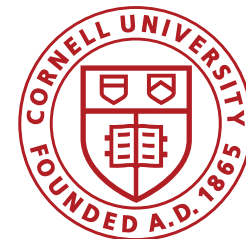


Cornell Cooperative Extension
Cornell Vegetable Program



Control of Ragweed with Pre-Emergent Herbicides

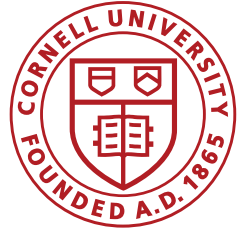
Christy Hoepting and Darcy Telenko

Cornell Cooperative Extension

Cornell Vegetable Program

2018 Empire Expo – Cabbage Session, Syracuse, NY: January 16, 2018

Acknowledgements

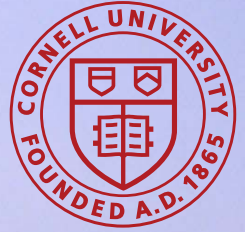


Funding provided by:

- New York Cabbage Research & Development Program (CRDP)



2017 Cabbage Herbicide Trial



Overall Project Objective:

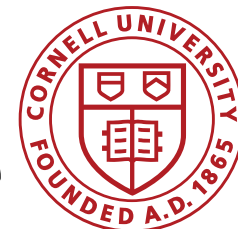
- To improve broad-spectrum weed control while improving crop safety in transplanted cabbage.



Photo: C. Smart

Introduction

PRE-Emergent Herbicides in Cabbage



WSSA Group	Product and Rate/A	Active Ingredient	Application Timing
3	Treflan 1-2 pt	trifluralin	PPI
15	Dual Magnum 0.5-1.3 pt* (NY-Special Local Needs)	S-metolachlor	<ul style="list-style-type: none">• PRE-transplant; or• Up to 48 h post-transplant
15	Devrinol 50-DF/XT 2 lb	napropamide	PPI
13	Command 6.67-1.3 pt	clomazone	PRE-transplant
14	Goal 2XL 1-2 pt Goaltender 0.5-1.0 pt**	oxyfluorfen	PRE-transplant
3	Prowl H ₂ O 1.0-2.1 pt	pendimethalin	Directed spray 1-3 days post-transplant

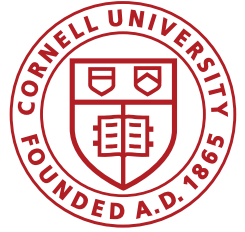
*Dual Magnum may not be used with Goal

****Goaltender 4-6 fl oz labeled (NY-SLN) for POST-emergent weed control**

Timing: Min: 2 weeks post-transplanting, PHI: 35 days

Introduction

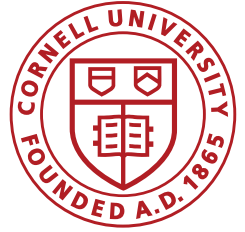
Dual Magnum



- Dual Magnum is more effective than Treflan
 - Added control of yellow nutsedge
 - Improved broadleaf weed control
 - Pigweed, hairy galingsoga, Eastern black nightshade
- Combining Dual Magnum with Goal was Robin Bellinder's "gold standard" in her herbicide trials
 - Weak on ragweed, some species of mustards, sometimes Lamb's quarters
- Dual Magnum, especially when used with Goal can result in stunting injury that delays early growth of newly transplanted plants, especially when conditions are cool and wet.

Introduction

New Formulation of Devrinol



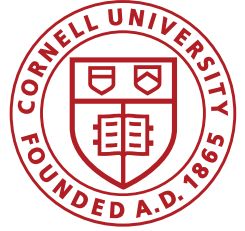
- Devrinol 50 DF generally not favored by New York cabbage growers, because it has a short residual
- New formulation available: Devrinol DF-XL
 - Residual lasts 4-6 weeks
 - In Michigan studies, Devrinol XL was safer than Dual Magnum in cabbage, especially when used at cooler temperatures (< 60 °F).

Trial Objective:

- To compare Devrinol XL to 50 DF, Treflan and Dual Magnum and in combination with Goaltender to see if similar weed control may be achieved with improved crop safety.

Introduction

Prowl H₂O



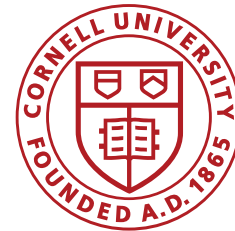
- Prowl H₂O is under-utilized in cabbage
 - Labeled as a directed spray
 - In onions, Prowl is known for:
 - Excellent control of Lamb's quarters (LQ)
 - Control of mustards (weakness of Dual Magnum +/- Goal)
 - Excellent crop safety (H₂O)

Trial Objective:

- To evaluate crop safety and weed control of Prowl H₂O alone and in combination with Goaltender.
 - Especially interested in whether it improves control of LQ and **mustards** compared to Treflan/Dual Magnum +/- Goal

Introduction

Chateau (Not labeled in cabbage)



Chateau (a.i. flumioxazin):

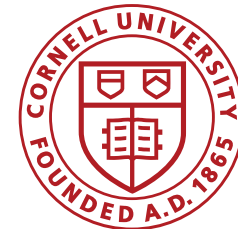
- WSSA group 14 (like Goal)
- Both PRE and POST-emergent activity (weeds < 2inch) at low rates (1-2 oz/A)
- Excellent control of pigweed, smartweed, certain species of mustard
- Huge adoption rate in muck onion production
- Can have phytotoxicity issues...
- In 2016 herbicide, trial, Chateau 1 oz and 2 oz did not cause unacceptable damage to cabbage (hot & dry)

Trial Objective:

- To trial Chateau POST-transplant following Treflan (for crop safety).
 - Especially interested in whether it improves mustard control over Dual Magnum +/- Goal.

Introduction

Spartan (Not labelled in cabbage)



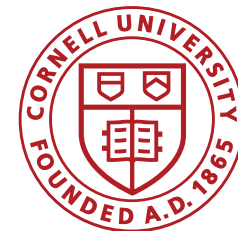
Spartan (a.i. sulfentrazone):

- WSSA group 14 (like Goal and Chateau)
- Labelled on processing cabbage in Michigan
- Robin was evaluating Spartan in cabbage: it should improve control of grasses, nightshade and pigweed

Trial Objective:

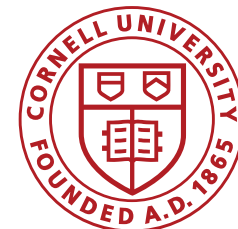
- Compare Spartan to Goaltender and half rates of Spartan + Goaltender when used in combination with Devrinol (Dual Magnum likely too hot).

