Differential induction of resistance to leaf rust in wheat cultivars by root-colonizing bacteria

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Plants dispose of several types of resistance mechanisms to cope with pathogens. These resistance types are commonly classified in quantitative, non specific resistance and vertical, host specific resistance. The resistances response depends upon plant variety, pathogen virulence, environmental conditions, growth stage of the plant and interactions with other organisms such as disease suppressive micro-organisms. Several root associated bacteria do not only inhibit the growth of pathogens, but they also induce systemic resistance (ISR) in the plant hence conferring protection on leaves. Only little is known about the interactions between plant resistances and ISR inducing bacteria, in particular about the genetic basis governing this interaction. The present study explored the effects of biocontrol strains of Pseudomonas fluorescens on the resistance of wheat varieties against leaf rust disease caused by Puccinia triticina. The wheat cultivars included highly susceptible (Cimetta and Arina) and intermediate resistant (Zinal and Forno). While cultivars Cimetta and Arina dispose of resistance gene Lr12 that is compatible with the P. tritina strain used, cultivar Forno disposes of quantitative resistance provided by resistance gene Lr34. Resistance of Zinal is not complete, indicating the presence of quantitative resistances of unknown origin. Inoculation of roots with biocontrol pseudomonads reduced significantly the severity of symptoms on the leaves in all wheat cultivars. Interestingly, the degree of disease reduction was lowest in Forno but highest in Zinal. The results highlight that level between wheat and bacteria inducing ISR take place at the genotype level.