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## Response of summer okra [*Abelmoschus esculentus* (L.) Moench.] In relation to growth and yield attributes on the application of weed management practices and fertility levels

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**Abstract**

A field experiment was carried out during summer season of 2008 on a loamy sand soil at Regional Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, District: Banaskantha (Gujarat) to study the eight weed management practices *i.e.*, Unweeded control ( $W_0$ ), Weed free (*i.e.*, Hand Weeding at 20, 40 and 60 DAS) ( $W_1$ ), Hand weeding at 20 and 40 DAS ( $W_2$ ), Interculturing at 20 and 40 DAS ( $W_3$ ), Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha (Blanket application) ( $W_4$ ),  $W_4$  + Interculturing at 20 DAS ( $W_5$ ),  $W_4$  + Interculturing at 40 DAS ( $W_6$ ) and  $W_4$  + Hand Weeding at 40 DAS ( $W_7$ ) along with two fertility levels *i.e.*, 75 % recommended dose of NPK (*i.e.*, 112.5 - 37.5 - 37.5 NPK kg/ha) ( $F_1$ ) and 100 % recommended dose of NPK (*i.e.*, 150 - 50 - 50 NPK kg/ha) ( $F_2$ ) on okra [*Abelmoschus esculentus* (L.) Moench.] crop. Results shows that finally weed free treatments  $W_1$  (H.W. at 20, 40 and 60 DAS) recorded the highest number of nodes per main stem and it was at par with treatments  $W_2$  (H.W. at 20 and 40 DAS) and  $W_7$  ( $W_4$  + H.W. at 40 DAS). Numbers of fruits per plant and fruit yield per plant were also significantly highest with weed free treatment. Treatment combination of  $W_0F_2$  recorded the highest dry weight of weeds (252.54 g/m<sup>2</sup>).

**Keywords:** *Abelmoschus esculentus*, Okra, Gujarat

**Introduction**

Okra [*Abelmoschus esculentus* (L.) Moench.] belongs to the family Malvaceae, is one of the important vegetable crop of subtropical and tropical regions. It is widely grown all over India for its immature tender fruits, which are used as vegetable in a variety of ways. The roots and stems of okra are used for clearing the cane juice in the manufacture of jaggery and sugar as a organic bleaching agent (Chauhan, 1972 and Singh, 1988) [2, 5]. Weed management is one of the most serious problems in modern intensive farming, as the total loss of crop yield, increased cost of cultivation would cause a greater economic loss. Weeds always offer severe competition with crop in early stage of crop growth and cause considerable reduction in the crop yield. Crop yield losses due to weeds have been estimated to the tune of 49 to 100 per cent (Singh *et al.*, 1982; Tiwari *et al.*, 1985 and Adejonwo *et al.*, 1991) [4, 7, 11].

**Materials and Methods**

A field experiment was conducted during *summer* season of the year 2008 with okra crop (cv. Parbhani Kranti) at Regional Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. The soil of the site had the characteristics as follows, well drained, loamy sand, sand 85.34 %, silt 8.19 %, clay 6.47 %, pH 7.7, EC 0.07 dSm<sup>1</sup> and Organic carbon 0.15 %. Available Nitrogen 138 kg ha<sup>-1</sup>, Available phosphorus 22 kg ha<sup>-1</sup> and Available potassium 279 kg ha<sup>-1</sup>. The included eight weed management practices *i.e.*, Unweeded control ( $W_0$ ), Weed free (*i.e.*, Hand Weeding at 20, 40 and 60 DAS) ( $W_1$ ), Hand weeding at 20 and 40 DAS ( $W_2$ ), Interculturing at 20 and 40 DAS ( $W_3$ ), Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha (Blanket application) ( $W_4$ ),  $W_4$  + Interculturing at 20 DAS ( $W_5$ ),  $W_4$  + Interculturing at 40 DAS ( $W_6$ ) and  $W_4$  + Hand Weeding at 40 DAS ( $W_7$ ) along with two fertility levels *i.e.*, 75 % recommended dose of NPK (*i.e.*, 112.5 - 37.5 - 37.5 NPK kg/ha) ( $F_1$ ) and 100 % recommended dose of NPK (*i.e.*, 150 - 50 - 50 NPK kg/ha) ( $F_2$ ) in a Randomized Block Design with factorial concept with four replications. Application rate of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O (kg ha<sup>-1</sup>) were supplied through Urea, DAP and MOP. A common seed rate of 10 kg ha<sup>-1</sup> was used. The rainfall was received during crop season was 500 mm in 23 rainy days during 2008. Periodical numbers of nodes were counted from the tagged five plants at 40, 60 and 80 DAS. Average value was worked out and recorded.

The number of days from the date of first flowering to the date of appearance of flowers on 50 per cent plants was recorded. The numbers of fruits per plant were obtained by averaging the fruit number of five plants of all picking. The fruit weight per plant was obtained by averaging the fruit weight of five plants in each picking.