Treatments



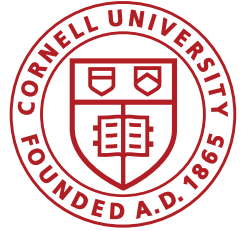
No.	PPI (Jun-13)	POST-Transplant (Jun-14)
1		Untreated Check
2		Handweeded Check
3	Treflan 2 pt	
4	Devrinol 50DF 2 lb	
5	Devrinol DF-XT 2 lb	
6		Dual Magnum 1 pt
7		Dual Magnum 1 pt + Goaltender 0.5 pt

Treatments, cont.

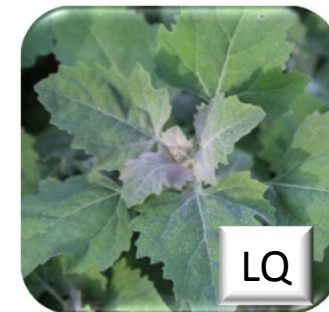


No.	PPI (Jun-13)	POST-Transplant (Jun-14)
8	Devrinol DF-XT 2 lb	Goaltender 0.5 pt
9	Treflan 2 pt	Goaltender 0.5 pt
10	Devrinol DF-XT 2 lb	Spartan 6 fl oz
11	Devrinol DF-XT 2 lb	Half-rates: Goaltender 0.25 pt + Spatan 3 fl oz
12	Treflan 2 pt	Chateau 1 oz
13	Treflan 2 pt	Chateau 2 oz
14		Prowl H ₂ O 2.1 pt
15		Prowl H ₂ O 2.1 pt + Goaltender 0.5 pt

Trial Design

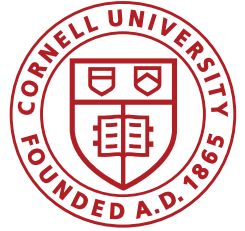


- NYSAES Research Farm, Geneva, NY
- Soil type: Gravel loam
- Variety: Cabton
- CO2 backpack sprayer
- 4 replications
- **Dates:**
 - Planting: Jun-14
 - PPI app: Jun-13
 - POST-Transplant app (1 day): Jun-14



- **VERY WET:**
 - 11 inches of rain from Jun 14 to Jul 30
- **Major weed species:** Ragweed (RW), smartweed (SW), pigweed (PW), hairy galinsoga (HG), Lamb's quarters (LQ), foxtail (fox)

Results



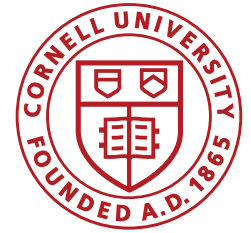
Crop Tolerance:

- **Crop Injury** – no injury observed in any treatment
 - Wet conditions may have impaired ability to detect stunting injury
- **No yield data taken** – extreme wet, waterlogged conditions and poor cabbage growth

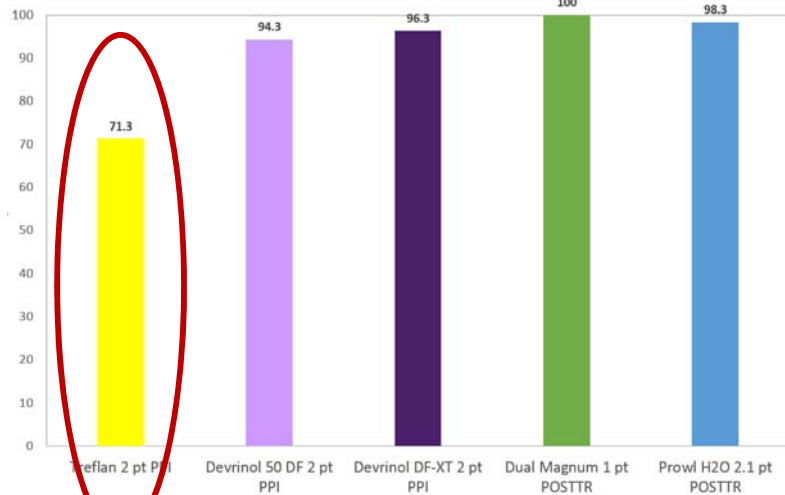
Weed Control:

- **Pigweed:** 98-100% control (all treatments)
- **Smartweed:** 98-100% control (all treatments EXCEPT Treflan (75%))

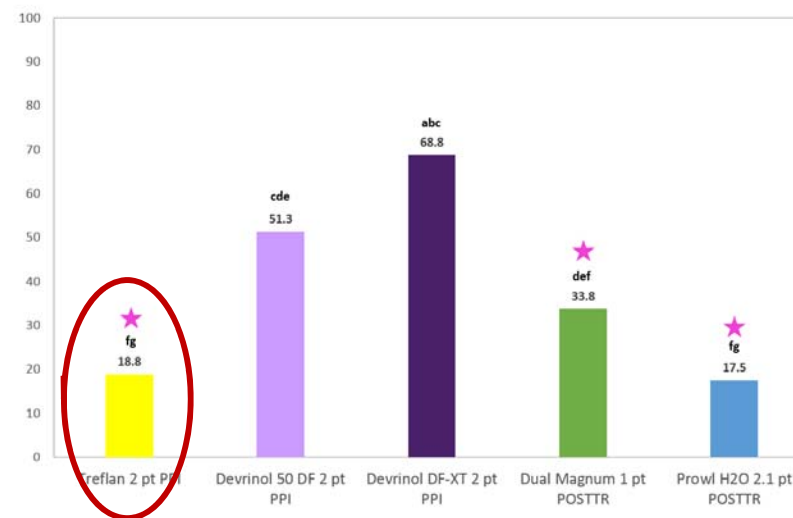
Results – Percent Weed Control Single Actives



