PROACTIVE BIOCONTROL OF SPOTTED LANTERNFLY

Locations	Canada, China, Switzerland
Dates	01/09/2019 - 31/12/2022
Summary	The spotted lanternfly is an Asian polyphagous pest that feeds on more than 70 plants by sucking the sap out of from leaves, stems and trunks. It was found in Pennsylvania in 2014 and has since expanded its geographical distribution. The damage caused by the pest, its sugary excrement and sooty mold has been devastating for the Pennsylvania wine industry – reportedly causing a 90% grape loss. Whilst spotted lanternfly is not present in Canada, climate models and growing populations in the US suggest that it can easily establish and be accidently introduced. Following a ‘proactive biocontrol’ approach, CABI is currently investigating the natural enemies of spotted lanternfly in China, particularly their host specificity and population level impact.

The problem

The spotted lanternfly, *Lycorma delicatula* (Hemiptera, Fulgoridae), is an Asian polyphagous pest of many arboreal plants. The up-to-25mm long, very colourful cicada, is native to China, India and Vietnam and was accidentally introduced into South Korea and Japan, with outbreaks reported since mid-2000s. In 2014, this pest was found in Pennsylvania, USA, and has expanded its geographical distribution ever since.

The spotted lanternfly feeds on more than 70 plants – grapes are among its favourites – by sucking out the sap from leaves, stems or trunks. Throughout the summer months, the adults and nymphs feed on plants, after which a sugary excrement, created by this insect, may coat the host plant, later leading to the growth of sooty mold. As a result of this new pest, the damage has been devastating for the Pennsylvania wine industry, where some growers have reported a 90% grape loss.

Spotted lanternfly is not present in Canada yet, but climate models suggest that it can establish in southern Ontario and British Columbia. With growing populations in the US, there is an increased risk that spotted lanternfly will be accidentally introduced with goods and human-aided movement in the near future.

What we are doing

This project is following a ‘proactive biocontrol’ approach which identifies, selects, screens and pre-approves natural enemies for release before an invasion.

Biocontrol forms part of integrated pest management which can be effective in controlling pests and disease. However, many countries have pre-requisite regulatory requirements and approval for release of any classical biological control agent now required thorough risk assessment. By completing the screening before a pest arrives, natural enemies can be released at a much earlier stage of the management process.

Ideally, natural enemies would then significantly reduce pest densities and slow rates of spread, which would lower the economic or environmental damage associated with the pest.

In this project, CABI is currently investigating the natural enemies of spotted lanternfly in China.

Results so far	To-date, natural enemies such as egg parasitoids in the genus *Anastatus* and nymphal parasitoids in the genus *Dryinus* are promising candidates as a long-term solution for management of the spotted lanternfly, but little is known on their host specificity and population level impact. In 2019, surveys for egg and nymphal parasitoids were conducted in the wider area of Beijing, where spotted lanternfly frequently occurs. In total, 302 egg masses (9,917 eggs) were collected from which 805 parasitoids were reared. Although not all samples have been identified yet, it seems that all specimens belong to the species *Anastatus orientalis*. Parasitized egg masses were found on nine different types of trees including *Amygdalus persica*, *Populus* sp. *Pinus* sp., *Toona sinensis*, *Crataegus pinnatifida* , *Salix* sp., *Broussonetia papyrifera*, *Platycladus orientalis*, and *Morus alba*. The highest proportion of parasitized egg masses (50-60%) were found at natural mountain sites, whereas at sites located in the city of Beijing parasitism was low or absent. In addition, more than 900 nymphs were collected from which more than 100 parasitoids were reared. Parasitism of nymphs was highly variable among sites, reaching up to 48%. Overall, parasitism of 2nd and 3rd instar nymphs was 17% and 9%, respectively. Further work continues and you can read more about the citizen science approach here.
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