

**SEASONAL OCCURRENCE OF THE MIRIDAE
(HETEROPTERA) ASSOCIATED WITH OHIO BUCKEYE,
AESCULUS GLABRA WILLD., IN MISSOURI**

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Abstract.—Seasonal history of the mirids *Lygocoris aesculi* (Knight), *Microphylellus modestus* Reuter, and *Orthotylus aesculicola* Blinn was followed on *Aesculus glabra* Willd. in central Missouri during 1985–86. The activity period of these univoltine plant bugs was confined to late March to early June, concurrent with the onset of flowering and leaf flush, with almost complete overlap between the species. The adult male of *L. aesculi* and the fifth-instar nymphs of all 3 species are described and illustrated.

The large plant bug genera *Lygocoris* Reuter and *Orthotylus* Fieber are better known compared to many other mirid genera, with respect to their host plants and distribution; much less is known about the genus *Microphylellus* Reuter. Members of these genera are in general arboreal and feed on a variety of trees and shrubs. Ohio buckeye, *Aesculus glabra* Willd., is interesting because it is a host of 1 species each of *Lygocoris* and *Orthotylus*, both of which are known only from Missouri. The discovery in 1984 of breeding populations of these little-known plant bugs, *Lygocoris aesculi* (Knight), and *Orthotylus aesculicola* Blinn, and the more widely known *Microphylellus modestus* Reuter, was the motivation for this study.

Herein I summarize the distribution, seasonal occurrence, and food habits for the 3 mirids found breeding on Ohio buckeye in Missouri. Descriptions of the adult male of *L. aesculi* (Knight) and of the fifth instars of the 3 species are also given.

STUDY SITE AND METHODS

The study site in Columbia (Boone Co.), Missouri, was a rocky, southern-exposed slope in a wooded area dominated by white oak, *Quercus alba* L., and shagbark hickory, *Carya ovata* (Mill.) K. Koch, with an understory of mostly Ohio buckeye, *A. glabra* Willd., and serviceberry, *Amelanchier arborea* (Michx. f.) Fern. The buckeyes were a mixture of mature and young trees ranging from 2–10 meters high.

Sampling began at, or slightly before, bud break to determine earliest eclosion (9 April in 1985; 31 March in 1986) and continued every 3 to 7 days until adults were no longer collected (early June). Mirids were sampled visually by inspecting the foliage and flowers of Ohio buckeye trees for ca. 30 minutes, and any specimens observed were captured. If an adequate sample was not obtained by visual inspection, the branches were shaken into a standard 15-inch beating net to obtain additional specimens. The numbers were generally small, with a typical sample consisting of 10 or fewer specimens of each species. Immatures were placed in alcohol and sorted to species and instar in the laboratory; preserved adults and immatures were deposited

as voucher specimens in the North Carolina State University Insect Collection, Raleigh. All measurements are in millimeters.

RESULTS AND DISCUSSION

Lygocoris aesculi (Knight)

Known only from Missouri, this mirine was originally described by Knight (1953) as *Neolygus aesculi* from three females collected on "buckeye leaves" in Kansas City (Jackson Co.). Blinn and Yonke (1985) collected this species in Columbia (Boone Co.) on Ohio buckeye.

