

**CRASPEDOLEPTA EAS: DISTRIBUTION, HOSTS, AND HABITS  
OF A PHLOX SPECIALIST  
(HOMOPTERA: PSYLLOIDEA: APHALARIDAE)**

A. G. WHEELER, JR.

Bureau of Plant Industry, Pennsylvania Department of Agriculture, Harrisburg, Pennsylvania 17110.

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*Abstract.*—*Craspedolepta eas* (McAtee), a psyllid known previously from Maryland and unrecorded since its description in 1918, is newly reported from Illinois, Missouri, Pennsylvania, Virginia, and West Virginia, and an additional Maryland record is given. *Phlox divaricata*, *P. stolonifera*, and *P. subulata* are cited as the first host plant records of *C. eas* and the first members of the Polemoniaceae to serve as hosts of a Nearctic psyllid. This early-season, univoltine species is sometimes common on *P. subulata* in shale barrens and on shale outcrops, developing on host stems at or near ground level. Nymphs overwinter at the base of phlox plants, adults begin to appear by early to mid-April, and they usually are present only until mid- to late May. Recognition features and a photograph of the adult are presented.

*Key Words:* Insecta, Psylloidea, distribution, host specialization, shale barrens

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During studies of plant bugs (Heteroptera: Miridae) associated with *Phlox subulata* L., I collected the little-known psyllid *Craspedolepta eas* (McAtee). Herein, I give new distribution records of *C. eas*, the first host plant associations, and notes on its seasonal history and habits. Recognition features of the adult are provided.

*Craspedolepta eas* (McAtee)

This psyllid was described in the genus *Aphalara* Foerster from specimens collected in Maryland near the Potomac River in the Washington, D.C., area: Plimmers Island (and vicinity) and Great Falls (McAtee 1918). McAtee said he swept adults from low vegetation but was unable to determine the host. The unusual specific epithet is an acronym that honors E. A. Schwarz, a coleopterist and entomologist of diverse interests, including the Psylloidea (McAtee 1918, Howard et al. 1928).

No additional specimens of *C. eas* have

been reported since its original description, and subsequent literature references to this species have been few. Russell (1973) recognized *Craspedolepta* Enderlein as a Holarctic genus distinct from *Aphalara* and included *eas* among North American taxa transferred to *Craspedolepta*. Journet and Vickery (1978) agreed with the placement of *eas* in *Craspedolepta*. Journet and Vickery (1979) figured male and female reproductive structures and terminalia in revising the Nearctic species of *Craspedolepta*, noting *C. eas* is known only from one region in Maryland and that the host is unknown. Hodkinson's (1988) annotated checklist of Nearctic psyllids reconfirmed the limited distribution and lack of biological information.

DISTRIBUTION

The following records of *C. eas* extend the known range (Figs. 1, 2); all specimens were collected by the author from *Phlox*



