

Greenhouse whitefly: Will the unwanted greenhouse whitefly make it in the wild?

September 2 2014

Greenhouses have improved the possibilities of invasion of greenhouse whitefly into the wild in the boreal region, new study finds. Genetic analysis sheds new light on the survival of whiteflies in Finland and helps to plan efficient pest management.

Irina Ovcarenko, research scientist at the MTT Agrifood Research Finland, has studied [genetic diversity](#) and ecology of greenhouse whitefly (*Trialeurodes vaporariorum*) in her thesis. Greenhouse whitefly is a widespread invasive [pest](#), which has occurred in Finland since the year 1920. It does not belong to the original fauna of the country, but survives in Finland as it finds suitable overwintering habitats in greenhouses. Carefully planned [pest management](#) reduces crop damages.

"Genetic analyses revealed that the same whitefly populations persist in the majority of the sampled greenhouses for two years. Year-round greenhouse crop producers should avoid planting new crop without complete extermination of [whiteflies](#) not only from the old crop, but also from the greenhouse premises," Ovcarenko says.

Insecticide-treated populations able to recover

Ovcarenko's findings show that genetic diversity of greenhouse whitefly is lower in the Finnish greenhouses compared with Greece, where whiteflies are able to persist outdoors all year round. Furthermore, global genetic diversity of greenhouse whitefly is low. Generally, low genetic

diversity results in species' decreased ability to adapt. However, whiteflies are able to recover from insecticide treatments and maintain even high levels of genetic diversity in their local populations.

"It was surprising to find medium to high levels of local genetic diversity and no signs of harmful genetic bottlenecks in whiteflies from greenhouses, where new crops are planted every year and insecticides cause frequent mortality," Ovcarenko says.

Moreover, low global genetic diversity has not reduced adaptation or invasion potential of the Finnish population. Whitefly is a generalist herbivore, which feeds on many plant species, but it may also specialize in feeding on greenhouse crops. Tomato and cucumber are the most common crops in the Finnish greenhouse cluster and initial signs of evolution of specialized races for these host plants were found in the study.

"Continuous cultivation of the same greenhouse crop species creates possibilities for host adaptation. Formation of these races may increase pest abundance and lead to a higher extent of crop damage," Ovcarenko says.

Despite initial signs of host race formation, whiteflies prefer natural species to cultivated crops as host plants, which could facilitate pest dispersal into natural vegetation in spring.

"Whiteflies are able to use numerous outdoor plants around greenhouses as seasonal habitats in summer. The same population of whiteflies may, therefore, return from these wild plants to newly planted greenhouse [crops](#) in August and September," Ovcarenko says.

Biological pest control pays off

The study showed that resistance to common insecticide pymetrozine varies considerably among the Finnish whitefly populations. Therefore, Ovcarenko recommends pest management should start at individual company level by maintaining pest free surroundings and monitoring for early detection of the pest. Results indicated that it pays off to maintain chemical free greenhouse crop production. If biological pest control was used, whitefly populations were more susceptible to insecticides, whereas whiteflies from greenhouses treated with insecticides over the years showed initial signs of resistance development.

The most important step to reduce crop damage and tackle invasion is to standardize practices in dense greenhouse areas. The study has motivated farmers to exchange information and monitor whiteflies outside greenhouses, in potato and strawberry fields.

"Co-operation is the key for sustainable pest management. To reduce pest dispersal potential to other [greenhouse](#) agroecosystems, synchrony in pest monitoring, exterminations and crop rotations among crop producers is advised," Ovcarenko concludes.

Provided by MTT Agrifood Research Finland

Citation: Greenhouse whitefly: Will the unwanted greenhouse whitefly make it in the wild? (2014, September 2) retrieved 26 April 2024 from <https://phys.org/news/2014-09-greenhouse-whitefly-unwanted-wild.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--