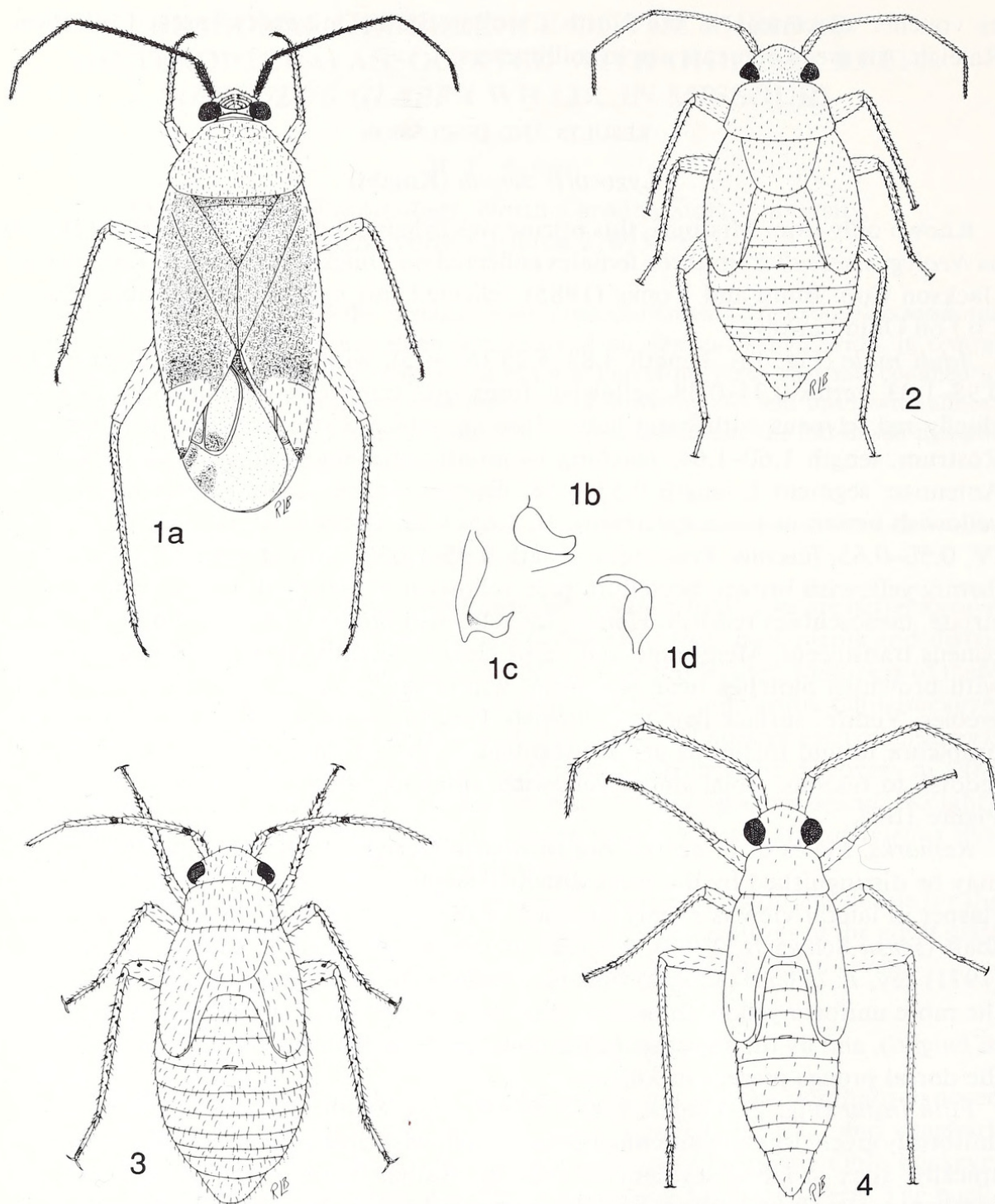
Adult male (Fig. 1a). Length 4.83–5.25 (N = 5), width 2.04–2.30. Head: width 0.98–1.03, vertex 0.35–0.38, yellowish, frons with transverse red lines, juga and lora chiefly red, clypeus with basal half yellowish with red streaks, distal half fuscous. Rostrum, length 1.60–1.64, reaching to middle of metacoxae, pale, apex fuscous. Antennae: segment I, length 0.53–0.58, fuscous, dorsal aspect (especially distally) yellowish brown in some specimens; II, 1.65–1.83, fuscous; III, 0.93–1.05, fuscous; IV, 0.50–0.65, fuscous. Pronotum: length 0.95–1.05, width at base 1.73–1.88; uniformly yellowish brown. Scutellum pale yellowish to yellowish brown, transversely striate, mesoscutum reddish. Hemelytra yellowish brown to brown. Embolium and cuneus translucent. Membrane and veins clear to slightly dusky, variously marked with brownish blotches near anal vein, within areoles near their apices and near areoles. Ventral surface pale to yellowish. Fuscous stripe extending from venter of propleura to and including genital segment. Legs pale, apical half of hind femora reddish to fuscous; tibial spines yellowish; third tarsal segment fuscous. Genitalia: Figure 1b–d.

