ASSESSMENT OF LOSSES CAUSED BY INSECT PESTS IN OKRA

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ABSTARCT

An experiment was conducted at the College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari during kharif 2007 with seven different treatment of protection to the okra crop against various insect pests following randomized block design replicated thrice. The highest okra fruit yield (1548 kg/ha) was recorded in treatment protection against insect-pests throughout the crop season (seed treatment + need base application of insecticides) (T_1), which was at par with protection against insect-pests up to 60 days (T_6) (1537 kg/ha). Lowest okra fruit yield (1090 kg/ha) was recorded in the treatment of no protection. Moreover, highest avoidable loss in okra fruit yield (29.59%) was recorded in treatment protection against insect pests throughout crop season, whereas lowest avoidable loss (10.00 %) was recorded in protection against insect pests from 60 day onwards. Maximum gross income (37152 Rs/ha) was obtained when the crop was protected against insect-pests throughout crop season, whereas minimum gross income was observed in unprotected treatment.

KEY WORDS: Avoidable losses, insect-pest, jassid, okra, shoot and fruit borer

INTRODUCTION

Among vegetables, okra [*Abelmoschus esculentus* (L.) Moench], is an important vegetable crop grown all over India and tropical and sub-tropical parts of the world. Besides various reasons for low productivity, heavy damage inflicted by insect pests is a key limiting factor. Okra crop suffers heavy damage by a number of insect pests *viz.*, Jassid [*Amrasca biguttula biguttula* (Ishida)], aphid [*Aphis gissypii* (Glover)], Okra shoot and fruit borer (*Earias* Spp) Whitefly [*Bemisia tabaci* (Genn.)] etc. Among these pests, fruit borer and jassid acts as major constraints in achieving the potential yield (Atwal and Singh, 1990; Shah *et al.*, 2001). Fruit borer is the most important pest causing direct damage to the marketable fruits. It is alone reported to cause 57.1% fruit infestation and 54.04% yield loss in okra (Chaudhary and Dadheech, 1989). Average loss in plant height, the number of leaves per plant and weight of healthy fruits can be as much as 49.8, 45.1 and 69.0 per cent, respectively due to combined effect of jassid and shoot and fruit borer (Rawat and Sahu, 1973). To get the potential marketable fruit yield, it is necessary to estimate the losses caused by insect pests of okra.

MATERIAL AND METHODS

An experiment was conducted at the College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari during *kharif* 2007 in a randomized block design replicated thrice including seven different treatments as follows:

T_1	:	Protection against insect pests throughout crop season (seed treatment + need base application of insecticides)
T_2	:	Protection against insect pests from 30 days onwards
T_3	:	Protection against insect pests from 45 days onwards
T_4	:	Protection against insect pests from 60 day onwards
T_5	:	Protection against insect pests up to 45 days. i.e. seed treatment
T_6	:	Protection against insect pests up to 60 days. (seed treatment + need base application of insecticides),
T_7	:	No protection against insect pests

