

## Influence of Pre and Post Emergence Herbicides on Yield and Quality of Garlic

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### Abstract

A field investigation entitled "Influence of pre and post emergence herbicides on yield and quality of garlic (*Allium sativum* L.)", was carried out at Main garden, University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the rabi season of 2011-2012. The investigation was carried out to study the relative influence of herbicides and cultural practices on weed control in garlic and to study the effect of herbicides on growth, yield and quality of garlic. The result of the present investigation revealed that, the treatment pendimethalin @ 1.0 kg a.i/ha before planting and quizalofop ethyl 0.050 kg a.i./ha at 30 DAP was obtained superior in respect of growth characters like maximum height of plant, leaves per plant, plant population and minimum days required for maturity, qualitative characters in regards to diameter and length of bulb, diameter and length of cloves, cloves per bulb and clove index was found to be significantly maximum. Further, the maximum fresh bulb yield (123.25 q ha<sup>-1</sup>), cured bulb yield (116.44 q ha<sup>-1</sup>) and cost benefit ratio (1:2.37) was observed with T<sub>4</sub> treatment.

**Keywords:** Garlic; IWM

### Introduction

India has been known as the "Home of Spices" from very ancient time. Garlic (*Allium sativum* L.) is one of the important spice crop belongs to family Alliaceae. It has been recognized all over the world as a valuable spices for seasoning and flavouring food and a popular remedy by various ailments and physiological disorders. Carbohydrates, proteins, phosphorus, ascorbic acid and sulphur are the principle ingredients of garlic (Pandey and Bhone, 2003).

Garlic is closely planted and is shallow rooted bulbous crop. Therefore, intercultural practices are very difficult to undertake and manual weeding during the establishment stage of crop causes physical damage to the crop plants. A most troublesome problem faced by garlic growers is the control of weed particularly during the early stage of crop growth. Because of higher plant density and show growth of the plants having erect tubular leaves the interculture is practically difficult and the crop suffer heavily from weed competition during establishment of seedlings. The weeds compete for the nutrients, moisture, space and light and affect growth and development. Weed reduces the bulb yield to the extent of 40-80% [1]; therefore, it is essential to keep the field weed free during the critical period of crop growth. As garlic is commercial crop, farmers invest more money through costly inputs like seed material, fertilizers, plant protection schedule and irrigation for achieving higher yield.

### Material and Methods

The present investigation entitled, "Influence of pre and post emergence herbicides on yield and quality of garlic" was carried out during the rabi season of 2011-12 at plot no.13, Main garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

The experimental plot of garlic crop variety G-41 (Agrifound white) was planted on 20<sup>th</sup> October, 2011 at 15 cm × 10 cm spacing with 100:50:50 Kg ha<sup>-1</sup> NPK. The crop was harvested on 6<sup>th</sup> to 8<sup>th</sup> March 2012. The treatments comprised of Oxyfluorfen @ 0.100-0.150 kg a.i/ha before planting + second application at 30 DAP (T<sub>1</sub>), Oxyfluorfen @ 0.100-0.150 kg a.i/ha before planting + Quizalofop ethyl 0.050 kg a.i/ha at 30 DAP (T<sub>2</sub>), Pendimethalin @ 1.0 kg a.i/ha before planting and second application at 30 DAP (T<sub>3</sub>), Pendimethalin @ 1.0 kg a.i/ha before planting + Quizalofop ethyl 0.050 kg a.i/ha at 30 DAP (T<sub>4</sub>), Fenoxaprop-p-ethyl @ 0.75-1.0 kg a.i/ha before planting + second application at 30 DAP (T<sub>5</sub>), Fenoxaprop-p-ethyl @ 0.75-1.0 kg a.i/ha + Quizalofop ethyl 0.050 kg a.i/ha at 30 DAP (T<sub>6</sub>), Hand weeding at 20, 40 and 60 DAP (T<sub>7</sub>), Control (no-weeding) (T<sub>8</sub>).

The data obtained on various traits were statistically analyzed by using mean standard error and coefficient of variation procedure given by Panse and Sukhatme [2].

### Results and Discussion

The data presented in Table 1 and revealed that, height of the garlic plant was influenced due to the treatment of different herbicides and it was increased subsequently at all the stages of growth. At harvest, the maximum plant height (72.07 cm) was attained in treatment T<sub>4</sub>, which was found significantly superior over all the treatments. The remaining treatments T<sub>6</sub>, T<sub>3</sub> and T<sub>5</sub> were at par with each other. However minimum plant height (66.09 cm) was recorded in the control treatment T<sub>8</sub>.

The maximum fresh yield garlic bulbs (2.77 kg per plot and 123.25 q ha<sup>-1</sup> per hectare) obtained in the treatment T<sub>4</sub> which was at par with the treatments T<sub>7</sub> (2.59 kg). However, the minimum fresh yield (1.41 kg per plot and 62.96 q ha<sup>-1</sup> per hectare) was recorded in control treatment T<sub>8</sub>. Significantly the maximum yield of cured garlic bulbs (2.62 kg per plot and 116.44 q per ha.) was harvested from the treatment T<sub>4</sub>.

