

# Insect skins improve soil

**Insects poo and shed their skin. PhD candidate Azkia Nurfikari shows how useful this manure is.**

In fact, the manure not only enriches the soil with nutrients but also inhibits the growth of pathogenic microbes. An experiment with lettuce infected with fungus demonstrated this. The key substance in this research is the polymer chitin, the hard substance in insects' exoskeletons. It is known that chitin stimulates the growth of soil bacteria that are able to break down chitin. Some of the enzymes responsible for breaking down the chitin end up in the soil.

**Chitin stimulates the growth of soil bacteria that are able to break down chitin**

The cell walls of pathogenic fungi also contain chitin. Could those enzymes also take on the fungi?

Nurfikari's experiments show the answer is yes. She added the waste (excrement and skin) of soldier flies, crickets and mealworms to soils infected with the fungus *Fusarium*. This fungus causes the wilting disease that so many growers fear.

## Black soldier flies

The insect waste does indeed kill the pathogenic fungus, but only when the pressure of disease is low, says Nurfikari. Furthermore, after the waste has been applied to the soil, several weeks are needed for the bacteria that break down the chitin to grow. It works best with the skins of black soldier flies as that material contains the most chitin.

Incidentally, 'good' microbes also get broken down because of the chitin effect. Even so, the overall effect is positive, says Nurfikari. That is because the waste (skins and excrement) also serves as manure and therefore boosts the growth of bacteria. 'The net effect of the growth and breakdown processes is an increase in the total biomass.' RK