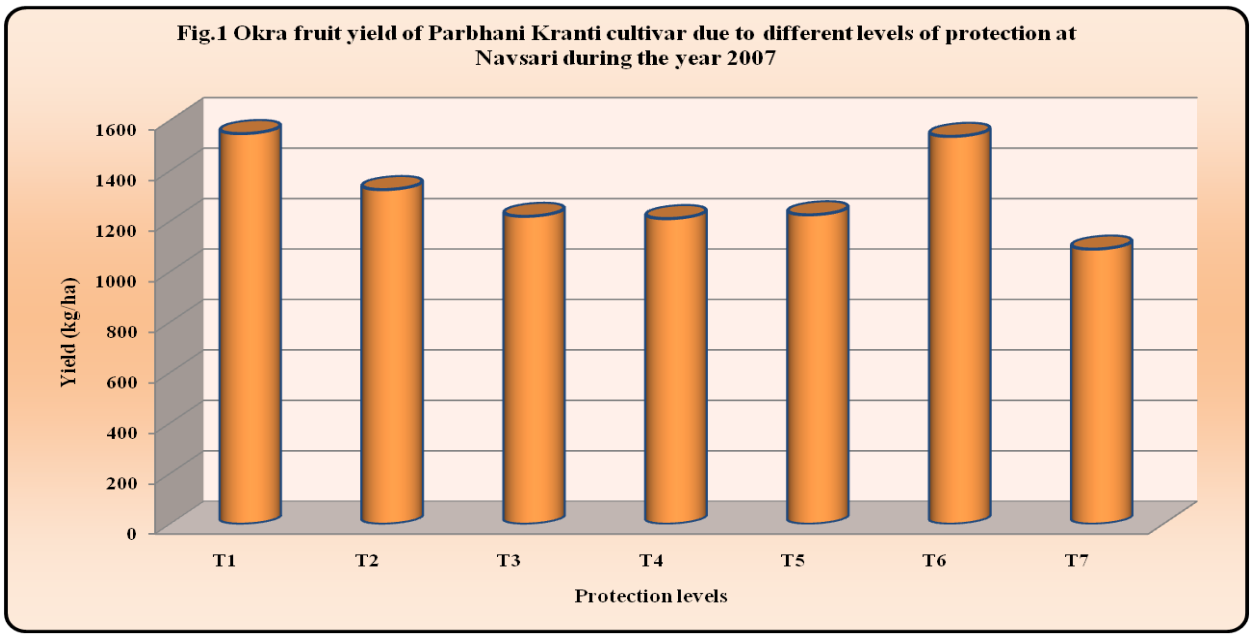
The okra cv. Parbhani Kranti was sown in a gross plot size of 4.5 m x 2.25 m with a spacing of 45 cm x 30 cm. Weekly observations were recorded for different insect and pests. To record the observations of sucking pests, five plants were randomly selected and pest population was recorded from three leaves each from the top, middle and lower part of each randomly selected plant, whereas to record the observations of shoot and fruit borer, ten plants were randomly selected and number of larvae as well as damaged fruit were recorded at weekly interval. Yield of healthy and damaged fruit were recorded separately at each picking. The average pest population was worked out using observations of a pest for all the respective treatments. The average pest population at each observation was used to compare it with economic threshold level to decide application of insecticide. The chemical control measures were adopted as and when the insect-pest populations exceed the economic threshold level fixed for each pest. Per cent avoidable losses of okra yield in different treatments were calculated by comparing the yield of respective treatments with unprotected treatment by adopting following formula:

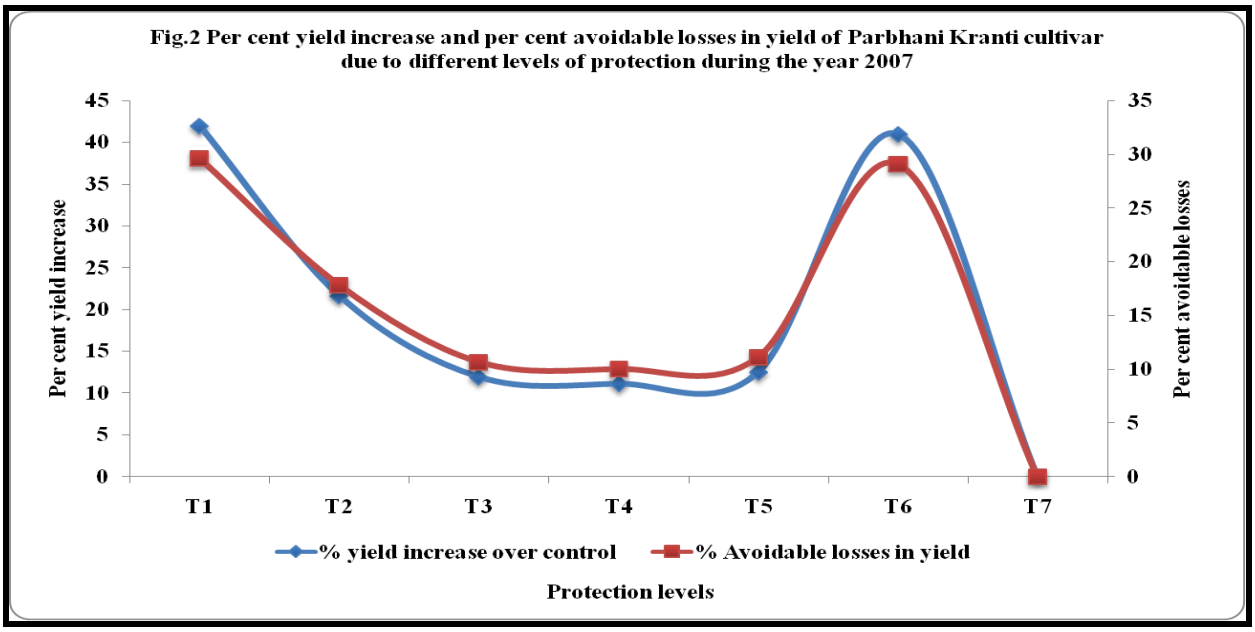
$$\text{Avoidable losses (\%)} = \frac{\text{Yield in protected plot} - \text{Yield in unprotected plot}}{\text{Yield in protected plot}} \times 100$$

