Asian Journal of Plant Sciences

ISSN 1682-3974

science alert

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Asian Journal of Plant Sciences 2 (6): 464-466, 2003
ISSN 1682-3974

Effect of Weedicides and Hand Weedings on the Yield of Onion (*Alliam cepa L.*)

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Abstract: Field experiment was conducted at Agricultural Research Station Serai Naurang, Bannu to find out the effect of two weedicides, i.e., Ronstar @ of 3 kg ha^{-1} and stomp 330E @ 4 lit ha^{-1} along with hand weedings, i.e., 2 and 4 times, keeping the required intervals in onion crop. Onion cultivar transplanted was Swat-1. The data were recorded on fresh yield with leaves; dry yield with leaves and bulb yield without leaves tons ha^{-1}. From the analysis of data, using LSD test, it was observed that fresh yield, dry yield and bulb yield tons ha^{-1} of onion were significantly increased with the application of Ronstar @ of 3kg ha^{-1} which produced 30.51, 26.33 and 25.19 tons ha^{-1}, respectively. Four times hand weeded plots followed the Ronstar treated plots and produced fresh yield, dry yield and bulb yield of 27.66, 23.71 and 22.10 tons ha^{-1}, respectively.

Key words: Onion, weeds, chemical, hand weeding, yield

Introduction

Onion (*Allium cepa* L.) belongs to the family alliaceae and is an important vegetable crop all over the world. The major crops like, cotton, rice, wheat and sugarcane etc. are contributing mainly in the country economy, however, the minor crops like onion also playing an important role in the national economy. Onion is used by rich and poor peoples alike, and are often called the poor man's food. The onion is a cool season crop and is affected by the length of the day. A relatively high temperature and long photoperiod are essential for bulb formation for must of commercial varieties grown in Pakistan. They are most successfully grown on fertile soil. Onion is a condiment crop and eaten as fresh in salads or added in cooking dishes as a spice. It increases nutrition value and promoting the deliciousness of our diets. During 1999-2000 onion was grown on an areas of 87 thousands ha, which produced 1.218 million tons bulb yield. In NWFP, swat and Dir are the major producing districts of onion (Anonymous, 2000). Vegetables in general and onion in particular exhibit greater susceptibility to weeds competition than many other crops. At the early stages of growth. The onion leaves are very small and are not able to shade the ground even in advanced stages of growth of the bulb crops. Thus onion facing the worst competition to the weeds (Appleby, 1996). Critical period of competition among the weed and onion (direct seeded), start from emergence of onion till 4 weeks duration.(Gaffer *et al.*, 1993 and Ghafoor *et al.*, 2000). If weeds are allowed freely in onion and unrestricted then they could deprive the onion yield by 36-48% (Babiker and Ahmad, 1986). However, Sinha and lagoke, reported 49 to 86% loss from India due to weed interference (Sinha and lagoke, 1983). From U.K. Bond and Burston reported 96% loss in onion due to weed competition (Bond and Burston, 1996).

Usage of herbicides has become popular in onion crop as it is grown on large scale both for internal consumption and for export purposes. It is not accessible as well as costly to mange the weeds in onion crop by the mechanical methods. In USA hand weeding costing $9259 ha^{-1}, 5-7 times more expansive than chemical control, (Appleby, 1996). While in Pakistan weeds are mostly managed manually and costing about Rs.1000 ha^{-1} (Defoer and Nieuwkoop, 1991). In a socio-economic survey of onion based cropping system in Swat indicated that farmers used hand weeding supplemented with the application of imathabenzthiazuron. The weeds provided tolerance to herbicides were *Poa annua*, *Eichinochloa crus-galli* and *Cyperus rotundus*. Farag and Korium (1995) also stated that all the weeds were controlled effectively, while *Convolvulus arvensis* and *Ammi visnaga* were most tolerant to the herbicides applied. (Marwat *et al.*, 1992). Therefore this project was conducted to compare chemical weed control with the farmer's practices of weed control and to fid out the most suitable and useful weed control method.

