

ASSESSMENT OF YIELD LOSSES DUE TO LEAF CRINKLE VIRUS IN URDBEAN, *VIGNA MUNGO* (L.) HEPPER

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Abstract

Losses inflicted by leaf crinkle virus (LCV) were determined by comparing components of infected and healthy plants of urdbean (*Vigna mungo*) cv. M-133. The disease reduced plant height by 8%, number of pods (90.8%), pod length (18.4%), seed weight (26.5%) and yield by 81%. LCV affected all the yield contributing components of plants except number of branches and leaves.

Introduction

Leaf crinkle virus (LCV) was first observed in the urdbean germplasm evaluation plots at the National Agricultural Research Centre, Islamabad during 1983. Plant disease surveys in the subsequent years revealed that LCV was widely distributed in all the areas where urdbean and mungbean are grown but the disease intensity was severe in urdbean (Bashir & Zubair, 1985; Bashir & Malik, 1988). The disease is characterized by curling, puckering and crinkling of leaves which is very much pronounced on young leaves, stunting of plants, thickening of stipules and rugosity or bushy appearance. Infected plants produce few or sterile flowers and few pods and grains. Williams *et al.*, (1968) failed to transmit the disease mechanically but it was successfully achieved by Nene (1972). However, seed-borne nature of LCV was reported and confirmed by many workers (Nene, 1972; Kolte & Nene, 1972; Narayana & Jaganathan, 1975). Under field conditions, LCV is transmitted by aphids (Dhingra, 1975, Dubey *et al.*, 1983) but not through whitefly (Nene, 1972). Beniwal *et al.*, (1983) and Kadian (1983) reported weed hosts as virus reservoir. Some physical and chemical properties of the causative virus were studied by Bhaktavastharam *et al.*, (1983), Kolte & Nene (1975) and Kadian & Verma (1981). Beniwal & Chaubey (1979) and Singh (1980) reported 76-100% yield losses. Yield losses caused by LCV in Pakistan and its effect on yield components in urdbean is given in this report.

Materials and Methods

Seeds were collected from LCV-infected as well as healthy plants of urdbean cultivar M-133, during 1987 and planted during summer season of 1988. Each lot was planted in a 15x15 m plot with a row to row and plant to plant distance of 30 and 10 cm respectively. Healthy plants with no signs of infection and diseased plants showing distinct crinkling at trifoliolate stage were selected at random, marked and harvested individually at maturity. Various yield contributory components such as plant height, number of branches, number of leaves, pods/plant, pod length, seeds per pod, yield

per plant and 100 grain weight were recorded (Singh, 1980). Percent losses were calculated and the results compared by the 't' test.

Results and Discussion

The results summarized in Table 1 indicated that LCV in variably affected almost all the components of urdbean. Plant height was reduced by 8%, but number of branches and leaves were not affected. The adverse effect of LCV was more pronounced on pod number followed by yield per plant. On average basis, infected plant produced less than 3 pods as against 29 on the healthy, giving a reduction of 90.8%. Similarly, the average yield per plant was 1.6 and 8.7 g in diseased and healthy plants, respectively, which amounted to 81% loss in yield an estimate reported by Benival & Chaubey (1979). Pod length and seeds per pod showed a decrease of 18.4 and 26.5%, respectively. However, there was no significant difference in the weight of 100 grains harvested from healthy or diseased plants. The losses are generally attributed to virus induced sterility in the flowers of urdbean. The results obtained are in close conformity with those reported by Nene (1972) and Singh (1986). However, it is desirable to characterize local isolate of leaf crinkle virus, determine extent of seed-borne infection and find out natural transmission agents. In view of the regular

Table 1. Effect of leaf crinkle virus on some yield contributing components of urdbean (*Vigna mungo*).

Character	D.F.	Healthy	Infected	% Reduction	t value	P value
Height/plant (cm.)	18	25.00	23.0	8.00	2.10	> 0.05
Branches/plant	18	4.80	4.8	00.0	00.0	NS
Leaves/plant	18	22.00	22.0	00.0	00.0	NS
Pods/plant	60	29.00	2.6	90.8	14.92	>.01
Pod length (cm.)	23	4.46	3.6	18.4	4.67	>.01
Seeds/pod	23	5.93	4.36	26.5	4.20	>.01
Yield/plant (gm.)	23	8.7	1.6	81.0	7.04	>.01
100 grain wt. (gm.)	8	5.12	4.95	3.32	0.279	NS

* Significant at P values above 0.05 - 0.01. NS = Non-significant

recurrence and the heavy losses caused by LCV, it is necessary to develop or select resistant or tolerant cultivars of urdbean. Presently, seed-borne infection seems to be mainly responsible for wide spread occurrence of LCV. The present losses, therefore, could be minimized by planting virus free seeds, roging out of infected urdbean plants and eradication of weeds serving as source of infection.

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