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RESEARCH ARTICLE

Assessment of Yield Loss in Groundnut due to Mosaic Virus in Agra

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ABSTRACT

Groundnut (Arachis hypogaea L.) is one of the most important oil seed and food crop of India. It is attacked by mosaic virus disease which causes considerable loss in quality and quantity of groundnut kernels. In the present study, losses incurred due to this disease in groundnut have been evaluated at Agra. In severely infected plants, percentage loss in yield in terms of seeds was 91.96, 90.86 and 91.13% in the years 2011, 2012 and 2013 respectively. The respective figures in relation to the reduction in number of pods per plant were 91.73, 91.70 and 90.08% respectively in the same years. In severe infections, there was cupping and malformation of leaves accompanied with stunting of groundnut plants. The flowering was delayed and very few or no fruits were formed.

Key word: *Groundnut, Arachis hypogaea L, Mosaic virus*

INTRODUCTION

The ravages caused by plant diseases exert serious repercussions on agricultural production and economy. The problem of assessment of consequent losses, therefore is of primary importance. (Vallega and Chiarappa, 1964). Groundnut *(Arachis Hypogaea L.)* is one of the most common Indian oil seed and food crops. In India, the total area under groundnut cultivation is about 10 million acres. It is mainly grown for production of groundnut oil, but its seeds are roasted and eaten as nutritious food it is also used as a nutritive, emollient and laxative in the veterinary science.

Many pathogenic organisms are reported to infect groundnut crop but mosaic disease caused by virus is most important due to its wide spread occurrence. Lizuka *et al* (1989) studied the effect of mosaic disease on groundnut and found that there was a significant reduction in the length and dry weight of pods in plants infected by mosaic virus. Reduction in number and size of seeds and in total plant weight was also noted. During survey of groundnut fields in Agra district of Uttar Pradesh, mosaic disease was found to infect about 30% plants in various fields. In the present investigation, losses incurred due to the mosaic disease in ground nut were studied.

MATERIALS AND METHODS

Three years data of disease incidence and crop loss due to mosaic disease in groundnut was collected from the fields of groundnut. After sowing the fields were crested regularly till the crop was harvested. At the time of harvest, 100 diseased and 100 healthy plants were collected at random. The number of pods per plant, the size of pod and weight of seeds per plant of both the healthy and diseased plants were recorded. The loss in yield was calculated by the following formulae as given by Chenulu *et al* (1966).

$$\text{Percentage loss in number of pods} = \frac{\text{Average no. of pods of healthy plants} - \text{Average no. of pods in diseased plant}}{\text{Average no. of pods in healthy plant}} \times 100$$

$$\text{Percentage loss in yield} = \frac{\text{Average yield of healthy plant} - \text{Average yield of diseased plant}}{\text{Average yield of healthy plant}} \times 100$$

The observations were tested for significance by application of "t" test.

RESULTS AND DISCUSSION

Mosaic symptoms on groundnut appeared in the third or fourth week after sowing the crop. The virus under investigation infected plants in systemic pattern. Therefore, all the parts of the plant were first observed as chlorotic spots on the apical leaves, which gradually increased in size and number and coalesce to give typical mosaic pattern.

In severe infections, there was cupping and malformation of leaves accompanied with little stunting. Not only the size of plants but also the number of pods per plant and numbers of seeds per pod were affected. Due to the stunted growth, the infected plants became bushy in appearance. The flowering was delayed and very few or no fruits were formed in the severely infected plants. The perusal of the data presented in table 1 indicates that not only the number of pods per plant was reduced due to disease but there was also a considerable loss in the yield from the diseased plants. Percentage loss in yield in terms of seeds was 91.96, 90.86 and 91.13% in the years 2004, 2005 and 2006 respectively. The respective figures in relation to the reduction of pods per plant were 91.73, 91.70 and 90.08% respectively in the same years.

Ravinder, *et al* (1985) recorded yield loss in French bean due to infection of bean mosaic virus in the range of 19.2 to 79.7% Chenulu, *et al* (1966) studded losses due to the groundnut mosaic in India. The number of pods was reduced by more than 60% and the seeds per pod were reduced to 90% in severely infected plants. Thus, it is clear that mosaic virus reduces yield of groundnut to a considerable extent and attempts should be made to minimize such losses.

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Table 1: Yield losses in groundnut due to mosaic disease (Data based on 100 plants)

S.No.	Nature of Observations	2011		2012		2013	
		Healthy	Diseased	Healthy	Diseased	Healthy	Diseased
1	No. of pods per plant	79.36	8.30	74.30	7.85	65.00	8.00
2	Length of pod (in cm.)	4.43	2.39	4.14	2.26	4.26	2.11
3	No. of seeds per pod	5.30	3.14	5.54	3.33	5.49	2.00
4	Weight of seeds per plant (in gms.)	59.28	6.30	48.94	5.89	44.30	5.30
5	Percentage loss in grain yield per plant	100.00	91.96	100.00	90.86	100.00	91.13
6	Percentage loss in no. of pods per plant	100.00	91.73	100.00	91.70	100.00	90.08

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