

Literature Cited

1. Hammer, P.A. 1980. Other flowering pot plants, p. 435-475. In: R.A. Larson (ed.). Introduction to floriculture. Academic Press, New York.
2. Harbaugh, B.K. and W.E. Waters. 1979. Evaluation of flowering potted plants under simulated home conditions. HortScience 14:743-745.
3. Kamp, M. and A.E. Nightingale. 1977. Exacum, a durable low maintenance crop. Flor. Rev. 161(4171):98-99.
4. Larson, R.A. 1981. Commercial production of exacum. N.C. Flow. Grow. Bul. 25(4):1-6.
5. Mastalerz, J.W. 1977. The greenhouse environment. Wiley, New York.

HortScience 18(3):367-368. 1983.

Yellow Nutsedge Control in Gladiolus

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Additional index words. alachlor, metolachlor, herbicide, *Gladiolus x hortulanus*, *Cyperus esculentus*

Abstract. Preliminary greenhouse and field experiments showed that alachlor [2-chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide] and metolachlor [2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)acetamide] were noninjurious to gladiolus (*Gladiolus x hortulanus*) and had potential for control of yellow nutsedge (*Cyperus esculentus* L.). In subsequent field experiments both herbicides at 2.2 and 4.5 kg a.i./ha preplant-incorporated gave good nutsedge control for 6 weeks. When alachlor and metolachlor at 2.2 and 4.5 kg/ha preplant-incorporated were repeated at 6 weeks, nutsedge control was extended for longer than 3 months. Little or no injury resulted from either herbicide applied once or repeated. Neither herbicide nor application method affected gladiolus height or flower production.

Yellow nutsedge thrives in a wide variety of soils and climates and is becoming an increasing problem in nursery crops because of the application of herbicides that control annual weeds (reducing competition) and the decrease in costly handhoeing and mechanical cultivation. Nutsedge infestations can reduce crop yields and quality as well as increase production costs for its control (4, 5). Nutsedge growth and its prolific reproduction have been described by several authors (4, 5, 8, 9).

Ahrens (1, 2) has reported on several herbicides for use in gladiolus; one such study included nutsedge control. Of the herbicides he investigated, alachlor appeared the most promising for nutsedge control. Alachlor, applied preemergence at 4.5 kg/ha, controlled nutsedge for 2 months with little gladiolus injury, but injured gladiolus cormels when applied preplant-incorporated. A preemergence application of alachlor plus diuron [3-(3,4-dichlorophenyl)-1,1-dimethylurea] caused more injury than alachlor alone without improved nutsedge control.

A series of experiments were conducted at the Univ. of Arkansas to evaluate alachlor and a herbicide (metolachlor) of similar

chemistry for control of yellow nutsedge and gladiolus tolerance. Results from preliminary greenhouse and field experiments in 1976 and 1977 (not reported) indicated that gladiolus were tolerant to alachlor and metolachlor and that both herbicides controlled yellow nutsedge.

For further evaluation, separate field experiments were conducted in 1978, 1979, and 1981 at the Main Experiment Station, Fayetteville on a Taloka silt loam in an area infested densely with yellow nutsedge. Alachlor and metolachlor were applied preplant at 2.2 and 4.5 kg/ha with a tractor-mounted sprayer and were incorporated into the soil 7 to 8 cm deep. Some herbicide treatments were reapplied and incorporated along each side of the row about 6 weeks after the first application. Gladiolus cultivars were 'T-512' in 1978, 'Christmas Red' in 1979, and 'Intrepid' in 1981. Plot sizes were 1 × 3 m in 1978, 1 × 4 m in 1979, and 1 × 3.5 m in 1981. Plots were arranged in randomized complete blocks with 4 replications. Rainfall and irrigation during the first 2 months after planting totalled 24, 30, and 30 cm for 1978, 1979, and 1981, respectively. Planting and first herbicide application dates were May 31 in 1978 and 1979 and May 29 in 1981. Nutsedge control and gladiolus injury were rated

Table 1. Yellow nutsedge control with alachlor and metolachlor applied preplant-incorporated in field-grown gladiolus in 1978, 1979, and 1981.

Herbicide	Treatment ² Rate (kg/ha)	Yellow nutsedge control (%) ^y		
		40-50	Days after first treatment	
			70-80	105-115
<i>1978</i>				
Check		19	11	29
Alachlor	2.2	59	36	54
	4.5	56	31	37
Metolachlor	2.2	91	56	55
	4.5	97	51	44
LSD 5%		28	29	23
<i>1979</i>				
Check		0	0	0
Alachlor	4.5 repeated	90	70	84
Metolachlor	2.2 repeated	97	91	98
	4.5 repeated	100	100	100
LSD 5%		9	18	21
<i>1981</i>				
Check		0	0	0
Alachlor	2.2	72	45	44
	2.2 repeated	88	81	33
	4.5	79	11	23
	4.5 repeated	83	92	89
	2.2	97	26	19
Metolachlor	2.2 repeated	90	96	94
	4.5	99	69	11
	4.5 repeated	100	98	98
LSD 5%		17	21	28

²Repeated treatments were applied 42 and 45 days after the first application in 1979 and 1981, respectively.

^yYellow nutsedge density in check plots at 40-50-day evaluations were: 590/m² (1978); 356/m² (1979); 372/m² (1981).

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Table 2. Injury, stand, and average height at flowering of gladiolus treated with alachlor and metolachlor preplant-incorporated in 1978, 1979, and 1981.

