

EFFICACY OF DIFFERENT HERBICIDES FOR CONTROLLING WEEDS IN ONION*

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ABSTRACT

Field study was conducted at Chakdara, NWFP during Rabi 2002–03, using RCB design, having six treatments and four replications. The experiment included 4 herbicides, a weedy check and a hand weeding treatment. The herbicides used were pendimethalin as pre- and post-transplanting while methabenzthiazuron and 2,4-D as post-transplanting. The data were recorded on weed density m^{-2} , onion count m^{-2} , size of onion bulbs and weight of onion bulbs in terms of yield ($kg\ ha^{-1}$). All the parameters were significantly affected by different herbicidal treatments. For controlling weeds, pendimethalin pre-transplanting proved to be the best giving only 6.75 weeds m^{-2} as compared to pendimethalin post-transplanting ($41.00\ m^{-2}$), methabenzthiazuron ($33.25\ m^{-2}$), 2,4-D ($71.75\ m^{-2}$) and weedy check ($78.25\ m^{-2}$). Similarly in terms of yield, pendimethalin pre-transplanting produced the highest yield ($16200\ kg\ ha^{-1}$) as compared to methabenzthiazuron ($13200\ kg\ ha^{-1}$), 2,4-D ($9600\ kg\ ha^{-1}$) and weedy check ($4800\ kg\ ha^{-1}$).

Key words: Onion, weed control, herbicides

INTRODUCTION

Onion (*Allium cepas* L.) belonging to family Alliaceae is one of the important vegetable crops not only in Pakistan, but all over the world. The agrarian economy of the nation, although mainly depends on major crops viz. cotton, rice and wheat, yet the minor crops like onions have also an impact on the national economy. At many times the nation was compelled to import onion by spending hard currency, so as to cope with the domestic supply-demand differential. Onion is a condiment crop and consumed as fresh in salads or added in cooking dishes as a spice. Apart from furnishing nutrition, it also provides relishing flavours to our diets. Recent research has suggested that onions in the diet may play a part in preventing heart diseases and other ailments. Onion bulb is rich in phosphorus, calcium and carbohydrates. The pungency in onion is due to a volatile oil known as allyl-propyl disulphide. Onion is an important crop in all continents with world production of about 25 million tones (Anonymous, 2002). There has been a progressive increase in area and production of onion in Pakistan. In 2001-02, the area increased to 103.8 thousand hectare, producing 1385 thousand tonnes at an average of 13.34 tonnes ha^{-1} (Anonymous, 2002). The onion yields in Pakistan are lower as compared to the maximum potentials of the cultivars. The gap could mainly be attributed to the weed competition, because of the peculiar canopy structure of the onions. At young stage the onion leaves are very small and cannot shade the ground even in advanced stages of growth of the bulb crop. Thus, onion is the worst in competition with the weeds (Appleby, 1996). The period from emergence to 4 weeks later was the most critical in the direct

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seeded onion (Shadbolt and Holm, 1956; Duranti and Cuocolo, 1988; and Ghafoor, et al., 2000).

In Pakistan, weeds are mostly managed manually which costs about Rs. 1000 ha⁻¹ (Defoer and Nieuwkoop, 1991). Whereas, in USA hand weeding costs have been reported to the tune of \$ 92 59 ha⁻¹, 5-7 times more expensive than using herbicides alone or in combinations (Arnold P. Appleby, Personal communication*). Efficacy of Tribunil 70 WP, Ronstar 12 L and Probe 75 WP for controlling weeds in D. I. Khan was statistically higher than the weedy check, but it could surpass the hand weeding in increasing the onion bulb yield (Ahmad et al., 1994). A dependable weed control in onion has been reported with the use of different chemicals of different chemistries (Patel, et al., 1986; and Keeling et al., 1990). Marwat et al., 1992 in a socio-economic survey of onion based cropping system in Swat revealed that farmers used hand weeding supplemented by the use of methabenzthiazuron. The use of selective herbicides together with mechanical methods for weed control in onion is recommended (Rapparni, 1994). Pendimethalin gave effective weed control applied just after transplanting (Sinha et al., 1996).

