

Diverse Responses Are Involved in the Defence of *Arabidopsis thaliana* against Turnip Crinkle Virus

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Z. Naturforsch. **68c**, 148–154 (2013); received February 29, 2012/March 1, 2013

Plant hormones play pivotal roles as signals of plant-pathogen interactions. Here, we report that exogenous application of salicylic acid (SA), jasmonic acid (JA), ethephon (ETH), and abscisic acid (ABA) can reduce *Turnip crinkle virus* (TCV) accumulation in systemic leaves of *Arabidopsis thaliana* during early infection. SA and ABA are more efficient and confer a longer-lasting resistance against TCV than JA and ETH, and the plant hormones interact in effecting the plant defence. Synergistic actions of SA and JA, and SA and ET, and an antagonistic action of SA and ABA have been observed in the *Arabidopsis*-TCV interaction. ABA can down-regulate the expression of the pathogenesis-related genes *PRI* and *PDF1.2*, and compared to the wild type, it drastically reduces TCV accumulation in *NahG* transgenic plants and the *eds5-p1* mutant, both of which do not accumulate SA. This indicates that SA signaling negatively regulates the ABA-mediated defence. ABA-induced resistance against TCV is independent of SA. We also found that mitogen-activated protein kinase 5 (MPK5) may be involved in ABA-mediated defence. These results indicate that *Arabidopsis* can activate distinct signals to inhibit virus accumulation. Cooperative or antagonistic crosstalk between them is pivotal for establishing disease resistance. These results show potential to enhance the plant defence against viruses by manipulating diverse hormones.

Key words: Turnip Crinkle Virus, Salicylic Acid, Abscisic Acid, Defence Response