Herbicide	Treatment ^a Rate (kg/ha)	Gladiolus injury (%)		Gladiolus stand (no./plot) ^b	Avg ht at flowering (cm)	No. spikes and florets per plot
		Days after first treatment 40-50	70-80			
<i>1978</i>						
Check		0	0	30	46	—
Alachlor	2.2	0	0	30	45	—
	4.5	0	0	28	47	—
Metolachlor	2.2	0	0	30	44	—
	4.5	0	0	32	47	—
LSD 5%		NS	NS	NS	NS	
<i>1979</i>						
Check		0	0	77	61	48
Alachlor	4.5 repeated	1	0	76	57	50
Metolachlor	2.2 repeated	0	0	78	57	49
	4.5 repeated	1	0	76	55	50
LSD 5%		NS	NS	NS	NS	NS
<i>1981</i>						
Check		0	0	31	73	26
Alachlor	2.2	2	8	32	72	28
	2.2 repeated	8	8	33	66	29
	4.5	14	13	31	73	27
	4.5 repeated	18	15	30	65	25
Metolachlor	2.2	8	9	31	74	28
	2.2 repeated	6	6	34	69	28
	4.5	12	19	34	70	29
	4.5 repeated	12	11	33	66	30
LSD 5%		5	7	NS	NS	NS

^aRepeated treatments were applied 42 to 45 days after the first application in 1979 and 1981, respectively.

^bPlot sizes were: 1 × 3 m (1978); 1 × 4 m (1979); and 1 × 3.5 m (1981).

visually on a scale of 0% to 100% at 40-50, 70-80, and 110-115 days after the initial treatment. In 1978, all plots, including checks, were rated for weed control based on 100% infestation of yellow nutsedge. Control ratings in 1979 and 1981 were based on comparisons of the nutsedge population present in the check plots.

Moderate (59%) control of yellow nutsedge was achieved in 1978 with first incorporation of alachlor, although the activity had decreased by the second evaluation date (Table 1). Our findings on nutsedge control and short-term activity agree with those of other investigators (3, 6, 7, 10). Metolachlor initially gave excellent nutsedge control (91% and 97%), but control declined with time, as it did with alachlor.

In an attempt to gain season-long nutsedge control, alachlor at 4.5 and metolachlor at 2.2 and 4.5 kg/ha were applied with preplant

incorporation and repeated after 42 days in the field experiment conducted in 1979. Both herbicides applied in this manner provided good nutsedge control (84-100%) for more than 3 months, although alachlor tended to give less control than metolachlor at either rate (Table 1).

In 1981, alachlor and metolachlor were applied at 2.2 and 4.5 kg/ha preplant-incorporated. One-half of the treatments were reapplied 45 days after the first application. Again, initial nutsedge control had declined after 2 months in plots where the herbicides were applied only once (Table 1). Repeat herbicide application and incorporation extended control for an additional 6 weeks.

Ahrens (1) reported severe injury to gladiolus when alachlor was incorporated. In our experiments, little or no morphological effects were observed in alachlor- or metolachlor-treated gladiolus in 1978 or 1979 (Ta-

ble 2). However, slight but significant injury was observed in 1981 from the 4.5 kg/ha rates. Injury was in the form of slight leaf blade twisting which is a typical effect of acetanilides.

Neither alachlor nor metolachlor affected gladiolus stand or height at the time of flowering. In 1979 and 1981, gladiolus spikes (unopened flowers) and florets (opened flowers) were counted in each plot. There were no differences in numbers of flowers produced among treatments (Table 2). No abnormalities in flower development or morphology were observed. It should also be noted that the heavy nutsedge populations had no effect on gladiolus stand or flower production.

Metolachlor and, to a slightly lesser degree, alachlor successfully controlled yellow nutsedge in our experiments, and control was extended with repeat applications.

Literature Cited

- Ahrens, J.F. 1972. Herbicide combinations for gladiolus cormels. *Bul. North Amer. Glad. Council* 110:64-68.
- Ahrens, J.F. 1975. Chemical control of nutsedge in gladiolus cormels. *Proc. N.E. Weed Contr. Conf.* 29:351-354.
- Armstrong, T.F., W.F. Meggitt, and D. Penner. 1973. Yellow nutsedge control with alachlor. *Weed Sci.* 21:354-357.
- Bell, R.S., W.H. Lachman, E.M. Rahn, and R.D. Sweet. 1962. Life history studies as related to weed control in the Northeast: 1. Nutgrass. *Rhode Island Agr. Expt. Sta. Bul.* 364.
- Hauser, Ellis W. 1971. Nutsedge: a worldwide plague. *Weeds Today* 2:21-23.
- Keeley, P.E. and R.J. Thullen. 1974. Yellow nutsedge control with soil-incorporated herbicides. *Weed Sci.* 22:378-383.
- Obrigawitch, T., J.R. Gipson, and J.R. Abernathy. 1979. Metolachlor, alachlor, EPTC, and fluridone efficacy on yellow nutsedge. *Proc. So. Weed Sci. Soc.* 32:66.
- Stoller, E.W., D.P. Nema, and V.M. Bhan. 1972. Yellow nutsedge tuber germination and seedling development. *Weed Sci.* 20:93-97.
- Thullen, R.J. and P.E. Keeley. 1975. Yellow nutsedge sprouting and resprouting potential. *Weed Sci.* 23:333-337.
- Wilson, H.P., R.L. Waterfield, Jr., and C.P. Savage. 1971. Field investigations of the activities of several herbicides for control of yellow nutsedge. *Proc. N.E. Weed Contr. Conf.* 25:255-262.