Weed Management in Onions

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Topics of Discussion

1. **Weed free period**

2. **Factors impacting onion yields**

3. **Challenges and potential solutions**

Weed Competition

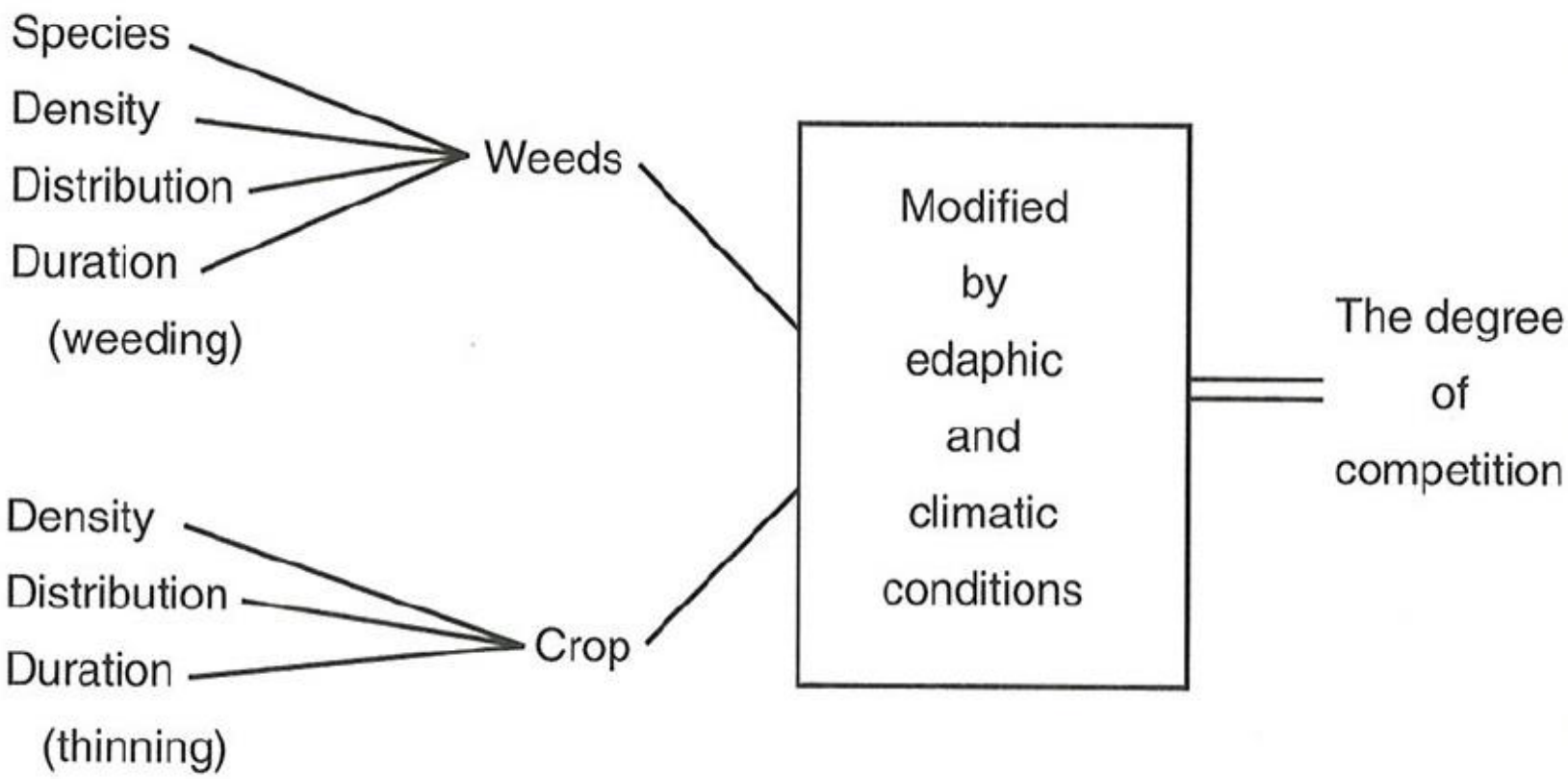


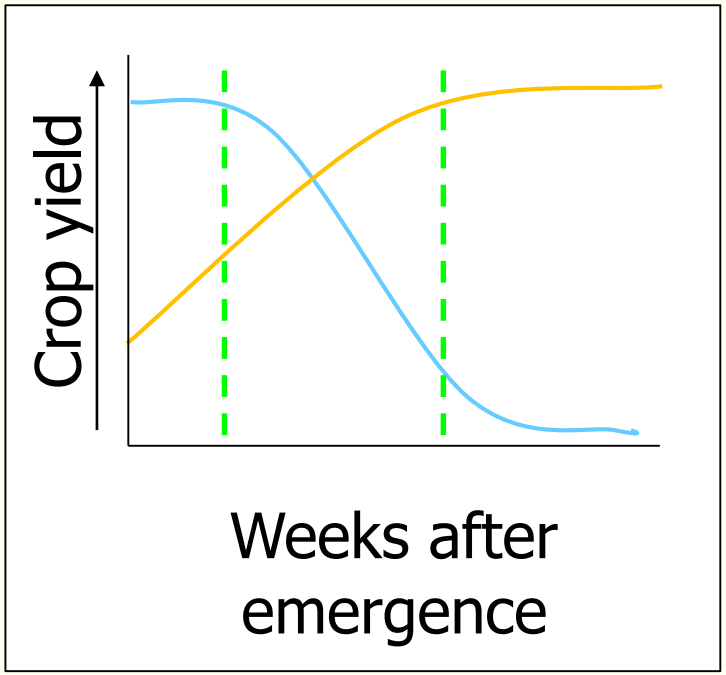
FIGURE 5.24 Schematic presentation of competition. (From Chisaka, 1977, and Bleasdale, 1960.)

