed the manuscript and offered suggestions for its improvement.

LITERATURE CITED

- Boivin, G. & R. K. Stewart. 1982. Identification and evaluation of damage to McIntosh apples by phytophagous mirids (Hemiptera: Miridae) in southwestern Quebec. *Canadian Entomologist* 114: 1037B1045.
- Brittain, W. H. 1916a. The green apple bug (*Lygus invitus* Say) in Nova Scotia. 46th Annual Report on Entomology of Ontario 1915: 65-78.
- Brittain, W. H. 1916b. [discussion of mirid papers by Brittain and Crawford]. 46th Annual Report on Entomology of Ontario 1915: 88.
- Clayton, R. A. 1982. A phylogenetic analysis of *Lygocoris* Reuter (Heteroptera: Miridae) with notes on life histories and zoogeography. Master's Thesis, Iowa State University, Ames. 78 pp.
- Henry, T. J. & A. G. Wheeler, Jr. 1988. Family Miridae Hahn, 1833 (= Capsidae Burmeister, 1835). The plant bugs. Pp. 251-507. *In*: Henry, T. J. and R. C. Froeschner, eds. *Catalog of the Heteroptera, or true bugs, of Canada and the continental United States*. E. J. Brill, Leiden and New York. 958 pp.
- Henry, T. J., C. V. Covell, Jr., & A. G. Wheeler, Jr. 2005. An annotated list of the plant bugs, or Miridae (Hemiptera: Heteroptera), of Kentucky. *Journal of the New York Entomological Society* 113: 24-76.

- Kelton, L. A. 1955. Genera and subgenera of the *Lygus* complex (Hemiptera: Miridae). *Canadian Entomologist* 87: 277-301.
- Kelton, L. A. 1971. Review of *Lygocoris* species found in Canada and Alaska (Heteroptera: Miridae). *Memoirs of the Entomological Society of Canada* 83: 1-87.
- Kelton, L. A. 1982. Plant bugs on fruit crops in Canada. Research Branch, Agriculture Canada Monograph. No. 24. 201 pp.
- Kerzhner, I. M. & M. Josifov. 1999. Cimicomorpha II. Miridae. Pp. 1-577. *In*: Aukema, B. and C. Rieger, eds. *Catalogue of the Heteroptera of the Palaearctic Region*. The Netherlands Entomological Society, Amsterdam.
- Knight, H. H. 1917. A revision of the genus *Lygus* as it occurs in America north of Mexico, with biological data on the species from New York. *Bulletin of the Cornell University Agricultural Experiment Station* No. 391, pp. 555-645.
- Knight, H. H. 1918. Additional data on the distribution and food plants of *Lygus* with descriptions of a new species and variety (Hemip. Miridae). *Bulletin of the Brooklyn Entomological Society* 13: 42-45.
- Knight, H. H. 1919. The male of *Lygus univittatus* with the description of a new *Lygus* (Hemip. Miridae). *Bulletin of the Brooklyn Entomological Society* 14: 21-22.
- Knight, H. H. 1923. Family Miridae (Capsidae). Pp. 422-658. *In*: W. Britton, ed. *The Hemiptera, or sucking insects, of Connecticut*. *Bulletin of the Connecticut State Geological and Natural History Survey* No. 34.
- Knight, H. H. 1925. Description of thirty new species and two new genera of North American Miridae (Hemiptera). *Bulletin of the Brooklyn Entomological Society* 20: 33-58.
- Knight, H. H. 1939. Three new species of Miridae from North America (Hemiptera). *Bulletin of the Brooklyn Entomological Society* 34: 21-23.
- Knight, H. H. 1941. The plant bugs, or Miridae, of Illinois. *Bulletin of the Illinois State Natural History Survey* 22: 1-234.
- Knight, H. H. 1953. New species of Miridae from Missouri (Hemiptera). *Iowa State Journal of Science* 27: 509-518.
- Leston, D. 1952. On certain subgenera of *Lygus* Hahn 1833 (Hem., Miridae), with a review of the British species. *Entomologist's Gazette* 3: 213-230.
- Schuh, R. T. 1995. Plant bugs of the world (Insecta: Heteroptera: Miridae). Systematic catalog distributions, host list, and bibliography. The New York Entomological Society, New York. 1329 pp.
- Smith, E. H. 1950. The problem of controlling peach pests in New York State. *Proceedings of the New York State Horticultural Society* 1950: 213-220.
- Wheeler, A. G., Jr. 2001. *Biology of the plant bugs (Hemiptera: Miridae). Pests, predators, opportunists*. Cornell University Press, Ithaca, New York. 507 pp.
- Yasunaga, T., M. D. Schwartz, & F. Chérot. 2002. New genera, synonymies, and combinations in the "*Lygus* complex" from Japan, with discussion on *Peltdolygus* Poppius and *Warrisia* Carvalho (Heteroptera: Miridae: Mirinae). *American Museum Novitates* 3378: 1-26.