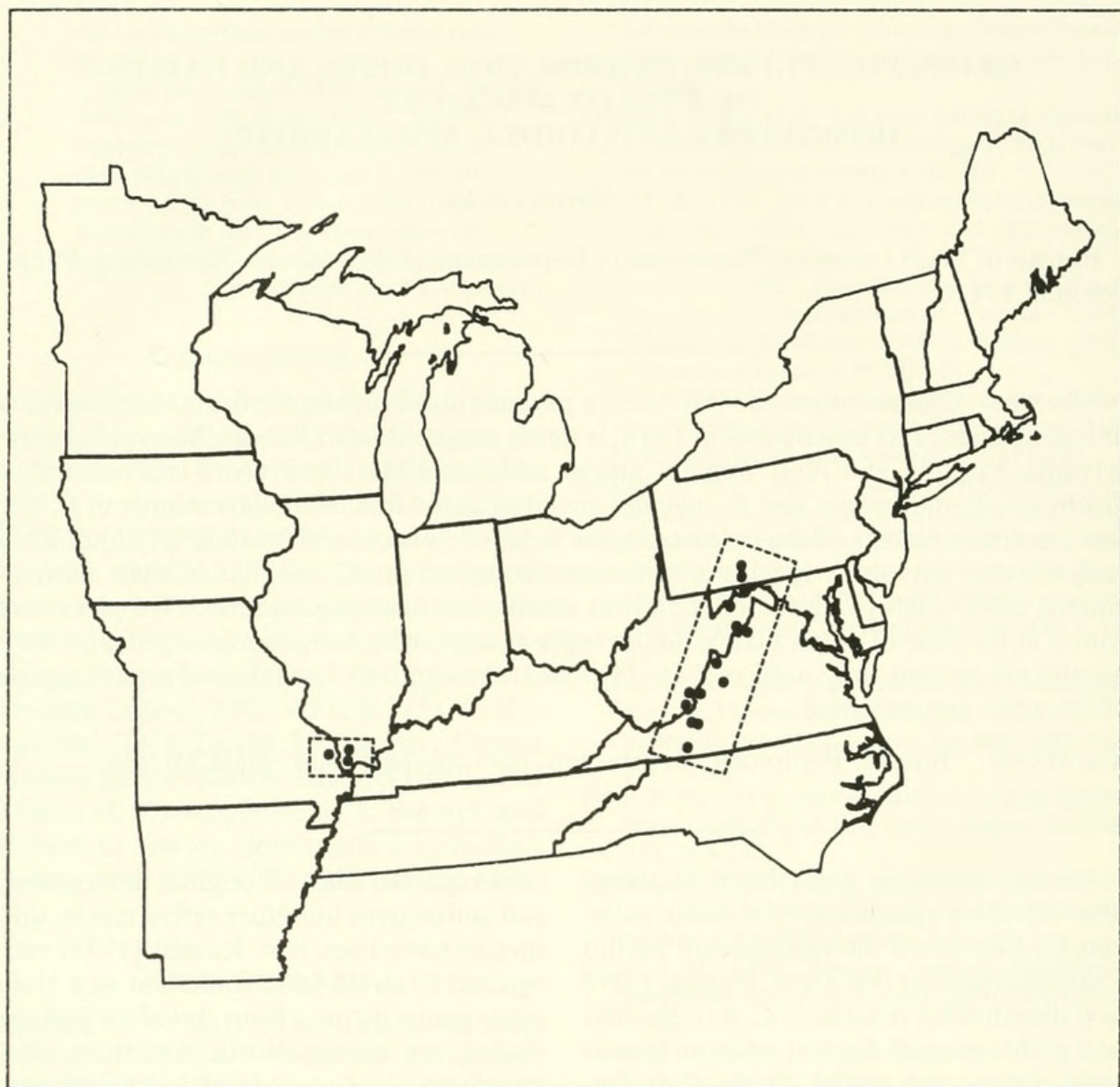


Fig. 1. New distribution records of *C. eas* (see also Fig. 2).

spp. (see also Host Plants and Habitats). Voucher material has been deposited in the collections of the Carnegie Museum of Natural History, Pittsburgh, PA (CMNH); Cornell University, Ithaca, NY (CUIC); National Museum of Natural History, Beltsville, MD (USNM); and Pennsylvania Department of Agriculture, Harrisburg (PADA).

ILLINOIS: *Alexander Co.*, Rt. 3, 0.5 mi. SE of Thebes, 25 April 1993 (nymphs only); *Union Co.*, Larue-Pine Hills Ecological Area,

22 April 1993 (nymphs only; adults reared). MARYLAND: *Allegany Co.*, Fifteen Mile Creek Rd. at Piclic Rd., Green Ridge State Forest, 15 May 1993. MISSOURI: *Cape Girardeau Co.*, co. rd. 630, E. of Egypt Mills, 25 April 1993 (nymphs only). PENNSYLVANIA: *Bedford Co.*, Shawnee State Park S. of Schellsburg, 9 May 1990; NE of Ryot, 10 May 1992. VIRGINIA: *Alleghany Co.*, George Washington Natl. Forest, Rt. 18, 6 and 10.6 mi. SW of Covington, 14 May 1989; *Carroll Co.*, Rt. 638, 3.0 mi. SE of



