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Abstract

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Searching for genes that make plants susceptible to spider mites as a target for resistance breeding*

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Herbivorous mites must have to overcome several barriers that are produced by plants to prevent herbivores from obtaining food and successfully colonize them. How this interaction plays out is determined by a set of complex molecular mechanisms that trigger physiological changes in plants to deter mites, and in mites to withstand deterrence and together these determine their degree of compatibility. We demonstrated that spider mites secrete specialized salivary proteins into plants that suppress plant defenses and therefore play a decisive role in the plant-mite interaction. To these proteins we refer as effectors (Villarroel *et al*. 2016; Jonckheere *et al*. 2016). Elucidating how effectors suppress plant defenses can aid plant resistance breeding and help to better understand plant-herbivore co-evolution.

Among the most abundant salivary proteins of *Tetranychus urticae* are those of the SHOT (secreted host-responsive protein of Tetranychidae) represented by paralog SHOT2b. The expression of SHOTs is strongly influenced by the host species identity (Jonckheere *et al*. 2018). An interaction screen between SHOT2b and the Arabidopsis proteome revealed that SHOT2b interacts with all members of a protein kinase family involved in a variety of complex processes such as chromatin organization and gene expression, light perception, and secondary metabolite production. We observed that a family of protein kinases (MLKs) act as susceptibility genes because *T. urticae* performance drops by 50% on *mlk* mutants possibly related to altered plant secondary metabolite production. The physiological aspects of the SHOT2b/MLK interaction and the development of new strategies for pest control will be discussed during the presentation.

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