



## Effect of integrated weed management practices on growth, yield attributes and yield of okra (*Abelmoschus esculentus* (L.) Moench) cv. Utkal Gaurav

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### ABSTRACT

The Present investigation entitled, "Effect of integrated weed management practices on growth, yield and its attributes in okra (*Abelmoschus esculentus* (L.) Moench) cv. Utkal Gaurav." was conducted at the field site of AICRP on Vegetable Crops of O.U.A.T, Bhubaneswar, Odisha, India during kharif season 2018-19. The objective of the present investigation was to study the impact of weed management on growth and yield attributing characters of Okra. The experiment was laid out in RBD Design with 7 treatments, replicated thrice. The Seven Treatments Schedules were T<sub>1</sub>-weedy check (Control), T<sub>2</sub>-weed free check (3 hand weeding), T<sub>3</sub>- pre-emergence application of pendimethalin @6 ml L<sup>-1</sup>, T<sub>4</sub>- Pre-application of pendimethalin @ 6 ml L<sup>-1</sup> + One hand weeding, T<sub>5</sub>- Pre application of pendimethalin @ 6 ml L<sup>-1</sup> + quizalofop ethyl 40-50 g ha<sup>-1</sup> at 20 DAS, T<sub>6</sub>-Post emergence application of metribuzin @ 525g ha<sup>-1</sup> at 20DAS, T<sub>7</sub>- Post emerging application paraquate (0.5 kg ha<sup>-1</sup>), fluchloralin (1.5 kg ha<sup>-1</sup>). Among the different weed management practices, the pre-emergence application of pendimethalin @ 6 ml L<sup>-1</sup> + one hand weeding (T<sub>4</sub>) resulted maximum green fruit yield of 113.09 q ha<sup>-1</sup> with maximum B:C ratio of 1.49 excluding fruit yield of 120.49 q ha<sup>-1</sup> under weed free check (T<sub>2</sub>). However, these both treatments (T<sub>2</sub> and T<sub>4</sub>) were statistically at par in terms of fruit yield per ha. Although, the weed free check (3 hand weeding) (T<sub>2</sub>) recorded highest fruit yield but the net return of this treatment is less (B:C ratio 1.19) due to higher cost of cultivation.

**Keywords:** Okra, pendimethalin, quizalofop ethyl and weed management

Okra (*Abelmoschus esculentus* L. Moench) belongs to family Malvaceae, known as Bhendi or Lady's finger is one of the most important vegetable grown in tropical and subtropical parts of the world. India is the largest producer of okra with an area of 528 (000' ha) and production of 6146 (000'MT) with the productivity of 11.64 MT (NHB, 2017). Among the problems encountered in cultivation of okra, control of weeds is of utmost importance. Weeds are the silent robbers of plant nutrients, moisture, sunlight and also compete for space that would otherwise be available to the main crop. Weeds also harbour pests and disease causing organisms; cause adverse allelopathic effects on okra and reduce the yield and quality of the produce. Because of the slow growth rate of okra during the initial stages, weeds take advantage of moisture, soil fertility and environmental conditions to suppress the growth of the crop. Due to this weed competition, the crop remains weak and unhealthy; this results in the reduction of yield and quality of the crop (Singh *et al.*, 1968). A yield loss of about 54.1 to 90.6 per cent was reported in okra due to weed competition (Singh *et al.*, 1982). The most critical period of crop weed competition in okra is upto 2-6 weeks after sowing (Singh *et al.*, 1981). Use of

herbicides for weed control is advocated for weed control due to their easy application and effectiveness in early control of weeds (Sardana, 1997). But unfortunately no single herbicide alone provides the desired degree of weed control as degradation and loss in persistence of herbicides in soil results in re-emergence of weeds during the main part of growing season of the crop (Mehta *et al.*, 1979). The present study was, therefore, designed to find out the effect of integrated weed management practices on growth, yield and its attributes in okra cv. Utkal Gaurav.

