

## PERCEPTION OF FARMERS REGARDING EFFECT OF VARIOUS WEED MANAGEMENT PRACTICES IN ONION CROP

Amir Khatam<sup>1</sup>, Wiqar Ahmad<sup>2</sup> and Muhammad Zafarullah Khan<sup>3</sup>

### ABSTRACT

*This present study was conducted in 2011 to examine the perception of farmers regarding the effect of various weed management practices in onion crop in five districts of Khyber Pakhtunkhwa, Province of Pakistan. The five districts included Swabi, Mardan, Charsadda, Malakand and Swat. Data were collected by survey method from 200 respondents, randomly selected 40 farmers from each district. Information were collected from farmers regarding weedy check (control), manual weed control and chemical weed control which included herbicides (Dual Gold S-metolachlor using @ 2 L ha<sup>-1</sup>, Pendimethalin 33% @ 2 L ha<sup>-1</sup> and Buctril super @ 1.5 L ha<sup>-1</sup>). Main weeds in onion crop were Convolvulus arvensis, Euphorbia helioscopia, Coronopus didymus, Avena fatua, Rumex dentatus, Melilotus indica, Medicago denticulata and Chenopodium murale. Data analysis showed that the different weed management practices in onion significantly increased bulb yield of the crop as compared to weedy check. However, farmers perceived that pendimethalin @ 2 L ha<sup>-1</sup> was the best herbicide as compared to the other weed management practices used by farmers of the area. The onion bulb yield was highest in the manual weed control followed by pendimethalin @ 2 L ha<sup>-1</sup>. The study recommends that both manual weeding and pendimethalin may be used for a desirable weed control in onion and for achieving higher onion bulb yield.*

**Keywords:** *Allium cepa*, herbicides, farmers' conception, weed management

### INTRODUCTION

Economy of Pakistan is mainly based on agriculture sector. The environmental conditions of Pakistan are conducive to grow a wide range of crops. However, production of most of the crops in Pakistan is lower as compared to the world's average (Khan, 2004). Various weeds infestation is one of the most important reasons for the lower yields of crops in the country. Onion crop is widely grown in almost all the districts of the Khyber Pakhtunkhwa Pakistan, covering irrigated

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<sup>1</sup>Agriculture Department (Extension), Government of Khyber Pakhtunkhwa, Pakistan

<sup>2</sup>Department of Soil and Environmental Sciences, Ameer Muhammad Khan Campus (Mardan), The University of Agriculture, Peshawar Khyber Pakhtunkhwa Pakistan

<sup>3</sup>Department of Agricultural Extension Education & Communication, The University of Agriculture, Peshawar Khyber Pakhtunkhwa Pakistan

Corresponding author's email: [wiqar280@yahoo.co.uk](mailto:wiqar280@yahoo.co.uk)

and un-irrigated areas of 10157 and 823 hectares, with total production of 170629 and 10624 tones, respectively (Anonymous, 2010-11).

The yield gap of 50–60% between potential and actual yield is also attributed to several agronomic constraints of which improper sowing methods and poor weed control practices are considered to be important ones (Ahmad, 1992). In Pakistan, it is estimated that more than 10 billion rupees annual losses are caused by weeds (Ahmad, 1992). Khan (1982) concluded that weeds not only reduce yield but also affect the quality of crop produce. Khan *et al.* (1998) found that weeds reduce crop yield because they compete with the crop plants for nutrients, water and light. In addition, weeds also hinder with the crops' harvesting and increase the cost of production. Weeds control is thus crucial to obtain desirable yields of crops. Weeds can be controlled by cultural, mechanical, biological and chemical methods. There is no doubt that cultural weed control methods are still useful but they need more labor, consume more time and more costly. Due to all these restraints, chemical weed control is the most important option. Khatam *et al.* (2012) concluded from the perception of farmer respondents that weeds can be effectively controlled by applying judicious chemical method. Similarly, Khan and Haq (2004) stated that this method is very successful if used properly. A variety of herbicides exists in the market but their accurate dose, time and way of application are still needed to be investigated for diverse cropping situations.

Keeping in view the above mentioned literature findings, the present study was planned to examine the perception of farmers regarding effect of various weed management practices in onion crop in Khyber Pakhtunkhwa as well as to sort out policy recommendations for effective control of weeds through manual and herbicidal control on the basis of the findings.

## **MATERIALS AND METHODS**

The population for the study consisted of the farmers of five districts of the Khyber Pakhtunkhwa, Pakistan including Swabi, Mardan, Charsadda, Malakand and Swat. It was not possible to investigate all the farmers of the five districts. Therefore, on the basis of the planning of Fitzgibbon and Lynn (1987), 40 farmers from each district were selected at random from the list of the onion growers provided by the Agriculture Department (Extension Wing) of the said districts, thereby making a total of 200 farmer respondents.