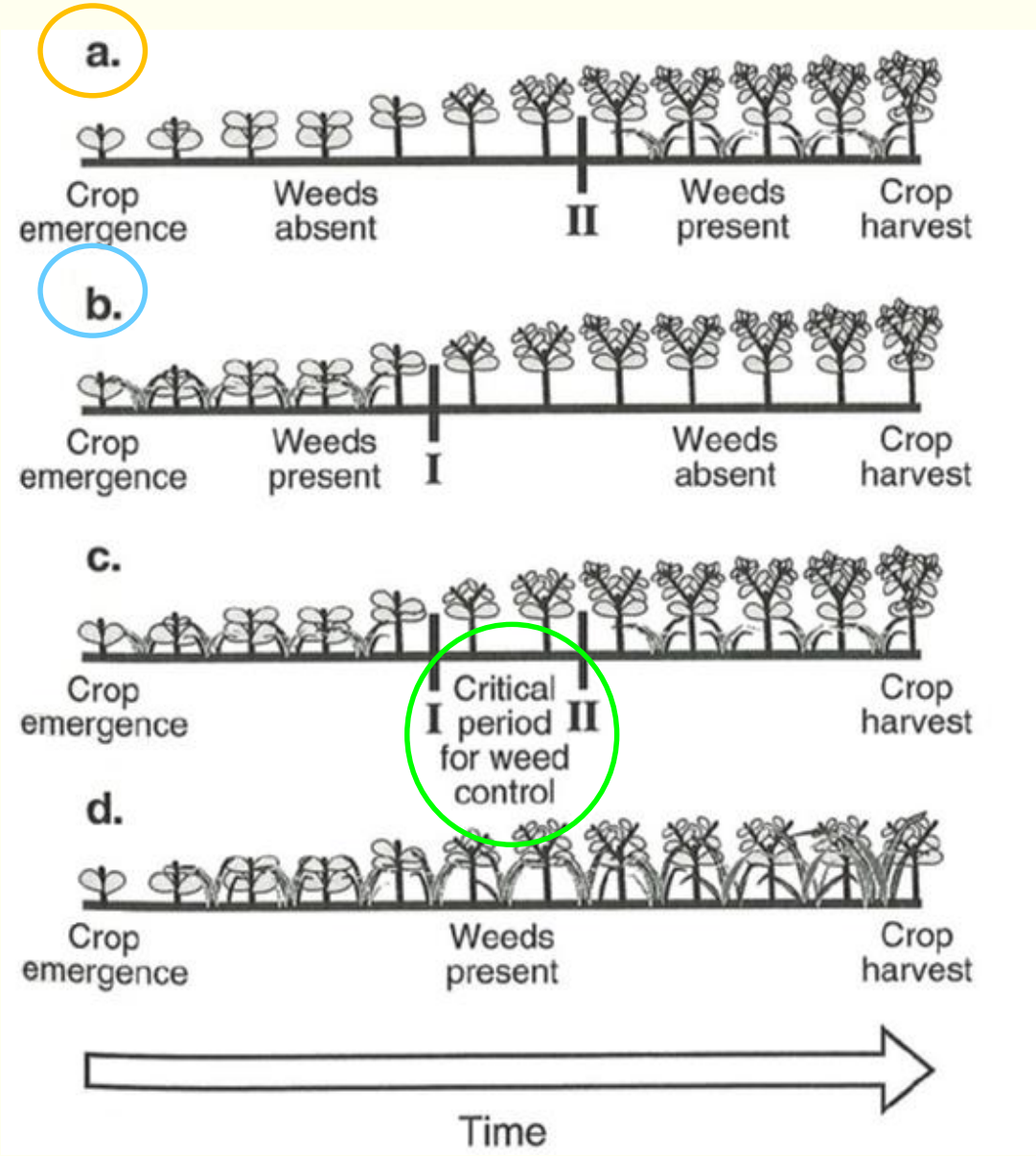
From Weed Ecology, Radosevich et al. 1997

The Critical Period of Weed Control

- *Begins* when crop yields in weed-infested experimental areas begin to decline
- *Ends* when crop yields in weed-free experiments are no longer impacted by the emergence of weeds

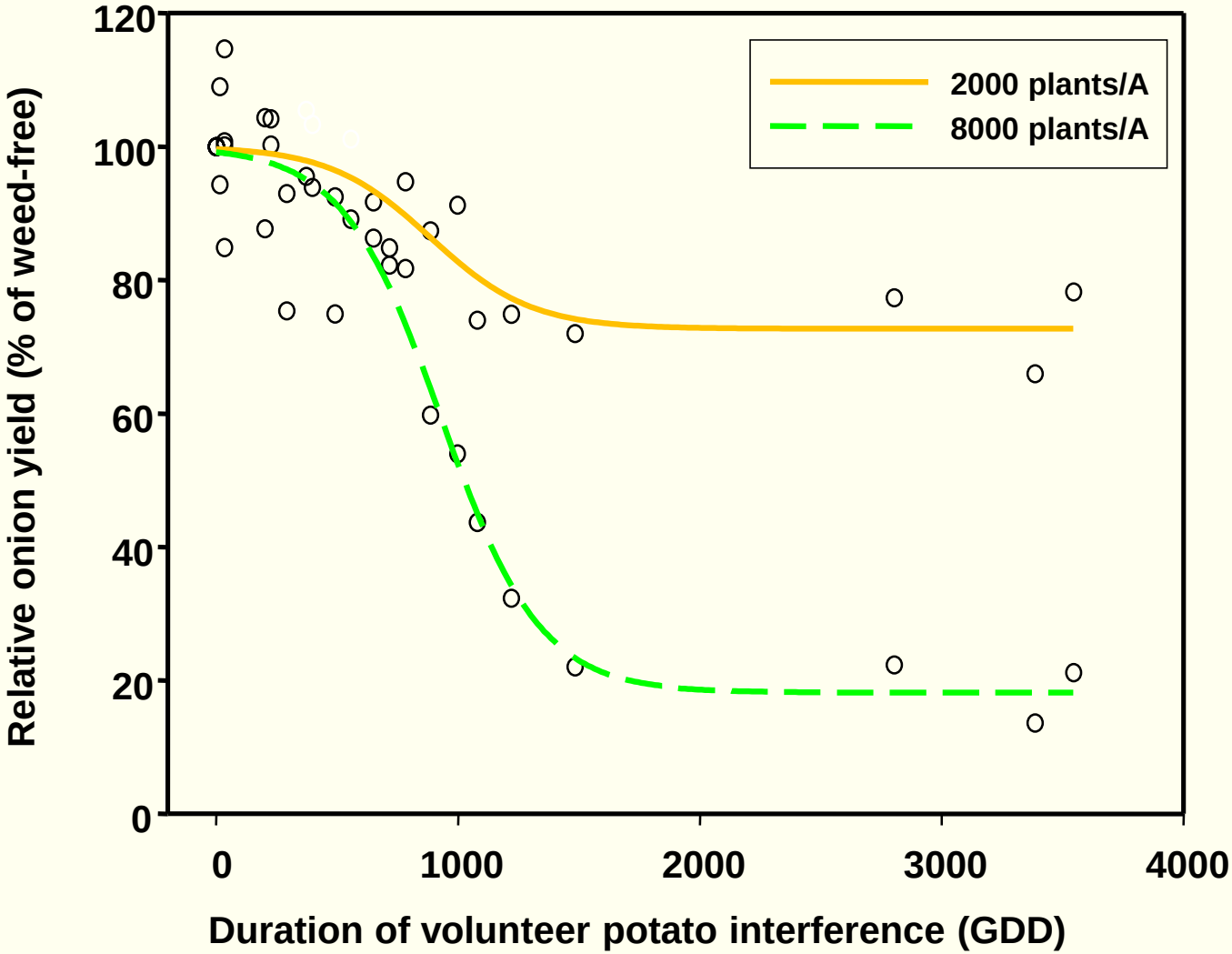
Critical Period of Competition





From Weed Ecology, Radosevich et al. 1997

Effect of Volunteer Potato Time of Removal and Density on Onion Yield in OR, WA, and ID, 2003



Topics of Discussion

1. Weed free period
2. Factors impacting onion yields
3. Challenges and potential solutions

What Factors Impact Onion Yield?

