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Impact of sowing date and mulching on the incidence of okra shoot and fruit borer

Shraddha S Dahivalkar, VS Desai, GM Golvankar and PB Shinde

Abstract
The field experiment was conducted to study the impact of sowing date and mulching on the incidence of okra shoot and fruit borer during *rabi* hot weather season of 2016-2017 at Agronomy farm, College of Agriculture, Dapoli. The results indicated that the data on effect of different sowing dates on per cent fruit infestation of okra shoot and fruit borer was recorded from 8th WAS to 12th WAS. During 8th, 9th, 10th, 11th and 12th WAS, the minimum (3.63%, 5.77%, 8.82%, 6.26% and 7.77, respectively) per cent fruit infestation was recorded in treatment S_1 (46th SMW, 12th-18th Nov.) The maximum (10.13%) fruit infestation by shoot and fruit borer was recorded in treatment S_6 (9th SMW, 26th-Feb.-4th Mar).
The results on effect of different mulches on per cent fruit infestation of okra shoot and fruit borer during 8th, 9th,10th, 11th and 12th WAS indicated that the minimum (3.87%, 6.27%, 9.20%, 6.43% and 4.89%, respectively) fruit infestation was recorded in treatment M_2 (Silver polythene mulch). The maximum (11.62%, 15.28%, 17.09%, 15.59% and 12.49%, respectively) fruit infestation was recorded in treatment M_1 (No mulch).
The data recorded on combination effect of different sowing dates and mulches on infestation of okra shoot and fruit borer was recorded from 8th WAS to 12th WAS. During 8th, 9th, 10th, 11th and 12th WAS, the minimum (1.23%, 3.17%, 6.20%, 3.33% and 2.33%, respectively) fruit infestation was recorded in treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.) + M_2 (Silver polythene mulch)] and both these treatment combinations were significantly superior over other treatment combinations. The maximum (11.10%, 14.54%, 15.93%, 14.78 and 11.98%, respectively) fruit infestation was recorded in treatment combination S_6M_1 [S_6 (9th SMW, 26th-Feb.-4th Mar) + M_1 (No mulch)].

Keywords: Sowing date, *Earias vittella*, okra shoot and fruit borer, mulch

Introduction
Okra, *Abelmoschus esculentus* Linn (Moench) is an important vegetable crop in tropics and subtropics region. It is the second most preferred vegetable (next to brinjal) in India. It is an important source of vitamin A, B and C and is also rich in protein, carbohydrates, fats and iron. It is also a rich source of dietary fibre, antioxidants, ascorbic acid and folate (Dilruba *et al.*, 2009) [5].
Okra is mainly cultivated in India under the states of Uttar Pradesh, Karnataka, Gujarat and Maharashtra. Area under this crop in Maharashtra state is 0.023 Mha with production of 241.50 MT and productivity of 10.50 MT/ ha (Anon., 2015) [2]. It is extensively grown in Ahmednagar, Amravati, Nagpur, Aurangabad, Dhule, Jalgaon, Nasik, Osmanabad, Parbhani and Pune districts in the state of Maharashtra.
The crop is attacked by a variety of pests throughout its growth stages (Rao *et al*., 2002) [8]. Amongst them okra shoot and fruit borer (*Earias vittella* Fabricius, Lepidoptera: Noctuidae) is of much significance (Gautam *et al*., 2014) [6] and causes extensive damage to fruits resulting in 69 per cent yield loss (Atwal and Singh 1990) [3] and 8.40 to 73.20 per cent variation in fruit infestation (Kumar and Urs 1988) [7]. It is an endemic pest and inflicts direct loss to the crop. It is an oligophagus pest and okra and cotton are its main host plants. It is also found feeding on a large number of malvaceous crop plants.
For the management of insect pests and diseases many options such as chemical, cultural, mechanical, biological *etc*. are available. Among available control methods, cultural method is considered to be the safest and environment friendly. Many cultural practices can be usually employed in an IPM scheme such as sanitation or destruction of debris, destruction of alternate hosts and volunteer plants, changing dates of planting and harvesting to avoid pest attack, crop rotation to avoid built of pests, tillage practices, habitat diversification, cropping systems or

intercropping, plant density, trap crops, water management, etc. The mulches are used to control pest, diseases, weeds and maintaining soil moisture. The benefits and importance of mulching in modern agriculture respective to the type of material used have been stressed by many authors (Agropages, 2009) [1]. The information on effect of sowing dates and mulching practices on okra shoot and fruit borer in Konkan region of Maharashtra is very scanty. Hence, the present investigation carried out to study the impact of sowing date and mulching on the incidence of okra shoot and fruit borer.