Remarks. Males of *L. aesculi* run to *viburni* (Knight) in Knight's (1941) key, but may be distinguished by the black antennal segment II and male genitalia. The left clasper in lateral view is evenly rounded at the angle between the sensory lobe and shaft (*sensu* Schwartz, 1984), whereas in *viburni* the angle is sinuate. In Kelton's (1971) key, *L. aesculi* (Knight) runs to *knighti* Kelton, but may be distinguished by the more uniform yellowish brown color, lack of dark rays behind the calli (present in *knighti*), and by the structure of the male genitalia. The left clasper of *aesculi* lacks the dorsal prongs present in *knighti*.

Fifth instar (Fig. 2). Length 3.40–3.96 (N = 5), width 1.60–1.82. Elongate oval, uniformly green, legs and antennae green to yellowish green, tarsal segment II fuscous apically, apex of labial segment IV fuscous. Rather densely clothed with pale, recumbent setae. Head: width 0.85–0.93, vertex 0.45–0.49. Rostrum, length 1.25–1.33, reaching base of mesocoxae. Antennae: segment I, length 0.33–0.36; II, 1.07–1.11; III, 0.82–0.87; IV, 0.45–0.56. Pronotum: length 0.45–0.49, width at base 1.18–1.29. Wing pads reaching abdominal segment IV; dorsal scent gland opening pale, indistinct. Parempodia fleshy, divergent apically.

Microphylellus modestus Reuter

This mirid is widely distributed in eastern North America, extending from Quebec south to North Carolina and west to Saskatchewan and Texas (Henry and Wheeler, 1988). In addition to Ohio buckeye, *M. modestus* has been recorded from *Acer* sp.,



Figs. 1–4. Fig. 1a–d. *Lygocoris aesculi* adult. 1a. Adult male habitus. 1b. Left paramere, lateral view. 1c. Left paramere, dorsal view. 1d. Right paramere, ventral view. Fig. 2. *Lygocoris aesculi*, fifth-instar nymph. Fig. 3. *Microphylellus modestus*, fifth-instar nymph. Fig. 4. *Orthotylus aesculicola*, fifth-instar nymph.

Catalpa sp., *Fraxinus pennsylvanica* Marsh., *Quercus velutina* Lam. (Blinn and Yonke, 1985), *Q. macrocarpa* Michx. (Kelton, 1980), *Carya* sp., *Corylus americana* Walt., *Crataegus mollis* (T. & G.) Scheele, *Q. alba* L., *Ulmus* sp. (Knight, 1941), and *Q. stellata* Wangenh. (Wheeler et al., 1983).

Although adults have been collected from a large number of plants and are believed to breed on *Ulmus* sp., there is no published evidence that any of these plants, other than Ohio buckeye, serve as true breeding hosts. Knight (1941) observed this species on elm leaves curled by aphids, where it fed to some extent on honeydew; less often, he observed it feeding on the eggs of the elm leaf beetle, *Pyrrhalta luteola* (Muller).

Fifth instar (Fig. 3). Length 2.15–2.64 ($N = 10$), width 0.87–1.18. Elongate oval, uniformly green, setigerous spot near apex of antennal segment I, basal annulus on antennal segments II and III, setigerous spot located anteriorly near apex of pro- and mesofemora, metafemora with 2 setigerous spots near apex, 1 anteriorly and a smaller 1 posteriorly, and spots at base of spines on tibiae fuscous. Densely clothed with pale recumbent setae. Head: width 0.55–0.62; vertex 0.31–0.37. Rostrum, length 0.80–0.96, extending to between metacoxae. Antennae: segment I, length 0.16–0.19; II, 0.49–0.55; III, 0.40–0.45; IV, 0.32–0.36. Pronotum: length 0.35–0.39, width at base 0.64–0.75. Wing pads reaching to or slightly beyond abdominal segment IV, dorsal scent gland opening slitlike. Parempodia to setiform, parallel.

Orthotylus aesculicola Blinn

This orthotyline was originally described from material collected in Columbia (Boone Co.), Missouri, on Ohio buckeye by Blinn (1987), who illustrated the adult and male genitalia.

