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Significant range extensions for two caddid harvestmen in eastern North America, *Caddo pepperella* and *Acropsopilio boopis* (Opiliones: Eupnoi: Caddidae)

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Three caddid harvestmen are known from eastern North America—*Caddo agilis* Banks, *C. pepperella* Shear and *Acropsopilio boopis* (Crosby) (Fig. 1). All also occur in Japan (Suzuki 1976; Shultz & Regier 2007), and all are apparently parthenogenetic, although a few male specimens of *C. agilis* are known (Gruber 1974, Suzuki & Tsurusaki 1983). The three species can be distinguished from other harvestmen by their large eye tubercle (ocularium), which occupies most of the carapace, as well as pedipalps with a proximal series of ventral spines. *Acropsopilio boopis* can be readily distinguished from the two *Caddo* species by its smaller size (body length < 1 mm in *A. boopis* versus 1.6–3.2 mm in *Caddo*) and the pedipalpal tarsus is shorter than the tibia rather than longer. (Fig. 1; Shear 1975). *Caddo* species can be difficult to separate as juveniles, but adult *C. pepperella* are smaller than *C. agilis*, (body length 1.6–1.9 mm in *C. pepperella* versus 2.8–3.2 mm in *C. agilis*) and the cuticle is brownish without prominent white or silver dorsal markings (Fig. 1; Shear 1975). In addition, the metapeltidium in *C. pepperella* bears a medial pair of fine erect projections that are absent in *C. agilis* (Shultz 1998).

Caddo agilis is the most well-known of these species, because it is easy to observe as it runs actively on exposed surfaces, whereas the others are cryptic inhabitants of the soil or leaf litter. In North America *C. agilis* ranges across the northern United States and southern Canada from the Atlantic Coast west to Wisconsin (Cokendolpher & Lee 1993), but it occurs farther south in the Appalachian Mountains, with the southern-most specimen reported here (1 female: U.S.A.: North Carolina: Macon County: Coweeta Hydrologic Station, pitfall, lat. 35.0595°, long. -83.4205°, no date recorded, Lee Reynolds, North Carolina Museum of Natural Sciences). Male and female specimens of a very similar form, *C. dentipalpis* (Koch & Berendt), are known as fossil inclusions in the Baltic amber of northern Europe (Bishop & Crosby 1924).

Specimens of *Caddo pepperella* were included within the earliest known collections of *C. agilis* and, in fact, were considered juveniles of that species in original description (Shear 1975). Until now the New World *C. pepperella* was known only from the northeastern United States, specifically, eastern New York, Connecticut, Massachusetts (Shear 1975) and New Hampshire (Shultz & Regier 2009). Here I report a westward range extension of almost 1100 km (~684 mi; Fig. 1). I collected three adult female specimens of *C. pepperella* at Toft Point State Natural Area, Door County, Wisconsin on 25 July 2012 (lat. 45.069414°, long. -87.093601°). The sample site is usually swampy but was dry at the time due to widespread drought; there was no standing water. The vegetation was dominated by white cedar (*Thuja occidentalis*), patches of thimbleberry (*Rubus parviflorus*) and clumps of dry moss (especially *Sphagnum*). Other harvestmen found in association with *Caddo pepperella* included adult *C. agilis*, adult and immature *Phalangium opilio* Linnaeus, adult *Leiobunum aldrichi* Weed and immature *Odiellus pictus* (Wood). Specimens were obtained by lifting pieces of bark and wood from the ground, striking the object while suspending it over a white pan, and scanning the pan for dislodged animals. Given these records it is possible that additional populations of *C. pepperella* occur in the northeastern United States and southeastern Canada. In fact, Shultz and Regier (2009) hypothesized that *C. agilis* and *C. pepperella* are ancient inhabitants of a pre-glacial Asian-American deciduous forest and that their current distribution in eastern North America and Japan correspond to disjunct remnants of that forest. This would also be consistent with a widespread distribution of *C. pepperella* in eastern North America similar to that already known for *C. agilis*.

Acropsopilio boopis is the only species of its genus in the United States and Canada (Shear 1975). It was known heretofore from probably fewer than 50 specimens collected from once-glaciated regions (Fig. 1). Here I report a specimen of *A. boopis* from the southern Appalachian Mountains near the southwestern border of North Carolina (1 female: U.S.A.: North Carolina: Macon County: Coweeta Hydrologic Station, lat. 35.0595°, long. -83.4205°, 10 June 1977, Lee Reynolds, North Carolina Museum of Natural Sciences). It is the first specimen collected outside the once-glaciated northern region and the southern-most occurrence of the species. It is a range extension of about 510 km (~317

mi). The occurrence of an otherwise northern species in the southern Appalachians is a common biogeographic pattern (Soltis *et al.* 2006) that includes such harvestman species as *Caddo agilis*, *Nelima elegans* (Weed), and *Leiobunum calcar* (Wood) (Cokendolpher & Lee 1993, original observations). Thus it is possible that *Acropsopilio boopis* occurs elsewhere in the Appalachian Region.