Treatments	Height of plant (cm)	Fresh yield/plot (kg)	Fresh yield/ha (q)	Cured yield/plot(kg)	Cured yield/ha(q)	Diameter of bulb(cm)	Length of bulb (cm)	Diameter of clove (cm)	Length of clove (cm)	Clove index(g)	Dry weight of weed (g)	Weed control efficiency (%)	Weed index (%)
T1	68.12	2	88.8	1.86	82.81	3.78	2.87	0.84	2.75	79.6	102.24 (10.61)	53.29	28.88
T2	68.44	2.27	101.18	2.15	95.7	3.81	3.02	0.9	2.82	80.06	87.19 (9.83)	60.29	17.81
T3	66.37	1.76	78.22	1.63	72.59	3.48	2.72	0.79	2.63	75.05	118.39 (11.38)	45.96	37.65
T4	72.07	2.77	123.25	2.62	116.44	3.89	3.22	1.1	3.1	85.46	69.02 (8.80)	68.49	_
T5	66.31	1.65	73.33	1.53	68.14	3.44	2.7	0.71	2.56	75.52	130.81 (11.93)	40.29	41.48
T6	67.35	1.88	83.55	1.76	78.22	3.6	2.84	0.8	2.63	77.62	113.40 (11.14)	48.24	32.82
T7	68.77	2.59	115.1	2.43	108.29	3.84	3.14	1.06	2.9	83.88	72.87 (9.03)	66.74	6.99
T8	66.09	1.41	62.96	1.31	58.36	2.9	2.6	0.6	2.3	68.92	219.09 (15.03)	_	49.87
F' TEST	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig		
SE (m) ±	0.58	0.12	1.6	0.11	1.11	0.14	0.12	0.04	0.07	1.38	0.28		
CD at 5%	1.72	0.36	4.78	0.35	3.32	0.43	0.38	0.12	0.23	4.07	0.83		

**Table 1:** Influence of different treatments on yield and quality of garlic. Figures in parenthesis are square root transformed values  $\sqrt{x+0.5}$ .

The control treatment T<sub>8</sub> had recorded significantly the minimum yield of cured garlic bulbs (1.31 kg per plot and 58.36 q per ha). This might be due to the fact that, wherever there was better weed control and maintainance of higher plant population in bulbous crop like garlic, the competition in between the crop for light, air, moisture and nutrient would have been reduced down considerably. Similar results were reported by Nandal and singh [3] and Singh et al. [4], Mohammad and Imran [5] in garlic.

The superior bulb quality of the maximum diameter of bulb (3.89 cm), length of bulb (3.22 cm) was recorded in treatment T<sub>4</sub>. The minimum diameter of bulb (2.90 cm), length of bulb (2.60 cm) was recorded in control treatment T<sub>8</sub>. Significantly the maximum clove diameter (1.10 cm) and clove length (3.10 cm) were recorded with treatment T<sub>4</sub>. However, control treatment T<sub>8</sub> had registered significantly the minimum clove diameter (0.60 cm) and clove length (2.30 cm). Whereas, treatment T<sub>4</sub> was found at par with T<sub>7</sub>, in both characters i. e. clove length and diameter. The clove index was found to be significantly the maximum (85.46 g) with the treatment T<sub>4</sub> and it was found at par with T<sub>7</sub> (83.88 g). However, significantly the minimum clove index (68.92 g) was recorded with the control treatment T<sub>8</sub>. This might be due to the fact that, more the diameter and length of garlic bulbs more would be the diameter and length of cloves. These results are in line with the findings of Ushakumari et al. [6], Singh et al. [4], Mohammad and Imran [5] in garlic.

The data regarding dry matter accumulation of weed m<sup>-2</sup> were at harvesting stage minimum (8.80 g) dry matter of weed was accumulated in the treatment T<sub>4</sub> and which was found at par with treatment T<sub>7</sub>. The maximum (15.03 g) dry matters of weed were recorded under the control treatment T<sub>8</sub>. This might be due to the fact that, less the numbers of monocotyledonous and dicotyledonous weed count in above treatments ,naturally the dry matter get reduced down accordingly .The similar results were quoted by Nandal et al. [7] in onion and Singh et al. [4], Mohammad and Imran [5] in garlic.

Effect of various treatments on weed control efficiency and weed index are presented in Table. The maximum weed control efficiency (68.49%) was observed in the treatment T<sub>4</sub> than all other treatments and it was followed by the treatment T<sub>7</sub> (66.74%), T<sub>2</sub> (60.29%), T<sub>1</sub> (53.29%). However the minimum weed control efficiency (40.29%) recorded in the treatment T<sub>5</sub>. Minimum weed index (6.99%) was recorded by the treatment T<sub>7</sub> than all the treatments and it was followed by treatment T<sub>2</sub> (17.81%). However, the maximum weed index was computed in the treatment T<sub>8</sub> (49.87%) and it was followed by the treatments T<sub>5</sub> (41.48%), T<sub>3</sub> (37.65%) and T<sub>6</sub> (32.82%). Whereas the treatments T<sub>1</sub> showed medium values for weed index (28.88%). Similar results were obtained by Lebedinskii [8], Warade [9] and Warade et al. [10] in onion

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