Fifth instar (Fig. 4). Length 3.09–3.81 ($N = 8$), width 0.96–1.16. Elongate slender, uniformly green to yellowish green, head tinged with orange near eyes. Sparsely clothed with pale, recumbent setae. Head: width 0.73–0.76; vertex 0.35–0.44. Rostrum, length 0.98–1.11, extending to apex of mesocoxae. Antennae: segment I, length 0.33–0.38; II, 1.02–1.09; III, 0.69–0.75; IV, 0.49–0.56. Pronotum: length 0.38–0.45, width at base 0.75–0.85. Wing pads reaching abdominal segment IV, dorsal scent gland opening slitlike, anterior area tinged with orange (faded in preserved specimens). Parempodia fleshy, convergent apically.

Seasonal History

Sampling results are given in Figures 5 and 6. Figure 5 gives the percentage of all stages of each species relative to the total number of Miridae collected per sampling date. Figure 6 shows the immatures and adults of each species separately as a percentage of the total immature, and adult catch, respectively, per sampling date.

The life cycles of these 3 species are similar and can be summarized as follows. All three species were present from late March or early April to the end of May, with almost complete overlap among the species (Fig. 5). Overwintering eggs begin to hatch from late March to early April, coinciding with leaf flush and the onset of flowering. All instars of these species are active feeding stages, and development takes place during a time when the host plant is producing new growth and flowers. Early instars (I–III) of both *L. aesculi* and *O. aesculicola* were observed feeding on the expanding leaflets and flowers where, with their uniform green color, they resembled the color of the young foliage and flowers. Later instars (IV–V) and adults of *L. aesculi* and *O. aesculicola* were observed feeding on both the flowers and leaves at about equal frequencies, with the former species preferring the flowers and the latter species the underside of leaves. Feeding by *M. modestus* was not observed.

