

Scientists warn about the dangerous interaction of plant protection products

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Pest control is one of the vital services provided by insects in agroecosystems. Natural methods relying on biological control agents, such as parasitoid wasps, represent a highly effective way to suppress crop

pest populations. Conventional practices in agriculture typically involve applying various synthetic pesticides (e.g. insecticides, fungicides, herbicides) simultaneously, in the form of a tank-mixture, to protect crops. However, current standard practices in pesticide risk assessment on biocontrol insects only examine the effects of individual pesticides.

Using a hymenopteran parasitoid wasp *Aphelinus abdominalis* (a globally distributed species widely used in biocontrol) as a model, a team of researchers showed the enhanced effect of a low-concentration [insecticide](#) (thiacloprid) treatment when combined with various concentrations of a fungicide (tebuconazole). This work highlights the potential impact on parasitoid mortality and paralysis (a state which inevitably leads to mortality under [natural conditions](#)) when these two compounds are tank-mixed for crop protection, with insecticide toxicity generally increasing as the combined fungicide concentration increases. Both of these compounds are commonly tank-mixed and applied in many crops and regions throughout Europe, including, for example, oilseed rape agroecosystems in Estonia.

Exposure to the fungicide tebuconazole alone did not seem to affect the parasitoid wasp populations, but combined application with thiacloprid synergistically increased the already toxic effect of this insecticide. The way these compounds act together is still not well understood, but the authors hope this work (along with several previously-published studies showing similar agrochemical synergism in bees) will influence the science and practice of pesticide risk assessment, and encourage a more integrated approach.

Thiacloprid belongs to a class of insecticides known as chloronicotinyls, or [neonicotinoids](#). Three other neonicotinoid insecticides (imidacloprid, clothianidin and thiamethoxam) were recently banned for outdoor use in all EU member states. It is a likely result that remaining neonicotinoids such as thiacloprid will increase in use, thus increasing the need for

examining its potential impact on nontarget organisms (e.g. beneficial insects), and agroecosystems in general.

Published on 22 February 2019 in *PLOS ONE*, the paper represents a cooperation between members of Estonian University of Life Sciences (Ph.D. student Jonathan Willow, Assoc. Prof. Eve Veromann), Ghent University (Prof. Guy Smaghe) and Cardiff University (Ph.D. student Ana Isabel Silva).

More information: Jonathan Willow et al, Acute effect of low-dose thiacloprid exposure synergised by tebuconazole in a parasitoid wasp, *PLOS ONE* (2019). [DOI: 10.1371/journal.pone.0212456](https://doi.org/10.1371/journal.pone.0212456)

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