Okra is one of the important summer vegetable crop grown all over the world. Old world tropics is believed to be okra’s native home (Shanmugavelu, 1989). This vegetable is grown for its tender green fruits which are generally marketed in fresh stage, but sometimes in canned or dehydrated form (Thakur et al., 2003). It contains vitamin A, vitamin B complex and vitamin C and minerals like calcium, magnesium, sodium and iron (Aykroyd, 1963). It is an excellent source of iodine and useful for control of goiter (Purewal and Randhawa, 1947). The roots and stems of okra are used for clearing the cane juice. It is said to be very useful against genitourinary disorders, spermatorrhoea and chronic dysentery. Okra is grown during summer and rainy season in mid hills of HP. Delayed and erratic germination is the serious problem in okra cultivation. Good germination can be achieved by producing good quality seed. For getting maximum returns from the okra crop, it is essential to increase the yield and quality of okra seeds. Fruit load is believed to have an effect on the quality and yield of okra seed. The reasonable number of fruits to be retained with pinching is a good device for getting better yield and quality in okra.

RESEARCH METHODS

The present investigation was carried out at the Experimental Farm of Seed Technology and Production Centre, Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan in the year 2011. The experimental site is located 15 km away from Solan at 30° 51’ N latitude and about 77° 11’ E longitudes. The elevation of the farm is 1250 m above mean sea level, which falls under the mid hill zone of Himachal Pradesh. The climate of Nauni is generally sub temperate to sub tropical. May and June are the hottest months and December to February are the coldest months. The annual rainfall ranges between 1000-1300 mm of which 75 per cent is recorded during June to September. Variety P-8 was used for the present investigation. Plants are tall with purple pigmentation, splashes on stem, petiole and lower surface of the leaf base. Stem, petioles, leaves and fruits are sparsely hairy. Fruits are medium long, thin, tender green and 5 ridged.

Effect of fruit number on seed yield and quality of okra
[Abelmoschus esculentus (L.) Moench]

SANTOSH KUMARI, SHIV PRATAP SINGH AND DHARMENDER KUMAR

ABSTRACT: An experiment was conducted at Research Farm of Seed Technology and Production Centre, Nauni, Solan to study the effect of fruit number on seed quality and yield of okra. Experiment consisted of five treatments. Six, eight, ten and twelve fruits per plant were retained and in control all the fruits were retained. Retaining six fruits per plant resulted in increased fruit length, fruit diameter, fruit weight, 100 seed weight, seed germination percentage, seed vigor index-I and seed vigor index-II. Seed yield per plant, per plot and per hectare was highest in the treatment where twelve fruits were retained on a plant.

KEY WORDS: Okra, Fruit number, Seed yield, Seed quality

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Experiment was laid out in Randomized Block Design (RBD) with three replications. Plot size was kept 2.40 x 2.00 m. Row to row and plant to plant distance was kept 60 cm and 20 cm, respectively. Recommended dose of fertilizers was applied i.e. 10 ton/ha FYM, 75 kg/ha N in the form of CAN, 55 kg/ha \( P_2O_5 \) in the form of muriate of potash and 55 kg/ha \( K_2O \) in the form of SSP as basal dose. After germination, plants were thinned and spaced 20 cm apart and 60 cm distance was maintained between rows. Plants were irrigated as and when needed and maintained properly to keep free from weeds. Hand weeding was also carried out. Preventive pest and disease control measures were followed during the entire period of crop. The observations were recorded on five selected plants in each treatment. The observations were recorded on plant height (cm), fruit diameter (mm), fruit length (cm) number of fruits per plant, Average fruit weight (g), number of seeds per fruit, seed yield per plant (g), seed yield per plot (kg), seed yield per hectare (q), 100 seed weight (g), seed germination percentage, seedling length (cm), seedling dry weight (mg), seed vigour index-I and seed vigour index-II.

**RESEARCH FINDINGS AND DISCUSSION**

Analysis of variance revealed that all the characters were significant except number of seeds per fruit (Table 1). Mean values of different characters have been presented in Table 2.