MATERIALS AND METHODS

Field experiment was conducted at Chakdara, Lower Dir, during 2002-03. Randomised complete block (RCB) design was used, replicated four times, having six treatments. All the plots were levelled and applied with enough FYM before transplantation. Recommended dose of NPK was also applied. The row-to-row and plant-to-plant distance was kept 20 and 8 cm, respectively. The treatment size was 3x1 m². The treatments as detailed in Table 1 were employed in the studies.

Table-1. Detail of treatments in the experiment

Treatments	Common name	Time of application	Rate (kg a.i ha ⁻¹)
Stomp 330 EC	Pendimethalin	Pre-transplanting	1.32
2,4-D 70 WP	2,4-D	Post-transplanting	1.13
Tribunil	Methabenzthiazuron	Post-transplanting	2.14
Stomp 330 EC	Pendimethalin	Post-transplanting	1.32
Hand weeding	-----	-----	-----
Weedy check	-----	-----	-----

Stomp 330 E was applied to the soil as pre-transplantation. The post-transplantation herbicides were applied after three weeks of transplantation. NPK Fertilizer was applied just before transplantation and half nitrogen was applied after four weeks of transplantation.

Data was recorded on weed density m⁻², onion count m⁻², size of onion bulbs and weight of onion bulbs (kg ha⁻¹).

The data collected were subjected to ANOVA and the treatment means were separated by LSD test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Weed density m⁻²

The statistical analysis of the data showed that there was significant ($P < 0.05$) effect of different herbicides on the weeds density m⁻² (Table 2). The maximum weeds density

(78.25 m²) was recorded in the weedy check. However it was statistically at par with 2, 4-D (71.75 m²) and hand weeding. While minimum weeds density (6.75 m⁻²) was recorded in plots treated with Stomp 330 EC as pre-emergence which was statistically at par with Tribunil (35.25) and stomp330 EC used as post-emergence (41.00). The variability in weeds population in different treatments can be attributed to the fact that some herbicides are more effective for weed control than the others. These results are in line with the findings of Manjunath *et al* (1989) and Warade *et al.*, (1995).

Onion count m⁻²

The onion bulbs count also differs significantly among the treatments. The means shown in the Table 2 indicated the highest bulb count (47) in Stomp 330E followed by Tribunil (43). The minimum bulb count (26) was observed in the Weedy check. These results agree with the work of Garcia, *et al* (1994).

Size of onion bulbs

The size of onion bulb differs significantly among the treatments. The means shown in the Table 2 indicated the largest bulb size in Stomp 330E (94 ml) followed by Tribunil (88 ml). Weedy check (68 ml), 2,4-D (67 ml) and Hand weeding (73 ml) gave smaller bulbs respectively. Similar results have been reported by Nadagouda *et al* (1996) and Sinha and Lagoke (1983).

Weight of onion bulbs (kg ha⁻¹)

The weight of onion bulbs also differs significantly among the treatments. The means shown in Table 2 indicate the highest yield in Stomp 330E pre-transplanting (16200 kg ha⁻¹) followed by Tribunil (13200 kg ha⁻¹). While the weedy check (4800 kg ha⁻¹) gave the lowest yield. These results are in analogy with the findings of Gaffer *et al* (1993) and Garcia, *et al.* (1994).

Table-2. Efficacy of different herbicides on weed density m⁻², onion count m⁻¹, size of onion bulb (ml) and weight of onion bulb (kg ha⁻¹)

Treatments	Weed density m ⁻²	Onion count m ⁻²	Weight of onion bulb (kg ha ⁻¹)	Size of onion bulb (ml)
Stomp330EC(Pre)	6.75 c	47.0 a	16200 a	94 a
2,4-D 70 WP (PoE)	71.75 ab	42.0 ab	9600 c	67 d
Tribunil (PoE)	35.25 bc	43.0 ab	13200 ab	88 ab
Stomp330EC (PoE)	41.00 abc	41.0 ab	12000 bc	80 bc
Hand weeding	65.00 ab	39.0 b	10800 bc	73 cd
Weedy check	78.25 a	26.0 c	4800 d	68 d

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