You <u>Don't</u> Control:

Weather
Soil type
Weed species and density
Growing season
Pest outbreaks

You <u>Do</u> Control:

Variety
Planting date
Tillage/cultivation
Nutrient and water management
Pest management
Herbicide selection and timing

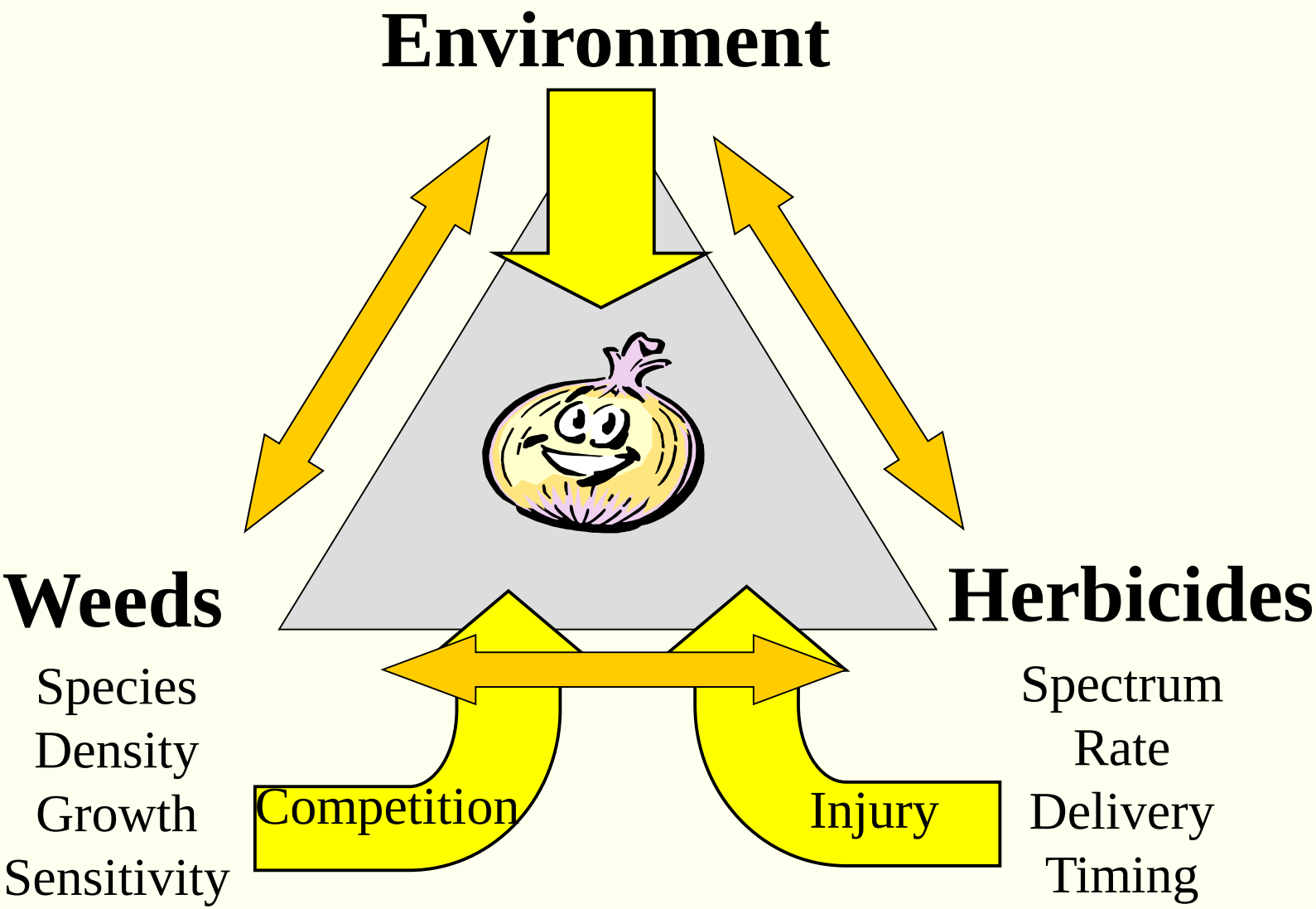
What impacts yields the most?

What factor do you have flexibility to change?

