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# Performance of Triasulfuron and Carfentrazone-ethyl against Broadleaf Weeds in Wheat

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## ABSTRACT

Field experiments were conducted at the experimental area of Punjab Agricultural University, Ludhiana from 2003-04 to 2005-06 on loamy sand soil. Post-emergence (35-40 DAS) application of triasulfuron at 15 g/ha (with and without 1% surfactant) and 20 g/ha alone as well as carfentrazone-ethyl 20 and 25 g/ha controlled broadleaf weeds in wheat very effectively and produced grain yield at par with the already recommended herbicide i. e. 2,4-D 0.5 kg/ha. On an average of three years, highest grain yield was recoded in plots treated with carfentrazone-ethyl 25 g/ha closely f. b. triasulfuron 20 g/ha, triasulfuron 15 g + 1% surfactant and 2, 4-D 0.5 kg/ha and compared to unweeded check these treatments increased wheat grain yield by 57.9, 57.3, 56.2 and 53.7%, respectively.



## INTRODUCTION

Wheat (*Triticum aestivum*) is one of the most important cereal crops of Punjab, which is infested with grassy as well as broad leaf weeds. Among grassy weeds, *Phalaris minor* Retz. is a weed of medium to heavy textured soils particularly of rice-wheat rotation, whereas *Avena ludoviciana* is a weed of light to medium textured soils. However, the infestation of broadleaf weeds can occur on all types of soils. The predominant broadleaf weeds of wheat crop are *Chenopodium album* (Bathu), *Medicago denticulata* (Maina), *Trigonella polycerata* (Maini), *Melilotus alba/Melilotus indica* (Wild sengi), *Rumex dentatus* (Jangli palak), *Rumex spinosus* (Kandyali palak), *Fumaria parviflora* (Pit papra), *Anagalis arvensis* (Billi booti), etc. At present the population of broadleaf weeds in wheat is increasing day by day due to the use of herbicides that are predominantly grass killers such as clodinafop, fenoxaprop-p-ethyl and sulfosulfuron. Therefore, the performance of two new herbicides i. e. triasulfuron (Logran 20 WG) and carfentrazone-ethyl (AIM 40 DF) was studied in comparison to already recommended herbicide i. e. 2, 4-D.

## MATERIALS AND METHODS

The experiment was conducted from 2003-04 to 2005-06 at the experimental farm of Department of Agronomy, Agrometeorology and Forestry, on loamy sand soil having 80.4, 7.4 and 12.2% of sand, silt and clay, respectively. The experimental field had enough natural population of *C. album* (Bathu), *M. denticulata* (Maina), *T. polycerata* (Maini), *M. alba/M. indica* (Wild sengi), *R. dentatus* (Jangli palak), *R. spinosus* (Kandyali palak), *F. parviflora* (Pit papra), *A. arvensis* (Billi booti), etc. Sowing of wheat variety PBW 343 was done on November 12, 2003, November 4, 2004 and November 12, 2005 with row to row spacing of 22 cm using 100 kg seed rate/ha. Crop was supplied with 125 kg N, 62.5 kg $P_2O_5$ and 30 kg $K_2O$/ha. Whole of phosphorus, potash and half of N were applied at the time of sowing and remaining half N was applied with the first irrigation. The experiment was laid out in randomized block design with 10 treatments (Table 1) and four replications. All the herbicidal treatments were given at maximum tillering stage of the crop i. e. within 35-40 days after sowing after dissolving in 500 l/ha of water. Dry matter accumulation by weeds was recoded at the time of harvest with the use of quadrate measuring 50 x 50 cm, randomly from two spots per plot. Blanket spray of Topik 15 WP (clodinafop) 60 g a. i./ha was given 35 DAS for the control of grassy weeds in the experiment.

## RESULTS AND DISCUSSION

### Effect on Weeds

The dry matter of weeds (Table 1) showed decreasing trend with the increase in dose of triasulfuron and carfentrazone-ethyl during all the three years. During 2003-04, triasulfuron 15 g+1% surfactant and 20 g/ha alone as well as carfentrazone-ethyl 25 g/ha produced significantly less dry matter of weeds as compared to recommended herbicide i. e. 2, 4- D. During second

