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RESEARCH PAPER

Assessment of Avoidable Losses due to Insect-pests in Staggered Sown Okra, *Abelmoschus esculentus* (L.) Moench Crop

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ABSTRACT

Investigation on Assessment of avoidable losses due to insect-pests in staggered sown okra, *Abelmoschus esculentus* (L.) Moench crop was carried out at Agronomy Farm, N.M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat during summer season 2021. The experiment was laid out in split plot design, with five different time of sowing ((S1- 12th February, S2- 22th February, S3- 8th March, S4- 22th March and S5- 8th April) as a main plot treatments and two levels of protection (P0 – Unprotected and P1- Protected) as a sub plot treatment with three replications using okra cultivar, GAO-5 . Protected condition registered higher yield (2260 to 12431 kg/ha) as compared to unprotected condition (1550 to 6500 kg/ha) in crop sown during different time. Avoidable loss due to insect pests was maximum (56.29%) when okra crop sown during 4th week of February (S2) whereas it was lowest (31.41%) in late sown crop i.e. 2nd week of April (S5). Hence, it is advisable to grow okra crop during the end of February month to get maximum advantage from insect pest.

HIGHLIGHTS

- Okra is an important vegetable crop and attack of so many insect pests are the limiting factor in okra cultivation.
- Though the protection to the okra crop against insect pest is essential to get higher marketable fruit yield, the damage losses can be effectively avoided by managing the time of sowing.

Keywords: Avoidable losses, insect pest, okra, *Abelmoschus esculentus*

Okra crop is attacked by several insect pests, of which eleven species of insects have been recorded in Gujarat (Patel *et al*. 1970). Amongst these, the major insect and non-insect pests are Leafhopper, *Amrasca biguttula biguttula* (Ishida) (Homoptera: Cicadellidae); Whitefly, *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae); Aphid, *Aphis gossypii* (Glover) (Homoptera: Aphididae); shoot and fruit borer, *Earias vittella* (Fabricius) (Lepidoptera: Noctuidae) and Red spider mite, *Tetranychus telarius* L. (Acarina: Tetranychidae). There are some minor insect and non- insect pest infesting okra crop viz., Shoot weevil, *Alcidodes affaber* (Aurivillius); Leaf weevil, *Mylocerus discolor* var Variegatus (Boh); Leaf miner, *Trachys herilla* (Obenb.); Red cotton bug, *Dysdercus cingulatus* (Fabricius); Gram pod borer, *Helicoverpa armigera* (Hubner); Cut worm, *Agrotis ipsilon* (Hufn); Cotton semilooper, *Acontia graellsi* (Fabricius); Blister beetle, *Mylabris pustulatus* (Asturianu) and Flower thrips, *Thrips tabaci* (Lind).

The losses caused by insect pests in okra have

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been estimated by various workers. Infested fruits become unfit for human consumption, thus resulting in 30.81 % decrease in yield of okra in Bihar (*Ghosh et al*. 1999). Whereas, 49.30 % reduction in marketable fruit yield was reported by Kanwar (2007). Around 23-54 % yield losses occurred in okra due to different insect-pest infestation (Sharma *et al*. 2017).

The majority of the farmers depend on insecticides for the management of okra pests. The indiscriminate uses of insecticides cause various problems. Under such circumstances, it is necessary to find out certain alternative methods of insect pest management. One of the methods is to alter the sowing time which may affect the incidence of insect pests and thereby reduce the extent of damage caused by them.

MATERIALS AND METHODS

To study the impact of sowing time on incidence of insect-pests of okra, field experiment was carried out during summer season 2021 at College Agronomy Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat using Okra cultivar, GAO-5 designed in split plot design with five different time of sowing (S1- 12th February, S2- 22th February, S3- 8th March, S4- 22th March and S5- 8th April) as a main plot treatments and levels of protection (P0 – Unprotected and P1- Protected) as a sub plot treatments with three replication. The crop was sown as row to row spacing of 45cm and 30cm spacing between two plants within a row. In protected plots application of insecticides were given at 15 days interval to protect the crop from incidence of sucking pest and shoot and fruit borer whereas unprotected plot was allowed for natural infestation of insect pests in the crop.

To assess the avoidable losses due to pests in okra, weight of healthy fruit from protected plots and unprotected plots were recorded at each picking. Yield obtained during each picking in particular treatments was summed up to get total yield of treatment and converted on hector basis. Losses in yield were calculated using following formula.

$$\text{Yield losses (\%)} = (T - C)/T \times 100$$

Where,

T = Yield from protected plot

C = Yield from unprotected plot

RESULTS AND DISCUSSION

Marketable fruit yield obtained from protected and unprotected plot of crop sown on different times were recorded and converted on hector basis which are presented in Table 1 and extent of yield losses which could be avoided are graphically presented in Fig. 1. Protected condition registered highest fruit yield (2260 to 12433 kg/ha) as compared to unprotected condition (1550 to 6500 kg/ ha) in all the sowing times. The avoidable yield losses in crop sown during different time were 31.41 to 59.29 %.