Dugspur, 15 May 1992; *Highland Co.*, shale barren, Head Waters, 9 May 1993; *Montgomery Co.*, Rt. 713 nr. junc. Rt. 603 N. of Ironto, 18 and 25 April 1991, 19 April 1992, and 2 May 1993; Rt. 625 NNW of McCoy nr. Big Falls, 18 April 1991; *Rockbridge Co.*, Rts. 39 and 42 W. of Goshen, 4 May 1989 and 8 April and 5 May 1990; *Shenandoah Co.*, Short Mountain barrens, 3 mi. SE of Mount Jackson, 14 April and 11 May 1991; 12, 17 and 19 April and 17 May 1992 (4 Sept. 1992, nymphs only); and 27 March and 11 April 1993 (nymphs only). WEST VIRGINIA: *Greenbrier Co.*, Kates Mountain barrens, S. of White Sulphur Springs, 6 and 19 May and 2 June 1990 and 27 March (nymphs only) and 12 May 1991; *Hardy Co.*, Lost River Rd., NW of Lost River State Park NW of Mathias, 5 May 1990; *Mineral Co.*, Rt. 50, 0.5 mi. E. and W. of Burlington, 30 April 1993; *Monroe Co.*, Rt. 219, 1 mi. S. of Salt Sulphur Springs, 8 May 1993.

#### HOST PLANTS AND HABITATS

The majority of my collections were made from moss phlox (also called ground-, moss-, or rock-pink), *P. subulata* (Polemoniaceae), and its varieties. This perennial of many-branched woody stems and persistent, sharp-pointed, awl-shaped leaves forms dense mats on sandy or gravelly soil and rocky ledges (Wherry 1936, Everett 1981). *Phlox subulata* is a pioneer, xerophytic plant that often colonizes bare, sunny slopes (Wherry 1929b). It is rarely found in nearby woods or meadows (Allard and Leonard 1946), where it is outcompeted by faster growing plants (Morse 1988). A characteristic (but not endemic) plant of mid-Appalachian shale barrens, moss phlox occurs on other types of bedrock (Wherry 1930, 1955, Core 1966, Keener 1983) and is common in serpentine barrens (Wherry 1929a). It also grows on limestone cliffs (Core 1966) and along rocky slopes of the Potomac Valley near Washington, D.C. (Wherry 1930). The range is from southern Ontario and New

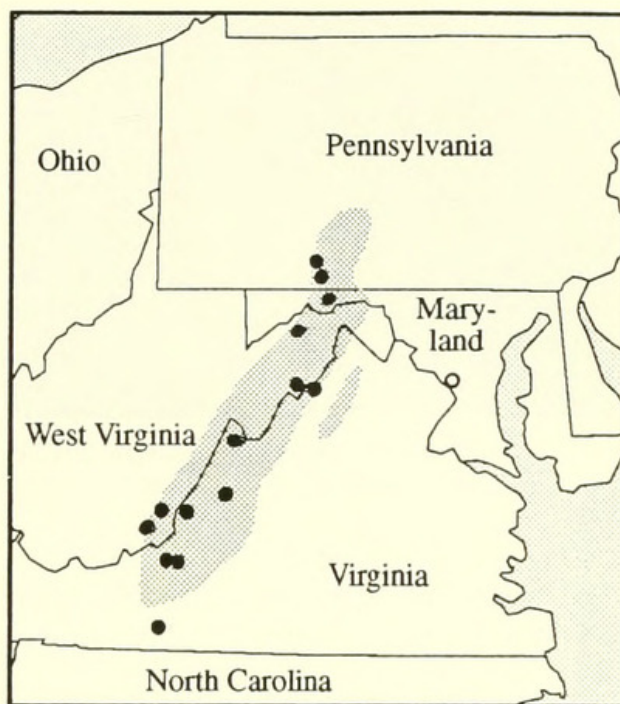


Fig. 2. Known distribution of *C. eas* in relation to that of mid-Appalachian shale barrens; circle = type locality in Maryland near Washington, D.C., filled circles = new records, and stippling = distribution of mid-Appalachian shale barrens based on Keener (1983).

York to southern Michigan and south to the mountains of North Carolina and Tennessee (Wherry 1929b, 1955, Flory 1970, Everett 1981, Gleason and Cronquist 1991).

