

Carry-over Effect of Sulfosulfuron Applied to Wheat on the Succeeding Crop of Cotton

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Cotton (*Gossypium hirsutum*) is a very important crop in the south-western districts of Punjab where the farmers generally adopt cotton-wheat rotation. *Phalaris minor* (Gullidanda/sitti), *Avena ludoviciana* (Wild oat/jaundhar) and other broadleaf weeds are the major problematic weeds of wheat crop. Generally, farmers use sulfosulfuron to control these weeds, which belongs to sulfonylurea group of herbicides and it is considered to be very long residual group of herbicide. Continuous use of single herbicide may lead to build up of residues in the soil which may harm the succeeding crop. Walker *et al.* (1989) also reported that sulfonylurea group of herbicides are highly persistent in soil and may cause residual effect on the succeeding crops like sugerbeet, red beet, lucerne, etc. Studies were thus planned on the field of farmers in the cotton belt of Punjab by keeping permanent layout to see the residual effect of sulfosulfuron applied to wheat.

Five cotton growers were selected in the Bathinda district. Sulfosulfuron at the recommended (25 g a. i. ha⁻¹) and double the recommended level (50 g a. i. ha⁻¹) was made to wheat crop on permanent plot basis during 2002-03 crop season. Apart from these two treatments, an unsprayed plot was also kept. The plot size for each treatment was 1333 m² (1/3 of acre). The herbicide was applied 30-35 days after sowing of wheat crop with knapsack sprayer fitted with flat fan nozzle and with discharge rate of 250 l ha⁻¹. Permanent layout of these experiments on farm of each farmer was maintained during all the three years of investigation i. e. from 2003 to 2005.

Before sowing cotton, soil samples from 0-30 cm soil depth were taken from all locations and during all the years and residual analysis of

sulfosulfuron was done with HPLC in the Residue Lab. of the Department of Agronomy, Agrometeorology and Forestry, PAU, Ludhiana.

Wheat crop was raised with recommended package of practices. The cotton crop at various locations was sown during May every year. The cotton varieties were different at various farmers' fields except during 2004 when Ankur 651 was taken for all the locations. Crop was managed as per farmers' practices.

During 2003, germination of cotton on two fields was very poor due to poor seed quality, hence, the data of these farmers were not included. During 2004, one farmer transplanted rice in the selected field and hence this location was discarded.

At each location, an area of 100 m² was earmarked permanently to record final plant height, branches/plant, bolls/plant, weight of 100 bolls and seed cotton yield of each picking. Seed cotton yield was worked out by adding yield of all the pickings as per treatment.

The plant height of cotton raised after the application of zero, recommended and double the recommended dose of sulfosulfuron to wheat was similar during 2003, 2004 and 2005 at four sites and during 2003 at one site. The total number of branches/plant and boll weight were also found nearly similar under different residual levels of sulfosulfuron at all the locations. However, there was slightly increasing trend in number of branches/plant in cotton crop raised without the application of sulfosulfuron to wheat particularly at two locations. Similarly, bolls/plant also showed increasing trend at these locations in the untreated crop.

By considering the years as replications, statistical analysis was done and the statistically

Table 1. Mean values of yield and yield attributes of cotton on farmers' fields (2003 to 2005)

Sulfosulfuron dose to wheat (g ha ⁻¹)	Plant height (cm)	Branches/plant	Bolls/plant	Boll weight (g)	Seed cotton yield (kg ha ⁻¹)
25	142.6	46.6	81.4	15.2	2592
50	142.0	45.7	79.6	15.9	2546
00	144.2	50.9	86.4	15.3	2635
LSD (P=0.05)	NS	04.2	NS	NS	NS

NS-Not Significant.

analyzed data are presented in Table 1 for yield and yield attributes of cotton. So, during the tenure of three years, one treatment was replicated eleven times. There was significant increase in the number of branches/plant of the cotton crop sown without the application of sulfosulfuron to wheat. However, the differences in plant height, bolls/plant, boll weight and seed cotton yield under variable residual levels were found to be statistically at par (Table 1). Yadav *et al.* (2003, 2004) also reported no residual effect of sulfosulfuron applied to wheat at 25 or 50 g ha⁻¹ on succeeding crop of cotton.

The sulfosulfuron content in soil (0-30 cm) was below the detectable limits in the soil samples collected from all the locations during all the years.

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