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Pleiotropic effects of over-expressed heterologous proteinase inhibitors in transformed *Lotus corniculatus* L. plants

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Proteinase inhibitors (PIs) are small proteins that occur naturally in a number of plant species that are characterized by varied specificity toward proteinases, among them insect digestive proteinases of the serine, cysteine, aspartyl and metalloproteinase class. Over-expression of heterologous proteinase inhibitor genes in transgenic plants was used as a strategy for introducing insect and nematode control. Besides their main effects (biodefense), PIs are also known to have positive *side-effects* on transgenic *plant physiology*. In this study engineered bird's foot trefoil (*Lotus corniculatus* L.) plants with three different PI genes - *Beta vulgaris* serine PI, *Nicotiana glauca* serine PI and squash aspartyl PI - exhibited enhanced growth with higher number of tillers and increased fresh and dry weight. Moreover, some of the transformed lines displayed higher tolerance to NaCl stress evaluated on the basis of growth and associated parameters, such as salinity injury and chlorophyll content, using two NaCl levels (100 and 200 mM) for up to 10 d. Overall, the results indicate that the over-expression of heterologous proteinase inhibitors could be a promising approach for increasing productivity of genetically improved *Lotus corniculatus* L. plants.