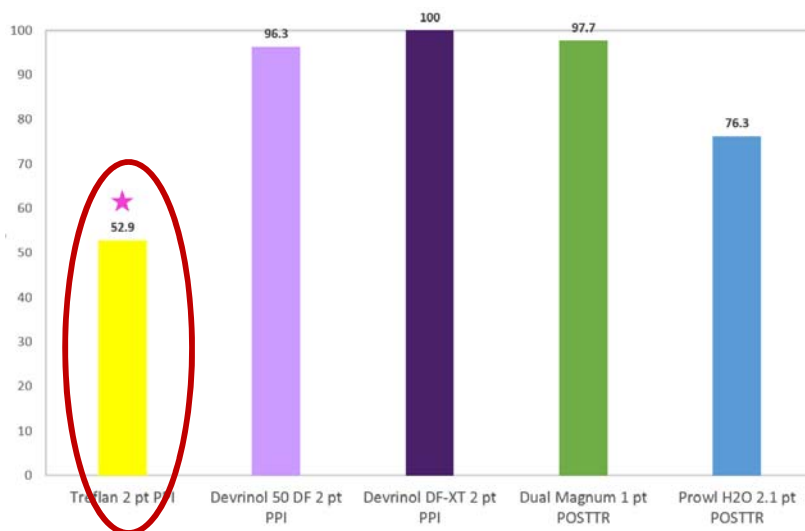
Lamb's quarters



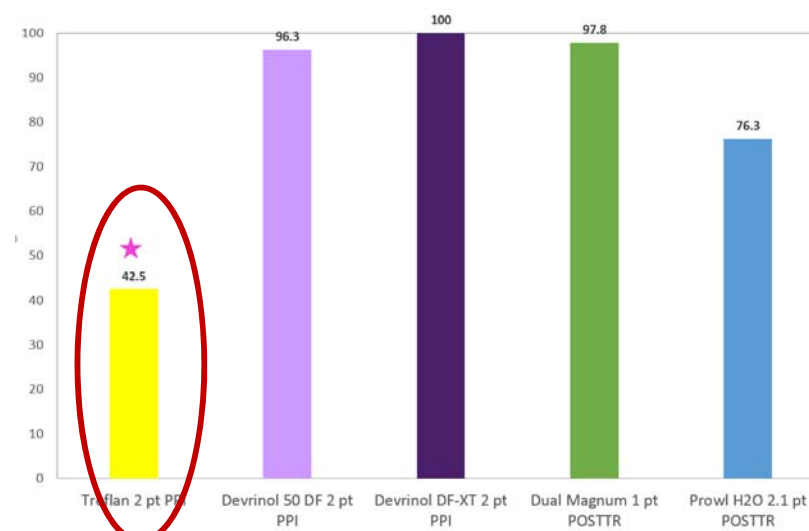
Common Ragweed



Hairy Galingsoga



Foxtail



Treflan 2 pt PPI



Devrinol 50 DF
2 pt PPI



Devrinol DF-XT
2 pt PPI



Dual Magnum
1 pt POSTTR

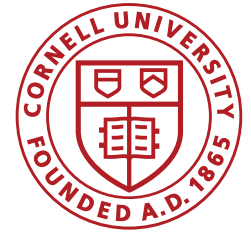


Prowl H2O
2.1 pt POSTTR

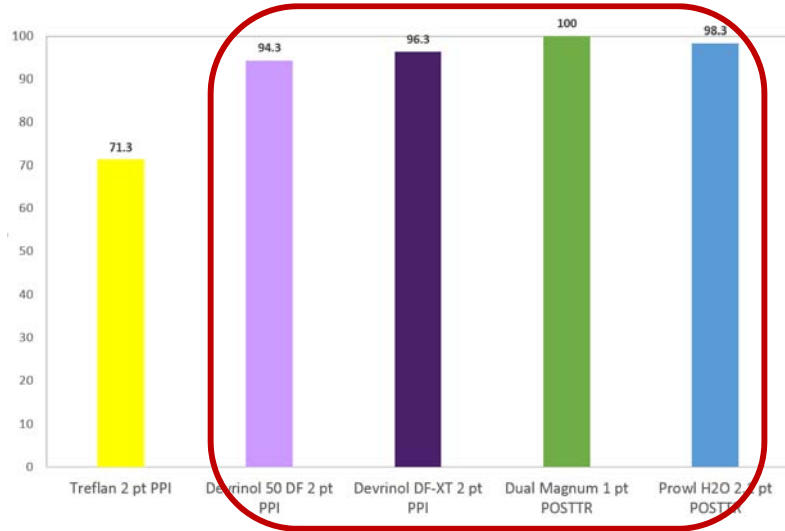


Significantly worse
than best treatment

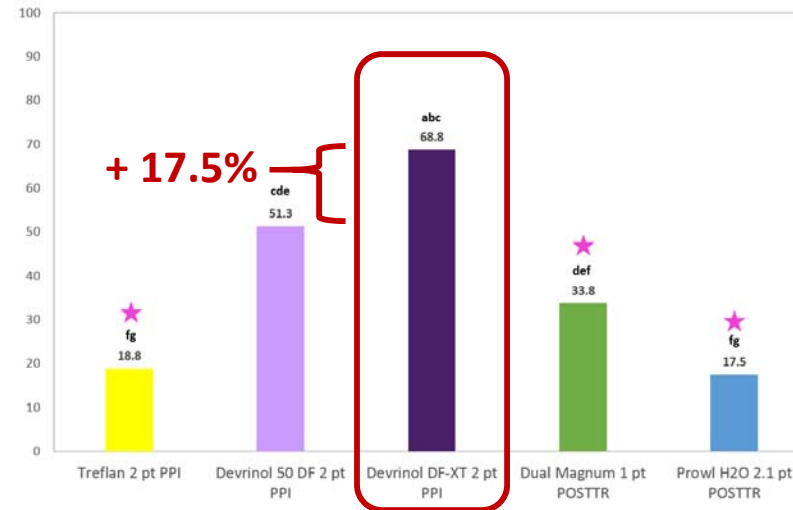
Results – Percent Weed Control Single Actives



