

Yellow rust fungus effector candidate PEC6 targets adenosine kinase to suppress PAMP triggered immunity

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Yellow (Stripe) rust, caused by the biotrophic fungus, *P. striiformis* f. sp. *tritici* (*Pst*), is globally the most prevalent and damaging disease on wheat. It is well known that pathogens employ effectors to interfere with host defence. However, no effector from the yellow rust fungus has been identified until now, but genome and transcriptome sequencing has revealed many effector candidates (Cantu et al. 2013, BMC Genomics 14: 279 and Garnica et al. 2013, PLOS ONE 8: e67150).

We selected effector candidates, which are highly expressed in haustoria, and tested their function in tobacco (*Nicotiana benthamiana*) and wheat (*Triticum aestivum*) by delivering effectors into plant cells using the type-three secretion system (T3SS) of the EtHAN strain of *Pseudomonas fluorescens*. In *N. benthamiana*, PEC6 (*Puccinia* Effector Candidate 6) significantly suppressed the ROS accumulation, ion leakage and callose deposition induced by *P. fluorescens*. Similarly, PEC6 compromised defence in wheat and enhanced susceptibility to yellow rust. Knocking down PEC6 by virus induced gene silencing decreased yellow rust virulence. Localization analysis showed that PEC6 localized in nucleus and cytosol in wheat leaves after transient expression by particle bombardment. Yeast two-hybrid screening (Y2H) and bimolecular fluorescence complementation (BiFC) showed that PEC6 targets host adenosine kinase, which is involved in cytokinin inactivation

We speculate that PEC6 might be working in defence signalling by targeting adenosine kinase and thereby induce changes of the cytokinin pool and compromise the defence response of the host.