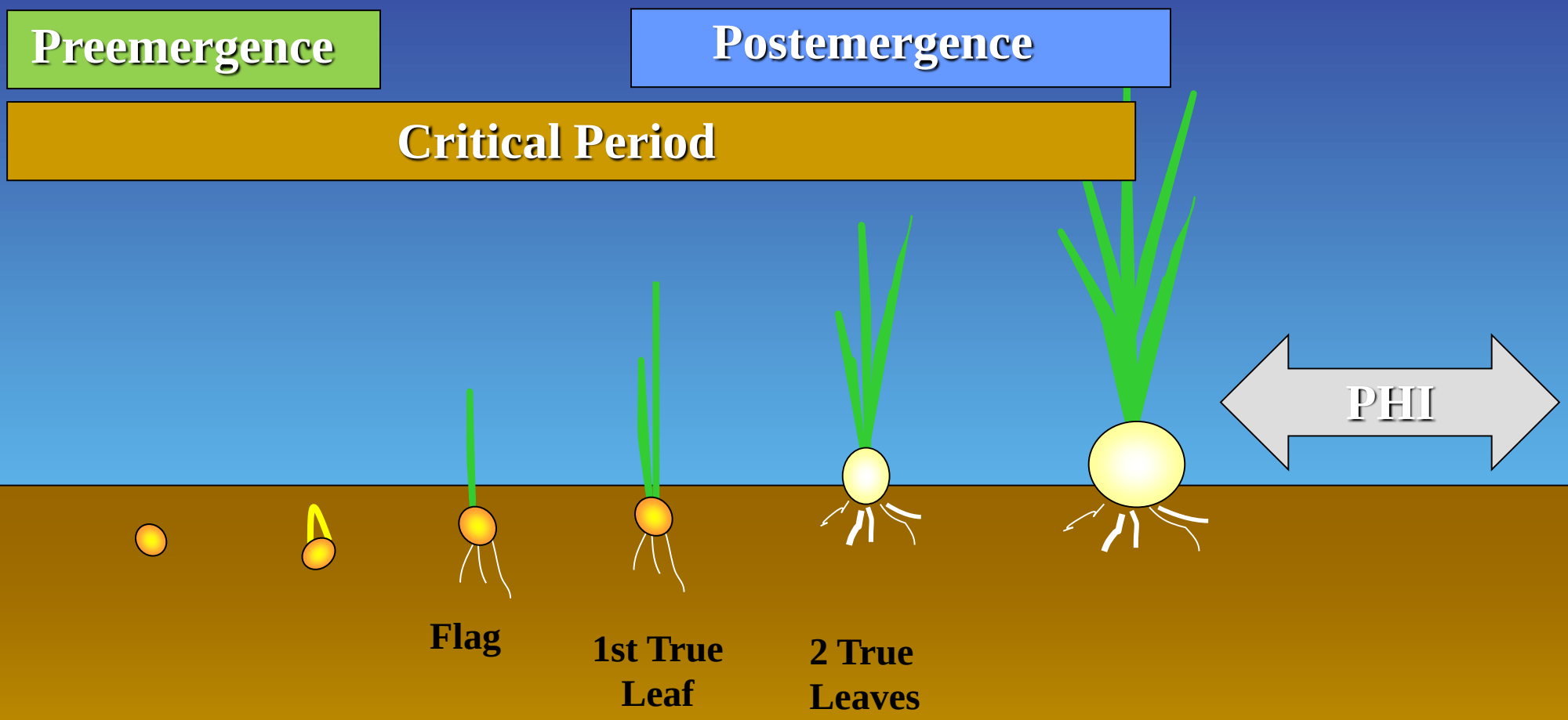
Weed Management Costs

Pesticides/herbicides				
Roundup	1	quart	$9.76	$9.76
Goal	1	pint	$13.40	$13.40
Ammo	20	ounce	$2.48	$49.60
Buctril	1.37	pint	$8.30	$11.37
Penncap	5	quart	$8.00	$40.00
Prowl	2	quart	$6.00	$12.00
Warrior	10	ounce	$5.22	$52.20
Custom application	14	acre	$5.00	$70.00
Cultivation				
1st Cultivating	1	acre	$19.60	$19.60
2nd and 3rd Cultivating	2	acre	$19.60	$39.20
Hand Weeding	1	acre	$67.00	$67.00

