Post-bloom weed control in tulip (2003-04)

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This year's ornamental bulb study conducted at WSU NWREC was a post-bloom, directed spray weed control trial. Plant material for this study was kindly donated by Washington Bulb Co. and funds were provided by the Washington Bulb Commission.

Materials and Methods:

'Negrita' and 'Preludium' tulip bulbs were planted in October, 2003, and plots were treated with either Gallery (isoxaben), Aquacap (pendimethalin), diuron, Surflan (oryzalin), Pennant Magnum (s-metolachlor), or Outlook (dimethenamid-p) plus Roundup (glyphosate) November 3-4, 2003. Ten postemergence herbicides were then applied post-bloom April 28, 2004 using a backpack sprayer with a shielded nozzle. These products were Rely (glufosinate), Chateau (flumioxazin), Goal (oxyfluorfen), ET (pyraflufen), Scythe (pelargonic acid), FirstRate (chloransulam), Basagran (bentazon), Aim (carfentrazone), Spartan (sulfentrazone), and Roundup. Basagran was applied with crop oil concentrate at 1% (v/v), while Chateau, FirstRate, Aim, and Spartan were applied with nonionic surfactant at 0.25% (v/v). An eleventh post-bloom treatment was flaming the sides of the row using an infrared flaming unit.

Crop injury and weed control were rated April 12 (prior to post-bloom treatments) and May 8 (10 days after post-bloom treatments). Flower height and number were recorded April 13 and 14 (prior to post-bloom treatments). Bulbs were harvested in July, then washed, sorted, and weighed. The statistical design for this trial was a randomized complete block design with four replicates. Means were separated using Fisher=s Protected LSD (P = 0.05).

Results:

Results are presented in Tables 1 and 2. Since there was no difference in response between 'Negrita' and 'Preludium', all data were averaged across both tulip varieties.

Preemergence products. Weed control from residual herbicides plus Roundup applied in November ranged from 73% (Pennant Magnum) to 99% (diuron and Surflan) through flowering (Table 1). Weed control from either Pennant Magnum or Outlook plus Roundup was excellent through flowering (85 and 97, respectively). Flower number did not differ significantly between treatments, and while flower height did differ, all heights were acceptable (from 17.1 to 17.9 inches tall). Surflan-treated plots yielded the greatest bulb weight, but number and average bulb weight were not different from non-treated plots. Diuron treatment resulted in the greatest number of bulbs, but total and average weights were similar to non-treated tulips. Gallery and Outlook, however, reduced total and average bulb weight compared to non-treated bulbs.

Based on these results, it appears that both Gallery and Outlook at these rates caused slight injury to tulip. It also appears that Aquacap, Pennant Magnum, and Outlook probably will require combination treatments to fully control common western Washington weeds.

Postemergence products. Tulip foliage was not severely injured by any treatments at 10 DAT (Table 2). The highest level of foliar burn resulted from Scythe (10%). Weed control resulting from most treatments was generally very good, with Aim, Spartan, flaming, Roundup, and Goal providing the best weed control at 10 DAT. Roundup treatment, however, resulted in reductions in total and average bulb rate compared to non-treated bulbs, while flaming reduced average bulb weight significantly. Rely also significantly reduced total bulb weight, although bulb number and average weight were similar to non-treated tulips. While Spartan treatments increased total bulb weight and Chateau increased total bulb number, other bulb parameters were not affected.

Based on these data, post-bloom weed control using Roundup was a risky strategy, even when using directed spray with shields. Rely, Scythe, and flame, too, may be overly "hot" for post-bloom use in tulip.

Table 1. Weed control, injury, and bulb yield after preemergence winter herbicide applications to tulip[a] plots.

Treatment	Rate	Foliar injury[b]	Weed control[c]		Flower height	Flower number	Bulb yield		
			4/12	5/8			total wt.	total no.	avg. wt.
	product/a	%	%	%	inches	no./plot	g/plot	no./plot	g/bulb
Gallery	10.7 oz	3	91	90	17.4	36	1177	95	13.2
Aquacap	6.3 pt	3	80	86	17.7	36	1291	93	14.0
Diuron	4 lbs	3	99	98	17.8	36	1294	99	13.6
Surflan	3 pt	3	99	97	17.9	36	1325	97	13.7
Pennant Magnum	2.6 pt	3	73	83	17.5	36	1224	90	13.7
Outlook	2.7 pt	3	80	87	17.1	36	1194	93	13.1
$LSD_{0.05}$	---	ns	4	1	0.4	ns	56	7	0.6

[a]Data averaged across both tulip varieties.
[b]Foliar injury rated May 8, 2003.
[c]Weed control April 12 was prior to post-bloom treatments; weed control May 8 was averaged across post-bloom treatments.

Table 2. Tulip[a] foliar injury and weed control after directed postemergence applications of various herbicides.

Treatment	Rate	Foliar injury[b]	Weed control[b]	Bulb yield		
				total wt.	total no.	avg. wt.
	product/a	%	%	g/plot	no./plot	g/bulb
Rely	4.0 pt	6	94	1165	89	13.2
Chateau	2.2 oz	4	88	1191	102	13.0
Goal	2 pt	0	90	1329	98	13.7
ET	2.8 fl.oz	0	88	1282	98	13.2
Flame	---	5	93	1214	101	12.9
Scythe	5%	10	87	1334	97	13.9
FirstRate	0.6 oz	0	89	1272	87	14.7
Basagran	1.5 pt	0	89	1252	93	13.6
Aim	4.8 fl.oz	8	97	1262	95	13.3
Spartan	5.3 oz	4	94	1350	96	14.1
Roundup	1.0 pt	0	92	1094	86	12.8
None	---	0	82	1265	92	13.9
$LSD_{0.05}$	---	1	2	80	10	0.8

[a]Data averaged across both tulip varieties.
[b]Foliar injury and weed control were averaged across residual herbicide treatments (applied November 3-4, 2003) at 10 days after post-bloom treatments (applied April 28, 2004).