Materials and Methods

A statistically designed field experiment using Split Plot Design having replications and treatments was laid out at Department of Agronomy farm, College of Agriculture, Dapoli to evaluate effect of sowing dates and mulches against pests of okra. The details of the experiment are given below;

Location: Department of Agronomy farm, College of Agriculture, Dapoli
Name of crop: Okra
Variety: Varsha Upahar
Design of experiment: Split plot design
Replications: 3 (Three)
Spacing: 45 cm x 30 cm
Method of Planting: Gross area - 4.20m x 3.6m
Net area - 3.60m x 2.70m
Method of Planting: Flat bed
Season and Year: Rabi-hot weather, 2016-17
Dose of fertilizers: 100:50:25 NPK Kg/ha

Treatments

1. Main Plot Treatments (Sowing dates)

S_1: 46th MW (12-18th November)
S_2: 49th MW (03-09th December)
S_3: 52nd MW (24-31st December)
S_4: 03rd MW (15-21st January)
S_5: 06th MW (05-11th February)
S_6: 09th MW (26th Feb.- 4th March)

2. Sub plot Treatment (Mulches)

M_1: No mulch
M_2: Silver polythene mulch
M_3: Transparent polythene mulch
M_4: Black polythene mulch

Method of recording observations

The observations of okra shoot and fruit borer was recorded as soon as the incidence is noticed. For okra shoot and fruit borer, per cent fruit infestation was calculated on the number basis, number of healthy and infested fruits at each picking on randomly selected five plants per treatment plot. Per cent fruit infestation was calculated by the following formula:

$$\text{Per cent fruit infestation} = \frac{\text{No. of infested fruits}}{\text{Total number of fruits}} \times 100$$

Data on per cent fruit infestation was converted to arcsine transformation and analyzed statistically.

Results and Discussion

1. Effect of sowing dates on per cent infestation by okra shoot and fruit borer

The data pertaining to the per cent fruit infestation by okra shoot and fruit borer are given in Table 1.

The incidence of shoot and fruit borer was not observed on okra shoots whereas, fruit infestation was started from 8th WAS. The data revealed that the effect of different sowing dates on per cent fruit infestation of okra shoot and fruit borer was recorded from 8th WAs to 12th WAS. During 8th WAS, the minimum (3.63%) per cent fruit infestation was recorded in treatment S_1 (46th SMW, 12th-18th Nov.) and was found to be at par with the treatment S_2 (49th SMW, 3rd-9th Dec.) with 4.78 per cent fruit infestation. The maximum (10.13%) fruit infestation by shoot and fruit borer was recorded in treatment S_6 (9th SMW, 26th-Feb.-4th Mar).

Data during 9th WAS revealed that the least (5.77%) per cent fruit infestation was recorded in S_1 (46th SMW, 12th-18th Nov.) and was found to be at par with treatment S_2 (49th SMW, 3rd-9th Dec.) which recorded 7.39 per cent fruit infestation. The highest (14.27%) fruit infestation was recorded in treatment S_6 (9th SMW, 26th-Feb.-4th Mar).

The data recorded on per cent fruit infestation by okra shoot and fruit borer during 10th WAS showed that the lowest (8.82%) was noticed in S_1 (46th SMW, 12th-18th Nov.) and was at par with the treatment S_2 (49th SMW, 3rd-9th Dec.) and S_3 (52nd SMW, 24th-31st Dec.) with 10.49 and 11.57 per cent, respectively. The per cent infestation was maximum (19.46%) in treatment S_6 (9th SMW, 26th-Feb.-4th Mar).

During 11th WAS, results revealed that the minimum (6.26%) per cent infestation was observed in S_1 (46th SMW, 12th-18th Nov.) and was at par with the treatment S_2 (49th SMW, 3rd-9th Dec.) with 7.57 per cent. The maximum (14.51%) per cent fruit infestation was recorded in treatment S_6 (9th SMW, 26th-Feb.-4th Mar).