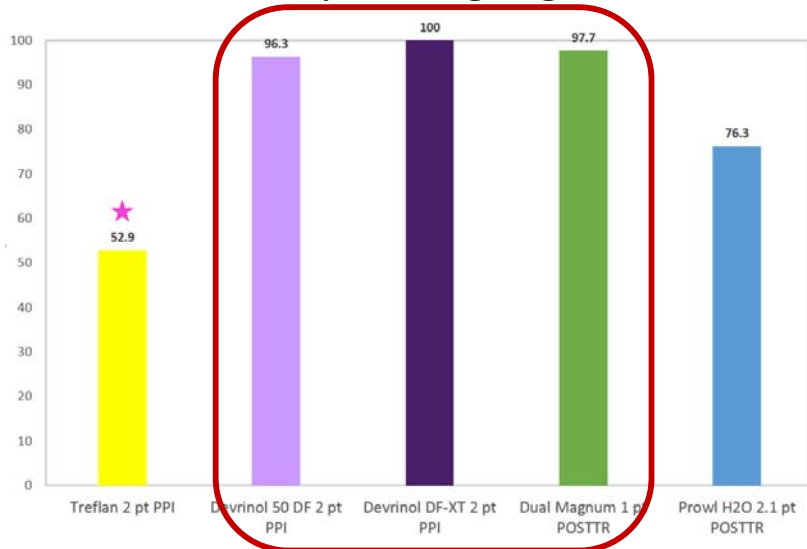
Lamb's quarters



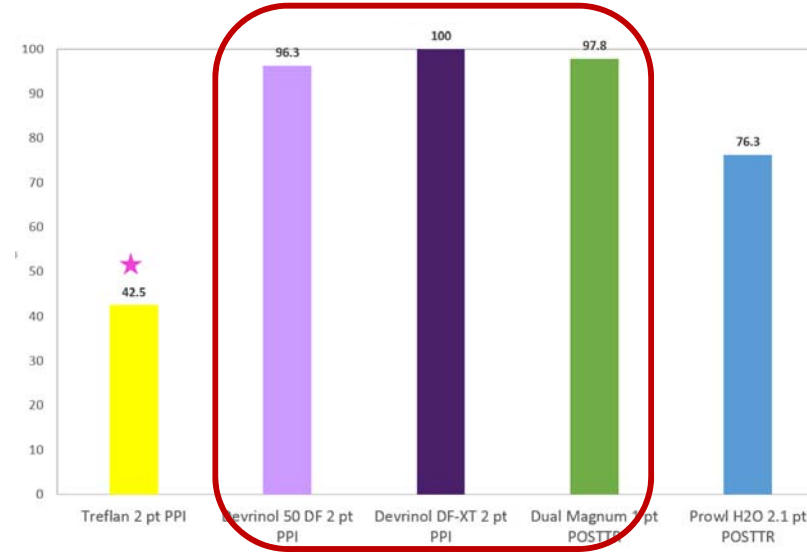
Common Ragweed



Hairy Galingsoga



Foxtail



Treflan 2 pt PPI



Devrinol 50 DF
2 pt PPI



Devrinol DF-XT
2 pt PPI



Dual Magnum
1 pt POSTTR



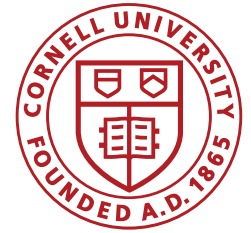
Prowl H2O
2.1 pt POSTTR



Significantly worse
than best treatment

Results – Percent Weed Control Single Actives 27 DAT

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Untreated



