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ESTIMATION OF LOSSES CAUSED BY INSECT AND WEED PESTS TO MAIZE CROP

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The experiment was conducted to estimate the losses caused by insect and weed pests to the maize crop. The results revealed that differences in total yield of ears in various treatments were significant. The difference in average plant height, number of grains per ear, weight of grains per ear and weight per ear in different treatments were significant when compared with control. However, the difference among the treatments were non-significant. The percentage loss in ears caused by weeds, insects and weeds plus insects was found to be 18, 14, and 31% respectively.

Key words : Losses, insects and weeds.

INTRODUCTION

Maize (*Zea maize*) is an important food and fooder crop of Pakistan. It has also gained significant importance in the industrial sector for the manufacture of textiles, paper, and food products. The yield of this crop is adversely affected on account of insects and weed pests. Cramer [2] recorded 10-15% loss in grain yield due to insects and weeds. It was reported that weeds were responsible for 12% loss in the yield of maize [4]. The grain yield of corn was reduced to the extent of 9.3% due to the attack of corn borer and corn earworm [5]. The loss caused by weeds, insects and weeds plus insects was 17, 12 and 28% respectively in the yield of ears [1]. Paharia [6] analysed the effects of pest, disease and weed problems on new high yielding cultivars in India and South Asia and suggested changes in agronomic practices to avoid losses. European corn borer also affects the crop yield adversely [3].

The present experiment was therefore, designed to estimate the losses caused by insects and weed pests in Pakistan.

MATERIALS AND METHODS

The studies were made from February to June, 1986 in the farmer's field at Faisalabad. The experimental design used was a randomized complete block with four replications. Maize variety "Neelam" was sown on 16.2.1986 in an area 0.4 hectare. There were four treatments including a control plot. The details of the treatments are as follows:

1. *Insecticides:* Carbofuran (3% G.) was applied twice, once at the time of sowing and then after one month at the rate of 0.45 kg (a.i.) per hectare. Thereafter, fenvalerate (20% E.C.) was sprayed at the rate of 0.5 litre per hectare. At first the spray was applied one month after the second application of carbonfuran granules and two more sprays were given at 15 days' interval.

2. *Cultural practices:* The first hoeing was done on 9.3.1986 and three subsequent hoeings were given to check the weeds at biweekly intervals.

3. *Insecticides plus cultural practices:* The Above-mentioned insecticides and cultural practices were given in the same way.

4. *Control:* Neither insecticides nor cultural practices were applied. The populations of insect pests and weeds were allowed to develop freely under natural conditions.

The following procedure was adopted to estimate the losses caused by insect and weed pests:

1. The ears were removed when mature on 22.6.86 and the total yield from each plot was recorded.

2. Fifty plants were selected at random from each plot (200 plans in each treatment) and their heights were estimated.

3. Twenty five ears were selected at random from each plot (100 ears in each treatment) and their weight was recorded. Then the grains were removed, weighed and their number was counted to calculate the average number of grains per ear, average weight per ear and the average weight of grains per ear. Insecticides and cultural practices treatment was kept as a standard to calculate the percentage losses caused by insect and weed pests in other treatments.

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RESULTS AND DISCUSIONS

It is evident that differences in total yield of ears/ha. (Table 1) in different treatments were significant. Insecticides + cultural practices gave maximum yield followed by cultural practices only. The difference in the height of plants, number of grains per ear, weight of grains per ear and weight of ears were significant when compared with the control. Insecticides + hoeing differed significantly from other treatments but were non-significant individually

Percent loss caused by weeds to ears and grains per hectare was 18 and 17 respectively was higher significantly than losses due to insects (14 and 14% respectivley). Plant height decreased by 14% due to weeds and 13% due to insects. The number and weight of grains were higher in plants where weeds were controlled than where insects were controlled. However, the differences were not significant.

Table 1. Mean results for different treatments

Treatments	Total yield of ear (kg/ha.)	Average plant height (cm)	Average number of grains per ear	Average weight of grains per ear (g)	Average weight per ear (g)
Insecticide only	3264^{b}	136^{b}	539^{b}	111^{b}	168^{b}
Hoeing only	3405^{c}	137^{b}	559^{b}	114^{b}	172^{b}
Insecticide + Hoeing	3964^{d}	159^{c}	649^{c}	132^{c}	198^{c}
Check	2737^{a}	118^{a}	467^{a}	90^{a}	139^{a}

Table 2. Loss percentage in different treatments from the insecticide plus Hoeing treatment

Treatment	Yield of ears	Height per plant	Grains per ear	Weight of grains/ ear	Weight per ear
Insecticide only	18^{b}	14^{b}	17^{b}	15^{b}	15^{b}
Hoeing only	14^{c}	13^{b}	14^{c}	14^{b}	13^{b}
Check	31^{a}	25^{a}	28^{a}	31^{a}	30^{a}

The yield of ears per hectare was reduced to 31% when neither the insects nor the weeds were controlled. It is, therefore, suggested that the application of insecticides and cultural practices both are necessary for getting the best yield from maize.

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