Data regarding per cent fruit infestation by okra shoot and fruit borer during 12th WAS indicated that the treatment S_1 (46th SMW, 12th-18th Nov.) recorded lowest (7.77%) fruit infestation and was at par with S_2 (49th SMW, 3rd-9th Dec.) which recorded 5.80 per cent infestation. The treatment S_6 (9th SMW, 26th-Feb.-4th Mar) recorded maximum (11.06%) fruit infestation.

The results of the earlier workers are more or less similar with the present findings. Shukla *et al.* (1997) [9] reported that fruit infestation started at the beginning of fruiting, increased progressively up to harvesting and reached a peak (41.25%) before harvesting in the first fortnight of June.

Bairwa *et al.* (2005) [4] observed increase in infestation of the shoot and fruit borer and decrease in yield of okra fruit with the advancement of sowing time.

Vanlaldiki *et al.* (2017) [10] reported that there was significant difference in the infestation of the fruit borer due to staggered sowing. The infestation varied from 40.45 to 25.68 per cent, with the least one of 4.45 per cent observed in the early sown crop (20 January). This was followed by those sown on 6 and 21 February, 8 and 23 March, and 8 April, with fruit damage increasing with delayed sowings. Similar trends were observed in 2012. The pooled data also revealed that the infestation increased with delayed sowing, reaching up to 24.57 per cent.

2. Effect of mulches on per cent infestation by okra shoot and fruit borer

The results on different mulches on per cent fruit infestation of okra shoot and fruit borer are presented in Table 2.

The results on effect of different mulches on per cent fruit infestation of okra shoot and fruit borer during 8th WAS indicated that the minimum (3.87%) fruit infestation was

recorded in treatment M_2 (Silver polythene mulch) and was found to be at par with the treatment M_3 (White polythene mulch) with 5.38 per cent fruit infestation. The maximum (11.62) fruit infestation was recorded in treatment M_1 (No mulch).

Data recorded during 9th WAS indicated that the least (6.27%) fruit infestation were recorded in M_2 (Silver polythene mulch) and was found to be at par with the treatment M_3 (White polythene mulch) with 7.80 per cent fruit infestation. The treatment M_1 (No mulch) recorded maximum (15.28%) fruit infestation.

The observation recorded on per cent fruit infestation by shoot and fruit borer during 10th WAS showed that the lowest (9.20%) was noticed in M_2 (Silver polythene mulch) and was at par with the treatment M_3 (White polythene mulch) with 12.68 per cent fruit infestation. The per cent fruit infestation was highest (17.09%) in treatment M_1 (No mulch).

During 11th WAS, results revealed that the minimum (6.43%) per cent fruit infestation was observed in M_2 (Silver polythene mulch) and was at par with the treatment M_3 (White polythene mulch) with 8.09 per cent. The maximum (15.59%) fruit infestation was recorded in treatment M_1 (No mulch).

Data on per cent fruit infestation during 12th WAS indicated that the treatment M_2 (Silver polythene mulch) recorded lowest (4.89%) fruit infestation and was at par with M_3 (White polythene mulch) which recorded 6.29 per cent fruit infestation. The treatment M_1 (No mulch) recorded maximum (12.49%) per cent fruit infestation.

No review of literature related to effect of mulching on okra shoot and fruit borer aspect is available. Hence, no review has been included and the obtained data remains uncomparable.

3. Combination effect of sowing dates and mulches on per cent infestation by okra shoot and fruit borer

The data regarding combination effect of sowing dates and mulches on per cent fruit infestation by shoot and fruit borer are presented in Table 3.