Devrinol **50 DF** 2 lb PPI



Dual Magnum 1 pt



Treflan 2 lb PPI

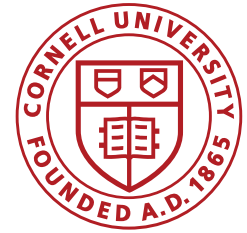


Devrinol **DF-XT** 2 lb PPI



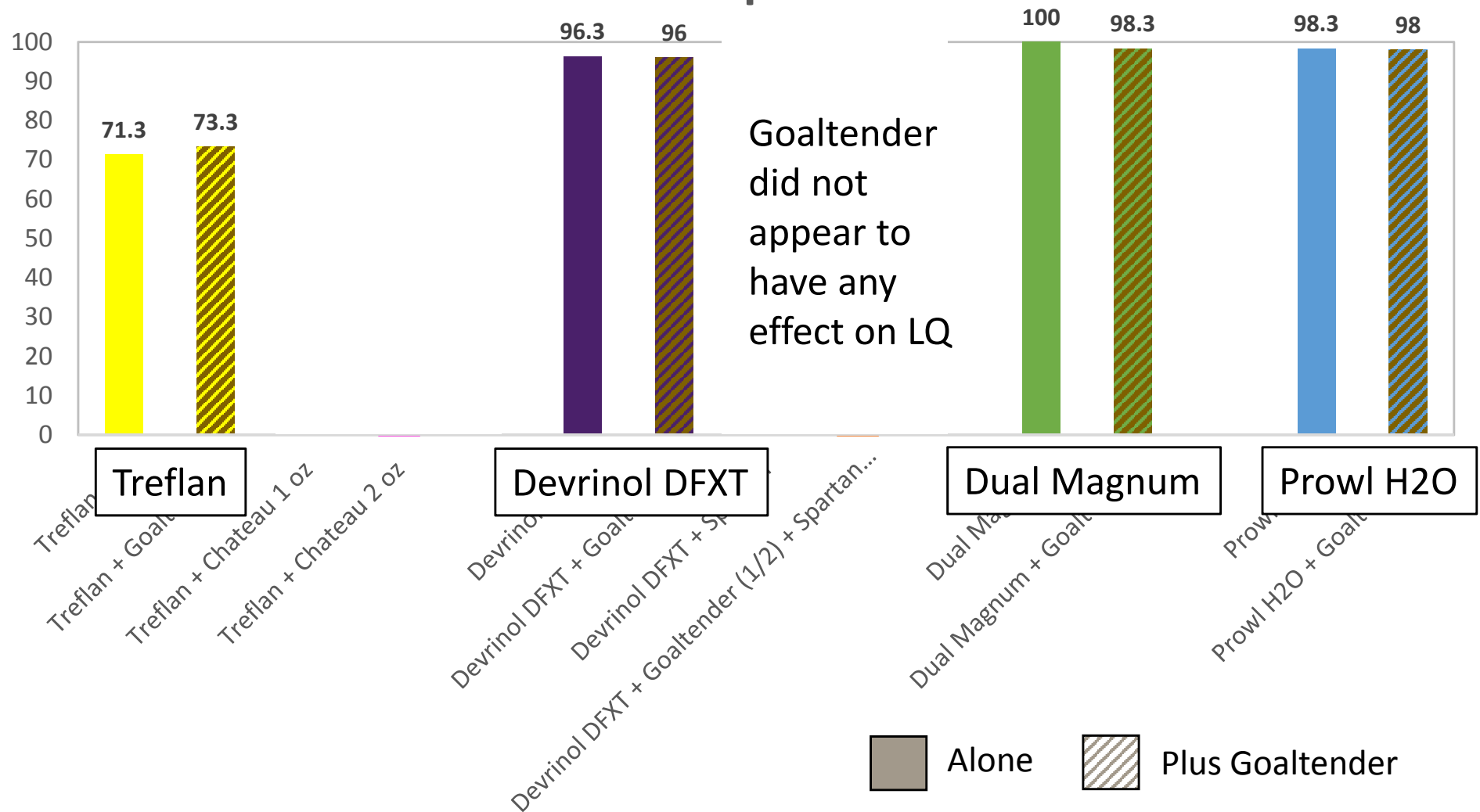
Prowl H2O 2.1 pt POSTTR

Results – Percent Weed Control With Goaltender 0.5 pt

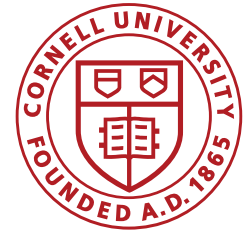


Percent Weed Control 50 DAT (Aug 3)

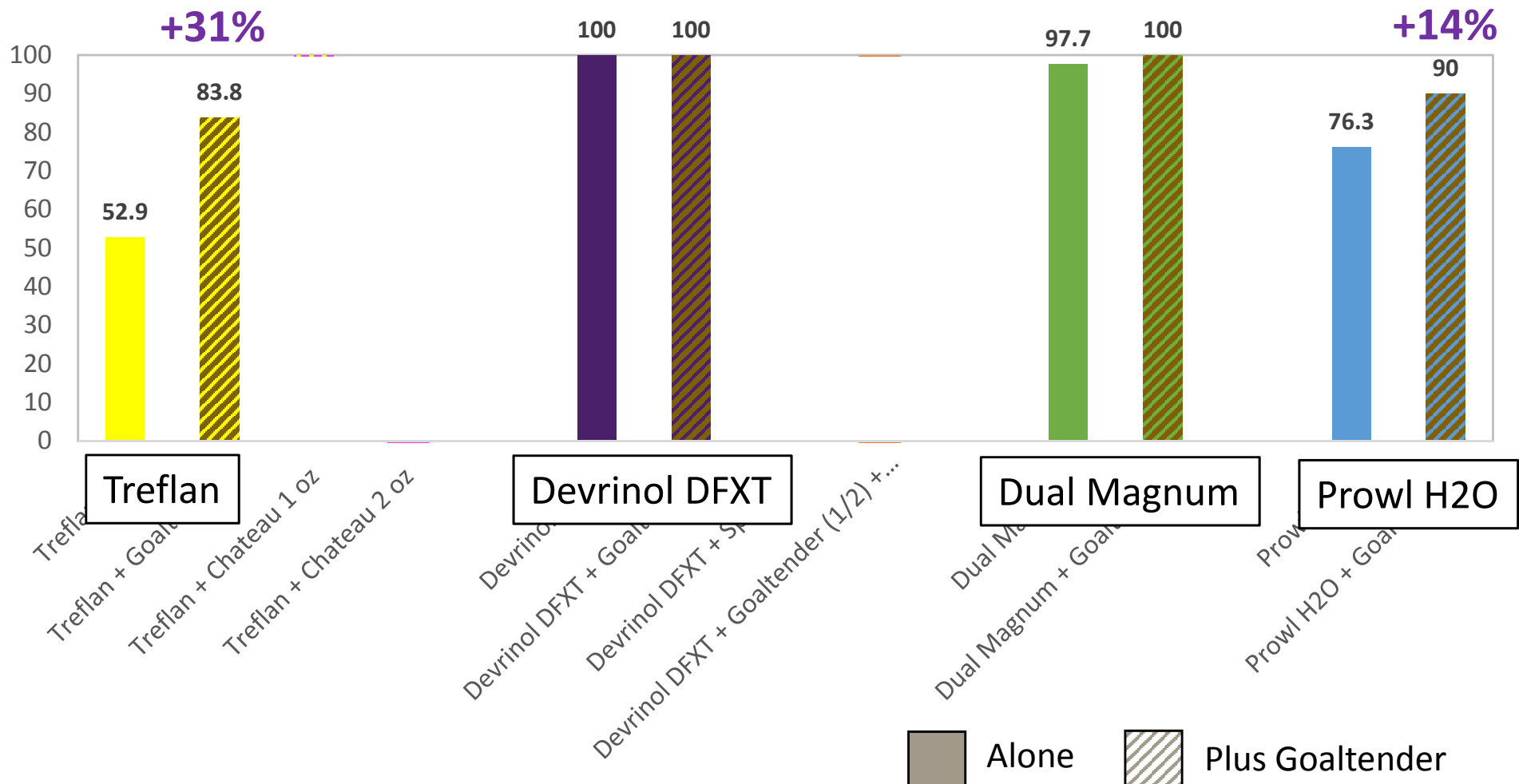
Lamb's quarters



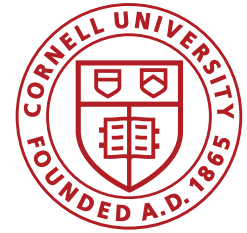
Results – Percent Weed Control With Goaltender 0.5 pt



