MARKER ASSISTED GAMETE SELECTION FOR MULTIPLE DISEASE RESISTANCE OF COMMON BEAN (Phaseolus vulgaris L) IN KENYA

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Abstract

Breeding beans for multiple constraint resistance in eastern Africa has traditionally relied on classical approaches which have resulted in slow progress towards the release of new varieties. Moreover, breeding programs have been dependent on erratic and unevenly distributed disease epiphytotics to identify genotypes with multiple resistance. It has been suggested that use of markers linked to resistance genes can improve precision, shorten duration of development of new varieties and improve efficiency of breeding programs. The objective of this study was validate the resistance of angular leaf spot, anthracnose, bean common mosaic virus, bacterial common blight and root rots in locally popular bean varieties. Another objective was to develop breeding populations with multiple disease resistance genes and assess the potential of polymorphic markers in selection of multiple resistance genes. Thirty-one bean varieties and advanced lines were inoculated with isolates/strains of the five diseases in the greenhouse and screened for polymorphism with 18 SSR and SCAR markers at Kabete, Field Station of the University of Nairobi, Kenya. The results showed that none of the commercial cultivars was resistant to all five diseases. Resistance to angular leaf spot in Mex 54 and G10909, anthracnose in G2333, bean common mosaic virus in BRB 191, common bacterial blight in VAX 6, and root rots in RWR719 and in AND 1062 were validated. Commercial varieties were polymorphic for markers linked to at least two diseases. Twelve new male gametes with combinations of resistance genes were developed. These results indicate that development of new bean varieties with multiple disease resistance using markers is feasible. Polymorphic markers can be used to identify male gametes with specific resistance genes for introgression to susceptible varieties and in identification of desirable recombinants during the early generation.

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