Tropentag, September 18-21, 2016, Vienna, Austria

"Solidarity in a competing world — fair use of resources"

Advance in Grain Legumes Genetic Transformation: The Case of GM Pea and Cowpea

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Abstract

Grain legumes are socio-economically important crops playing a substantial role in providing dietary protein for millions of households in the world. As multipurpose crops, they are used for different purposes such as food and feed. They also fix atmospheric nitrogen contributing to the sustainability of farming system by enriching soil fertility and maintaining the productivity of agricultural land. However, different production factors, such as insect pests and diseases, have limited the productivity of grain legumes both in field and during the storage and are impacting their contribution to nutrition security and poverty reduction. Furthermore, in the current trend of climate change, there is an increasing pressure on plant breeders to develop climate-smart varieties of crops with multiple traits against the different production factors. In order to enhance the economic and social contribution of grain legumes, genetic transformation approaches have been used to develop transgenic lines with new traits such as resistance to insects and diseases as well as tolerance to drought. In this paper, the experience and result of pea and cowpea Agrobacterium-mediated transformation will be presented. Special emphasis will be given to the success and challenges of transgenic insect resistance and its importance in these two important grain legumes. Based on insect bioassay tests, the level of insect resistance in some of the transgenic lines will be presented against that of none transgenic lines. Finally, recommendation will also be discussed for future genetic transformation to develop climate-smart variety of transgenic grain legumes.

Keywords: Agrobacterium, cowpea, genetic transformation, grain legume, pea, transgenic

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