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Fungi and roundworms as non-chemical substitutes for pesticides

The use of some pesticides is a recognised concern for health and the environment. A new UK study identifies some naturally occurring alternatives to control wireworm, a widespread pest of potatoes.

The wireworm causes major problems in arable crops, including potatoes, in many parts of the world. Wireworms are the larvae of click beetles and their damage to potatoes can drastically reduce yield. When more than 10-15 per cent of potatoes are damaged, the crop is no longer financially viable for the farmer.

One of the major ways of controlling wireworms is by applying insecticides to the soil, but there are concerns about their health and environmental impact of these chemicals. The study identified three alternative, naturally occurring, pesticides that showed promise for development. These were two types of parasitic fungi and one type of parasitic nematode (or roundworm).

The researchers investigated the pesticidal properties of twelve fungi and six nematodes in all. The wireworms were exposed to the different parasites and the mortality of the wireworms was assessed every week for three weeks. The dead larvae were dissected to confirm the cause of death. Differences in the effects of the fungi and nematodes were analysed statistically.

After three weeks, there were significant differences in the effects of the fungi. Most striking were the effects of the *Metarhizium anisopliae* strains, V1002 and LRC181A, which caused 90-100 per cent mortality. There were also significant differences in the parasitic effects of the different types of nematode. The most aggressive was the UK strain of *Heterorhabditis bacteriophora*, UWS1, that caused 67 per cent mortality.

The authors also refer to previous research which demonstrates that the fungi *M. anisopliae* can work together with chemical pesticides to control wireworm and other pests. This suggests it could be used to reduce the use of conventional pesticides. The same fungi can also be used in conjunction with nematodes, providing a completely organic or chemical-free approach to controlling pests.

In addition to a directive to control which pesticides can be placed on the market[1], the EU has adopted a strategy to improve the way pesticides are used[2]. This includes promoting alternative methods of protecting plants which have fewer negative impacts on health and the environment.

[1] See http://ec.europa.eu/environment/ppps/legal.htm
[2] See http://ec.europa.eu/environment/ppps/pdf/com_2006_0372.pdf

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