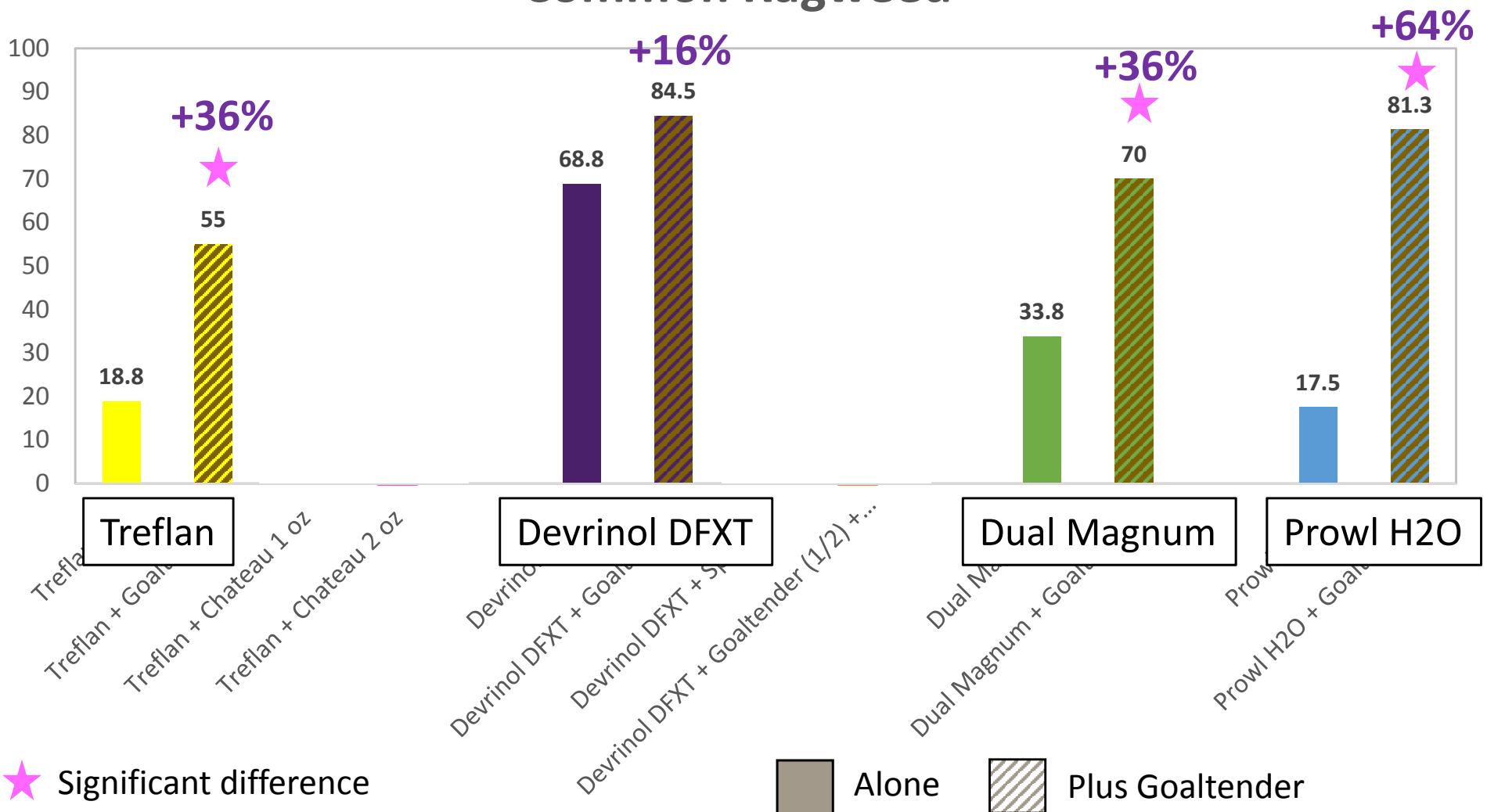
Percent Weed Control 50 DAT (Aug 3):
Hairy Galingsoga



Results – Percent Weed Control With Goaltender 0.5 pt

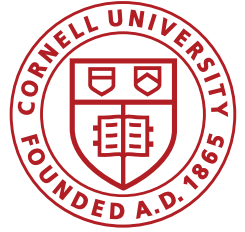


Percent Weed Control 50 DAT (Aug 3)
Common Ragweed



Results – Percent Weed Control With Goaltender 0.5 pt

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Treflan 2 lb PPI



Prowl H2O 2.1 pt POSTTR



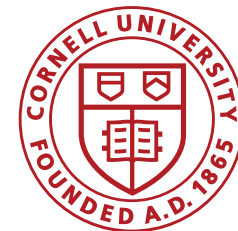
Treflan 2 pt PPI
+ Goaltender 0.5 pt POSTTR



