

The Efficacy of Salicylic Acid and Puccinia Triticina Isolates Priming Wheat Plant to Diuraphis Noxia Damage

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Abstract : Russian wheat aphid (*Diuraphis noxia*, Kurdjumov) is considered an economically important wheat (*Triticum aestivum* L.) pest worldwide and in South Africa. The RWA damages wheat plants and reduces annual yields by more than 10%. Even though pest management by pesticides and resistance breeding is an attractive option, chemicals can cause harm to the environment. Furthermore, the evolution of resistance-breaking aphid biotypes has out-paced the release of resistant cultivars. An alternative strategy to reduce the impact of aphid damage on plants, such as priming, which sensitizes plants to respond effectively to subsequent attacks, is necessary. In this study, wheat plants at the seedling and flag leaf stages were primed by salicylic acid and isolate representative of two races of the leaf rust pathogen *Puccinia triticina* Eriks. (Pt), before RWA (South African RWA biotypes 1 and 4) infestation. Randomized complete block design experiments were conducted in the greenhouse to study plant-pest interaction in primed and non-primed plants. Analysis of induced aphid damage indicated salicylic acid differentially primed wheat cultivars for increased resistance to the RWASA biotypes. At the seedling stage, all cultivars were primed for enhanced resistance to RWASA1, while at the flag leaf stage, only PAN 3111, SST 356 and Makalote were primed for increased resistance. The *Puccinia triticina* efficaciously primed wheat cultivars for excellent resistance to RWASA1 at the seedling and flag leaf stages. However, Pt failed to enhance the four Lesotho cultivars' resistance to RWASA4 at the seedling stage and PAN 3118 at the flag leaf stage. The induced responses at the seedling and flag leaf stages were positively correlated in all the treatments. Primed plants induced high activity of antioxidant enzymes like peroxidase, ascorbate peroxidase and superoxide dismutase. High antioxidant activity indicates activation of resistant responses in primed plants (primed by salicylic acid and *Puccinia triticina*). Isolates of avirulent Pt races can be a worthy priming agent for improved resistance to RWA infestation. Further confirmation of the priming effects needs to be evaluated at the field trials to investigate its application efficiency.

Keywords : Russian wheat aphid, salicylic acid, *puccinia triticina*, priming

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