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Pollinating bees can now suppress crop pests

Vector biocontrol costs the same as conventional fungicides

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Grey mould on strawberries.

Grey mould on raspberries.

The busy bee just got more efficient by being tasked with biocontrol of plant pests.

The proven method relies on dispensers that fit onto bumblebee boxes or honeybee hives. When the bees leave to pollinate, they brush by the dispensers, picking up biological agents that are left on the flowers. The one-way system prevents the agents from entering the bee hives on the return home with pollen or nectar. Various beneficial agents have proven effective in economic suppression of a number of crop pests on various crops.

Strawberries and raspberries were early targets for this innovative research. Dispensers carrying beneficial fungi were set into the entrances of honeybee hives. The bees delivered the fungi to the flowers while pollinating them. The beneficial fungi took up residence in the flowers, but remained more or less inactive until the pollinated flowers produced ripening fruit. The result was the suppression of grey mould to such an extent that the shelf-life of the fruits was extended by about a week. Great for fresh markets, stores, and shipping! The effectiveness and cost was the same as the application of chemical fungicides.

More recently, the same idea has been applied in greenhouses where bumblebees are state-of-the-art pollinators of tomatoes, peppers and eggplant. The bee vector technology is now being used to suppress grey mould and several insect pests such as tarnished plant bugs, western flower thrips, white flies, peach aphids and cabbage looper. Other crops that have been tested include blueberries and sunflowers.

For sunflowers, tests from 2011 indicate that yields were boosted by more than 20 per cent, that banded sunflower moth was suppressed to below economic loss levels, and that the incidence of sclerotinia head rot was suppressed.

For lowbush blueberries in Maritime Canada, the incidence of grey mould and mummy berry was suppressed in tests completed in 2010 and 2011. The same technology can be applied to highbush blueberries.

Greenhouse growers now have access to commercial production of these biological agents for suppression of grey mould and insect pests, except cabbage looper. For sunflowers, strawberries and raspberries commercial availability is assured for the 2012 season for suppression of both fungal disease and some insect pest suppression. For blueberries, lowbush and highbush, some further testing is needed but interested growers can contribute as collaborator-growers.

At present the technology is tailored to bumblebee pollination. By 2013, it will become applicable to honeybees and their management.

More crops are being added to the list to receive the quadruple benefits of better pollination, bigger and better crops, and protection from pests and diseases. These include apples and pears, canola, other small and tender fruits, and so on.

Costs are generally competitive with those for conventional, chemical, treatments but vary depending on various grower's practices, investments into pollination, crop blooming times, and other factors. At present, use of the technology is tailored to individual grower's needs.

The research and development have been a joint effort of scientists at the University of Guelph, Agriculture & AgriFood Canada, and partners in the Canadian Pollination Initiative (NSERC-CANPOLIN).

Growers interested in trying the technology for themselves, through buy-in or pre-commercialized testing can contact the scientific team at beevectoring@gmail.com. A web-page should be operational soon.

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