The data revealed that the combination effect of different sowing dates and mulches on infestation of shoot and fruit borer was recorded from 8th WAS to 12th WAS. During 8th WAS, the minimum (1.23%) fruit infestation was recorded in treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.) + M_2 (Silver polythene mulch)] and both these treatment combinations were significantly superior over other treatment combinations. The next best treatment combinations were S_3M_2 [S_3 (52nd SMW, 24th-31st Dec.) + M_2 (Silver polythene mulch)], S_4M_2 [S_4 (3rd SMW, 15th- 31stJan.) + M_2 (Silver polythene mulch)], S_5M_2 [S_5 (6th SMW, 5th -11th Feb.) + M_2 (Silver polythene mulch)] and S_6M_2 [S_6 (9th SMW, 26th-Feb.-4th Mar) + M_2 (Silver polythene mulch)] and all these combinations recorded 2.28 per cent fruit infestation. The maximum (11.10%) fruit infestation was recorded in treatment combination S_6M_1 (S_6 (9th SMW, 26th-Feb.-4th Mar) + M_1 (No mulch)].

Data during 9th WAS, revealed that the least (3.17%) fruit infestation were recorded in treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.) + M_2 (Silver polythene mulch)] and both these treatment combinations were significantly superior over rest of the treatment combinations. The next best treatment combinations were S_1M_3 [S_1 (46th SMW, 12th-18th Nov.) + M_3 (White polythene mulch)], S_2M_3 [S_2 (49th SMW, 3rd-9th Dec.) + M_3 (White polythene mulch)] and S_3M_2 [S_3 (52nd SMW, 24th-31st Dec.) + M_2 (Silver polythene mulch)] which recorded 4.16 per cent fruit infestation each. The highest (14.54%) fruit infestation was recorded in treatment combination S_6M_1 (S_6 (9th SMW, 26th-Feb.-4th Mar.) + M_1 (No mulch)].

The data recorded on per cent fruit infestation during 10th WAS showed that the lowest (6.20%) fruit infestation was recorded in treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.) + M_2 (Silver polythene mulch)] which was found to be at par with the treatment combinations S_3M_2 [S_3 (52nd SMW, 4th-31st Dec.) + M_2 (Silver polythene mulch)], S_4M_2 [S_4 (3rd SMW, 15th- 31stJan.) + M_2 (Silver polythene mulch)], S_5M_2 [S_5 (6th SMW, 5th -11th Feb.) + M_2 (Silver polythene mulch)], S_6M_2 [S_6 (9th SMW, 26th-Feb.-4th Mar.) + M_2 (Silver polythene mulch)], S_1M_3 [S_1 (46th SMW, 12th-18th Nov.) + M_3 (White polythene mulch)], S_2M_3 [S_2 (49th SMW, 3rd-9th Dec.) + M_3 (White polythene mulch)] and S_3M_3 [S_3 (52nd SMW, 24th-31st Dec.) + M_3 (White polythene mulch)] with 7.42, 7.42, 7.42, 7.42, 7.70, 7.70 and 7.70 per cent, respectively. The highest (15.93%) fruit infestation was recorded in treatment combination S_6M_1 (S_6 (9th SMW, 26th-Feb.-4th Mar) + M_1 (No mulch)].

During 11th WAS, results revealed that the minimum (3.33%) fruit infestation was observed in treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.) + M_2 (Silver polythene mulch)] and both these treatment combinations were significantly superior over rest of the treatment combinations. The next best treatment combinations were S_3M_2 [S_3 (52nd SMW, 24th-31st Dec.) + M_2 (Silver polythene mulch)], S_4M_2 [S_4 (3rd SMW, 15th- 31stJan.) + M_2 (Silver polythene mulch)], S_5M_2 [S_5 (6th SMW, 5th -11th Feb.) + M_2 (Silver polythene mulch)] and S_6M_2 [S_6 (9th SMW, 26th-Feb.-4th Mar.) + M_2 (Silver polythene mulch)] and all these treatment combinations recorded 4.61 per cent fruit infestation. The maximum (14.78%) fruit infestation was recorded in treatment combination S_6M_1 (S_6 (9th SMW, 26th-Feb.-4th Mar) + M_1 (No mulch)].

Data regarding per cent fruit infestation by okra shoot and fruit borer during 12th WAS indicated that the treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-9th Dec.)) + M_2 (Silver polythene mulch)] recorded minimum (2.33%) fruit infestation and both these treatment combinations were significantly superior over other treatments. The next best treatment combinations were S_3M_2 [S_3 (52nd SMW, 24th-31st Dec.) + M_2 (Silver polythene mulch)], S_4M_2 [S_4 (3rd SMW, 15th- 31stJan.) + M_2 (Silver polythene mulch)], S_5M_2 [S_5 (6th SMW, 5th -11th Feb.) + M_2 (Silver polythene mulch)] and S_6M_2 [S_6 (9th SMW, 26th-Feb.-4th Mar) + M_2 (Silver polythene mulch)] and all these treatment combinations recorded 3.36 per cent fruit infestation. The treatment combination S_6M_1 (S_6 (9th SMW, 26th-Feb.-4th Mar) + M_1 (No mulch)] was recorded highest (11.98%) fruit infestation.