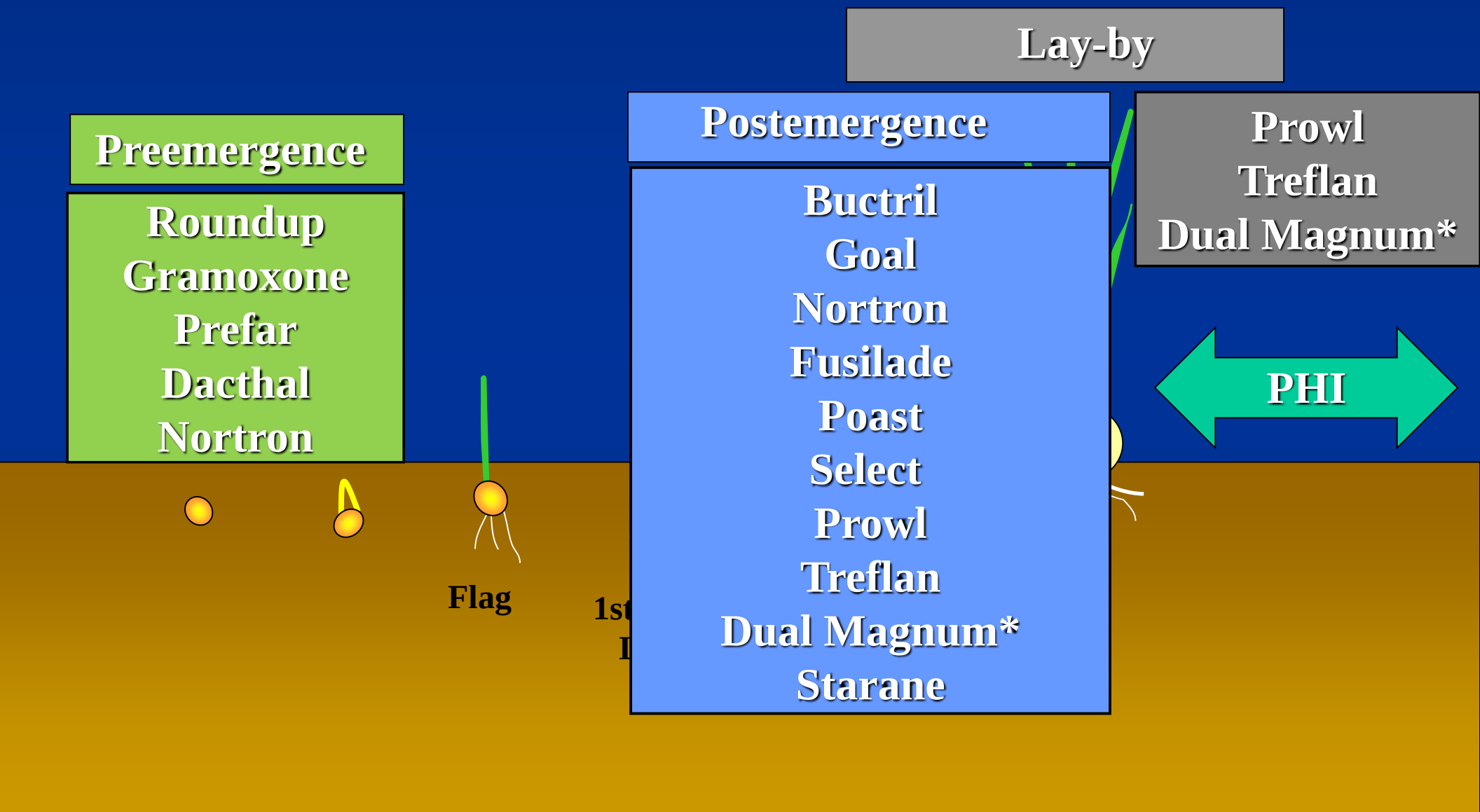
Weed Control in Onions



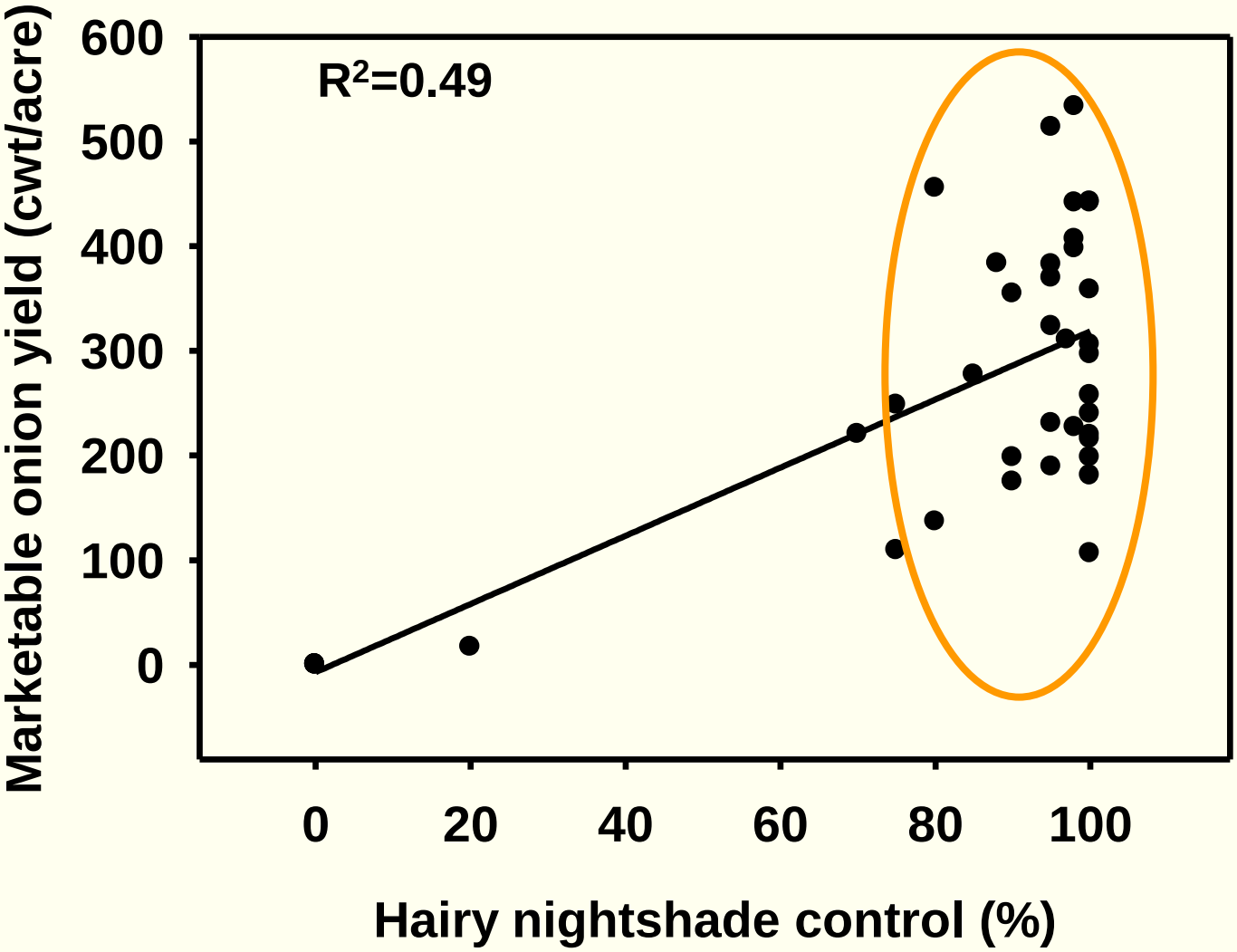
Application Timings and Onion Development



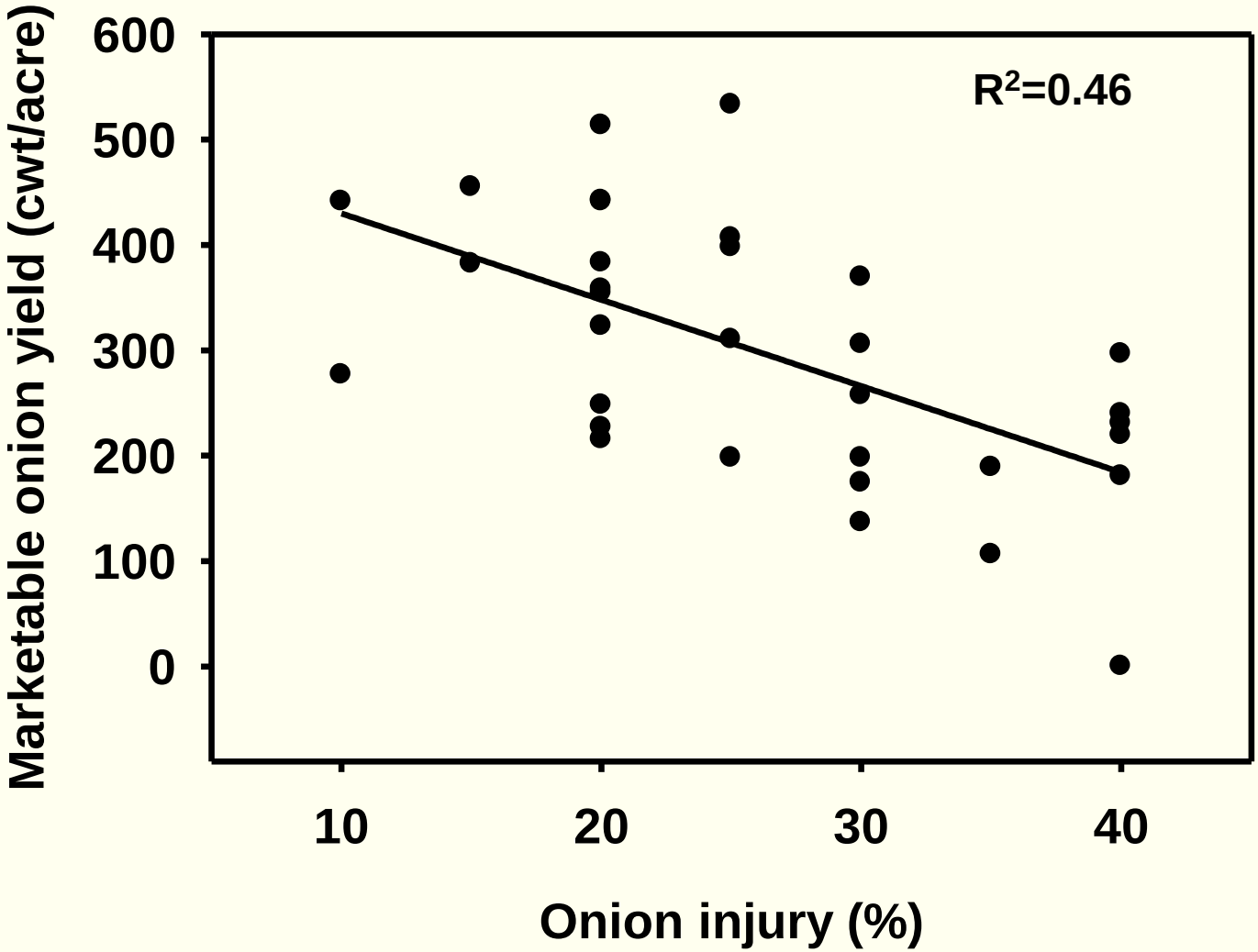
Application Timings and Onion Development



