USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Eastern Region State, Private, and Tribal Forestry | R9–PR–016-24 | November 2024

Pest Alert

Elm Zigzag Sawfly

Aproceros leucopoda

The elm zigzag sawfly (EZS) is a defoliator of many species in the Ulmaceae (elm) family. Native to East Asia, this pest was discovered in Europe in 2003 where it spread rapidly. In 2020, the insect was first reported in North America by a community science contributor in Québec, Canada. In 2021, it was confirmed in Virginia, U.S.A. EZS impact on native elm populations already imperiled by Dutch elm disease (*Ophiostoma ulmi* or *O. novo-ulmi*) is unknown.

Hosts

EZS feeds on North American trees in the family Ulmaceae, including American elm (*Ulmus americana*), slippery elm (*U. rubra*), and winged elm (*U. alata*), as well as non-native landscape trees such as Chinese elm (*U. parvifolia*) and Siberian elm (*U. pumila*). Susceptibility of other Ulmaceae species, such as zelkova (*Zelkova* spp.), is unknown and requires further investigation.

Description

The adult EZS is small, approximately 7-8 mm long, with a shiny black body; dark, smoky-colored wings; and whitish to pale yellow legs (figure 1). As a member of the Argidae family, they have distinct 3-segmented antennae where the third segment is much longer than the first two. The yellow-green larvae reach 10–11 mm long and can be identified by a brown band on the head and dark T-shaped markings on the two hind pairs of thoracic legs (figure 2).

Figure 3.—Early instars create the characteristic, sinusoidal “zigzag” pattern from the leaf margin to midvein. USDA Forest Service photo by Nathan Siegert.

Figure 1.—Elm zigzag sawfly adult. Courtesy photo by Kelly Oten, North Carolina State University.

Figure 2.—Elm zigzag sawfly larva feeding on an elm leaf. Courtesy photo by Kelly Oten, North Carolina State University.

Life History

EZS have 1-6 generations per year determined by environmental conditions and location. The insect is active from April to September. EZS reproduce parthenogenetically; females produce only females without mating (no males). Oviposition begins shortly after emergence, with each female laying 7-60 individual eggs along leaf margins. Eggs hatch in 4-8 days, and larvae begin feeding in a “zigzag” pattern from leaf margin to midvein (figure 3). Older larvae often change feeding pattern to consume larger portions of leaf tissue (figure 4). Larvae feed for approximately 10-18 days before spinning a light “summer” cocoon on the underside of leaves to pupate (figure 5). Pupation takes 4-7 days. In high-density infestations, summer cocoons may be attached to inanimate objects, such as fence posts or vehicles. Overwintering larvae spin a thicker “winter” cocoon within the leaf litter and soil.

Invasion Potential

EZS can spread quickly and are likely more widespread than presently known. Since the 2020 North America discovery,

Figure 4.—Larval feeding in a high-density EZS infestation strips elm leaves to the midvein. USDA Forest Service photo by Nathan Siegert.

Figure 5.—Summer cocoon with prepupa. USDA Forest Service photo by Nathan Siegert.

Figure 6.—American elm tree severely defoliated by elm zigzag sawfly. Courtesy photo by Kelly Oten, North Carolina State University.

the insect has been detected in numerous Southern, mid-Atlantic, Northeastern, and Midwestern States. EZS adults are strong flyers estimated to disperse up to 45-90 km (~27-55 mi) per year. Human-mediated dispersal spreads EZS to new locations by moving infested trees and leaf litter or objects with cocoons attached.

Host trees in residential landscaping and forested areas are susceptible to EZS infestation. In areas with large, well-established EZS infestations, severe to near complete defoliation is possible (figure 6).

Management

Pesticides available for general sawfly management in the U.S. may be effective for EZS, however none are currently labeled specifically for EZS control. In Europe, foliar insecticides (e.g., deltamethrin and teflubenzuron) demonstrated some success. In the U.S., foliar applications of dinotefuran were efficacious in bioassays; field studies are currently underway. Biological controls, like *Beauveria bassiana* (a soil fungus), were also shown effective at reducing EZS infestations. Continued evaluation of insecticide efficacy and the impact of natural enemies of EZS is warranted.

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References & Resources

Blank, S.M.; Hara, H.; Mikulás, J. [and others]. 2010. *Aproceros leucopoda* (Hymenoptera: Argidae): an East Asian pest of elms (*Ulmus* spp.) invading Europe. European Journal of Entomology. 107(3): 357-367. https://doi.org/10.14411/eje.2010.045.

Martel, V.; Morin, O.; Monckton, S.K. [and others]. 2022. Elm zigzag sawfly, *Aproceros leucopoda* (Hymenoptera: Argidae), recorded for the first time in North America through community science. The Canadian Entomologist. 154(1): 1. https://doi.org/10.4039/tce.2021.44.

Oten, K.L.F.; Day, E.; Dellinger, T. [and others]. 2023. First records of elm zigzag sawfly (Hymenoptera: Argidae) in the United States. Journal of Integrated Pest Management. 14(1): 12. https://doi.org/10.1093/jipm/pmad009.

Papp, V.; Ladányi, M.; Vétek, G. 2018. Temperature-dependent development of *Aproceros leucopoda* (Hymenoptera: Argidae), an invasive pest of elms in Europe. Journal of Applied Entomology. 142(6): 589-597. https://doi.org/10.1111/jen.12503.

Vétek, G.; Bartha, D.; Oláh, R. 2017. Occurrence of the alien zigzag elm sawfly, *Aproceros leucopoda* (Hymenoptera: Argidae), in arboretums and botanical gardens of Hungary. Periodicum Biologorum. 119(2): 101-106. http://dx.doi.org/10.18054/pb.v119i2.4944.

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