Prowl H2O 2.1 pt
+ Goaltender 0.5 pt POSTTR

Results – Percent Weed Control With GoalTender 0.5 pt

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Devrinol **DF-XT** 2 lb PPI



Dual Magnum 1 pt

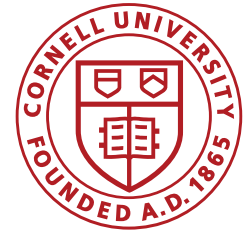


Devrinol DF-XT 2 lb PPI
+ Goaltender 0.5 pt POSTTR



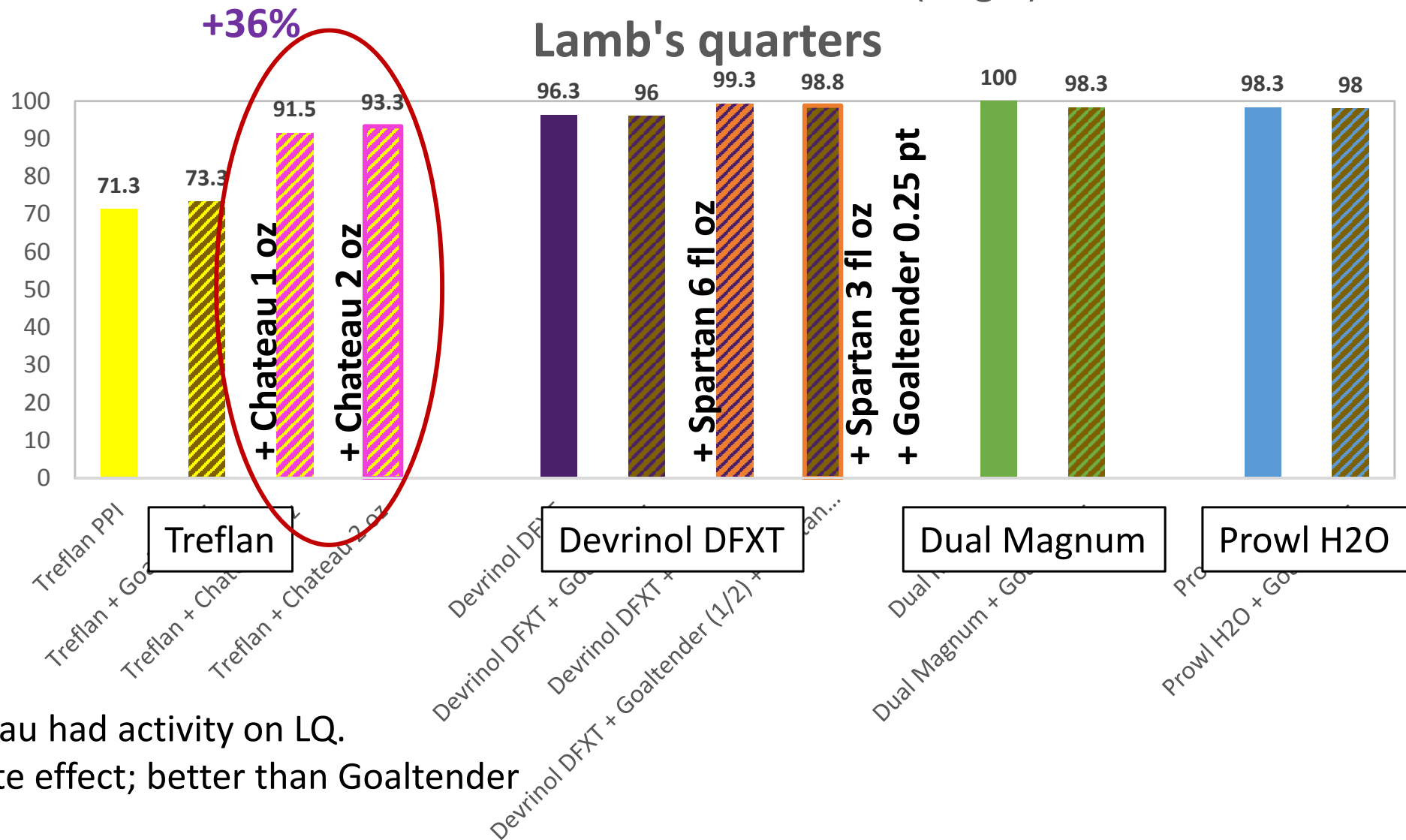
Dual Magnum 1 pt
+ Goaltender 0.5 pt POSTTR

Results – Percent Weed Control With Chateau, Spartan



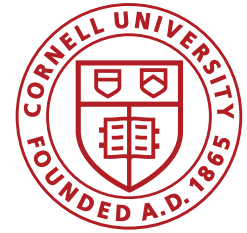
Percent Weed Control 50 DAT (Aug 3)