Plant height varied from 102.18 cm (T<sub>2</sub>) to 118.32 cm (T<sub>4</sub>). All the treatments except T<sub>2</sub> showed better results than control. Maximum plant height was recorded in T<sub>4</sub> (118.32 cm) followed by T<sub>1</sub> (115.12 cm) and T<sub>3</sub> (106.15 cm). Treatment T<sub>1</sub> was at par with T<sub>4</sub>. Treatments T<sub>1</sub>, T<sub>3</sub>, T<sub>4</sub> showed 12.15 per cent, 9.1 per cent and 0.61 per cent increase over control, respectively. Retaining higher number of fruits resulted in higher plant height. Similar results were reported by Nabi et al. (2010).

Fruit diameter ranged from 15.00 mm (T<sub>5</sub>) to 17.00 mm (T<sub>1</sub>). Maximum fruit diameter was recorded in T<sub>1</sub> (17.00 mm) followed by T<sub>2</sub> (16.55 mm) and T<sub>3</sub> (16.38 mm). Treatment T<sub>1</sub> was found at par with T<sub>2</sub>. All the treatments showed better results than control for fruit diameter. Retaining lesser number of fruits per plant resulted in increased fruit diameter. Lesser number of fruits per plant utilized the food materials and assimilates more efficiently and had more fruit diameter. Similar results were reported by Deshmukh and Tayde (1986), Reddy et al. (1997) and Nabi et al. (2010).

Maximum fruit length was recorded in T<sub>1</sub> (21.80 cm). Next best treatments were T<sub>1</sub> (21.22 cm) and T<sub>4</sub> (20.85 cm). All treatments performed better than control. Minimum fruit length was observed in control, T<sub>5</sub> (18.95 cm). Fruit length was found higher in such plants where less number of fruits were retained. The results are in consonance with the results of Deshmukh and Tayde (1986), Reddy et al. (1997), Narayan et al. (2009) and Nabi et al. (2010).

Fruit weight varied from 7.30 g (T<sub>5</sub>) to 9.00 g (T<sub>1</sub>). Maximum fruit weight was recorded in T<sub>1</sub> (9.00 g) followed by

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Table 1: Analysis of variance for different characters under study

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>Mean sum of squares</th>
<th>df</th>
<th>Plant height (cm)</th>
<th>Fruit diameter (mm)</th>
<th>Fruit length (cm)</th>
<th>Fruit weight (g)</th>
<th>Seed yield (kg)</th>
<th>Seed germination percentage (%)</th>
<th>Seedling length (cm)</th>
<th>Seedling dry weight (mg)</th>
<th>Seed vigour index-I</th>
<th>Seed vigour index-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatments</td>
<td>4</td>
<td>Error</td>
<td>8</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>3</td>
<td>0.80</td>
<td>0.14</td>
<td>0.08</td>
<td>0.14</td>
<td>0.08</td>
<td>0.14</td>
<td>0.08</td>
<td>0.14</td>
<td>0.14</td>
<td>0.08</td>
<td>0.14</td>
<td>0.08</td>
</tr>
</tbody>
</table>

* Indicates significance of certain P > 0.05.
EFFECT OF FRUIT NUMBER ON SEED YIELD & QUALITY OF OKRA

Maximum number of seeds per fruit were recorded in T₁ (47.25) followed by T₄ (46.80) and T₂ (46.80). Minimum number of seeds were observed in T₅ (45.85). Retaining 12 fruits per plant resulted in maximum number of seeds per fruit. Similar findings were reported by Nabi et al. (2009).

Seed yield per plant ranged from 19.00 g (T₁) to 40.45 g (T₄). Maximum seed yield per plant was recorded in T₄ (40.45 g) which was significantly higher than all other treatments followed by T₃ (30.25 g). T₁ and T₂ showed 43.33 per cent and 7.1 per cent increase over control. By retaining 12 fruits per plant, seed yield per plant was increased over control.

Highest seed yield per plot was recorded in T₄ (1.534 kg) which was significantly higher than all other treatments. Next best treatment was T₃ (1.210 kg). T₄ and T₃ showed 43 per cent and 7.2 per cent increase over control. Minimum seed yield per plot was recorded in T₁ (0.76 kg).

Seed yield per hectare ranged from 15.83 q (T₁) to 31.96 q (T₄). Maximum seed yield was recorded in T₄ (31.96 q) which was significantly higher than all other treatments. Next best treatment was T₃ (25.21 q). T₁ and T₂ showed 36 per cent and 7.2 per cent increase over control. Minimum seed yield per plot was recorded in T₁ (0.76 q).