The data was collected using survey method. For this purpose a research instrument was constructed for data collection. The research instrument was pre-tested for its validity through experts from the

Agriculture Department (Extension Wing), Khyber Pakhtunkhwa and the University of Agriculture, Peshawar. Similarly, for the purpose of testing reliability, four respondents from each of the 5 districts making a total of 20 farmers were interviewed. Perception of respondents regarding the effect of various weeds management practices on density of weeds  $m^{-2}$ , weight of bulb (average weight of a single bulb), number of bulbs  $plot^{-1}$ , yield of bulb  $plot^{-1}$  (kg), yield of bulb (in tons  $ha^{-1}$ ) were recorded. The data were tabulated and analyzed with SPSS analysis software.

## RESULTS AND DISCUSSION

### Comparison of weed control methods

Data in Table-1 showed that majority of the farmer respondents (93.5%) were of the view that weeds were effectively controlled manually and ranked 1<sup>st</sup> followed by controlling weeds through pendimethalin 33% @ 2 L  $ha^{-1}$  with (76.5%) and ranked 2<sup>nd</sup>. However, a simple majority (i.e., 63.5, 58.0 and 52.5%) of the farmer respondents perceived that Dual Gold (S-metolachlor) @ 2 L  $ha^{-1}$ , Portico (Nicosulfuron) 75% WG @ 30 g  $ac^{-1}$  and Buctril Super @ 1.5 L  $ha^{-1}$  also controlled weeds but lower than that of the manual weed control and pendimethalin. Data in Table-1 depicted that perception of farmers regarding all the treatments were statically different. The findings of the survey are supported by Zubair *et al.* (2009) who reported that hand weeding and application of herbicides significantly reduced weeds  $m^{-2}$ . Similar results have also been reported by Rehman *et al.* (2012). They also concluded that the highest yield was recorded in plots where weeds were uprooted manually and bulb yield was 79% higher than that of the weedy check.

### Density of weeds $m^{-2}$

Data in Table-2 showed that all the treatments significantly affected the number of weeds  $m^{-2}$  in onion crop. It was evident from perception of the respondents that highest (86.5%) weeds control was obtained from the treatment of manual weed control whereas better weed control (76.5%) was achieved by using pendimethalin @ 2 L  $ha^{-1}$  followed by weeds control through dual gold @ 2 L  $ha^{-1}$  and Portico @ 30 g  $acre^{-1}$  with 68.5 and 62% weed control in the onion crop. However, applying buctril super @ 1.5 L  $ha^{-1}$  gave minimum (56%) weed control in the crop. The results showed that pendimethalin and dual gold have effectively controlled both the broad leaved and grassy weeds whereas, buctril super controlled only the broad leaved weeds. The findings of these results are supported with those of Ghaffor (2004), Manisha *et al.* (2005), Marwat *et al.* (2005) who concluded that pendimethalin is the best herbicide to control weeds in garlic crop. Similarly Porwal (2000) and Toloraya *et al.*

(2001) stated that weeds were effectively controlled by hand hoeing and herbicidal application. Similar results were also obtained by Johnson *et al.* (2002) and Janjic *et al.* (2004).

#### **Weight of bulb (g)**

Data (Table-2) showed that average weight (g) of the onion bulb was significantly affected by various weeds management practices. The highest average bulb weight was produced in the plots with manual weed control followed by the plot sprayed with pendimethalin @ 2 L ha<sup>-1</sup>, dual gold @ 2 L ha<sup>-1</sup> and as perceived by a high number 83.5, 76.0, and 70.5% of the respondents. However, simple majority (62.5%) of the respondents perceived about weeds control through buctril super @ 1.5 L ha<sup>-1</sup>. The findings of these results are supported with those of Mahmood *et al.* (2002) who stated that an increased average bulb weight was got from the treatments where pendimethalin was sprayed as compared to average bulb weight produced in control treatment.

#### **Number of bulbs plot<sup>-1</sup>**

Significantly increased number of bulbs was produced in the plots where weeds were controlled manually. However, Pendimethaline positively affected the number of onion bulbs per plot in the crop was sprayed as compared to other weedicides. The findings of these results are supported with those of Mahmood *et al.* (2002) who reported significant effect of manual weed control and use of herbicides on the number of garlic bulbs in the crop. Dual gold @ 2 L ha<sup>-1</sup> and Portico @ 30 g acre<sup>-1</sup> with 68.5 and 62% weeds control in the onion crop, However, applying buctril super @ 1.5 L ha<sup>-1</sup> gave minimum (56%) weeds control in onion crop.