In sowing time S1 (2nd week of February), protected plot (P1) recorded 12433 kg/ha as against 6500 kg/ ha fruit yield in unprotected plot (P0). Therefore, avoidable yield loss of fruit yield was worked out as 47.71 % when crop was sown during 2nd week of February.

The okra fruit yield recorded in protected plot (P1) was comparatively higher (9533 kg/ha) than fruit yield from unprotected plot (P0) (4166 kg/ha) when crop sown during 4th week of February and thus avoidable yield loss in sowing time S2 (4th week of February) was 56.29 %.

In sowing time S3 (2nd week of March) yield from protected plot (P1) was 5633 kg/ha and yield from unprotected plot (P0) was 3533 kg/ha which exhibited 37.27 % avoidable yield loss.

The sowing time S4 (4th week of March) recorded higher fruit yield from protected plot (P1) (3600 kg/ha) as compared to yield from unprotected plot (P0) in which the yield was 1760 kg/ha and thus avoidable yield loss in sowing time S4 was 51.10 %.

In late sown crop i.e. crop sown during 2nd week of April recorded 2260 kg/ha fruit yield in protected plot (P1) as against 1550 kg/ha yield from unprotected plot (P0). Thus, the avoidable yield loss was 31.41 % in late sown crop.

Hence, it is advisable to grow okra crop during the end of February month to get maximum advantage from insect pest. Present finding are in accordance with the result of Gaikwad *et al*. (2020). They reported highest fruit yield (4334 kg/ha) from protected plot and minimum fruit yield (2815 kg/ha) was recorded in unprotected condition and reported average avoidable yield losses of 33.07 % of two years during *kharif* season. In past, Patel *et al.* (2015) reported highest okra fruit yield (1548 kg/ha) in protected crop against insect-pests throughout the

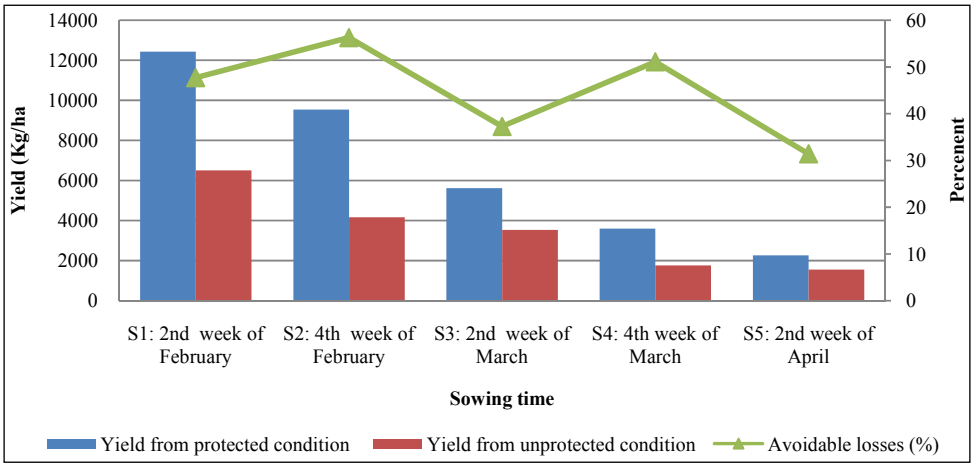

Fig. 1: Yield of okra from protected and unprotected condition and extent of avoidable loss under different sowing period

Table 1: Avoidable yield losses in okra crop sown during different periods

Sowing times	Yield (Kg/ha) from protected condition (P1)	Yield (Kg/ha) from unprotected condition (P0)	Avoidable losses (%)
S1: 2nd week of February	12431	6500	47.71
S2: 4th week of February	9533	4166	56.29
S3: 2nd week of March	5623	3533	37.27
S4: 4th week of March	3600	1760	51.10
S5: 2nd week of April	2260	1550	31.41

crop season (seed treatment + need base application of insecticides). 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 protected crop against insect-pests throughout crop season, whereas lowest avoidable loss (10.00 %) was recorded in unprotected crop.

CONCLUSION

From the present study it is concluded that though the protection to the okra crop against insect pest is essential to get higher marketable fruit yield, the damage losses can be effectively reduced by managing the time of sowing.

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