The present investigation was conducted at the field site of AICRP on Vegetable Crops of O.U.A.T, Bhubaneswar, Odisha, India during Kharif season 2018-19. The trial was laid out in Randomized Block Design replicated thrice. Seven treatments consisting of T<sub>1</sub>- Weedy Check (Control), T<sub>2</sub>-Weed free check (3 hand weeding), T<sub>3</sub>- Pre-emergence application of pendimethalin @ 6 ml L<sup>-1</sup>, T<sub>4</sub>- Pre application of pendimethalin @ 6 ml L<sup>-1</sup> + One hand weeding, T<sub>5</sub>- Pre application of pendimethalin @ 6ml L<sup>-1</sup> + quizalofop ethyl 40-50 g ha<sup>-1</sup> at 20 DAS, T<sub>6</sub>-Post emergence application of metribuzin @ 525g ha<sup>-1</sup> at 20DAS, T<sub>7</sub>-

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Post emerging application Paraquate (0.5 kg ha<sup>-1</sup>) fluchloralin (1.5 kg ha<sup>-1</sup>). The field was fertilized with recommended doses of NPK at the rate of 80:40:40 kg ha<sup>-1</sup>, respectively. The seeds of Okra cv. Utkal Gaurav were sown on ridges at 50 × 30 cm spacing. The data was recorded on plant height (cm) at final harvest stage, number of fruits plant<sup>-1</sup>, average fruit wt. (g) (mean of 10 fruits), fruit yield per plot (kg), fruit yield (q ha<sup>-1</sup>), B:C ratio. Data thus obtained was analyzed statistically and means were compared for the interpretation of the result.

### Growth characters

Weed management practices significantly influenced the crop growth characters like plant height (cm) at final harvest stage. The highest plant height (149.83) was recorded in weed free check (3 hand weeding *i.e.* T<sub>2</sub>). The lowest plant height was recorded in weedy check (T<sub>1</sub>) (122.03). This might be due to the reason that, the crop faced minimum crop weed competition because of herbicidal action and hand weeding practice and it resulted into maximum height of plant. Similar results were also recorded from the earlier findings of Jadho *et al.* (2001), Quasem (2007), Anisuzzaman *et al.* (2009) and Kolse *et al.* (2010).

### Yield, yield attributes and economics

The data pertaining to the yield and yield attributes like number of fruits plant<sup>-1</sup>, mean fruit wt. (g) (average

of 10 fruits), fruit yield per plot (kg), fruit yield (q ha<sup>-1</sup>), B:C ratio is presented in the table 1. The highest number of fruits per plant was recorded in weed free check (3 hand weeding *i.e.* T<sub>2</sub>) being, 12.76 and it was on par with T<sub>4</sub> *i.e.* pre application of pendimethalin @ 6ml L<sup>-1</sup> + one hand weeding. The least number of fruits per plant was recorded in weedy check (T<sub>1</sub>) (9.6). Application of weed free check resulted in significantly maximum fruit yield per plant (120.06 q ha<sup>-1</sup>). The least fruit yield per ha was recorded in weedy check being, 73.66 q. Throughout the crop growth period this treatment exhibited better growth and development due to excellent control of weed infestation, less crop weed competition during the critical growth stage of crop and ultimately resulted in higher yields compared to all other treatments. Reduced fruit yield in case of unweeded control may be due to reduced plant growth, reduced fruit size and number and due to severe crop weed competition for nutrients, moisture, light and space during the crop growth period. Similar results were reported by Bhowmik and Mcglew (1986), Singh *et al.* (2001), Anuradha *et al.* (2006), Quasem (2007) and Basavaraj *et al.* (2009). Based on the results obtained, the most effective measure of weed control in okra is the integrated weed management involved T<sub>2</sub>-weed free check (3 hand weeding).