#### **Bulb yield (t ha<sup>-1</sup>)**

Outstanding majority (94%) of the respondents (Table-2) perceived that highest onion bulb was obtained from the plot where weeds were yield of bulb tones ha<sup>-1</sup> was significantly affected by manually controlled followed by the yields in the plots where weeds were controlled through application of pendimethalin @ 2 L ha<sup>-1</sup>, dual gold @ 2 L ha<sup>-1</sup> and portico @ 30 g acre<sup>-1</sup> with 85, 77 and 73% of the respondents. Weed control in the onion crop; however was lowest majority (67%) of the respondents perceived weeds control by applying buctril super @ 1.5 L ha<sup>-1</sup> in onion crop. Our results are supported with those of Porwal, (2000) and Toloraya *et al.* (2001) who stated that weeds were drastically controlled in the treatments with hoeing and herbicides application. Mishra and Jyotishi (2002) obtained the highest yield of onion bulb in the plots in which pendimethalin was sprayed. They also reported that bulb yield was 63% higher than the treatments where weeding was not carried out. Similarly, Jilani *et al.* (2003), Ghafoor (2004) and Manisha *et al.* (2005) also reported that

the highest bulb yield was obtained in the plots where pendimethalin was used.

**Table-1. Perception of respondents regarding the effect of various weed management practices in onion crop**

Treatments	Frequencies	Percentages
Manual weed control	187	93.5
Pendimethalin 33% @ 2 L ha <sup>-1</sup>	153	76.5
Dual Gold (S-metolachlor) @ 2 L ha <sup>-1</sup>	127	63.5
Portico (Nicosulfuron) 75% WG @ 30 g acre <sup>-1</sup>	116	58.0
Buctril Super @ 1.5 L ha <sup>-1</sup>	105	52.5

Source: Field data, n=200

**Table-2. Perception of respondents regarding the effect of various weeds management practices on yield and yield components of onion**

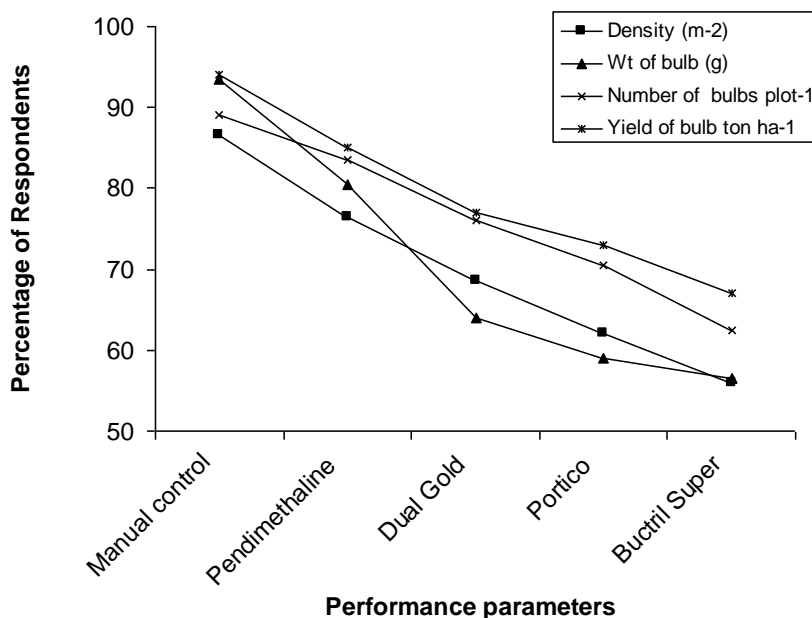
Treatments	No. of respondents and their percentages perceived regarding			
	Weed density (m <sup>-2</sup> )	Bulb weight (g)	Bulbs plot <sup>-1</sup>	Bulb yield (ton ha <sup>-1</sup> )
Manual weeds control	173	187	178	188
Pendimethalin 33% using @ 2 L ha <sup>-1</sup>	153	161	167	170
Dual Gold (S-metolachlor) using @ 2 L ha <sup>-1</sup>	137	128	152	154
Portico (Nicosulfuron) 75% WG @ 30 g ac <sup>-1</sup>	124	118	141	146
Buctril Super @ 1.5 L ha <sup>-1</sup>	112	113	125	134

Source: Field data, n=200

## CONCLUSION

It can be concluded from this study that weed management practices are necessary for effective weed control and for getting the desirable yields of onion. The highest increase in onion yield was due to the manual weed control; however, this method is very laborious as compared to the use of herbicides. Manual weed control is also not affordable to the farming community especially for those farmers who cultivate larger lands. The herbicides, dual gold @ 2 L ha<sup>-1</sup>, pendimethalin @ 2 L ha<sup>-1</sup> and buctril super @ 1.5 L ha<sup>-1</sup> may be used to effectively controll weeds in onion crop. However, controlling weeds

with pendimethalin @ 2 L ha<sup>-1</sup> was perceived as the best option for controlling weeds in onion.



**Figure 1. Perception of respondents regarding the effect of various weed management practices on yield and yield components of onion.**

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