### Results and Discussion

A perusal of data presented in table 1 revealed that the number of nodes per main stem at 40 DAS was significantly differ due to weed management treatments. The significantly higher number of nodes per main stem (3.60) was recorded with the treatments W<sub>5</sub> (W<sub>4</sub> + I.C. at 20 DAS). But it was found at par with treatments W<sub>1</sub> (H.W. at 20, 40 and 60 DAS) and W<sub>7</sub> (W<sub>4</sub> + H.W. at 40 DAS) by producing 3.36 and 3.35, respectively. The increase in number of nodes per main stem under treatments W<sub>5</sub>, W<sub>1</sub>, W<sub>2</sub> and W<sub>7</sub> was to the extent of 35.85, 26.79, 26.42 and 24.53 per cent as compared to W<sub>0</sub> (unweeded control). The highest number of nodes per main stem at 60 DAS was significantly higher with treatments (H.W. at 20, 40 and 60 DAS) but it was at par with treatments W<sub>2</sub> (H.W. at 20 and 40 DAS) and W<sub>7</sub> (W<sub>4</sub> + H.W. at 40 DAS). The magnitude of increase in number of nodes per main stem with treatments W<sub>1</sub>, W<sub>2</sub> and W<sub>7</sub> were to the tune of 154.01, 151.34 and 136.63 per cent respectively as compared to W<sub>0</sub> (unweeded control). At 80 DAS weed free treatments W<sub>1</sub> (H.W. at 20, 40 and 60 DAS) recorded the highest number of nodes per main stem and it was at par with treatments W<sub>2</sub> (H.W. at 20 and 40 DAS) and W<sub>7</sub> (W<sub>4</sub> + H.W. at 40 DAS). The increase in number of nodes per main stem under treatments W<sub>1</sub>, W<sub>2</sub> and W<sub>7</sub> was to the extent of 150.57, 133.72 and 132.76 per cent respectively as compared to W<sub>0</sub> (unweeded control). The maximum number of nodes per main stem under these treatments mainly ascribed to better control of weeds throughout the growth period, which may have

resulted in better availability of moisture and nutrients to the crop which may increase the growth attributes of the okra crop. The present findings are in accordance to those obtained by Tiwari *et al.* (1985)<sup>[7]</sup>.

Number of days required for 50 per cent flowering (Table 2) were found to invariable among the various weed management treatments.

Number of fruits per plant and fruit yield per plant (Table 3) were also significantly highest with weed free treatment *i.e.*, H.W. at 20, 40 and 60 DAS (W<sub>1</sub>) but it was found at par with treatments W<sub>2</sub> (H.W. at 20 and 40 DAS) and W<sub>7</sub> (W<sub>4</sub> + H.W. at 40 DAS). The magnitude of increase in number of fruits per plant under treatments W<sub>1</sub>, W<sub>2</sub> and W<sub>7</sub> were to the tune of 162.78, 144.34 and 139.48 per cent respectively as compared to W<sub>0</sub> (Unweeded control). Similarly, the magnitude of increase in fruit yield per plant under treatments W<sub>1</sub>, W<sub>2</sub> and W<sub>7</sub> were to the tune of 171.87, 158.60, and 156.36 per cent respectively as compared to W<sub>0</sub> (Unweeded control). It might be due to complete removal of weeds throughout crop growth period by hand weeding and herbicide which might have resulted in maintaining high soil fertility status by way of removing less plant nutrient through weeds might have produced favorable effect on yield attributes. The results are in accordance with those Singh and Batra (1994)<sup>[6]</sup> and Kumar and Choudhary (2004)<sup>[3]</sup>.

The interaction effect of weed management and fertility levels on dry weight of weeds (g/m<sup>2</sup>) at 60 DAS was found to be significant (Table 3). Treatment combination of W<sub>0</sub>F<sub>2</sub> recorded the highest dry weight of weeds (252.54 g/m<sup>2</sup>) followed by W<sub>0</sub>F<sub>1</sub> (196.06 g/m<sup>2</sup>), while significantly the lowest dry weight of weeds (36.43 g/m<sup>2</sup>) was found with treatment combination of W<sub>1</sub>F<sub>1</sub> but it was found at par with treatment combination of W<sub>7</sub>F<sub>2</sub> (45.60 g/m<sup>2</sup>), W<sub>2</sub>F<sub>2</sub> (44.55 g/m<sup>2</sup>), W<sub>7</sub>F<sub>1</sub> (43.30 g/m<sup>2</sup>), W<sub>2</sub>F<sub>1</sub> (42.97 g/m<sup>2</sup>) and W<sub>1</sub>F<sub>2</sub> (39.3q g/m<sup>2</sup>).

