Postemergence weed control in tulip (2002-2003).

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This year's ornamental bulb study conducted at WSU Mount Vernon during 2002-2003 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, 2002, and plots were treated with either Outlook (dimethenamid-p) or Pennant Magnum (s-metolachlor) plus Roundup (glyphosate) in December. Nine postemergence herbicides were then applied post bloom (May 6) using a backpack sprayer with a shielded nozzle. These products were Roundup, Rely (glufosinate), Reglone (diquat), Gramoxone (paraquat), Valor (flumioxazin), Basagran (bentazon), Spartan (sulfentrazone), FirstRate (chloransulam), and Aim (carfentrazone). Basagran was applied with crop oil concentrate at 1% (v/v), while all other herbicides except Roundup and Rely were applied with nonionic surfactant at 0.25% (v/v). Crop injury and weed control were rated May 8, 13, and 27 (2, 7 and 21 days after treatment). 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:

Preemergence products. Although both Pennant Magnum and Outlook were applied at the same rate of active ingredient, it appeared that Outlook was the more active product (Table 1). Weed control from either Pennant Magnum or Outlook plus Roundup was excellent through flowering (85 and 97, respectively). These preemergence products only caused slight foliar injury to tulip (4 to 6%) and Outlook also slightly reduced flower height. Treatment with Outlook resulted in greater total bulb weight and number compared to Pennant Magnum treatment, although Outlook reduced average bulb size significantly. Based on these results, it appears that both Pennant Magnum and Outlook are good herbicides for use in tulips. An Outlook rate of 1 pt/a, however, is probably too high.

Postemergence products. Tulip foliage was severely injured by Reglone and Gramoxone, despite shielding (Table 2). Injury was apparent at 2 days after treatment (DAT), and progressed through 21 DAT. No other treatment resulted in significant foliar injury at 21 DAT (0 to 6%). Weed control was equally rapid with Reglone and Gramoxone (99 and 100% control at 2 DAT). Weed control with Aim, Spartan, and Valor had improved to 80 to 86% by 7 DAT, while other products were slower in their activity. By 21 DAT, all treatments had resulted in total weed control of 85% or greater. All bulb yield parameters were severely reduced by Reglone and Gramoxone treatments (Table 3). FirstRate also caused damage to tulips, reducing total bulb weight and number, as well as slightly reducing marketable bulb weight and number. Basagran also reduced production of large bulbs. Based on these data, Reglone and Gramoxone at these rates caused excessive injury to tulip foliage and reduced bulb yield. FirstRate also is probably

too injurious to tulip for this type of use.

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

Treatment	Rate	Foliar injury	Weed control[b]	Flower height	Flower Number	Bulb yield		
						total wt.	total no.	avg. wt
	product/a	%	%	cm	no./plot	g/plot	no./plot	g/bulb
Pennant Magnum	0.8 pt	4 b	85 b	41.2 a	36 a	1249 b	122 b	10.3 a
Outlook	1.0 pt	6 a	97 a	38.7 b	35 a	1371 a	170 a	8.1 b

[a]Data averaged across both tulip varieties.
[b]Weed control rated May 8, 2003.
Means followed by the same letter are not significantly different.

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

Treatment	Rate	Foliar injury			Weed control[b]		
		2 DAT	7 DAT	21 DAT	2 DAT	7 DAT	21 DAT
	product/a	%	%	%	%	%	%
Roundup	1.0 pt	0 c	0 c	6 c	11 cd	50 e	99 ab
Rely	4.0 pt	0 c	2 c	4 c	24 c	68 d	88 abc
Reglone	2.0 pt	26 a	39 a	47 a	99 a	98 a	98 ab
Gramoxone	1.6 pt	21 b	30 b	34 b	100 a	95 ab	100 a
Valor	2.3 oz	3 c	2 c	5 c	64 b	80 c	85 bc
Basagran	1.5 pt	0 c	1 c	0 c	6 d	49 e	94 ab
Spartan	5.3 oz	0 c	1 c	3 c	64 b	83 c	97 ab
FirstRate	0.6 oz	0 c	0 c	3 c	4 d	36 f	96 ab
Aim	3.0 oz	0 c	1 c	3 c	67 b	86 bc	96 ab

[a]Data averaged across both tulip varieties.
[b]Weed control at 2 and 7 DAT from postemergence treatment alone (herbicide burn).
Means followed by the same letter are not significantly different; DAT = days after treatment.

Table 3. Tulip bulb yield after directed postemergence applications of various herbicides[a].

Treatment	Rate	Total yield (all sizes)			Yield (#7 bulbs)		Yield (#10+ bulbs)	
		Weight	number	avg. wt.	weight	number	weight	number
	product/a	g/plot	no./plot	g/bulb	g/plot	no./plot	g/plot	no./plot
Roundup	1.0 pt	1245 ab	145 a	8.8 a	312 abc	33 abc	722 abc	26 a
Rely	4.0 pt	1252 ab	145 a	8.9 a	332 a	35 ab	707 abc	26 a
Reglone	2.0 pt	766 c	116 c	6.8 b	249 d	27 d	331 d	15 b
Gramoxone	1.6 pt	903 c	130 b	7.0 b	276 cd	31 cd	439 d	18 b
Valor	2.3 oz	1307 a	148 a	9.3 a	335 a	37 a	721 abc	27 a
Basagran	1.5 pt	1232 ab	148 a	8.6 a	335 a	36 a	675 bc	26 a
Spartan	5.3 oz	1342 a	154 a	9.0 a	323 ab	34 abc	797 a	29 a
FirstRate	0.6 oz	1116 b	130 b	8.7 a	289 bc	31 bc	656 c	26 a
Aim	3.0 oz	1315 a	151 a	8.9 a	333 a	35 ab	766 ab	28 a
None	---	1286 a	148 a	8.9 a	309 abc	33 abc	768 ab	28 a

[a]Data averaged across both tulip varieties.
Means followed by the same letter are not significantly different.