**Table 1: Effect of weed management on yield and economics of okra (2018-2019)**

Treatments	Plant height (cm)	No. of fruits plant <sup>-1</sup>	Avg. fruit wt. (g) (Avg. of 10 fruits)	Fruit yield per plot (kg)	Fruit yield (q ha <sup>-1</sup> )	B:C ratio
T <sub>1</sub> -Weedy check (Control)	122.06	9.6	10.58	6.77	73.66	1.08
T <sub>2</sub> -Weed free check (3 hand weeding)	149.83	12.76	13.15	10.57	120.49	1.19
T <sub>3</sub> - Pre-emergence application of pendimethalin @ 6 ml L <sup>-1</sup>	142.78	11.78	11.38	8.65	96.87	1.48
T <sub>4</sub> - Pre application of pendimethalin @ 6 ml L <sup>-1</sup> + one hand weeding	140.27	12.55	12.16	10.03	113.09	1.49
T <sub>5</sub> - Pre application of pendimethalin @ 6 ml L <sup>-1</sup> + quizalofop ethy l 40-50 g ha <sup>-1</sup> at 20 DAS	133.18	10.77	11.20	8.88	99.62	1.27
T <sub>6</sub> -Post emergence application of metribuzin @ 525 g ha <sup>-1</sup> at 20DAS	142.75	10.78	12.18	9.05	102.03	1.53
T <sub>7</sub> -Post emerging application paraquate (0.5 kg ha <sup>-1</sup> ) fluchloralin (1.5 kg ha <sup>-1</sup> )	118.23	10.66	12.34	8.58	96.49	1.35
<b>LSD (0.05)</b>	<b>14.87</b>	<b>1.74</b>	<b>1.53</b>	<b>1.36</b>	<b>15.78</b>	<b>-</b>
<b>CV</b>	<b>7.03</b>	<b>9.63</b>	<b>8.30</b>	<b>9.58</b>	<b>8.58</b>	<b>-</b>

**Table 2: Effect of weed management on number of weeds (per 0.5 sq. m) at 20, 40 and 60 DAS**

Treatments	20DAS	40DAS	60DAS
T <sub>1</sub> -Weedy check (Control)	49.01	103.33	145
T <sub>2</sub> -Weed free check (3 hand weeding)	27.7	19.53	30.2
T <sub>3</sub> - Pre-emergence application of pendimethalin @ 6 ml L <sup>-1</sup>	24.9	50.99	79.60
T <sub>4</sub> - Pre application of pendimethalin @ 6 ml L <sup>-1</sup> + one hand weeding	14.16	29.10	42.68
T <sub>5</sub> - Pre application of pendimethalin @ 6 ml L <sup>-1</sup> + quizalofop ethy 140-50 g ha <sup>-1</sup> at 20 DAS	16.03	24.52	42.57
T <sub>6</sub> -Post emergence application of metribuzin @ 525 g ha <sup>-1</sup> at 20DAS	29.22	39.20	56.20
T <sub>7</sub> - Post emerging application paraquate (0.5 kg ha <sup>-1</sup> ) fluchloralin (1.5 kg ha <sup>-1</sup> )	45.92	36.73	55.3
<b>LSD (0.05)</b>	<b>4.68</b>	<b>4.62</b>	<b>7.39</b>
<b>CV</b>	<b>9.42</b>	<b>7.46</b>	<b>7.00</b>

Among the different weed management practices, the pre-emergence application of pendimethalin @ 6ml L<sup>-1</sup>+ one hand weeding (T<sub>4</sub>) resulted maximum green fruit yield of 113.09 q ha<sup>-1</sup> with maximum B:C ratio of 1.49 excluding fruit yield of 120.49 q ha<sup>-1</sup> under weed free check (T<sub>2</sub>). However, these both treatments (T<sub>2</sub> and T<sub>4</sub>) were statistically *at par* in terms of fruit yield per ha. Although, the weed free check recorded highest fruit yield but the net return of this treatment is less (B:C ratio 1.19) due to higher cost of cultivation.

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