No review of literature related to aspect the combination effect of sowing dates and mulches on infestation of okra shoot and fruit borer is available. Hence, no review has been included and the obtained data remain un comparable.

Table 1: Effect of sowing dates on okra shoot and fruit borer

Treatments	Per cent fruit infestation of okra shoot and fruit borer				
	8 WAS	9 WAS	10 WAS	11 WAS	12 WAS
Main plot: Sowing dates					
S_1: 46th SMW (12th-18th Nov.)	3.63 (10.92)	5.77 (13.76)	8.82 (17.03)	6.26 (14.34)	4.77 (12.51)
S_2: 49th SMW (3rd-9th Dec.)	4.78 (12.52)	7.39 (15.58)	10.49 (18.57)	7.57 (15.77)	5.80 (13.80)
S_3: 52nd SMW (24th-31st Dec.)	5.96 (13.99)	8.83 (17.03)	11.57 (19.51)	9.01 (17.21)	6.96 (15.13)
S_4: 3rd SMW (15th- 31stJan.)	7.51 (15.70)	10.14 (18.26)	13.13 (20.79)	10.32 (18.42)	8.29 (16.50)
S_5: 6th SMW (5th -11th Feb.)	8.79 (16.99)	11.82 (19.73)	15.28 (22.44)	11.96 (19.84)	9.52 (17.69)
S_6: 9th SMW (26thFeb.-4th Mar)	10.13 (18.25)	14.27 (21.68)	19.46 (25.36)	14.51 (21.87)	11.06 (19.07)
F test	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.54	0.62	0.87	0.5	0.45
C.D. at 0.05%	1.60	1.85	2.61	1.50	1.33

*Figures in parentheses are arcsine transformed values. WAS- Weeks after sowing

Table 2: Effect of mulches on okra shoot and fruit borer

Treatments	Per cent fruit infestation of okra shoot and fruit borer				
	8 WAS	9 WAS	10 WAS	11 WAS	12 WAS
Sub plot: Mulches					
M_1: No mulch	11.62 (19.55)	15.28 (22.44)	17.09 (23.75)	15.59 (22.67)	12.49 (20.27)
M_2 : Silver polythene mulch	3.87 (11.27)	6.27 (14.35)	9.20 (17.39)	6.43 (14.53)	4.89 (12.67)
M_3 : White polythene mulch	5.38 (13.29)	7.80 (16.01)	12.68 (20.43)	8.09 (16.31)	6.29 (14.38)
M_4 : Black polythene mulch	6.68 (14.81)	9.73 (17.89)	13.26 (20.89)	9.99 (18.12)	7.62 (15.82)
F test	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.68	0.59	1.17	0.65	0.63
C.D. at 0.05%	2.02	1.75	3.50	1.94	1.87

*Figures in parentheses are arcsine transformed values. WAS- Weeks after sowing

Table 3: Combination effect of sowing dates and mulches on okra shoot and fruit borer