*Craspedolepta eas* develops on *P. subulata* in classic and well-known shale barrens (Fig. 2) such as Kates Mountain in West Virginia (Core 1940, Keener 1983) and Head Waters and Short Mountain in Virginia (Allard and Leonard 1946), and it occurs on this plant on other shale outcrops. This psyllid also was collected on phloxes that occupy habitats other than shale barrens. Nymphs and adults were found on blue (or forest) phlox, *P. divaricata* L., growing in rich woods near the New River in Virginia (Montgomery Co., Big Falls locality above) and at the edge of woods in Monroe Co., West Virginia. *Phlox divaricata* growing in similar habitats was the host in Illinois and Missouri. Adults were common on creeping (or crawling) phlox, *P. stolonifera* Sims, inhabiting



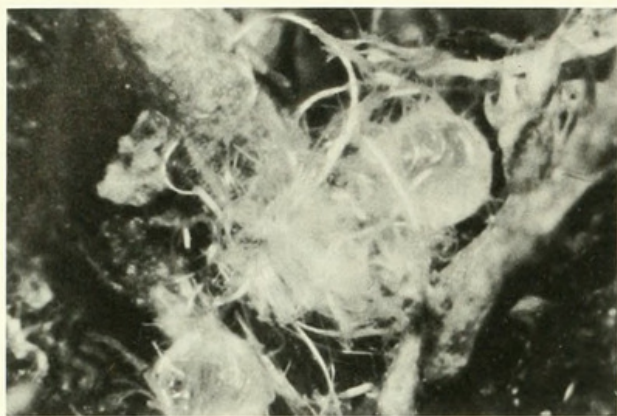


Fig. 3. Honeydew droplets and waxy filaments produced by *C. eas* nymphs on basal stems of *Phlox subulata*.

damp woods along the stream bottom of the Brandon Branch in Carroll Co., Virginia.

#### SEASONAL HISTORY AND HABITS

Biological information on *C. eas* is based mainly on early-season observations of populations on *P. subulata* during 1989–1993 and supplemented by less frequent observations during August 1990, September 1992, and July 1993. Nymphs overwinter on woody stems at the base of plants, and third instars have been found in late March. In spring, nymphal development resumes early in shale barrens, which are generally exposed, bare slopes of southern exposure characterized by high insolation temperatures.

Nymphs feed on stems rather than on the foliage, occurring at or slightly below ground level. Their brown color blends in well with that of *P. subulata* stems, and nymphs are obscured by the prostrate stems and dense foliage of this mat- or cushionlike host. Colonies of *C. eas*, however, can be detected on infested moss phlox by folding over the mats and looking for the white waxy secretions and droplets of honeydew that nymphs produce on basal stems (Fig. 3). Nymphs were found on *P. divaricata* by scraping away leaves and soil from the base of plants. Despite the copious production of honeydew, no ants were observed attending *C. eas* nymphs.

Although this psyllid can be collected with a sweepnet (McAtee 1918), adults were most easily obtained from *P. subulata* by holding a shallow pan at the plant's base, shaking the prostrate stems over the pan, and hand picking or aspirating dislodged specimens. They were similarly collected from *P. divaricata* and *P. stolonifera*, but at times they probably could be collected from these more upright phloxes by using a sweepnet.

Adults of this univoltine species began to appear on *P. subulata* by early to mid-April in mid-Appalachian shale barrens. At Short Mountain, a few adults were present on 12 April in 1992; teneral adults were collected the year before on 14 April. By 11 May 1991, no adults could be collected, but they were still common on some *P. subulata* plants on 17 May 1992. At the slightly higher elevation on Kates Mountain, a last-instar nymph was collected as late as 19 May 1990, and a few adults were collected there on 2 June. No adults were found during the summer at any of the localities.

Early instars, which presumably would overwinter, were observed on basal stems in early September at Short Mountain. These nymphs were covered by only small amounts of wax and, in contrast to the mid- to late instars observed in spring, no honeydew production was evident. Feeding may be minimal on *P. subulata* during adverse conditions in summer when temperatures on the shale barren surface may be 55–60°C (Platt 1951). Surface temperatures, of course, would be much lower in shaded forest habitats where *C. eas* occurs on *P. divaricata* and *P. stolonifera*. *Craspedolepta eas*, however, may be typical of the genus in having a long nymphal diapause that represents an adaptation to extreme arid conditions of a probable Mediterranean-Subtropical origin (Loginova 1963, Journet and Vickery 1978 and references therein).