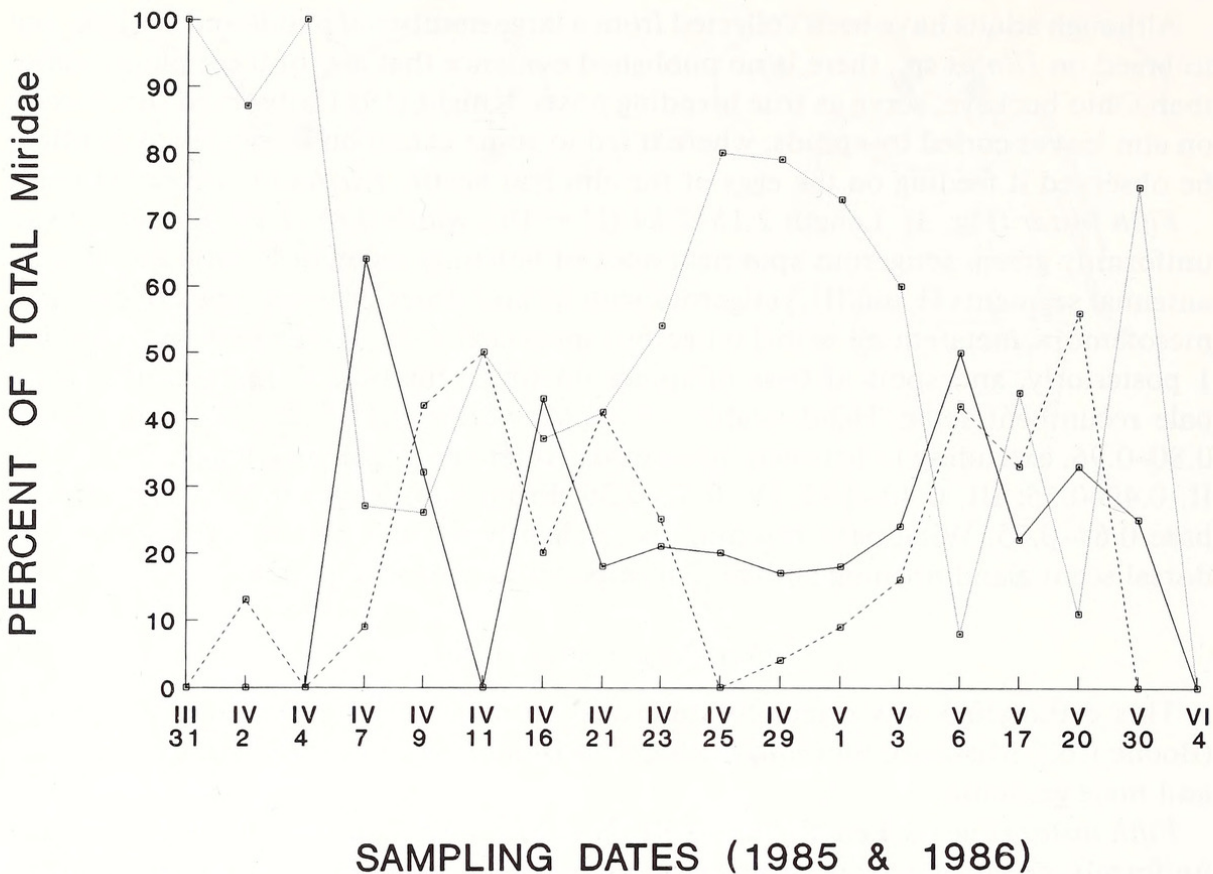


Fig. 5. Seasonal occurrence of the three species of Miridae on *Aesculus glabra* during 1985 and 1986. Adults and immatures combined for each plant bug species. Solid line = *Lygocoris aesculi*; dotted line = *Microphylellus modestus*; dashed line = *Orthotylus aesculicola*.

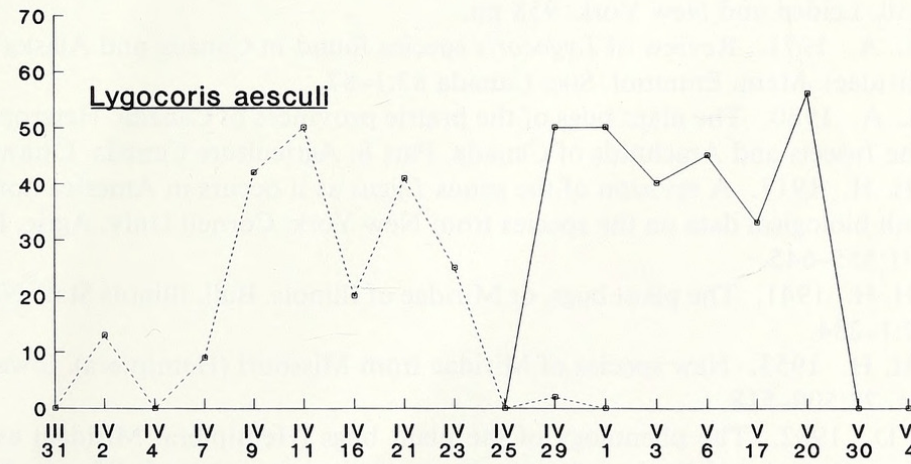
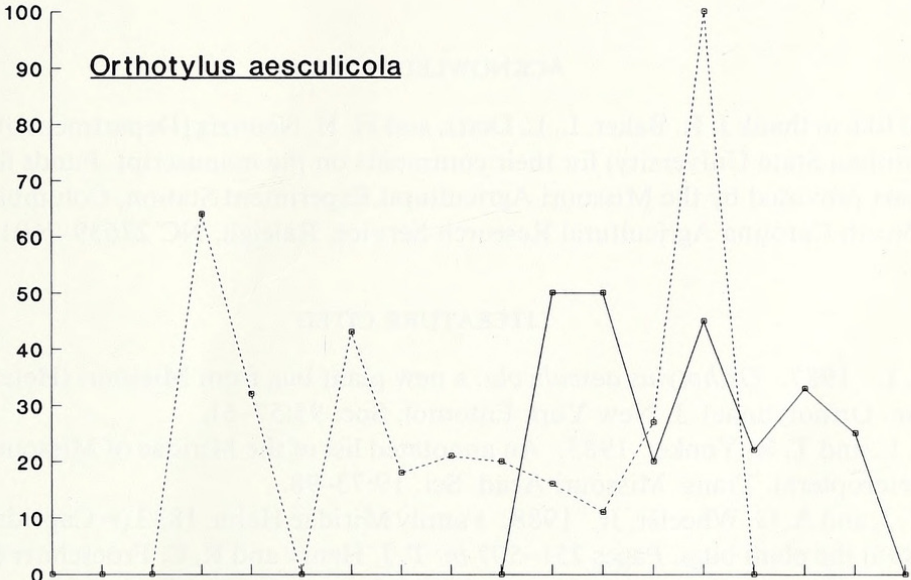
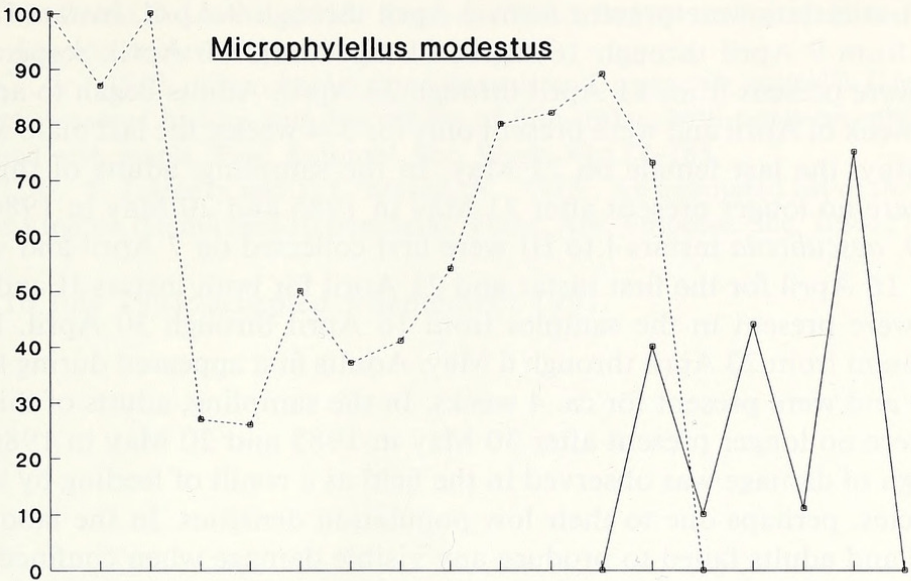
Developmental time from first instar to the adult molt takes ca. 3.5 to 4.5 weeks, with each of the 5 nymphal instars taking from 4 to 7 days. Adults can be found in the field for 3 to 4 weeks following eclosion from late April through May where they mate and the females deposit the overwintering eggs. By late May or early June the active portion of the life cycle of these mirids has ended, with the eggs overwintering to complete the life cycle. There was no evidence of more than a single generation per year for each species, which is consistent with what has been reported for congeners (Knight, 1917; Pinto, 1982; Southwood and Leston, 1959; Wheeler, 1982).

