Research Note

CLOMAZONE AND OXYFLUORFEN AS PREPLANT HERBICIDES FOR CUCURBITA MOSCHATA *(CALABAZA)*[1]

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Calabaza, *Cucurbita moschata* Duchesne (Poir.), is considered an important fresh vegetable crop in Puerto Rico. Its production in 1999/00 reached 15,480 t with a farm value of $9.07 million (Anonymous, 2001). Weed interference may limit calabaza production; however, the only available method of weed prevention is the use of chemicals and plastic mulches as a control before or after calabaza planting. Among these chemicals, two postemergence herbicides, glyphosate and paraquat, are registered for total control of weeds in this crop (Almodóvar et al., 1998). Sethoxydim is also registered postemergence, but only for the selective control of grasses. At present, there is no preemergence herbicide registered for weed control in calabaza. The use of paraquat and glyphosate represents a few limitations. They are non-selective and therefore must be applied before calabaza emergence or directed to weeds to avoid crop injury.

Preemergence herbicides are needed to control weeds before the critical period of weed interference in calabaza. For maximun yield recovery, calabaza requires a weed-free period during the first four to six weeks after planting (Armstrong, 1998). Several herbicides were evaluated at the Agricultural Experiment Station of Juana Díaz in 1980; however, no significant differences were detected in calabaza yields among the herbicide treatments and the check plots (Semidey et al., 1986). Liu et al. (1992) evaluated new potential herbicides in calabaza and obtained excellent control of grasses with a preplant treatment of clomazone alone and with clomazone plus paraquat as a follow-up post-directed treatment. Preplant treatments of clomazone and oxyfluorfen resulted in good control of weeds in transplanted cabbage, and yields were similar to those with hand-weeding control (Semidey, 1997; Semidey et al., 1999). On the basis of the above results in cabbage, clomazone and oxyfluorfen were selected with the objective of evaluating their performance as potential herbicides for preemergence weed control in calabaza.

An experiment was established at the Lajas Agricultural Experiment Station in 1994. The soil belongs to the Fraternidad series (Typic Haplusterts, fine, mixed montmorillonitic, isohyperthermic). A randomized complete block design with four replications was followed for treatment distribution. One row of calabaza cv. Soler was directly seeded with 0.9-m spacing 6 May 1994. Plots were 5.5 m wide and 6.0 m long. Clomazone (1.12 and 2.24 kg ai/ha) and oxyfluorfen (0.28 and 0.56 kg ai/ha) were applied and incorporated mechanically by using a tractor-mounted rotavator one day before planting. Herbicides were applied with a CO_2-pressurized sprayer calibrated to deliver 187 L/ha of herbicide solution. Drip irrigation was supplied for seven hours two days per week throughout the experiment. A band of 10-10-10 (N, P_2O_5, K_2O) commercial fertilizer was applied at the rate of 1,120 kg/ha 11 May 1994. The same amount was broadcast seven weeks later. Weed count by species was made at three weeks after planting (WAP). Weed control and crop injury ratings were

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TABLE 1.—*Effect of pre-plant treatments of clomazone and oxyfluorfen on weed control, weed density, and yield of calabaza at Lajas, in 1994.*

Treatment	Rate	Weed control[1]		Weed density[3]	Calabaza yield
		4 WAP[2]	7 WAP		
	kg ai/ha	---------- % ----------		No./ 0.5 m²	kg/ha
Clomazone	1.12	45	28	28	15,808
Clomazone	2.24	65	61	21	17,178
Oxyfluorfen	0.28	43	29	43	8,693
Oxyfluorfen	0.56	39	36	31	16,237
Handweeding	—	88	96	45	31,604
Nonweeded	—	0	31	53	11,660
LSD (0.05)		19	23	15	NS

[1]Rating scale from 0 to 100, with 0 = no control and 100 = weeds completely controlled.

[2]WAP = Weeks after planting.

[3]Weed density three WAP.

recorded at four and seven WAP. Calabaza fruits were harvested 15 and 19 WAP. Data were analyzed by ANOVA and means were separated by LSD (0.05) test.

Injury symptoms caused by clomazone and oxyfluorfen treatments in the calabaza foliage were few (3 to 5%) and non-significant compared with those of the control plots at four WAP (data not shown). Clomazone and oxyfluorfen, at both rates, provided unsatisfactorily lower weed control than the handweeding control at four and seven WAP (Table 1). At seven WAP, clomazone at the 2.24 kg/ha rate was more efficient in weed control than at the 1.12 kg/ha rate and more efficient than oxyfluorfen at either rate. Early weed densities in plots treated with clomazone at the two rates and with oxyfluorfen at 0.56 kg/ha were lower than with handweeding and nonweeded treatments. In terms of calabaza yields, no significant differences were detected among herbicide treatments, handweeding, and nonweeded controls. Although there were differences in the initial weed densities among treatments, no significant differences were detected among the calabaza yields. Liu et al. (1992) obtained good to excellent control of grasses with clomazone in calabaza; however, yields were lower than expected. In this experiment at Lajas, the efficacy of clomazone and oxyfluorfen was not as good as that reported by Semidey (1997) and Semidey et al. (1999) in cabbage at Juana Díaz. The lack of yield response in calabaza at Lajas could be attributed to variability of weed density, especially to johnsongrass [*Sorghum halepense* (L.) Pers.] and morningglory [*Ipomoea tiliacea* (Willd.) Choisy]. Population density ranged from 8 to 14 plants per 0.5 m² for johnsongrass and 8 to 20 plants per 0.5 m² for morningglory. These two species predominated and were highly competitive at the end of the experiment.

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