

## RESPONSE OF ONIONS (*ALLIUM CEPA* L.) CULTIVARS TO WEED MANAGEMENT TREATMENTS

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### ABSTRACT

Studies were conducted at Agricultural Research Station, Mingora, Swat to investigate the response of weeds to different cultivars and varying herbicidal treatments. The experiment was laid out in a triplicated randomized block design with a split plot arrangement. The cultivars ('Swat-1', 'Tarnab' and 'Pakhal') were assigned to the main plots, while 4 treatments viz., Tribunil (methabenzthiazuron), Basagran (bentazone), Butacide (isoproturon) and Weedy check were kept in the sub-plots. Each sub-plot measured 2 x 1 m<sup>2</sup>. The nursery was planted to a well prepared seed bed during the month of March, 1993. The data were recorded on weed density (m<sup>-2</sup>) of grasses and broadleaves and the importance value of weeds, whereas the agronomic data were recorded on No. of bulbs/plot, bulb size (cm<sup>3</sup>) and bulb yield (t ha<sup>-1</sup>). The analyses of data revealed that the density of grasses did not vary across the cultivars and herbicides, but in interaction it did. The lowest No. of grassy weeds were counted in the cultivar Pakhal under Tribunil (44.7 m<sup>-2</sup>) and Butacide (52.7 m<sup>-2</sup>). For broadleaves, only the herbicidal response was significant. The herbicide Butacide (42.3 m<sup>-2</sup>) surpassed in efficacy, which was however statistically at par with all the herbicidal treatments except the weedy check. In importance value *P. annua* generally emerged as the most potent weed across all the treatments except where Butacide suppressed it. *Cynodon dactylon* was not very important in the studies, but all the herbicides failed to subdue its value. Owing to the higher number of bulbs of robust size, the cultivar Swat-1 outyielded rest of the cultivars included in the trial. The cultivation of Swat-1 (18.8 t ha<sup>-1</sup>) or Tarnab (16.8 t ha<sup>-1</sup>) with the application of Tribunil and Swat-1 (16.5 t ha<sup>-1</sup>) with the application of Basagran outyielded the rest of the interactions which are recommended for adoption for bumper harvest of onion bulbs in Swat area.

**Key Words:** Onion, weed control.

### INTRODUCTION

Onion (*Allium cepa* L.) belonging to the family Alliaceae is one of the most important vegetable crops not only in Pakistan, but all over the world. The agrarian economy of the nation, although mainly depends on the major crops viz. cotton, rice and wheat, yet the minor crops like onions have also an impact on the national economy. At many a times the nation was compelled to import onions by spending hard currency, so as to cope with the domestic supply-demand differential. Onion is a condiment crop and consumed as a fresh in salads or added in cooking dishes as a spice. Apart from furnishing nutrition, it also provides relishing flavours to our diets. In Pakistan, during 1999-2000, onion was grown on an area of 87 thousand ha with a production of 1.218 million bulb yield. Sindh and Balochistan are leaders in onion production in the country. In NWFP, Swat and Dir are the leading districts in onions production (Anonymous, 2000).

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cultivars, herbicides and their interaction. The cultivar Swat-I out-numbered in bulb production (80.1), but it was however statistically comparable with Tarnab (74.6) [Table 4]. Among the herbicides the highest number of bulbs were recorded in the Tribunil (84.4), which was however statistically at par with Basagran (79.9). The Butacide failed to excel even the weedy check in bulbs/plot (Table 4). In interaction, the highest No. of bulbs/plot were observed in Swat-I when treated with Basagran. It was however, statistically equal in bulb number produced by either Swat-I (89.3) or Tarnab (89.0), when treated with Tribunil (Table 4). The interactions across Butacide and the weedy check were statistically similar.

**Bulb size ( $\text{cm}^3$ ):** The analysis of variance depicted statistically significant differences for herbicides only. The largest sized bulbs were obtained in Butacide ( $46 \text{ cm}^3$ ) [Table 5]. It was however, statistically comparable with the Tribunil ( $42 \text{ cm}^3$ ). The size of the Basagran bulbs was at par statistically with the weedy check. The most robust bulbs were availed in the cultivar Swat-I under the Butacide regime (Table 5). This important yield component will have an ultimate bearing on the overall bulb yield.

**Bulb yield ( $\text{t ha}^{-1}$ ):** The ANOVA showed significant difference for all the sources of variation in the bulb yield. The perusal of data in Table 6 enunciates that the cultivar Swat-I being a locally availed genotype had the highest adaptability under the agro-climatic conditions of Swat. It outyielded ( $14.1 \text{ t ha}^{-1}$ ) the other two cultivars included in the trial (Table 6). The cultivar Tarnab ( $11.2 \text{ t ha}^{-1}$ ) outyielded Pakhal ( $8.6 \text{ t ha}^{-1}$ ). Among the herbicides, Tribunil ( $15.3 \text{ t ha}^{-1}$ ) outyielded rest of the herbicidal treatments. It was followed by the Basagran ( $11.9 \text{ t ha}^{-1}$ ) which however was statistically at par with the Butacide ( $11.5 \text{ t ha}^{-1}$ ). The statistically lowest yield was realized in the weedy check ( $6.3 \text{ t ha}^{-1}$ ). For interaction, the highest yield was harvested in Tribunil across all the cultivars included in the test. The cultivation of Swat-I ( $18.8 \text{ t ha}^{-1}$ ) or Tarnab ( $16.8 \text{ t ha}^{-1}$ ) with the application of Tribunil and Swat-I ( $16.5 \text{ t ha}^{-1}$ ) with the application of Basagran (Table 6) outyielded the rest of the interactions. All the interactions involving Pakhal were the poor scorers (Table 6). These findings are in a great analogy with the work of Sinha and Lagoke (1983), Manjmath *et al.*, (1989), Marwat *et al.*, (1992), Ahmad *et al.*, (1994), Garcia *et al.*, (1994) and Saikia *et al.*, (1997).