M. modestus was the first species to appear in the sampling. First instars were present from 31 March to 4 April. Instars II and III were first collected on 7 April, and 9 April, respectively and were present until 21 April and 25 April, respectively. Fourth instars were collected only from 21 April to 23 April. Fifth instars were present from 23 April to 3 May. Adults first appeared in the samples on 3 May and were present until 30 May.

For *L. aesculi* the earliest specimen observed was a first instar collected on 2 April

Fig. 6. Seasonal occurrence of the three species of Miridae on *Aesculus glabra* during 1985 and 1986. Dotted lines indicate immatures, solid lines adults.

PERCENT OF TOTAL IMMATURE/ADULT Miridae



SAMPLING DATES (1985 & 1986)

1986. First instars were present from 2 April through 9 April. Instars II to IV were present from 9 April through 16 April, 11 April, and 30 April, respectively. Fifth instars were present from 11 April through 23 April. Adults began to appear during the last week of April and were present only for 3–4 weeks; the last male was collected on 17 May, the last female on 21 May. In the sampling, adults of this univoltine mirid were no longer present after 21 May in 1985 and 20 May in 1986.

For *O. aesculicola* instars I to III were first collected on 7 April and were present through 16 April for the first instar and 21 April for both instars II and III. Fourth instars were present in the samples from 16 April through 30 April. Fifth instars were present from 23 April through 6 May. Adults first appeared during the last week of April and were present for ca. 4 weeks. In the sampling, adults of this univoltine mirid were no longer present after 30 May in 1985 and 20 May in 1986.

No sign of damage was observed in the field as a result of feeding by these 3 plant bug species, perhaps due to their low population densities. In the laboratory, both nymphs and adults failed to produce any visible damage when confined to unblemished leaves of Ohio buckeye.

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