**Table 1:** Number of nodes per main stem in summer okra

Treatment	Days after sowing		
	At 40 DAS	At 60 DAS	At 80 DAS
<b>Weed management</b>			
W <sub>0</sub> : Unweeded control	2.65	3.74	5.22
W <sub>1</sub> : Weed free ( <i>i.e.</i> , Hand Weeding at 20, 40 and 60 DAS)	3.36	9.50	13.08
W <sub>2</sub> : Hand weeding at 20 and 40 DAS	3.35	9.40	12.20
W <sub>3</sub> : Interculturing at 20 and 40 DAS	3.25	6.59	9.97
W <sub>4</sub> : Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha (Blanket application)	3.16	4.78	7.99
W <sub>5</sub> : W <sub>4</sub> + Interculturing at 20 DAS	3.60	7.42	9.98
W <sub>6</sub> : W <sub>4</sub> + Interculturing at 40 DAS	3.25	7.50	9.78
W <sub>7</sub> : W <sub>4</sub> + Hand Weeding at 40 DAS	3.27	8.91	12.15
S.Em.±	0.11	0.24	0.34
C.D. at 5 %	0.32	0.69	0.97
<b>Fertility levels (NPK kg ha<sup>-1</sup>)</b>			
F <sub>1</sub> : 75 % of recommended dose	3.15	7.02	9.76
F <sub>2</sub> : 100 % recommended dose ( <i>i.e.</i> , 150-50-50 NPK kg/ha)	3.33	7.43	10.33
S.Em.±	0.06	0.12	0.17
C.D. at 5 %	0.16	0.34	0.49

**Table 2:** Days to 50 per cent flowering, number of fruits per plant and fruit yield per plant in summer okra

Treatment	Days to 50 per cent flowering	Number of fruits per plant	Fruit yield per plant (g)
<b>Weed management</b>			
W <sub>0</sub> : Unweeded control	52.20	3.09	58.94
W <sub>1</sub> : Weed free ( <i>i.e.</i> , Hand Weeding at 20, 40 and 60 DAS)	50.70	8.12	160.24
W <sub>2</sub> : Hand weeding at 20 and 40 DAS	51.98	7.55	151.36
W <sub>3</sub> : Interculturing at 20 and 40 DAS	50.80	6.23	143.73
W <sub>4</sub> : Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha (Blanket application)	51.30	5.60	96.89
W <sub>5</sub> : W <sub>4</sub> + Interculturing at 20 DAS	52.10	5.90	108.13

W <sub>6</sub> : W <sub>4</sub> + Interculturing at 40 DAS	52.09	6.10	112.64
W <sub>7</sub> : W <sub>4</sub> + Hand Weeding at 40 DAS	51.95	7.51	151.10
S.Em.±	1.74	0.22	4.25
C.D. at 5 %	NS	0.62	12.07
<b>Fertility levels (NPK kg ha<sup>-1</sup>)</b>			
F <sub>1</sub> : 75 % of recommended dose	50.22	6.07	119.39
F <sub>2</sub> : 100 % recommended dose (i.e., 150-50-50 NPK kg/ha)	53.06	6.42	126.37
S.Em.±	0.87	0.11	2.12
C.D. at 5 %	2.47	0.31	6.03

**Table 3:** Interaction effects of weed management and fertility levels on dry weight of weeds (g/m<sup>2</sup>) at 60 days after sowing

Treatment	Fertility levels (NPK kg ha <sup>-1</sup> )	
	75 % recommended dose (F <sub>1</sub> )	100 % recommended dose (F <sub>2</sub> )
<b>Weed management</b>		
W <sub>0</sub> : Unweeded control	196.06	252.54
W <sub>1</sub> : Weed free (i.e., Hand Weeding at 20, 40 and 60 DAS)	36.43	39.31
W <sub>2</sub> : Hand weeding at 20 and 40 DAS	42.97	44.55
W <sub>3</sub> : Interculturing at 20 and 40 DAS	75.99	85.35
W <sub>4</sub> : Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha (Blanket application)	98.64	102.66
W <sub>5</sub> : W <sub>4</sub> + Interculturing at 20 DAS	85.25	96.49
W <sub>6</sub> : W <sub>4</sub> + Interculturing at 40 DAS	79.31	82.21
W <sub>7</sub> : W <sub>4</sub> + Hand Weeding at 40 DAS	43.30	45.60
S.Em.±	4.14	
C.D. at 5 %	11.77	
C.V. %	9.61	

## References

- Adejonwo KW, Ahmed MK, Lagoke BTO, Karikari SK. Chemical weed control in irrigated okra in the Nigeria, Sudan Savanna Zone. *Tropical Pest Management*. 1991; 39(1):91-95.
- Chauhan DVS. Vegetable production in India (3<sup>rd</sup> Ed.) Ram Prasad and Sons, Agra-3, 1972.
- Kumar A, Choudhary BM. Weed management of okra [*Abelmoschus esculentus* (L.) Moench]. Pub. Bhubaneswar, India: Orissa Horticultural Society. 50: Orissa Journal of Horticulture. 2004; 32(1):73-74.
- Singh G, Bhan VM, Tripathi SS. Weed control in okra [*Abelmoschus esculentus* (L.) Moench]. *Indian Journal of Weed Science*. 1982; 14(1):19-23.
- Singh SP. Production technology of vegetable crops. University Publishing Centre, Kernal, Haryana, 1988.
- Singh SV, Batra BR. Weed control studies in relation to nitrogen doses in okra. *Haryana Journal of Horticultural Science*. 1994; 23(2):137-140.
- Tiwari SK, Singh BP, Bramachari VS. Integrated methods of weed control in okra [*Abelmoschus esculentus* (L.) Moench]. *Pesticides*. 1985; 19(6):70-72.