Plant Pathology Journal

ISSN 1812-5387

science alert

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Pakistan Journal of Plant Pathology Vol. 1 (1): 25-26, 2002

Reaction of Cowpea (*Vigna unguiculata* L. Walp) Cultivars to Yellow Mosaic Virus Disease

Yousaf Ali, M. Yasin Ashraf, Z. Aslam and S.S. Alam
Nuclear Institute for Agriculture and Biology, P.O. Box 128, Jhang Road, Faisalabad, Pakistan

Abstract: An experiment was conducted at three different locations of Punjab with twenty-four genotypes of cowpea under natural field conditions where yellow mosaic virus disease is a serious problem. Yellow mosaic virus infestation was rated after 4-5 weeks of sowing. Results indicated that genotypes 1T-95k-1156-3, 1T-94k-137-6, 1T-97k-9042-8,1T-97k-499-4, 1T-97k-497-2, 1T-93k-452,1T-97-k-350-4, SA Dandy, p-518, Elite, No.44 and 1T-84-552 showed highly resistant to resistant reaction, 1T-94k-440-3, 1T-95k-627-34, 1TK-238-3 gave tolerant to moderately tolerant reaction and 11-97k-461-4, 1T-97k-1021-15 showed moderately tolerant to susceptible reaction.

Key words: Cowpea, yellow mosaic virus, genotypes, resistance

Introduction

Cowpea (*Vigna unguiculata* L. Walp) is an important legume crop grown in tropical and sub-tropical countries in the world. It is consumed in form of leaves, green pods and grain. It is also grown as fodder crop mixed in sorghum and millet. In Pakistan it is grown on an area of approximate by 17 thousand hectares with annual production of 8 thousand tones Bashir *et al.* (1999). Several factors could be considered responsible for low productivity but yield are most often affected drastically by adverse environmental conditions and out-break of epidemic diseases. In Pakistan five seed borne viruses are known to cause disease in cowpea. Yellow mosaic virus transmitted by white fly (*Bemisia tabaci*) vector affects both vegetative and reproductive parts of the plant (Bashir *et al.*, 2002). Yellow mosaic virus may cause 14 to 54 % decrease in plant height 30 to 95 % decrease in dry stem weight of cowpea and mungbean (Ilyas, 1999). Singh (1985) suggested that for controlling the white fly application of dimethoate and phosphamidion were very effective as foliar spray to control the disease. Cowpea is notorious to host more seed-borne viruses than any other legume species (Hamptan, 1983) The objective of this study was to note incidence of yellow mosaic virus on twenty-four cultivars of cowpea to use them in different cropping systems in the country.

Materials and Methods

Twenty-four genotypes (Table 1) were grown during summer 2001 at three locations i.e. Ayub Agricultural Research Institute, Faisalabad, Fodder Research Institute Sargodha and Nuclear Institute for Agriculture and Biology (NIAB) Farm, Faisalabad under natural field conditions where yellow mosaic virus disease is a serious problem in a randomized complete block design with three replications. Each plot consisted of five rows of four meter long. Cultivars were planted at 15 cm plant to plant and 30 cm row to row distance. Fertilizer @ 20:20 Kg ha^{-1} Nitrogen and P_2O_5 were applied before planting. Yellow mosaic virus infection was rated after 4-5 weeks of sowing as mentioned by Capoor *et al.* (1947).

Results and Discussion

Reaction of 24 genotypes of cowpea cultivars to yellow mosaic virus disease varied at different locations (Table 1). It is evident from the data that cowpea genotypes under study vary in reaction against yellow mosaic virus disease (Table 1). Cowpea genotypes 11-97k-461-4, 1T-97k-1021-15 showed moderately tolerant to susceptible reaction and 1T-95k-1156-3, 1T-94k-137-6, 1T-97k-1042-8, 1T-97k-499-4, 1T-97k-497-2, 1T-93k-452, 1T-97k-350-4, SA Dandy, P-518, Elite, No.44 and 1T-84-552 Showed highly resistant to resistant reaction. 1T-94k-440-3, 1T-95k-627-34, 1TK-238-3 gave tolerant to moderately tolerant reaction.

Table 1: Reaction of twenty four cowpea cultivars to yellow mosaic virus disease in Punjab (Pakistan)

Cultivars	NIAB-Farm	AARI-Farm	Fodder Res. Insti. Sargodha
1T-97K-461-4	5.7	7.0	5.2
1T-98k-469-11	4.6	6.3	4.1
1T-97k-1068-7	5.4	7.0	5.2
1T-94k-440-3	4.8	5.3	4.3
1T-95k-627-34	4.6	5.5	4.2
1T-95k-1093-5	4.1	6.3	4.7
1T-97k-1021-15	4.7	7.0	5.0
Lolcia-2000	3.3	5.0	3.0
1Tk-238-3	4.4	5.0	4.0
1T-98k-463-6	4.5	6.3	4.8
1T-97k-529-14	4.2	6.3	4.2
1T-98k-558-1	5.4	7.0	5.1
1T-95k-1156-3	1.6	2.3	1.3
1T-94k-137-6	1.3	2.0	1.0
1T-97k-1042-8	1.8	1.7	1.1
1T-97k-499-4	1.6	2.0	1.2
1T-97k-497-2	1.7	1.0	1.4
1T-93k-452	1.4	1.0	1.5
1T-97k-350-4	1.6	1.0	1.0
S.A. Danely	1.5	1.0	1.0
P-518	1.5	1.0	1.0
Elite	1.8	1.0	1.0
No.44	1.8	1.0	1.0
1T-84-552	1.0	0.7	1.1

Yellow mosaic virus incidence was very high at Ayub Agricultural Research Institute compared with NIAB-Farm and Fodder Research Institute Sargodha. NIAB-Farm and F.R.I. Sargodha disease reaction was almost same with non-significant difference. Cowpea (*Vigna unguiculata*) has the distinction of carrying more seed borne viruses than any other crop species (Hamption, 1983). Establishment and distribution of virus free cowpea breeding material and germplasm is suggested to control or avoid the introduction of new viruses (Bashir *et al.*,1999). There are many other viruses i.e. BICMV, CABMV and Potyviruses which are also virulent (Bashir and Hampton, 1996a; Bashir and Hampton, 1996b; Zia *et al.*, 1999).

Cowpea cultivars identified in this study have also higher yielding ability. Correa and Zeigler (1995) suggested that selecting high levels of resistance when diverse sources are combined can be used to develop a cultivar with stable resistance against disease. For establishing definite relation with disease resistance and high yielding cultivars further studies are in progress with these basic information.

Acknowledgment

The cooperation of fodder botanist AARI in recording the data is highly acknowledged.

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Corresponding Author: Dr. S. Sarwar Alam, Senior Scientific Officer, NIAB, P.O.Box 128, Jhang Road, Faisalabad, Pakistan

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