

Samurai wasp has minimal impact on native stink bugs, new study confirms

June 12 2023



The samurai wasp sets to work parasitizing the eggs of the brown marmorated stink bug. Credit: Tim Haye

A new study led by CABI has confirmed that the samurai wasp (*Trissolcus japonicus*)—a natural enemy of the brown marmorated stink

bug (*Halyomorpha halys*) pest—has minimal impact on native stink bugs.

Dr. Tim Haye, head of arthropod [biological control](#), based at CABI's center in Switzerland, teamed up with colleagues to question whether the fundamental host range of *T. japonicus* matches its realized host range in Europe—including Switzerland, Italy and Germany where it has already been detected.

The scientists, which included those from the University of Turin, Agriculture and Agri-Food Canada, and the Swiss Department of Finance, Economy and Agriculture, found that *T. japonicus* is more likely to attack [species](#) in the same [ecological niche](#) as *H. halys*.

The brown marmorated stink bug, originally from Asia, can cause considerable damage to fruit and nut crops in Switzerland as well as elsewhere in the world.

The Guardian newspaper in 2020 reported how scientists fear the brown marmorated stink bug has spread through eight cities in Turkey, mainly across the Black Sea region, putting around 70% of the world's hazelnut supply at risk.

T. japonicus, which was released for the first time in a pear orchard in Zurich, Switzerland, in 2020, as part of a field trial conducted by Agroscope and supported by CABI, and is seen as a potential foe for the pest which also attacks fruit including cherries.

The latest study, which was published in the *Journal of Pest Science*, assessed—over three years—the realized host range of *T. japonicus*. It did this by exposing sentinel egg masses of *H. halys* and 18 non-target species and collecting naturally laid egg masses in Switzerland and Italy.

In total, 15 of 18 non-target species were successfully parasitized by *T. japonicus* in the field, confirming its broad fundamental host range. However, most non-target species were less parasitized by *T. japonicus* than *H. halys*, profiting from either partial temporal or spatial refuges from parasitism.

Dr. Haye said, "Species with an unusual life cycle and the same ecological niche as *H. halys*, such as *Pentatoma rufipes*, which was the most parasitized non-target species in both countries, potentially face an increased risk of parasitism.

"In contrast, beneficial non-target effects may occur for the invasive pest, *Nezara viridula*, which suffered high non-reproductive mortality induced by *T. japonicus*. In both cases, life table studies will be needed to determine the impact of non-target parasitism and the potential consequences at the population level."

Dr. Haye and his colleagues learnt that the large majority of European stink bug species lay their eggs in spring when *T. japonicus* populations are low, and can therefore gain partial temporal refuge from parasitism.

In addition, species living on herbaceous hosts in the ground cover can escape intensive parasitism due to the preference of *T. japonicus* for woody habitats, thereby providing a spatial refuge for those species occupying such habitats.

On the other hand, species sharing the same ecological niche as *H. halys* (trees) are more likely to be attacked by *T. japonicus*, but a potential increased risk should only be considered for those species with an unusual life cycle, such as *P. rufipes* or *Picromerus bidens* (L.) (Hemiptera: Pentatomidae), that lay their eggs in late summer when the majority of parasitism by *T. japonicus* takes place.

Dr. Haye added, "Incorporating ecological factors such as habitat specificity, host and parasitoid phenology, host density and competition with native parasitoids or predators, can help to yield a more realistic scenario of potential risks for non-target species."

"However, such field studies will only be possible where the [biological control agents](#) have become established—either through intentional releases or accidental establishments."

More information: Tim Haye et al, Does the fundamental host range of *Trissolcus japonicus* match its realized host range in Europe?, *Journal of Pest Science* (2023). [DOI: 10.1007/s10340-023-01638-0](https://doi.org/10.1007/s10340-023-01638-0)

Provided by CABI

Citation: Samurai wasp has minimal impact on native stink bugs, new study confirms (2023, June 12) retrieved 28 April 2024 from <https://phys.org/news/2023-06-samurai-wasp-minimal-impact-native.html>

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