Treatment combinations: Main plot x Sub plot	Per cent fruit infestation of okra shoot and fruit borer				
	8 WAS	9 WAS	10 WAS	11 WAS	12 WAS
S_1M_1	8.31 (16.53)	10.49 (18.57)	12.56 (20.33)	10.94 (18.97)	9.38 (17.56)
S_1M_2	1.23 (6.35)	3.17 (10.20)	6.20 (14.27)	3.33 (10.46)	2.33 (8.75)
S_1M_3	2.74 (9.49)	4.16 (11.69)	7.70 (15.91)	4.90 (12.68)	3.67 (10.98)
S_1M_4	3.91 (11.33)	6.48 (14.59)	9.43 (17.60)	7.06 (15.23)	4.96 (12.76)
S_2M_1	9.41 (17.59)	12.79 (20.52)	14.59 (21.92)	13.09 (20.76)	10.57 (18.64)
S_2M_2	1.23 (6.35)	3.17 (10.20)	6.20 (14.27)	3.33 (10.46)	2.33 (8.75)
S_2M_3	2.74 (9.49)	4.16 (11.69)	7.70 (15.91)	4.90 (12.68)	3.67 (10.98)
S_2M_4	3.91 (11.33)	6.48 (14.59)	9.43 (17.60)	7.06 (15.23)	4.96 (12.76)
S_3M_1	9.41 (17.59)	12.79 (20.52)	14.59 (21.92)	13.09 (20.76)	10.57 (18.64)
S_3M_2	2.28 (8.66)	4.16 (11.69)	7.42 (15.62)	4.61 (12.31)	3.36 (10.51)
S_3M_3	2.74 (9.49)	4.50 (12.16)	7.70 (15.91)	4.90 (12.68)	3.67 (10.98)
S_3M_4	3.91 (11.33)	6.48 (14.59)	9.43 (17.60)	7.06 (15.23)	4.96 (12.76)
S_4M_1	9.41 (17.59)	12.76 (20.52)	14.59 (21.92)	13.09 (20.76)	10.57 (18.64)
S_4M_2	2.28 (8.66)	4.50 (12.16)	7.42 (15.62)	4.61 (12.31)	3.36 (10.51)
S_4M_3	3.62 (10.91)	5.99 (14.03)	9.41 (17.59)	6.09 (14.15)	4.41 (12.03)
S_4M_4	3.91 (11.33)	6.48 (14.59)	9.43 (17.60)	7.06 (15.23)	4.96 (12.76)
S_5M_1	9.41 (17.59)	12.79 (20.52)	14.59 (21.92)	13.09 (20.76)	10.57 (18.64)
S_5M_2	2.28 (8.66)	4.50 (12.16)	7.42 (15.62)	4.61 (12.31)	3.36 (10.51)
S_5M_3	3.62 (10.91)	5.99 (14.03)	9.41 (17.59)	6.09 (14.15)	4.41 (12.03)
S_5M_4	5.10 (12.94)	7.41 (15.61)	11.15 (19.15)	7.66 (15.86)	5.98 (14.02)
S_6M_1	11.10 (19.11)	14.54 (21.89)	15.93 (22.91)	14.78 (22.07)	11.98 (19.85)
S_6M_2	2.28 (8.66)	4.50 (12.16)	7.42 (15.62)	4.61 (12.31)	3.36 (10.51)
S_6M_3	3.62 (10.91)	5.99 (14.03)	9.41 (17.59)	6.09 (14.15)	4.41 (12.03)
S_6M_4	5.10 (12.94)	7.41 (15.61)	11.15 (19.15)	7.66 (15.86)	5.98 (14.02)
F test	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.14	0.13	0.62	0.14	0.14
C.D. at 0.05%	0.37	0.39	1.78	0.39	0.39

*Figures in parentheses are arcsine transformed values. WAS- Weeks after sowing

Conclusion

Date of sowing is one of the best cultural practice use by farmers to escape, avoided the pest infestation on the crop and get appropriate yield as well as income. From the present investigation, it can be concluded as the okra crop was cultivated at early sowing date S_1 (46th SMW, 12th-18th Nov.) recorded minimum per cent fruit infestation over the treatment S_6 (9th SMW, 26th-Feb.-4th Mar). Similarly, in treatment M_2 (Silver polythene mulch) was noticed minimum fruit infestation over the treatment M_1 (No mulch). The treatment combinations S_1M_2 [S_1 (46th SMW, 12th-18th Nov.) + M_2 (Silver polythene mulch)] and S_2M_2 [S_2 (49th SMW, 3rd-

9^{th} Dec.) + M_2 (Silver polythene mulch)] and both these treatment combinations were significantly superior over other treatment combinations for reducing the fruit infestation. While, in treatment combination S_6M_1 [(S_6 (9^{th} SMW, 26^{th}-Feb.-4^{th} Mar) + M_1 (No mulch)] was recorded maximum fruit infestation in okra. The results showed that the infestation of the shoot and fruit borer increased with the delay in sowing of the crop and without mulching practices.

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