Relationship of H. Nightshade Control on Marketable Onion Yields



Relationship of Onion Injury on Marketable Onion Yields (plots with 80% or higher weed control)



Large Herbicide Trial Analysis – Effects

Table 1. Significance of PRE and POST treatment main effects and the PRE by POST interactions for onion injury and yield and weed control evaluation data.

	Onion			Weed control				
Effects	Injury 5-28	Injury 6-13	Total yield	Pigweed	Common lambsquarters	Hairy nightshade	Kochia	Barnyard -grass
	----------probability (F)----------							
PRE	0.3416	0.0834	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
POST	0.5878	0.0001	0.0616	0.0001	0.5035	0.0008	0.0007	0.5170
PRE X POST	0.2756	0.4218	0.1386	0.0005	0.3958	0.0108	0.0073	0.9529

Large Herbicide Trial Analysis – Weeds

Table 3. Weed control in onion on September 8, 2005 provided by PRE herbicide applications averaged over POST treatments.

			Weed control	
Treatment	Rate	Timing	Common lambsquarters	Barnyardgrass
	lb ai or ae/acre		----------%----------	
None	--	--	67	75
Roundup	0.75	PRE	85	88
Roundup + Prowl	0.75 + 1.0	PRE	99	96
Roundup Prowl + Outlook	0.75 1.0 + 0.84	PRE 1-leaf	98	97
LSD (0.05)	--	--	6	8

