CONTEMPORARY RESEARCH IN INDIA
ISSN 2231 - 2137

EFFECT OF DIFFERENT TOPPING MANAGEMENT ON GROWTH CONTRIBUTING CHARACTERS IN SUMMER SESAMUM

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Received: 19/07/2017	Edited: 24/07/2017	Accepted: 31/07/2017

Abstract: *Topping management significantly effect on growth and yield on summer sesamum. All growth contributing characters were significantly influenced by the T_1: Topping at 30 DAS which resulted in the best of all growth contributing characters like plant height, number of functional leaves plant^{-1}, leaf area plant^{-1}, number of branches plant^{-1}, number of capsules plant^{-1} and dry matter plant^{-1} in the crop as compared to the T_0:No Topping and T_2:Topping at 45 days after sowing.*

Key words: *Topping management effect, Summer seasamum, growth contributing characters.*

Introduction

Sesamum (*Sesamum indicum* L.) is an East Indian important oilseed crop belongs to family *Pedaliaceae* and the genus *Sesamum*. Sesame seeds have been a source of food and oil. It has one of the highest oil content of any seed; some varieties exceeding 50 percent oil content as compared to soybean having 20 percent. Sesame oil is one of the most stable vegetable oils with long shelf life because of the high level of natural antioxidants *viz*., sesamin, sesamolin, and sesamol. The word *sesame* is derived from Latin *sesamum*, borrowed from Greek *sesamon* "seed or fruit of the sesame plant, the plant sesamum is a tropical annual herb having white and purple flowers. It is also known as til, sesame, sisim, hawari, benniseed and gingelly.

Increase in the production of oil can be achieved by increasing the area under sesamum crop, evolving new technologies which can help to increase the seed yield and oil yield of sesamum and also by approaching the modern crop production technologies that particularly include the spacing with topping which increase the number of branches and number of capsules per plant and enhance the production of sesamum crop.

The planting geometry helps in altering canopy architecture affecting light interception and CO_2 assimilation which further affects productivity (Brar *et al.* 1998) so spacing is important factor for altering the architecture to increase the production of sesamum. Light interception is also affected by changing plant architecture.

The spacing and topping both these aspects are equally beneficial and interact with each other and gives significantly higher yield. Terminal bud topped at 25 DAS with 30 cm x 30 cm spacing improved the growth characters like number of capsules plant^{-1}, seed yield, biomass production and growth rate of sesamum (Sarkar and Pal, 2005). Topping of the terminal bud at 25 DAS with plant geometries 45 cm x 15 cm significantly increased the seed yield as compared to regular operations (Ramanathan and Chandrashekharan, 1998).

Materials and Methods

The field experiment was conducted during summer, 2014 at Experimental Farm, College of Agriculture, Pune- 411005, Maharashtra State, India. Geographically the campus of Agriculture College, Pune is situated on 18^{0}32'N latitude and 73^0 32' E longitude. The altitude is about 557.74 m above mean sea level.

The experiment was laid out in split plot design with three replications. Twelve treatment combinations were formed considering main plot treatments comprise four spacings and three sub-plot treatments of topping management. The Toppingtretments details are listed below.

B. Treatments (Toppings)
T_0:No Topping
T_1:Topping at 30 days after sowing
T_2:Topping at 45 days after sowing

Experiment was carried out in the Experimental Farm, College of Agriculture, Pune. JLT-408 Variety of summer Sesamum crop was used. Experiment was carried out in March 2014. Plot size for gross was5.00 m x 5.00 m and for net was 4.50 m x 4.50 m.

1. Biometric observations

The various biometric observations were recorded on five randomly selected plants of sesamum from each net plot. Pegs were fixed near the selected plants by tying with tags for easy identification. All the observations were recorded at an interval of 14 days from 28 DAS till harvest.

1.1 Plant height (cm)

The plant height was measured from the ground level up to the top base of terminal leaf bud on the main stem. Observations were started from 28th days after sowing and were subsequently recorded at an interval of 14 days up to harvest.

1.2 Number of functional leaves plant^{-1}

Numbers of functional leaves were recorded periodically at 14 days interval from 28th day after sowing up to harvest.

1.3 Leaf area plant^{-1}(dm^2)

For determining the leaf area plant^{-1}, the plants were collected at 28, 42, 56, 70, 84 days of crop growth and at harvest stage. The leaves were separated and their area (dm^2) was measured with the help of leaf area meter (LI-3100).

1.4 Number of branches plant^{-1}

Numbers of branches were recorded periodically at 14 days interval from 28th day after sowing up to harvest.

1.5 Number of capsules plant^{-1}

The numbers of capsules plant^{-1} were recorded from 56 DAS till harvest from five observational plants.

1.6 Dry matter plant^{-1} (g)

For determination of total dry matter plant^{-1}, one plant from each plot was uprooted randomly. The plants were cleaned and sun dried and then kept in thermostatically controlled oven at 60± 2°C till constant weight was obtained.

Results and Discussion

Biometric observations

The biometric observations of sesamum were recorded periodically *viz*., plant height, number of functional leaves plant^{-1}, leaf area plant^{-1}, number of branches plant^{-1}, number of capsules plant^{-1}and dry matter plant^{-1}at 28, 42, 56, 70, 84 DAS and at harvest.

1. Plant height (cm)

It was seen that the mean plant height increased with the advancement in the age of the crop and maximum plant height was recorded at 84 DAS. Data indicated that there was progressive increase in growth up to 84 days after sowing from 28 days onwards and slightly decrease at the time of harvest.