**Table 1: No. of grassy weeds ( $\text{m}^{-2}$ ) in three onion cultivars under different herbicidal treatments**

Cultivars	Herbicides				Cultivar Mean
	Weedy check	Tribuni l	Basagra n	Butacide	
Swat-I	142.3	58.7	112.0	61.7	93.7
Tarnab	96.0	61.0	131.0	110.3	99.6
Pakhal	124.3	44.7	124.7	52.7	86.6
Herbicide means	120.9	54.8	122.6	74.9	-
LSD <sub>0.05</sub> for cultivars	N.S				
LSD <sub>0.05</sub> for herbicides	N.S				
LSD <sub>0.05</sub> for interaction	64.3				

**Table 2: No. of broadleaf weeds (m<sup>-2</sup>) in three onion cultivars under different herbicidal treatments.**

Cultivars	Herbicides				Cultivar Mean
	Weedy check	Tribunil	Basagran	Butacide	
Swat-I	260.7	83.7	76.3	42.0	115.7
Tarnab	229.7	97.3	41.0	14.7	95.7
Pakhal	235.0	85.7	53.3	70.3	111.1
Herbicide means	241.8	88.9	56.9	42.3	-
LSD <sub>0.05</sub> for cultivars	N.S				
LSD <sub>0.05</sub> for herbicides	55.1				
LSD <sub>0.05</sub> for interaction	N.S				

**Table 3: Importance value of 6 dominant weeds in three onion cultivars under different herbicidal treatments**

Cultivar	Herbicide	<i>Poa annua</i>	<i>Beta</i> sp.	<i>Polygonum</i>	<i>Senecbera didyma</i>	<i>Cynodon dactylon</i>	<i>Lamium</i>
Swat-I	Tribuni	49.48	40.08	17.53	53.98	4.33	7.44
Swat-I	Basagran	77.88	81.84	0.00	17.24	6.14	0.00
Swat-I	Butacide	75.60	17.82	23.32	50.24	2.56	10.28
Swat-I	Weedy check	56.69	19.12	45.49	9.37	15.73	11.76
Tarnab	Tribuni	42.63	43.93	21.34	54.68	3.95	6.22
Tarnab	Basagran	65.12	76.33	0.00	38.61	11.95	2.58
Tarnab	Butacide	108.43	0.00	23.59	44.18	1.55	5.55
Tarnab	Weedy check	40.86	55.86	26.04	26.76	15.32	27.21
Pakhal	Tribunil	49.98	41.85	14.40	51.14	4.08	16.75
Pakhal	Basagran	67.86	90.87	7.13	22.56	6.74	3.07
Pakhal	Butacide	92.79	1.43	28.61	50.87	7.52	8.65
Pakhal	Weedy check	53.83	47.86	31.71	31.16	7.21	7.12

**Table 4: No. of onion bulbs/plot in three onion cultivars under different herbicidal treatments**

Cultivars	Herbicides				Cultivar Mean
	Weedy check	Tribunil	Basagran	Butacide	
Swat-I	67.3	89.3	93.3	70.3	80.1
Tarnab	75.0	89.0	69.3	65.0	74.6
Pakhal	62.3	75.0	77.0	62.3	69.2
Herbicide means	68.2	84.4	79.9	65.9	-
LSD <sub>0.05</sub> for cultivars	6.04				
LSD <sub>0.05</sub> for herbicides	6.98				
LSD <sub>0.05</sub> for interaction	12.08				

**Table 5: Size of the onion bulbs (cc) of three onion cultivars under different herbicidal treatments**

Cultivars	Herbicides				Cultivar Mean
	Weedy check	Tribunil	Basagran	Butacide	
Swat-I	32.7	42.3	40.0	53.0	42.0
Tarnab	22.0	53.3	28.3	45.3	37.5
Pakhal	23.3	32.0	37.7	38.7	32.9
Herbicide means	26.0	42.6	35.3	46.0	-
LSD <sub>0.05</sub> for cultivars	N.S				
LSD <sub>0.05</sub> for herbicides	9.34				
LSD <sub>0.05</sub> for interaction	N.S				

**Table 6: Onion bulb yield (t ha<sup>-1</sup>) of three onion cultivars under different herbicidal treatments**

Cultivars	Herbicides				Cultivar Mean
	Weedy check	Tribunil	Basagran	Butacide	
Swat-I	8.0	18.8	16.5	12.5	14.0
Tarnab	6.0	16.8	8.2	13.8	11.2
Pakhal	4.8	10.3	11.1	8.3	8.6
Herbicide means	6.3	15.3	11.9	11.5	-
LSD <sub>0.05</sub> for cultivars	1.285				
LSD <sub>0.05</sub> for herbicides	1.484				
LSD <sub>0.05</sub> for interaction	2.571				

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