No PRE Herbicide

Roundup PRE

Roundup + Prowl PRE

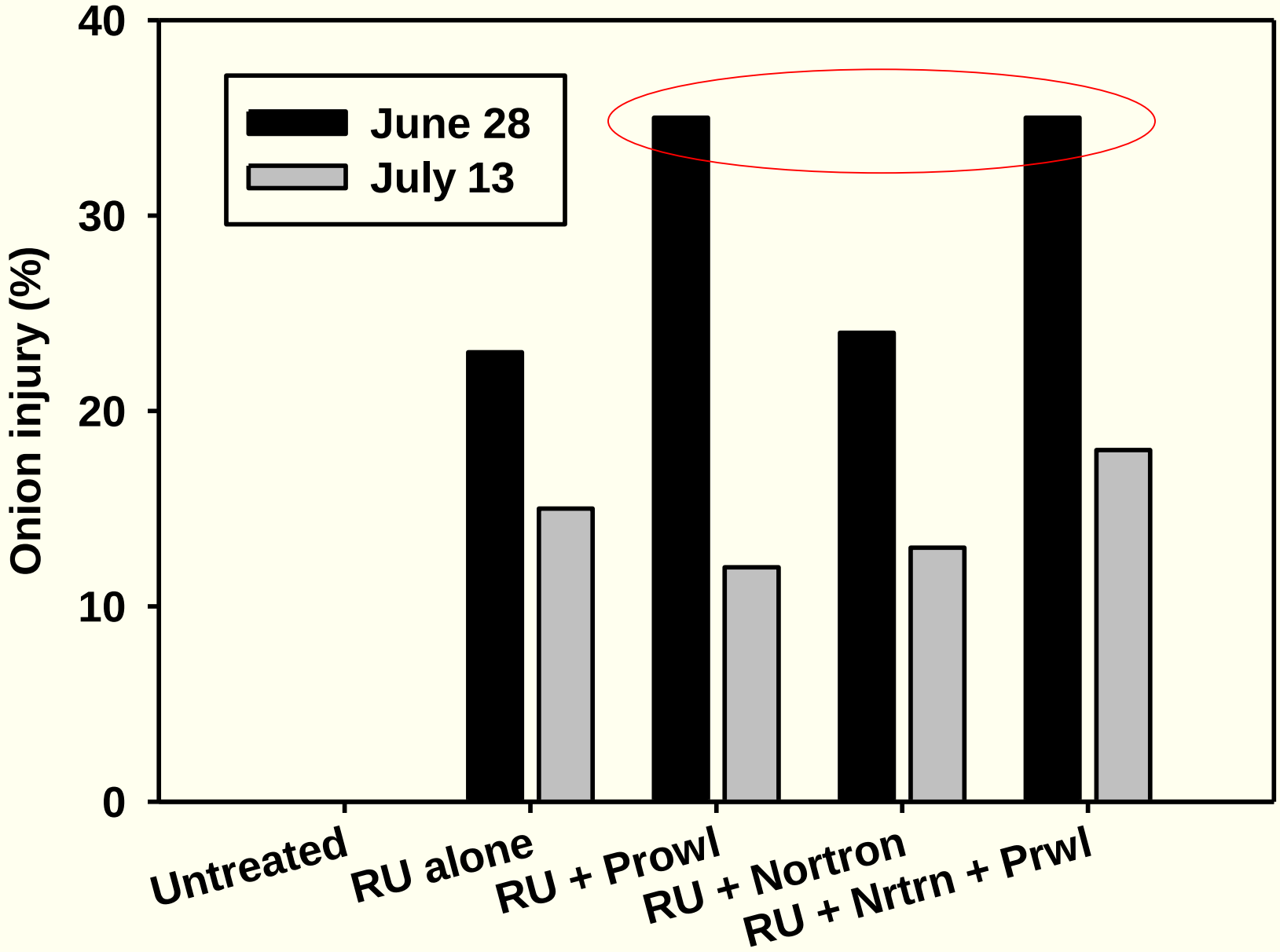
RU PRE fb Prowl + Outlook 1 lf

Large Herbicide Trial Analysis – Onion Yield

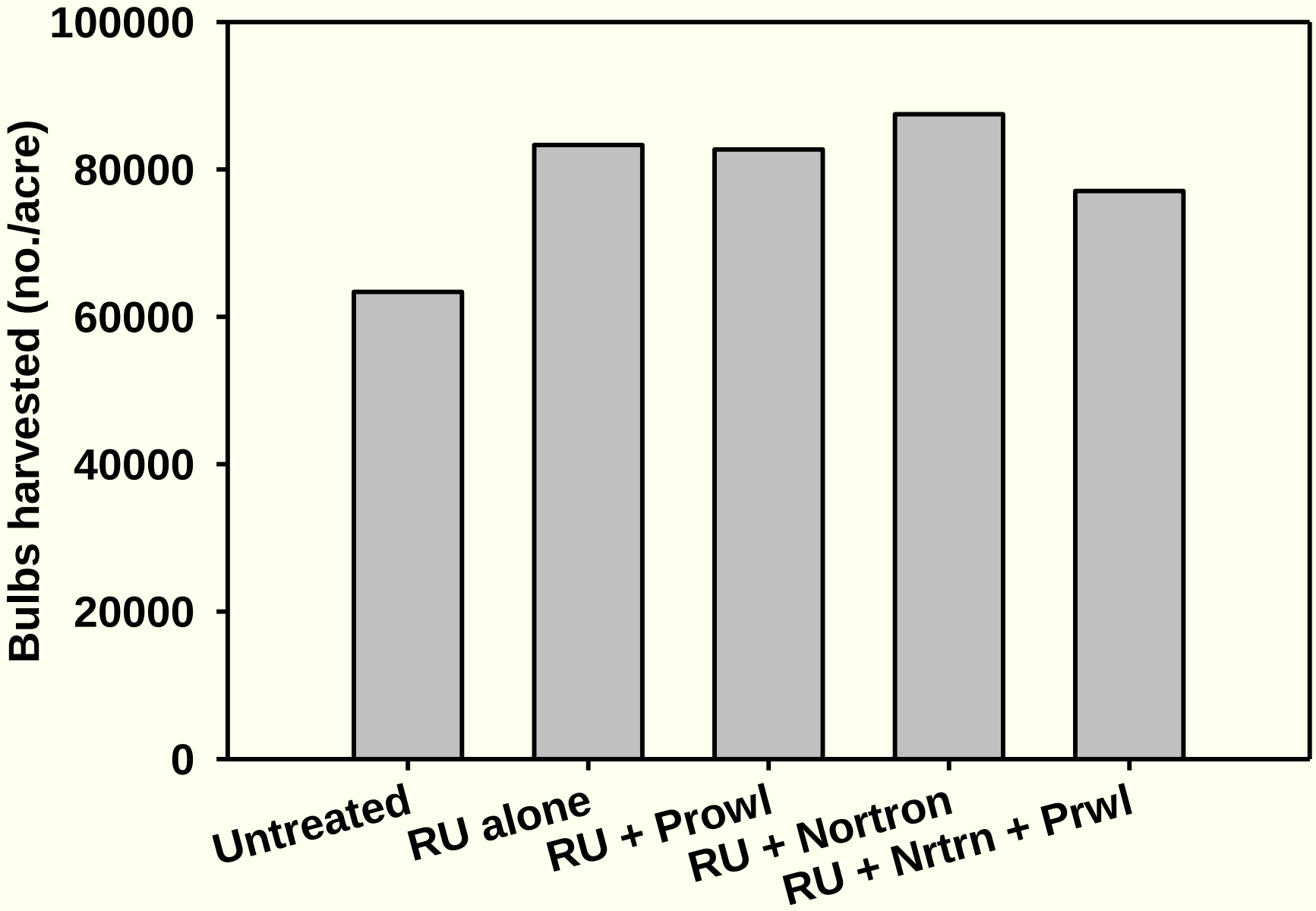
Table 4. Onion yield on September 14 as influenced by preemergence herbicide treatments.

			Onion yield						
Treatment	Rate	Timing	Small	Medium	Jumbo	Colossal	S. Colossal	Total	Market-able
	lb ai or ae/acre		---cwt/acre---						
None	--	--	98	208	89	0	0	394	297
Roundup	0.75	PRE	26	284	339	0	0	659	624
Roundup + Prowl	0.75 + 1.0	PRE	6	87	838	14	0	945	939
Roundup Prowl + Outlook	0.75 1.0 + 0.84	PRE 1-leaf	12	155	686	5	0	859	847
LSD (0.05)	--	--	12	27	66	6	NS	52	63

