

Transgenic maize is more susceptible to aphids

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The environmental consequences of transgenic crops are the focus of numerous investigations, such as the one published in the journal *PloS ONE*, which was carried out by Cristina Faria and her colleagues, under the supervision of Ted Turlings, professor in chemical ecology at the University of Neuchâtel.

The researchers observed that most transgenic maize lines were significantly more susceptible to the aphid *Rhopalosiphum maidis* than their conventional equivalents. "We have studied six lines of Bt maize containing an insecticidal gene derived from the bacteria *Bacillus thuringiensis*. The toxin produced by these genes is very specific and only affects the caterpillars feeding on the plants, not the aphids. Five of the lines contained up to twice the number of aphids", states Cristina Faria. She does, however, go on to clarify what seems, at a first glance, detrimental to the plant.

"It all depends on the economic threshold for aphids in the region where maize is being grown. If these insects are not a major problem, then it is rather good news." In fact, aphids produce honeydew, a sugar-rich substance that can be used as a food source by beneficial insects, such as the parasitic wasp *Cotesia marginiventris*. This parasitoid helps the plant when it is attacked by caterpillars. It kills these pests by laying its eggs in them. In cages with aphid-infested Bt maize, *Cotesia* wasps lived almost twice as long and parasitized 37.5% more caterpillars. Hence, an increase in the number of aphids might help to control caterpillars in areas where these are a major problem. "However, in regions where

aphids are considered to be a pest, growing Bt maize could be problematic," adds the biologist. Aphids mainly damage plants by transmitting viruses and using Bt maize might amplify this problem.

So where does this unexpected difference between conventional and Bt maize come from" The insertion of the Bt gene could have an effect on other genes, but the NCCR Plant Survival researchers rather think that by producing Bt toxin the plant's chemistry is otherwise altered. In Bt plants, they measured slightly higher concentrations of amino acids, which are essential nutrients for aphids. Moreover, the plant may mobilise energy resources for the production of the Bt toxin at the cost of producing substances that it normally uses in defence against aphids.

Citation: Faria CA, Wäckers FL, Pritchard J, Barrett DA, Turlings TC (2007) High Susceptibility of Bt Maize to Aphids Enhances the Performance of Parasitoids of Lepidopteran Pests. PLoS ONE 2(7): e600.doi:10.1371/journal.pone.0000600

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