EFFECT OF FRUIT NUMBER ON SEED YIELD & QUALITY OF OKRA

Table 2: Effect of fruit number on seed yield and quality of okra

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Seed yield / plot (g)</th>
<th>Seed yield / plant (g)</th>
<th>100 seed weight (g)</th>
<th>Seed germination percentage</th>
<th>Seedling length (cm)</th>
<th>Seedling dry weight (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁ (6 fruits)</td>
<td>7.253</td>
<td>138</td>
<td>7.225</td>
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<tr>
<td>T₂ (7 fruits)</td>
<td>6.856</td>
<td>173</td>
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<td>T₃ (10 fruits)</td>
<td>6.554</td>
<td>181</td>
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<tr>
<td>T₄ (12 fruits)</td>
<td>6.254</td>
<td>185</td>
<td>6.254</td>
<td>6.254</td>
<td>6.254</td>
<td>6.254</td>
</tr>
<tr>
<td>T₅ (Control)</td>
<td>6.254</td>
<td>185</td>
<td>6.254</td>
<td>6.254</td>
<td>6.254</td>
<td>6.254</td>
</tr>
</tbody>
</table>

EFFECT OF FRUIT NUMBER ON SEED YIELD & QUALITY OF OKRA

Highest 100 seed weight was recorded in T₁ (7.253 g) followed by T₂ (7.225 g) and T₃ (6.856 g). T₄ was found at par with T₅. Minimum 100 seed weight was observed in T₅ control (6.254 g). Retaining lesser number of fruits per plant resulted in production of heavier seeds. Similar results were reported by Reddy et al. (1997) and Nabi et al. (2009).

Seed germination percentage ranged from 81 per cent (T₅) to 95 per cent (T₃, T₄). Highest seed germination percentage was recorded in both T₁ and T₃ (95%). T₁ and T₂ were at par with T₅ (94%). T₃, T₄ and T₅ showed 17.28 per cent, 17.28 per cent, 16.04 per cent and 13.58 per cent increase over control. Seed germination percentage was higher where less number of fruits were retained per plant. Similar results were reported by Reddy et al. (1997) and Nabi et al. (2009).

Seedling length varied from 16.70 cm (T₁) to 20.00 cm (T₅). Maximum seedling length was recorded in T₁ (20.00 cm) which was significantly higher than all other treatments. T₅ was followed by T₃ (18.97 cm) and T₂ (18.20 cm). T₄, T₃ and T₁ showed 19.76 per cent, 13.60 per cent and 8.98 per cent increase over control.

Seedling dry weight ranged from 0.02240 mg (T₂) to

T₁ (8.82 g) and T₅ (8.60 g). T₁ was found at par with T₅. Results revealed that retaining lesser number of fruits per plant resulted into increased fruit weight. The reason may be that food materials were utilized more efficiently by lesser number of fruits retained on the plant. Deshmukh and Tayde (1986), Reddy et al. (1997) and Nabi et al. (2010) also reported similar results.
0.03768 mg (T₁). Highest seedling dry weight was recorded in T₁ (0.03768 mg) and this treatment was significantly higher than other treatments. Next best treatments were T₂ (0.02664 mg) and T₃ (0.02612 mg) and were at par with each other.

Treatment T₁ (3.57960) showed highest seed vigour index-I which was significantly higher than other treatments. T₂ (2.53080) and T₃ (2.45528) were next best treatments.

Minimum seed vigour index–I was observed in T₅ (1.81440). Data revealed that retaining lesser fruits per plant had positive effect on seed vigour index-I. Results are in consonance with those of Reddy et al. (1997) and Nabi et al. (2009).

Seedling vigour index-II ranged from 1352.70 (T₅) to 1900 (T₁). Best treatment was T₁ (1900) which was statistically higher from all other treatments. T₁ was followed by T₂ (1802.15) and T₃ (1710.80). Retaining lesser fruits per plant resulted in higher seed vigour index-II. Similar results were reported by Reddy et al. (1997) and Nabi et al. (2009).

On the basis of present studies it can be concluded that retaining six fruits per plant resulted in increased values for fruit length, fruit diameter, fruit weight, 100 seed weight, seed vigour index-I and seed vigour index-II and seed yield per plant, per plot and per hectare was highest in the treatment where twelve fruits were retained.

REFERENCES