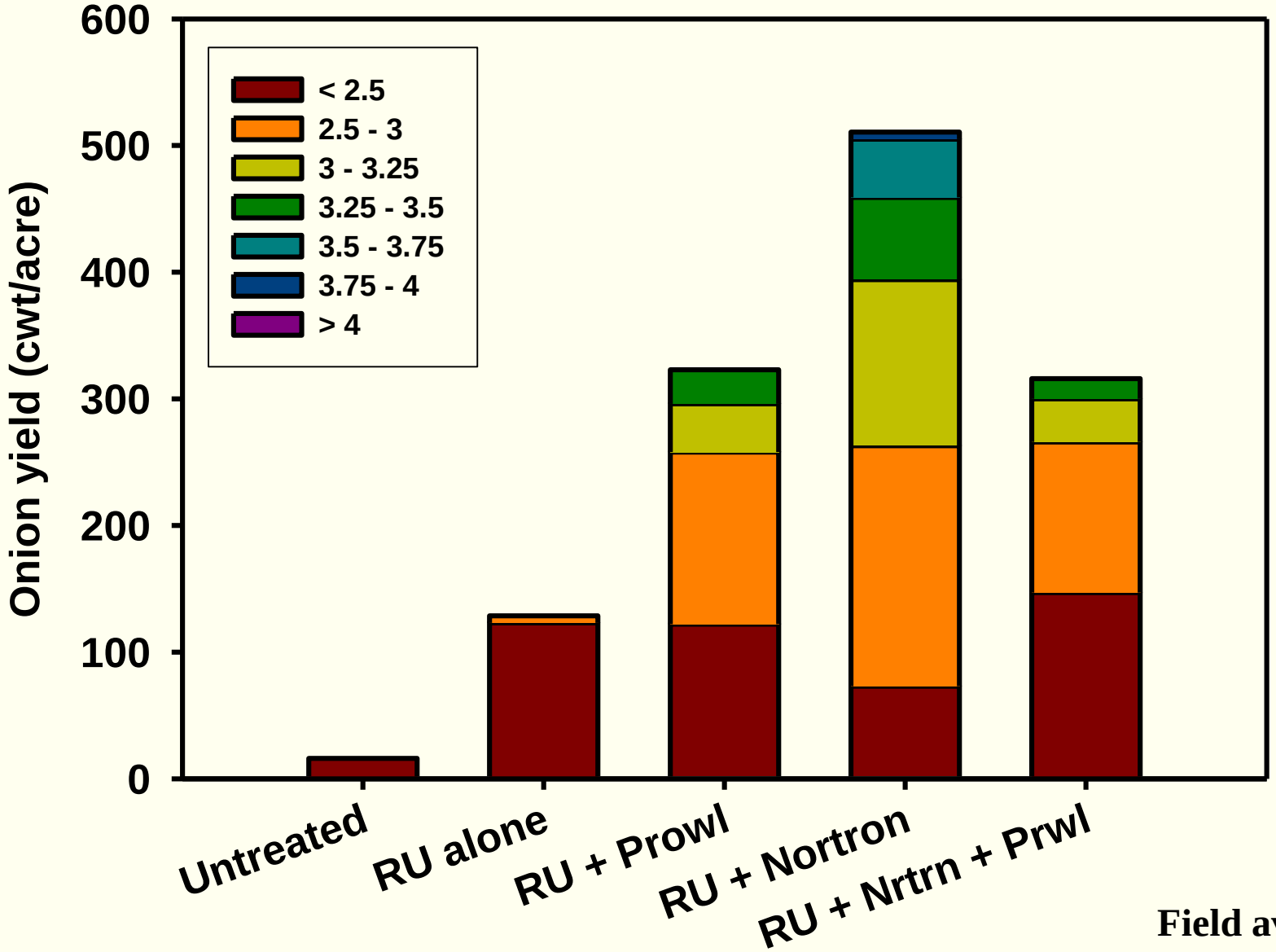
Onion Injury - PRE Herbicides



Bulbs Harvested - PRE Herbicides

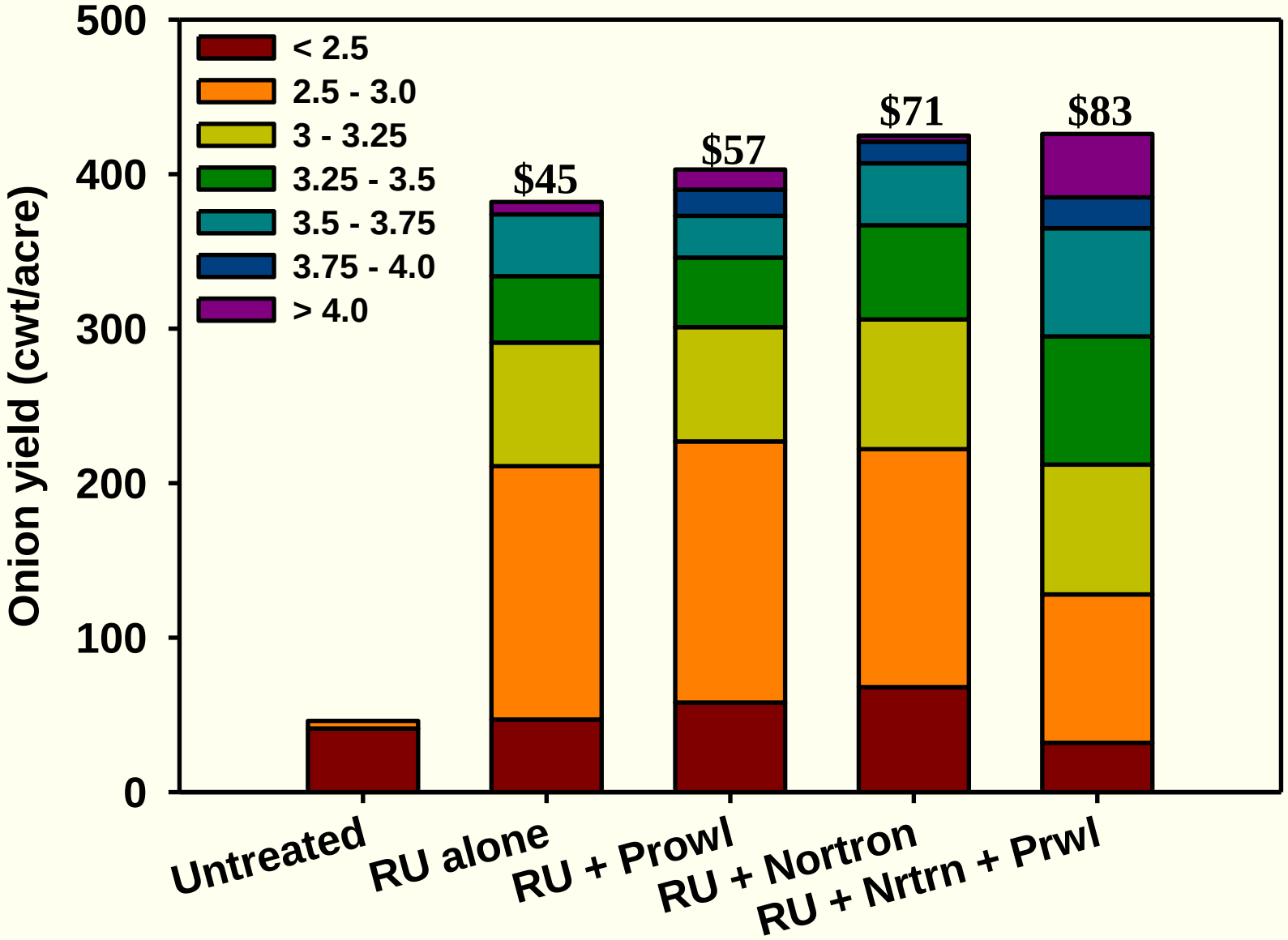


Onion Yield as Influenced by PRE Herbicides, 2008



Field avg. 499 cwt/acre

Onion Yield as Influenced by PRE Herbicides, 2009



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Challenges and Solutions

Lack of herbicide options.

- Pursue registrations

Inability to make timely applications.

- Smaller sprayers?

New weed problems (ie Velvetleaf)

- Select effective herbicides

Challenges and Solutions

What are the cost of a missed spray?

Challenges and Solutions

Velvetleaf control

Starane Ultra

- **0.35 pt/acre, can be applied twice.**
- **Volunteer potato, nightshade, kochia, prickly lettuce, purslane, puncturevine, bindweed, knotweed, mallow, Russian thistle, <u>velvetleaf</u>**

- **Control in other crops.**

Conclusions – Weed Management in Onions

Weed management in onions is challenging

Looking for better ways to manage weeds is required as the weed populations and the available tools are changing

Producer involvement in seeking registrations is necessary to get action from the agrichemical industry