#### RECOGNITION CHARACTERS

The rounded clypeus, rather than cone-shaped or elongate as in species of *Aphalara*,



and absence of a distinct furrow separating the vertex from the genae, allow placement of *C. eas* in *Craspedolepta*. Additional characters distinguishing these similar-appearing genera are discussed by Heslop-Harrison (1949), Russell (1973), and Journet and Vickery (1978).

Technical characters probably are not needed for a tentative determination of *C. eas* (Fig. 4). McAtee (1918) said his new species could be easily recognized by its "chunky appearance, and broad milky fore wings with some of the veins darkened distally." Journet and Vickery (1979) diagnosed and illustrated *C. eas*, stating this whitish species is so distinctive among North American *Craspedolepta* that identification should not be a problem. They also said it cannot be confused with any Palearctic member of the genus.

A more widely distributed species of *Craspedolepta* usually co-occurs with *C. eas* on *P. subulata*. This second phlox-inhabiting psyllid, which cannot be confused with *C. eas* because of its green color, closely resembles *C. flavida* (Caldwell). It will be reported on once its identity is confirmed.

#### DISCUSSION

*Craspedolepta eas* has remained a poorly known psyllid, with apparently no additional specimens reported since the original description about 75 years ago. In addition to the type series, the USNM collection contains only a few other specimens; all were collected from the same Maryland localities and at approximately the same time as the types, but they were not designated as paratypes. Its perceived rareness has most likely resulted from its cryptic habits, early-season occurrence, and a general lack of attention to the Psylloidea by entomologists.

Like nearly all Psylloidea (Hodkinson 1974), *C. eas* is narrowly host specific. Although several specimens (including two paratypes) collected by H. S. Barber from Great Falls, Maryland, bear labels indicating their collection from wild phlox, McAtee

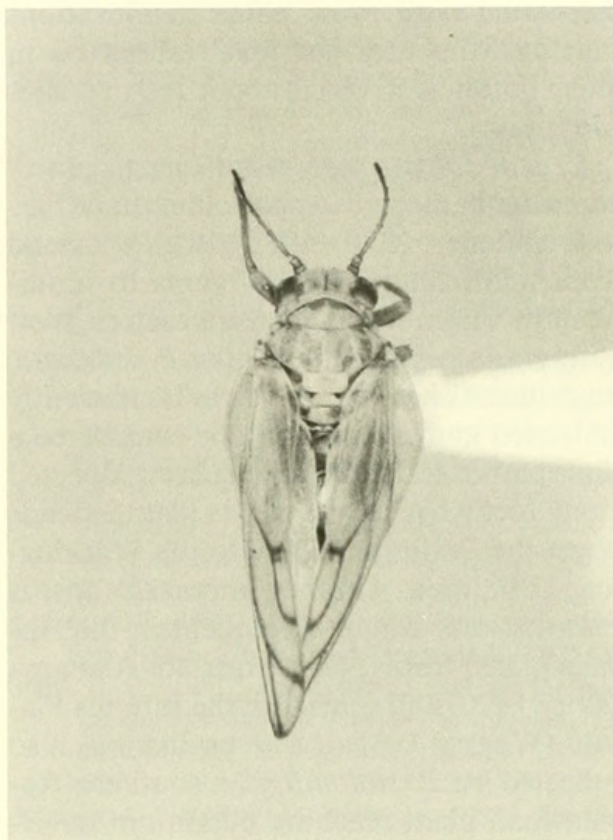


Fig. 4. *Craspedolepta eas*, dorsal habitus.

(1918) did not use this information in describing *C. eas*. The present paper therefore represents the first record of phloxes or any member of the mainly North American family Polemoniaceae (Grant 1959, Flory 1970) serving as a psyllid host plant. Species of the Holarctic genus *Craspedolepta* feed mainly on plants of the Asteraceae and Onagraceae (Hodkinson 1988), with an especially diverse Palearctic fauna associated with composites (Loginova 1963).

