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IDENTIFICATION OF RESISTANCE IN COWPEA AGAINST BLACKEYE COWPEA MOSAIC VIRUS

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Abstract

Two hundred cowpea germplasm accessions (local and exotic) were evaluated against blackeye cowpea mosaic virus (BlCMV) under green house conditions by sap inoculation method. Out of 134 local accessions only two (27168 and 27192) were found resistant to BlCMV, whereas 23 out of 66 were resistant from exotic material. Although resistance to BlCMV has been known in cowpea, but in this study we report some additional sources of resistance to a local virulent isolate of BlCMV.

Introduction

Virus diseases are considered to be a major limiting factor for the production of cowpea (*Vigna unguiculata*) in the tropical and sub-tropical countries of the world. The most important and worldwide occurring seed-borne virus of cowpea is blackeye cowpea mosaic virus (BlCMV) (Bashir & Hampton, 1996). Yield losses of 32 to 85% have been reported by BlCMV when cowpea is infected with mixed infection of cucumber mosaic virus (CMV) and BlCMV (Kuhn, 1989). Although effective control of BlCMV can be achieved through integrated approaches, but the use of host plant resistance is the most economical and practicable method. In the present study, 200 cowpea germplasm accessions were evaluated against a local virulent isolate of BlCMV with the objective to identify resistant genotypes to be used in breeding programme to develop virus resistant cowpea varieties.

Material and Methods

A virulent isolate of BlCMV was obtained by growing infected seeds of cowpea collected from Narowal (Punjab) market during May, 2000. The identity of the virus isolate was confirmed by direct enzyme-linked immunosorbent assay (DAS-ELISA) and host reaction. The stock culture of the isolate was maintained on susceptible cowpea plants in an insect-free greenhouse. A total of 200 cowpea germplasm accessions (134 local and 66 exotic) were evaluated against BlCMV isolate by sap-inoculation method under greenhouse conditions. Disease reactions were recorded at two weeks interval on 0-4 scale (-: no symptoms at all, +: mild symptoms, ++: moderate symptoms, +++: severe symptoms, ++++: very severe symptoms). Three months after first inoculation only symptomless plants were tested by direct antigen coating enzyme-linked immunosorbent assay (DAC-ELISA) as described by Hobbs *et al.*, (1987) to separate the resistant plants from susceptible (latent infection) ones.

Results and Discussion

Only two lines (27168 and 27192) out of 134 were found resistant from local material, whereas all the others were highly susceptible indicating a very narrow genetic base of these accessions. Out of 66 exotic lines obtained from International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, 23 (34.8%) were found with resistant reaction to BlCMV. From this material 20 accessions expressed a segregating pattern towards virus infection. Resistant as well as susceptible plants were found within the same line expressing segregating pattern. Such observations in cowpea germplasm from IITA material had been reported previously (Ladipo & Allen, 1979). Although there are several reports on the identifications of resistance sources to BlCMV (Mali *et al*, 1988; Bashir & Hampton, 1996), but in this study we report some additional sources of resistance to a virulent isolate of BlCMV obtained from local cowpea seeds.

The BlCMV is known to be seed-transmitted from 0 to 22.6% in cowpea (Mali *et al*., 1988). Planting of virus infected seeds facilitates the introduction of pathogen in new localities and provide primary source of virus infection under field conditions. The identified cowpea lines resistant to BlCMV are potential source for establishment and production of certified seeds to avoid the introduction of BlCMV in new areas.

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