Table 1. Dry matter accumulation by weeds, grain yield and yield attributes of wheat as influenced by different treatments

| Treatment | Dose (g/ha) | Dry matter of weeds (kg/ha) | | | | Effective tillers/m row length | | | | Grain yield (kg/ha) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2003-04 | 2004-05 | 2005-06 | Mean | 2003-04 | 2004-05 | 2005-06 | Mean | 2003-04 | 2004-05 | 2005-06 | Mean |
| Triasulfuron | 10 | 525 | 616 | 410 | 517 | 56.5 | 55.8 | 60.0 | 57.4 | 4012 | 2671 | 3640 | 3441 |
| Triasulfuron + 1% S | 10 | 375 | 411 | 280 | 355 | 58.4 | 54.7 | 61.3 | 58.1 | 4391 | 2792 | 3870 | 3684 |
| Triasulfuron alone | 15 | 480 | 217 | 310 | 336 | 59.7 | 55.8 | 60.7 | 58.7 | 4463 | 2860 | 3924 | 3749 |
| Triasulfuron + 1% S | 15 | 230 | 194 | 170 | 198 | 58.3 | 59.7 | 59.2 | 59.1 | 4590 | 3040 | 4187 | 3939 |
| Triasulfuron | 20 | 280 | 55 | 190 | 175 | 61.1 | 56.2 | 58.9 | 58.7 | 4619 | 3183 | 4093 | 3965 |
| Carfentrazone-ethyl | 15 | 633 | 618 | 414 | 555 | 58.4 | 55.8 | 58.0 | 57.4 | 3997 | 3161 | 3742 | 3633 |
| Carfentrazone-ethyl | 20 | 411 | 226 | 354 | 330 | 59.3 | 55.8 | 58.3 | 57.8 | 4215 | 3255 | 3984 | 3818 |
| Carfentrazone-ethyl | 25 | 209 | 60 | 121 | 130 | 62.6 | 58.1 | 60.0 | 60.2 | 4481 | 3441 | 4019 | 3980 |
| 2,4-D ( Sodium salt) | 500 | 518 | 212 | 312 | 347 | 59.9 | 57.4 | 63.0 | 60.1 | 4217 | 3494 | 3914 | 3875 |
| Control ( unweeded) | - | 985 | 1593 | 539 | 1039 | 42.8 | 32.6 | 44.5 | 40.0 | 2851 | 2021 | 2691 | 2521 |
| LSD ( P= 0.05) | | 190 | 212 | 115 | 148 | 6.1 | 7.5 | 7.1 | 6.8 | 558 | 517 | 480 | 252 |

S–Surfactant.

year, triasulfuron 15 g/ha (with and without surfactant) and 20 g/ha alone as well as carfentrazone-ethyl 20 and 25 g/ha were found to be significantly superior to 2, 4-D with respect to reduction in dry matter production of weeds. During 2005-06 and on the average of three years, triasulfuron 15 g+1% surfactant, triasulfuron 20 g/ha alone as well as carfentrazone-ethyl 25 g/ha produced significantly less dry matter of weeds as compared to 2, 4-D sodium 0.5 kg/ha.

Malik *et al.* (2005) also reported triasulfuron at 20 and 25 g/ha to be effective against broadleaf weeds. Similarly, carfentrazone-ethyl was reported to be very effective against these weeds by Cauchy (2000).

**Effect on Crop**

The number of effective tillers recorded at the time of harvest during 2003-04, 2004-05 and 2005-06 was found to be significantly higher in all the herbicidal treatments as compared to unweeded (control) treatments (Table 1). However, all treatments of triasulfuron and carfentrazone-ethyl were found to be statistically at par among themselves with respect to production of effective tillers per metre row length. During 2003-04, all the tried levels of triasulfuron and carfentrazone-ethyl yielded at par with 2, 4-D. During second year, triasulfuron 10 g/ha (with and without surfactant) and 15 g/ha alone resulted in significant reduction in grain yield as compared to the recommended treatment, whereas the other herbicidal treatments were found to be at par with the 2, 4-D (recommended). During 2005-06, all the treatments of triasulfuron and carfentrazone-ethyl yielded at par with 2, 4- D. On an average of three years, the highest grain yield of 3980 kg/ha was recorded in the plots treated with 25 g/ha of carfentrazone-ethyl, which was followed by triasulfuron 20 g/ha and both these treatments increased wheat grain yield by 57.9 and 57.3% over unweeded (control) treatment, respectively. These treatments were closely followed by triasulfuron 15 g + 1% surfactant and carfentrazone-ethyl 20 g/ha. Similarly, Singh *et al.* (2004) and Yadav *et al.* (2004) reported increase in grain yield of wheat with the application of carfentrazone-ethyl and triasulfuron, respectively.

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