

ABSTRACT

Breeding bean for multiple constraint resistance in eastern Africa has traditionally relied on classical approaches which have resulted in slow progress towards release of new varieties. Moreover, breeding programs have 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 resistance major diseases in locally popular bean varieties, develop breeding populations with multiple resistance genes, and assess the potential of polymorphic markers in breeding for multiple resistance to angular leaf spot, anthracnose, bean common mosaic virus, bacterial common blight and root rots. 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 markers at Kabete. Results showed that none of the commercial cultivars was resistant to the five diseases. Resistance to angular leaf spot in Mex 54, G10909, anthracnose in G2333, bean common mosaic virus in BRB 191, common bacterial blight in VAX 6, and root rots in RWR719 and AND 1062 were validated. Commercial varieties were polymorphic for markers linked to at least two diseases. Twelve new male gametes with combination 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.