

## The sawfly is zigzagging its way across elm leaves

A species is classified as “exotic” if it is found outside its natural distribution area. Whether it is an insect, a plant, a fungus, or an animal, this exotic newcomer will be considered a pest if it disrupts the ecology of its new environment, threatens its ecosystem, or has an economic impact. The introduction of exotic species by sea, land, or air is often accidental. How then does the Canadian Forest Service (CFS) prepare for the accidental arrival of such pests as the elm zigzag sawfly?

### An additional exotic pest

The elm zigzag sawfly (*Aproceros leucopoda*) is an insect whose larvae feed exclusively on elm leaves. Its natural distribution area is in East Asia, more precisely in Japan and certain regions of China. In 2003, this sawfly was reported in Hungary and Poland and has since spread to more than 15 European countries. The arrival of this exotic pest in Europe created further pressure on species of the *Ulmus* genus that were already being attacked by Dutch elm disease.

In North America, the elm zigzag sawfly was first reported in July 2020 in Sainte-Martine, in the Montérégie region of Quebec. The discovery was made thanks to a curious photographer who posted a photo of a zigzag defoliation pattern on an elm leaf on the iNaturalist website. Thanks to this post, a series of stakeholders were able to identify the sawfly that creates this unique type of defoliation. The presence of this exotic insect was then confirmed by the Canadian Food Inspection Agency (CFIA) in August 2020.



A. Elm leaf damage.  
Photo: Véronique Martel, NRCan

B. Zigzag sawfly larva.  
Photo: Fons Verheyde, waarnemingen.be

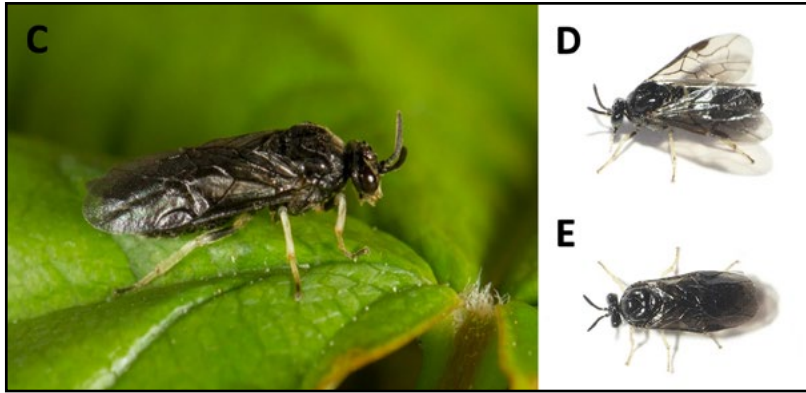
This kind of community science, which hinges on citizens' contributions, has made it possible to observe the insect in other regions of southern Quebec (Montréal, Lanaudière), with most sightings having been reported through the [iNaturalist.ca](https://www.inaturalist.ca) website.

### The elm: a victim of its own popularity

It is in its larval form that the zigzag sawfly causes the damage that affects elm trees. By feeding on the leaves, the young larvae create the characteristic zigzag pattern to which the pest owes its name (see photo A). Although defoliation is usually light, some attacks by this



sawfly can lead to complete defoliation, as has been the case in some parts of Hungary and Romania. Infested trees are usually able to produce new leaves during the same year. Although the sawfly can kill entire branches in some cases, no elm tree mortality specifically caused by this insect has been reported thus far.



Adult female elm zigzag sawfly.

Photo C: Sandra Lamberts,  
Amsterdam Sloterdijk,  
(nederlandsesoorten.nl)

Photos D et E: Dick Belgers,  
Netherland (nederlandsesoorten.nl)

## A reproductive champion

The zigzag sawfly belongs to the Hymenoptera order along with ants, bees, and wasps. The adult is either brownish or black with white legs. Its wings enable it to fly to nearby elm trees and to reach greater distances as well. Once it has located a host tree, its highly effective mode of reproduction allows it to settle quickly in a new area. Depending on the climate, the sawfly can produce between four and six generation cycles per year, as each generation takes less than a month to complete its cycle – egg-laying, hatching, larval development (6 stages), pupation in a cocoon and adult emergence. As soon as they emerge, the females are ready to lay eggs and another cycle begins. The rapid egg-laying after emergence is due to the fact that the adult females reproduce partheno-genetically, which means they have the capacity to lay eggs without being fertilized by a male. Thus, there is no need to wait for the mating season to multiply. In fact, the observation of male sawflies has yet to be reported.

Although the sawfly's dispersal is inevitable due to its ability to fly, it is essential to raise public awareness about the risks of moving infested elms in order to limit the spread of this pest outside of infested areas.

## Ongoing strategy

CFS researchers, working in collaboration with the CFIA and the public, are tracking this insect to document its presence, notably through the iNaturalist platform. The CFS researchers involved are working to define the geographical distribution of this species of sawfly and to determine, through genetic analyses, the route of its introduction into Canada (either through Asia or Europe). Starting in the spring of 2021, CFS researchers will study the sawfly's dynamics in its new Canadian environment. They will try to determine which species of elm trees are attacked, how many generations of zigzag sawfly are produced per year, what damage has been done and whether or not there are natural enemies present in Canada that could attack this forest pest. These are all issues that scientists will try to address in the coming years.

## Useful links

CFIA fact sheet

<https://www.inspection.gc.ca/plant-health/plant-pests-invasive-species/insects/elm-zigzag-sawfly/fact-sheet/eng/1599690785672/1599690786222>

Simply Science

Article-

<https://www.nrcan.gc.ca/simply-science/citizen-scientist-spots-newcomer-canadian-elm-trees/23000>

Podcast-

<https://www.nrcan.gc.ca/simply-science/discovering-elm-zigzag-sawfly-canada/23088>

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