

Plants choose ammunition carefully

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Plants are anything but as defenceless as they might seem. Various plant hormones work together to specifically fend off attacks. Dutch researcher Antonio Leon-Reyes has now shown how these hormones cooperate. By 'consulting' with each other plant hormones determine which defence mechanism they shall set in motion.

Leon-Reyes investigated how three plant hormones - [salicylic acid](#) (SA), jasmonic acid (JA) and ethylene (ET) - cooperate with each other to initiate the correct defence response. The biologist used the model plant *Arabidopsis thaliana* (thale cress) to analyse the communication lines between hormones. He discovered that JA is under the control of SA but if JA and ET cooperate then JA no longer 'listens' to SA.

The right defence

Plants are confronted with various external attacks. [Fungi](#), bacteria, viruses and [insects](#), such as [caterpillars](#) and [aphids](#), can inflict serious damage on a plant. The three different hormones all respond to these attacks in their own way. SA ensures that pathogens feeding on living plant tissue are tackled, whereas JA and ET tackle pathogens that live on dead tissue and suppress feeding by insects.

Switching on the defence mechanism requires a lot of energy from the plant and can go to the cost of growth and reproduction. It is therefore vital that the plant only initiates the defence mechanisms required. Leon-Reyes discovered that if the SA response was activated just before or at the same time as the JA response, the defence mechanisms regulated by

JA are suppressed. Yet if the JA response was activated at the same time as the ET response then SA could no longer suppress JA.

Each year billions of euros are spent on [chemical pesticides](#) to control diseases and plagues. Leon-Reyes's discoveries could make an important contribution to new crop protection methods. His research was part of Corné Pieterse's research project. Pieterse received a Vici grant in 2004 from NWO's Innovational Research Incentives Scheme for his research into the self-defence mechanisms of plants.

Source: NWO

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