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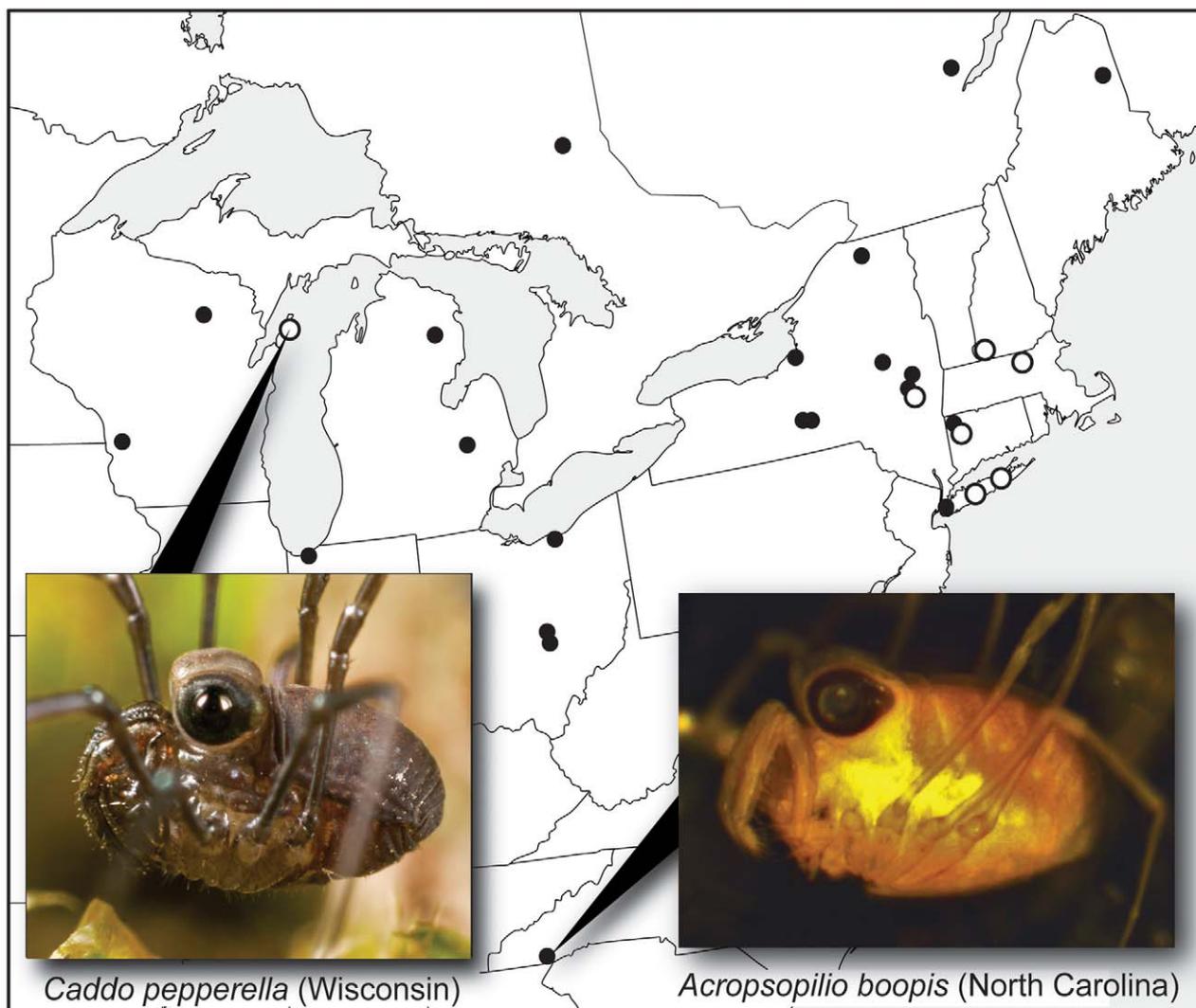


FIGURE 1. Known distribution of *Caddo pepperella* (open circles) and *Acropsopilio boopis* (filled circles) in eastern North America. Photo of *C. pepperella* courtesy of Joe Warfel. Data from Levi *et al.* (1959), Shear (1975), Shultz & Regier (2009), Walker (1928) and one original observation: 1 female, U.S.A.: Wisconsin: Langlade County, Kempster, Black Oak Lake Bog, Berelese ex. *Sphagnum*, lat. 45.3043°, long. -89.2145°, 5 Aug. 1977, J. Wagner [Field Museum of Natural History: 77-303].

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