# Studies on weed management in onion ( *Allium cepa* L.)

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Onion is one of the most important vegetable crops and is widely grown as a cash crop in different parts of country. Cultivation of onion is greatly effected by crop-weed competition. Uncontrolled weed growth reduces the bulb yield of the tune of 40 – 80% depending on types of weed flora, their intensity and duration of crop-weed competition (Patel *et al*., 1983; Mishra *et al.*, 1986). Besides having a shallow root system, onions are usually planted at a closer spacing and these become the main reasons for a tedious, time consuming and expensive weeding. Under such circumstances, chemical weed control becomes the best alternative solution. However, continuous use of chemicals not only increases the cost of cultivation but also drastically reduces the soil fertility along with reduction in productivity and residual problem. Hence, the present investigation on integrated weed management involving herbicides and cultural practices was undertaken to provide economically acceptable and eco-friendly weed control.

A field experiment was carried out during the winter season of 2006 at the Horticultural Research Station, Mondouri, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal. The experiment was laid out in randomized block design with 8 treatments and 3 replications. The treatments comprised of Quizalofop-ethyl 5% EC @1.5 ml/l of water at 20 DAP ($T_1$), Quizalofop-ethyl 5% EC @2.0 ml/l of water at 20 DAP ($T_2$), Quizalofop-ethyl 5% EC @2.5 ml/l of water at 20 DAP ($T_3$), Quizalofop-ethyl 5% EC @1.5 ml/l of water at 20 DAP followed by one hand weeding at 40 DAP ($T_4$), Quizalofop-ethyl 5% EC @ 2.0 ml/l of water at 20 DAP followed by one hand weeding at 40 DAP ($T_5$), Quizalofop-ethyl 5% EC @ 2.5 ml/l of water at 20 DAP followed by one hand weeding at 40 DAP ($T_6$), hand weeding at 20 and 40 DAP ($T_7$) and untreated control ($T_8$).

The healthy seedlings of onion cv. 'Arka Kalyan' were transplanted in the flat beds at distance of 30cm × 20cm in 2 x 2 $m^2$ plot size. One light irrigation was given just after transplanting and others were given as and when required. Observations were recorded on weed population and dry weight of weed from an area of 0.50m × 0.50m at two randomly selected places in each plot. Effect of treatments on yield attributes and yield were also recorded. The predominant weed species infesting the experimental plots were *Cyperus rotundus, Cynodon dactylon, Cirsium arvense, Commelina benghalensis, Euphorbia hirta, Oxalis corriculata, Physalis minima, Digitaria sanguinalis* and *Eleusine indica.* Hand weeding at 40 days after transplanting along with application of Quizalofop-ethyl 5% EC @ 2.5 ml/l of water at 20 DAP ($T_6$) significantly reduced weed density (25.5) and dry weight (55.3 g) of weed compared to other treatments. This was followed by application of Quizalofop-ethyl 5% EC @2.5 ml/l of water at 20 DAP ($T_3$) (34.5 and 65.3 g respectively). Hand weeding at 20 DAP and 40 DAP had significantly lower weed density (38.0) and dry weight (73.84 g) than Quizalofop-ethyl 5% EC @ 2.0 ml/l of water at 20 DAP followed by one hand weeding at 40 DAP ($T_5$) (Table1).However, control ($T_8$) had the highest weed density (56.5) and dry weight (107.32 g) than other treatments. Plant height, number of leaves, bulb diameter, neck thickness, bulb weight and bulb yield were significantly influence by the treatments (Table1). Highest plant height was found in $T_3$ (44.41cm) followed by $T_4$ (36.82cm) as compared to the lowest plant height in $T_6$ (31.42cm). Application of Quizalofop-ethyl 5% EC @ 2.0 ml/l of water at 20 DAP along with hand weeding at 40 DAP ($T_5$) had the highest number of leaves and neck thickness (1.16 cm).Hand weeding at 40 DAP along with Quizalofop-ethyl 5% EC @ 2.5 ml/l of water ($T_6$) had the highest bulb diameter (4.09 cm), bulb weight (13.42 kg) and bulb yield (335.64 q/ha), followed by $T_7$ (3.45cm,13.23kg and 330.83q/ha) as compared to control (2.86cm,9.74kg and 243.50q/ha respectively).

Hand weeding at 45 days after transplanting in combination with herbicides in general, further enhances the bulb yield compared to herbicides alone. These results were in accordance with the findings of Malik *et al.* (1982), Patel *et al.* (1983), Singh *et al.* (1987) and Singh (1996). It can be concluded from the results that application of Quizalofop-ethyl 5% EC @ 2.5 ml/l of water at 20 DAP along with one hand weeding at 40 days after transplanting was the best treatment in controlling weeds and increasing yield.

## REFERENCES

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**Table 1: Effect of different treatments on growth, yield parameters, weed population and dry weight of weeds in onion.**

| Treatment | Plant height (cm) | No. of leaves | Bulb diameter (cm) | Neck thickness of bulb (cm) | Bulb weight per plot (kg) | Bulb yield (q/ha) | Weed population (No. / $m^2$) | Dry weight of weeds ($g/m^2$) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ – Quizalofop-ethyl 5% EC @1.5ml/liter at 20 DAP | 36.57 | 8.65 | 3.28 | 1.04 | 12.70 | 317.50 | 38.5 | 78.7 |
| $T_2$ – Quizalofop-ethyl 5% EC @ 2.0ml/lit at 20 DAP | 33.80 | 9.63 | 3.35 | 1.13 | 12.74 | 318.58 | 43.0 | 82.3 |
| $T_3$ – Quizalofop-ethyl 5% EC @2.5ml/lit at 20 DAP | 32.00 | 9.22 | 3.38 | 1.07 | 13.01 | 325.33 | 34.5 | 65.3 |
| $T_4$ – $T_1$ + HW40 DAP | 36.82 | 9.26 | 2.96 | 1.02 | 12.51 | 312.75 | 40.5 | 84.8 |
| $T_5$ – $T_2$ + HW 40 DAP | 34.78 | 10.26 | 3.42 | 1.16 | 13.21 | 330.42 | 35.0 | 74.2 |
| $T_6$ – $T_3$ + HW 40 DAP | 31.42 | 8.18 | 4.09 | 1.04 | 13.42 | 335.64 | 25.5 | 55.3 |
| $T_7$ – HW 20 DAP + HW 40 DAP | 44.41 | 9.48 | 3.45 | 0.98 | 13.23 | 330.83 | 38.0 | 73.84 |
| $T_8$ – Untreated control | 34.39 | 10.11 | 2.86 | 1.03 | 9.74 | 243.50 | 56.5 | 107.32 |
| LSD (P = 0.05) | 2.53 | 1.42 | 0.52 | 0.11 | 1.20 | 30.32 | 3.09 | 2.39 |

HW – Hand weeding, DAP – Days after planting