Among the topping treatments the maximum plant height was recorded with no topping (94.76 cm) at 84 DAS followed by topping at 45 DAS (71.03 cm) and topping at 30 DAS (62.49 cm). No topping was on par with topping at 45 DAS only in 42 DAS observation. After topping the apical dominance is declined this resulted in less height. The results are in confirmation with the findings of Kokilavani (2007).

2. Number of functional leaves plant^{-1}

The number of functional leaves plant^{-1} increased with advancement in the age of the crop. The number of functional leaves plant^{-1} was significantly affected by the topping management. Number of functional leaves plant^{-1} were observed significantly maximum in topping at 30 DAS (162.86) as compared to topping at 45 DAS (151.04) and no topping (132.97). This was due to timely topping at 30 DAS and topping at 45 DAS seems to be somewhat late. Similar results were recorded by Kathiresan (1997).

3. Leaf area palnt^{-1} (dm^2)

The data revealed that with the advanced age of crop, there was an increase in the mean leaf area per plant up to 84 DAS of crop. Topping of the

terminal buds at 30 DAS showed significant effect on leaf area plant^{-1}. Topping of terminal buds at 30 DAS increased the number of secondary branches plant^{-1} which ultimately increased leaf area plant^{-1}(11.85 dm^2) Table 1 Similar results were obtained by Korhale *et.al* (2012).

4. Number of branches plant^{-1}

The mean number of branches plant^{-1} increased with increase in the age of the crop. Terminal topping of plant showed significant effect on mean number of branches plant^{-1}. It reduces the apical dominance which results in producing more lateral branches. The treatment of topping at 30 DAS (11.25) produced significantly maximum number of branches plant^{-1} as compared to topping at 45 DAS (10.02) and no topping (8.72) at all crop growth stages (Table 1). Similar results were recorded by Imayavaramban *et al.* (2002).

5. Number of capsules plant^{-1}

The mean number of capsules plant^{-1} increased progressively with the advancement of the age of crop. The maximum mean number of capsules plant^{-1} were recorded at harvest (66.83).

Topping of the terminal buds at 30 DAS showed significant effect on number of capsules plant^{-1}. Topping of terminal buds at 30 DAS increased number of primary and secondary branches plant^{-1} which ultimately increased the number of capsules plant^{-1} at harvest (80.56) Table 14. There results are in confirmation with the findings of Korhale *et. al* (2012) and Kathiresan (1997).

6. Dry Matter:

The mean dry matter accumulation plant^{-1} differed significantly among different topping treatments. The dry matter accumulation with topping at 30 DAS was the highest at all the crop growth stages from 42 DAS to harvest except 28 DAS. When topping done at 30 DAS dry matter accumulation was found to be the highest (21.58 g) followed by topping at 45 DAS (19.21 g) and no topping (16.97 g) at harvest. (Table 1)Similar results were obtained by Korhale (2012).

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Table 1: Growth contributing characters of summer sesamum as influenced periodically by different toppings

Treatment	Plant height (cm)						Number of functional leaves plant^{-1}						Leaf area plant^{-1}(dm^2)					
	28	42	56	70	84	At harvest	28	42	56	70	84	At harvest	28	42	56	70	84	At harvest
T_0: No Topping	18.56	41.98	75.15	88.17	94.76	94.42	8.04	29.82	76.13	113.30	132.97	26.47	3.93	5.77	7.48	9.42	9.84	4.61
T_1: Topping at 30 DAS	18.68	26.03	39.32	51.22	62.49	62.20	8.02	36.85	91.04	143.33	162.86	35.95	3.89	7.43	8.72	11.42	11.85	5.85
T_2: Topping at 45 DAS	18.73	42.83	47.03	60.85	71.03	70.73	8.02	29.65	80.25	132.54	151.04	28.83	4.01	5.79	8.23	10.67	11.09	5.33
S.Em. ±	0.24	0.42	0.40	0.33	0.30	0.30	0.20	0.21	0.43	0.46	0.58	0.16	0.05	0.04	0.03	0.04	0.04	0.03
C.D. at 5%	NS	1.17	1.21	0.98	0.91	0.91	NS	0.64	1.29	1.39	1.73	0.48	NS	0.11	0.09	0.12	0.11	0.10

Treatment	Number of branches plant^{-1}						Number of capsules plant^{-1}						Dry matter (g) plant^{-1}					
	28	42	56	70	84	At harvest	28	42	56	70	84	At harvest	28	42	56	70	84	At harvest
T_0: No Topping	2.01	3.83	5.48	7.50	8.39	8.72	-	-	11.31	39.21	52.01	52.74	2.83	4.90	9.67	14.64	16.93	16.97
T_1: Topping at 30 DAS	2.02	5.88	7.13	10.01	11.25	11.59	-	-	18.99	65.73	78.56	80.56	2.80	5.61	13.26	18.91	21.52	21.58
T_2: Topping at 45 DAS	2.00	3.56	6.23	8.42	9.66	10.02	-	-	12.26	51.53	64.33	67.20	2.81	4.78	11.06	16.52	19.15	19.21
S.Em. ±	0.04	0.15	0.08	0.07	0.09	0.12	-	-	0.19	0.41	0.52	0.42	0.05	0.06	0.11	0.10	0.06	0.17
C.D. at 5%	NS	0.45	0.24	0.21	0.28	0.35	-	-	0.58	1.22	1.57	1.27	NS	0.18	0.33	0.30	0.18	0.51