Materials and Methods

The experiment was laid out at the Agriculture Research Station. Serai Naurange, Bannu, during 2000. Variety of onion used was Swat-1. Randomized complete block design (RCBD) was applied, replicated four times, having five treatments. Plot size was 5 × 1.5 m^2 and row to row distance was maintained at 25 and 6 cm, respectively. Herbicides tested were Ronstar 12 L (oxadiazon) and stomp 330 E (Pendimethalin) at the rates of 3 kg ha^{-1},

respectively. Hand weeding, 2 times and 4 times with the required intervals of 25 and 35 days, respectively. A single plot in each replication was also reserved for control purpose. Plots were sprayed 10 days after onion transplantation. Parameters recorded during the experiment were fresh yield with the leaves (t ha^{-1}), dry yield with leaves (t ha^{-1}) and bulb yield without leaves (t ha^{-1}). Weeds identified in the control plots were wild carrot (*Daucus carrota*), Curly dock (*Rumex dentatus*), Bermuda grass (*Cynodon dactylon*), Wild oat (*Avena fatua*).

Results and Discussion

Fresh yield with leaves (t ha^{-1}): Data recorded on fresh yield t/ha showed significant differences among the treatments (Table 1). Highest fresh yield of 30.51 t ha^{-1} was obtained from the plots treated with Ronstar. Treatment like, stomp, 2 times hand weeding and 4 times hand weeding were statistically at par with each other, however 4 times hand weeding produced comparatively higher fresh yield of 27.66 t ha^{-1}. Minimum fresh yield of 22.99 t ha^{-1} was given by the control plots where no weed control measures were carried out. The highest fresh yield of Ronstar treated plots was probably due to the efficient control of most of the weeds infesting the union crop. These results are in analogy with the findings of Porwal and Singh (1993). They stated that Ronstar + hand weeding increased the onion yield. Nandal *et al.* (1995) also reported the same results.

Dry yield with leaves (t ha^{-1}): Statistical analysis at 5% level of significance of the data for dry yield showed significant differences among the treatments (Table 1). The heaviest dry yield of 26.33 t ha^{-1} was obtained from the plots, which were treated with Ronstar. Stomp, 2 times hand weeding and 4 times hand weeding produced statistically the same yield, however the plots that hand weeded 4 times gave 23.71 t ha^{-1} dry yield of onion as compared to those f stomp and two time hand weeded plots which produced 22.90 and 22.35 t ha^{-1} dry yield, respectively. Lowest dry yield of onion was recorded in the weedy check (control) plots, which produce 119.42 t ha^{-1}. Better result of Ronstar treated plots may be due to the efficient weed control in onion, thus reduced the weed competition with the onion crop for nutrients, moisture, space and sunlight. The above findings are in conformity with those of the findings of Porwal and Singh (1993). They reported that the onion yield increased with the application of Ronstar + hand weeding.

Bulb yield (t ha^{-1}): The data (Table 1) showed that the bulb yield t ha^{-1} was significantly different at 5% level of significance. Among all the treatments, the highest bulb yield of 25.19 t ha^{-1} of onion was produced by Ronstar treated plots followed by four times hand weeding, stomp and 2 times hand weeding treatments, which produced 22.10, 21.60 and 21.06 t ha^{-1} bulb yields, respectively. The lowest bulb yield of 17.97 t ha^{-1} was observed in the control plots. The highest yield given by Ronstar treated plots are attributed to the efficient weed control which provided an opportunity for the crop to utilize the available resources efficiently to produce highest bulb yield. The above results are matching with the work of Amrutkar *et al.* (1998), Mazullah *et al.* (1993), Farag and Koriem (1995).

Table 1: Effect of weedicides on the yield of onion

Treatments	Fresh yield (t ha^{-1})	Dry yield (t ha^{-1})	Bulb yield (t ha^{-1})
Rostar 12 L	30.51A	26.33A	25.19A
Stomp330 E	26.66B	22.90B	21.60B
2 times weeding	26.33B	22.35B	21.06B
4 times weeding	27.66B	23.71B	22.10B
Control	22.99C	19.42C	17.97C
LSD (0.05)	1.653	1.828	1.905

Prob (P<0.05)

It was concluded from the project that weed control in onion increased the onion yield. Among the weed control methods chemical weed control by Ronstar 12 L @ 3 kg ha^{-1} produced highest onion yield, so it is recommended for weed control in onion to increase onion yield per unit area.

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