The main host of *C. eas* in the Valley and Ridge Province, a long narrow belt consisting of folded mountains and parallel valleys and ridges (Fenneman 1938), is *P. subulata*. This plant's apparent dispersal center lies in eastern West Virginia (Wherry 1935a, b). Most collections were made from the subspecies *brittonii* (Small) Wherry, plants of glandular-hairy inflorescence that have been referred to as *P. subulata* var. *setacea* (L.) A. Brand (Gleason and Cronquist 1991, Rhoads and Klein 1993). The psyllid was



associated with moss phlox at elevations ranging from near sea level (about 60 m along Potomac River) to about 760 m (Kates Mountain).

*Craspedolepta eas* seems particularly common in the mid-Appalachian shale barrens (Keener 1970, 1983), which extend from south-central Pennsylvania to southwestern Virginia and adjacent eastern West Virginia (see Fig. 2). But like *P. subulata*, its principal host, *C. eas* is not sufficiently restricted in distribution to be considered a shale barren endemic, having been collected along rocky banks where this plant extends down the Potomac Valley to the Washington, D.C., area. Another important host is *P. divaricata*, which is frequent in the Appalachians from New York to Alabama (Flory 1970) and centers in the Interior Plateau (Wherry 1935a). The psyllid was also collected on *P. stolonifera*, a southern Appalachian plant reaching maximum development in West Virginia (Wherry 1935a, 1936) and that hybridizes with *P. subulata* (Wherry 1955, Flory 1970).

This psyllid appears not to have followed (or had ample time to follow) the slow migration of *P. subulata* northeast- and northwestward from presumed glacial refugia, which Wherry (1929b; 1935a, b) suggested were in the mid-Appalachians. I have not collected it on native moss phlox in Kentucky, Maryland, Ohio, New Jersey, and New York or on this plant in serpentine barrens and other communities in eastern Pennsylvania; nor has it been found in ornamental plantings of *P. subulata* in the mid-Appalachians. I also have not been able to find this psyllid on *P. bifida* Beck in Illinois, Indiana, Kentucky, or Tennessee or on *P. nivalis* Lodd. in North and South Carolina. In addition to *P. subulata*, *P. bifida* and *P. nivalis* are the only other eastern narrow-leaved phloxes belonging to the section (or subsection) *Subulatae* (Smith and Levin 1967, Flory 1970).

*Craspedolepta eas* appears to be patchily distributed on phloxes in the mid-Appala-

chians, but comments on the extent of its range must be considered tentative. It often appears to be restricted to a small percentage of plants in a colony, which, coupled with its cryptic habits, makes *C. eas* difficult to detect. For several seasons I surveyed *P. subulata* at the Head Waters shale barren in Virginia and the barren in Allegany County, Maryland, when adults of this psyllid should have been present, but did not find it until 1993. I considered it a probable Appalachian endemic before I discovered populations in Illinois and Missouri. Additional collections from the three *Phlox* species known to serve as hosts—*P. divaricata*, *P. stolonifera*, and *P. subulata*—as well as surveys of other wild phloxes, are needed to delimit the range of this interesting psyllid.

#### ACKNOWLEDGMENTS

I thank I. D. Hodkinson (Liverpool Polytechnic, Liverpool, UK) for identifying *C. eas*; R. K. Tressler (PADA, Harrisburg) for Fig. 1, C. Jung (Denver, CO) for Fig. 2, J. F. Stimmel (PADA, Harrisburg) for Fig. 3, and J. E. Rawlins (CMNH, Pittsburgh) for Fig. 4; G. L. Miller (Systematic Entomology Laboratory, USDA, Beltsville, MD) for sending copies of several papers, checking label data on type specimens of *C. eas*, and reviewing the manuscript; E. R. Hoebeke (CUIC, Ithaca) for copying literature and reviewing the manuscript; W. C. Forrey (Bureau of State Parks, PA Department of Environmental Resources, Harrisburg) for permission to collect at Shawnee State Park and M. S. Mumford (Shawnee National Forest, Jonesboro, IL) for permission to collect in the LaRue-Pine Hills Ecological Area; and T. J. Allen (West Virginia Division of Natural Resources, Elkins), E. A. Cypher (formerly Southern Illinois University, Carbondale), C. S. Keener (Penn State University, University Park), T. J. Rawinski (Virginia Division of Natural Heritage, Richmond), T. E. Wieboldt (Virginia Polytechnic Institute & State University, Blacks-



burg), and D. Young (Shawnee State Park, Schellsburg, PA) for helping locate phlox populations.

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