RESULTS AND DISCUSSION

Picking wise fruit yield of okra was recorded in different treatments during *kharif* 2007 and presented in Table.1, Fig.1 and Fig. 2. The results revealed that significant differences in okra yield among different levels of protection. The highest yield (1548 kg/ha) was recorded in treatment of the protection against insect-pests throughout the crop season (seed treatment + need base application of insecticides) (T_1), which was at par with protection against insect-pests up to 60 days (T_6) (1537 kg/ha). The lowest yield was recorded in the treatment of no protection against insect-pests (T_7) (1090 kg/ha), which was at par with the protection against insect-pests from 60 days onwards (T_4) (1211 kg/ha), protection against insect-pests from 45 days onwards

(T_3) (1220 kg/ha) and protection against insect-pests up to 45 days (T_5) (1226 kg/ha). The descending order of okra yield was (T_1) (1548 kg/ha) > (T_6) (1537 kg/ha) > (T_2) (1326 kg/ha) > (T_5) (1226 kg/ha) > (T_3) (1220 kg/ha) > (T_4) (1211 kg/ha) > (T_7) (1090 kg/ha).





Looking to the extent of increase in yield over control, the treatment T_1 remained on top (41.94 %) followed by T_6 (40.94 %). The treatments T_2, T_5, T_3 and T_4 were in the descending order of effectiveness.

Avoidable losses in yield

The highest avoidable loss in okra fruit yield (Table 1) was recorded (29.59%) in treatment T_1 followed by T_6 (29.08 %) and T_2 (17.80 %). The lowest avoidable loss (10.00 %) was recorded in T_4 followed by T_3 (10.65 %) and T_5 (11.09 %) treatments.

Economics

The maximum gross income (Table 2) of 37152 Rs/ha was obtained when the crop was protected against insect-pests throughout crop season (T_1), followed by the treatment of T_6 (36888 Rs/ha). Minimum gross income was observed in unprotected treatment (T_7). Further, it can be seen from the above results that the highest BCR (1: 9.63) was recorded in the treatment of T_6 followed by the treatment T_1 (1: 4.04). The lowest BCR (1: 0.42) was obtained in the treatment of T_4.

CONCLUSION

Looking to the results, it can be concluded for getting the highest okra fruit yield, decrease the avoidable loss in okra fruit yield and also to get higher income, okra crop can be protected against insect-pests throughout the crop season with seed treatment + need base application of insecticides.

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Table 1: Okra yield in different treatments during *kharif* 2007

Sr. No.	Treatments	Yield (kg/ha)	Avoidable Losses in Yield (%)	Yield Increase Over Control (%)
T_1	Protection against insect pests throughout crop season. (seed treatment + Need base application of insecticides)	1548	29.59	41.94
T_2	Protection against insect pests from 30 days onwards.	1326	17.80	21.62
T_3	Protection against insect pests from 45 days onwards.	1220	10.65	11.91
T_4	Protection against insect pests from 60 day onwards.	1211	10.00	11.09
T_5	Protection against insect pests up to 45 days. i.e. seed treatment	1226	11.09	12.47
T_6	Protection against insect pests up to 60 days. (seed treatment +Need base application of insecticides)	1537	29.08	40.94
T_7	No protection against insect pests.	1090	0.00	0.00
	S. Em. ±	55.03		
	C.D. (0.05)	166.91		
	CV %	7.28		

Table 2: Economics of different protection levels against insect pest complex of okra Cv. Parbhani Kranti during *kharif* 2007.

Treat.	Total Spray	Cost of Insecticide (₹/ha)	Labour Cost (₹/ha)	Total Cost of Plant Protection (₹/ha)	Yield (kg/ha)	Gross Income (₹/ha)	Net Gain (₹/ha)	Net Profit Over Control (₹)	BCR
T_1	2	1980	200	2180	1548	37152	34973	8813	1:4.04
T_2	2	1950	200	2150	1326	31824	29674	3514	1:1.63
T_3	2	1950	200	2150	1220	29280	27130	970	1:0.45
T_4	2	1850	200	2050	1211	29064	27014	854	1:0.42
T_5	1	909	100	1009	1226	29424	28415	2255	1:2.23
T_6	1	909	100	1009	1537	36888	35879	9719	1:9.63
T_7	0	-	-	-	1090	26160	26160	-	-

Price: Fruit yield = ₹12 /500 gm, Labour charge =₹100 /spray

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