Lamb's quarters

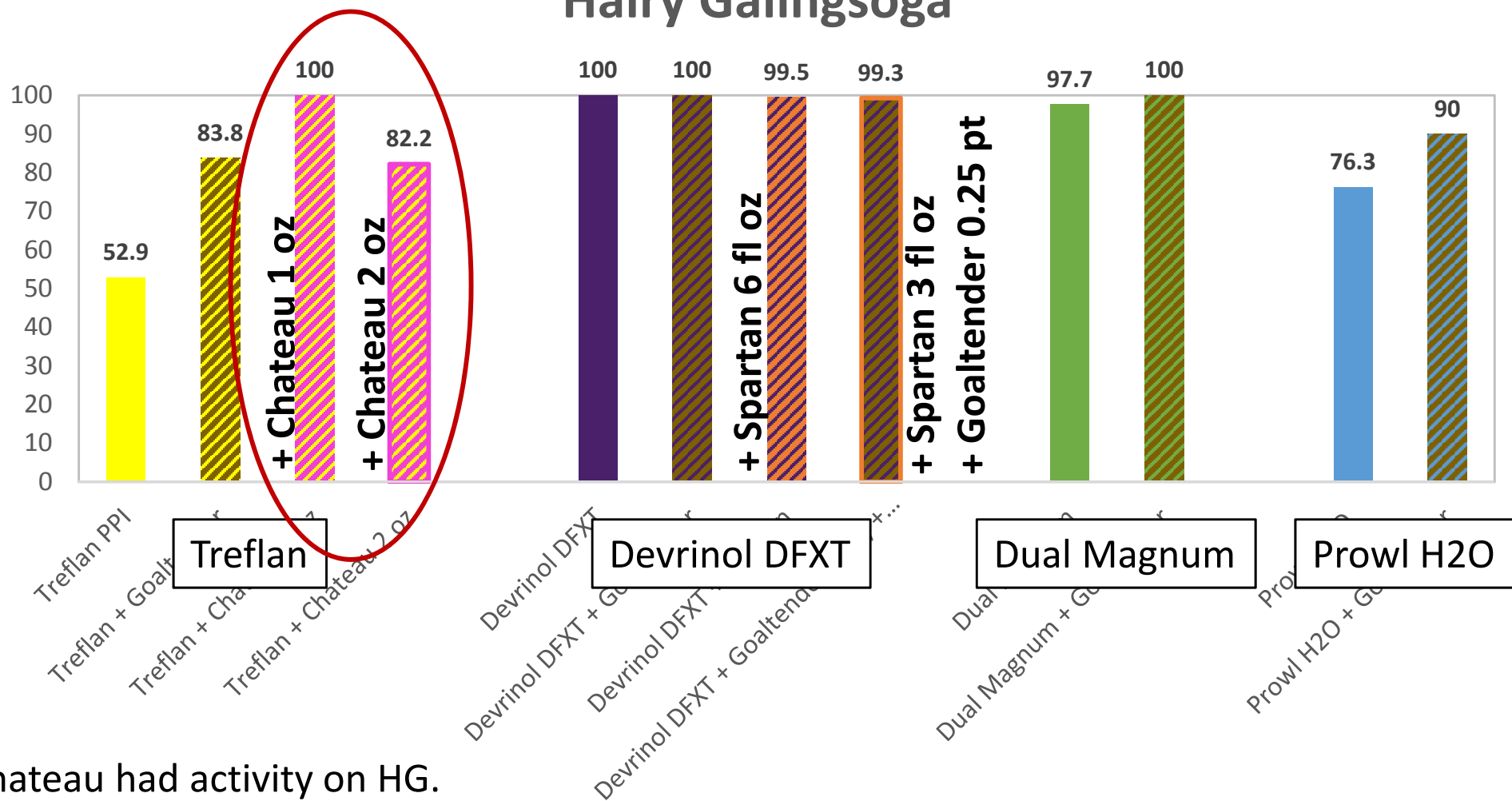


Chateau had activity on LQ.
 No rate effect; better than Goaltender

Results – Percent Weed Control With Chateau, Spartan

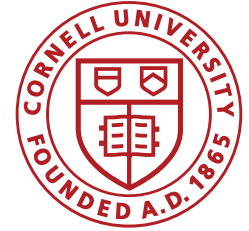


Percent Weed Control:
Hairy Galingsoga



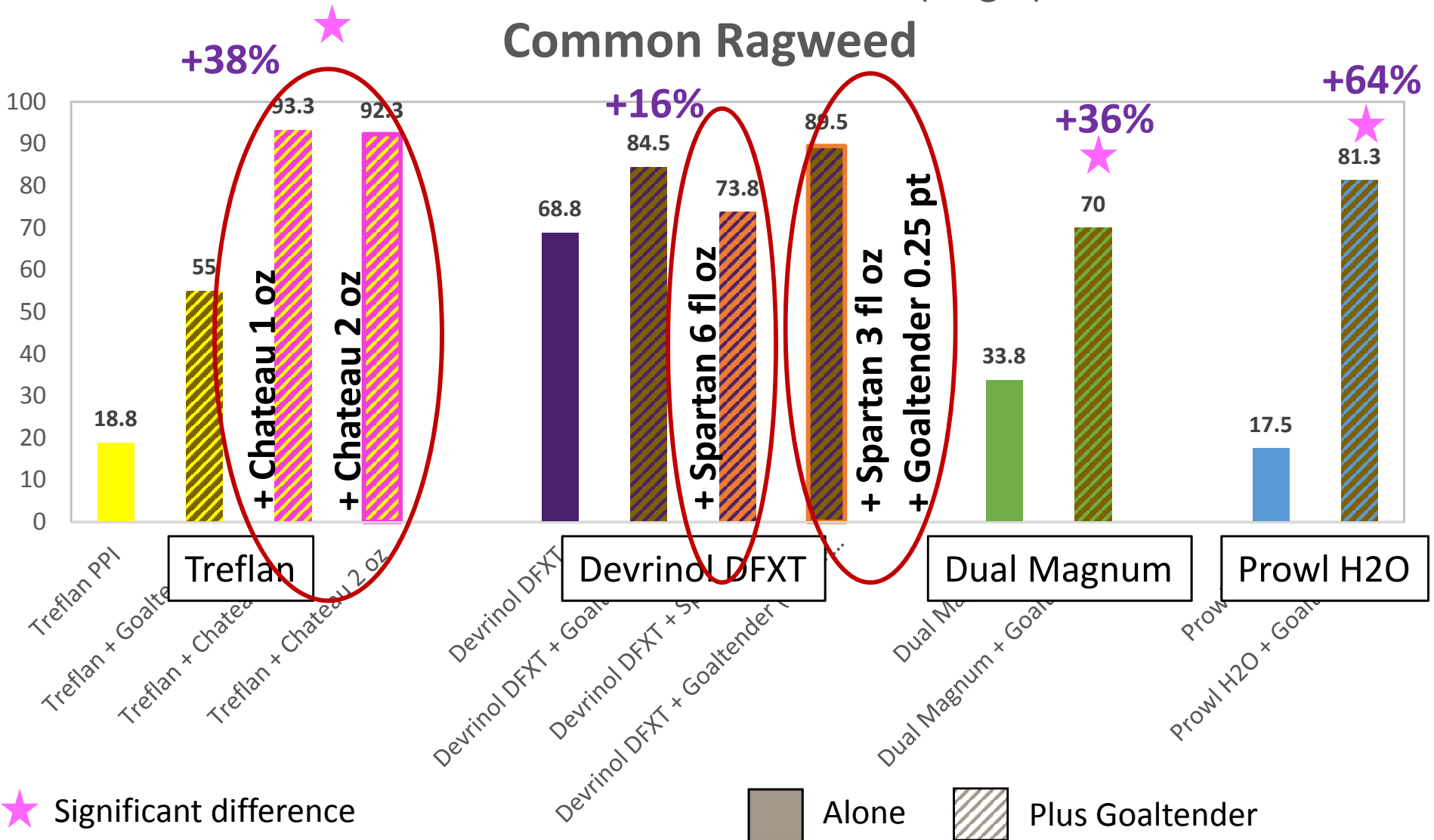
Chateau had activity on HG.
No rate effect; same as Goaltender

Results – Percent Weed Control With Chateau, Spartan

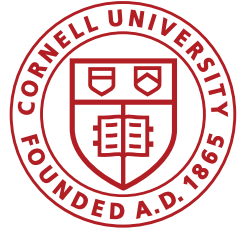


Percent Weed Control 50 DAT (Aug 3)

Common Ragweed



Results – Percent Weed Control With Chateau, Spartan



Chateau:

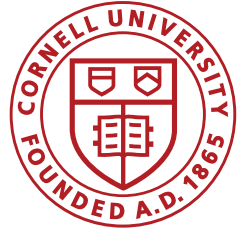
- Chateau had excellent activity on ragweed (RW)
- No rate effect, 1 oz was enough
- Chateau controlled RW better (twice as good) than Goaltender

Spartan:

- Spartan did not control RW as well as Goaltender
- Spartan + Goaltender controlled RW as well as Goaltender
- Did not identify any benefit to Spartan in this trial with respect to improving control of any of the weeds tested in this trial.

Results – Percent Weed Control With Chateau

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Treflan 2 lb PPI



Treflan PPI 2 pt PPI
+ Chateau **1 oz** POSTTR

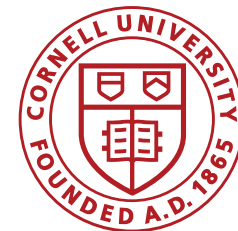


Treflan 2 pt PPI
+ Goaltender 0.5 pt POSTTR



Treflan 2 pt PPI
+ Chateau **2 oz** POSTTR

Results – Percent Weed Control With Spartan



JULY 11, 2017



Devrinol **DF-XT** 2 lb PPI



Devrinol DF-XT 2 lb PPI + Spartan 6 fl oz

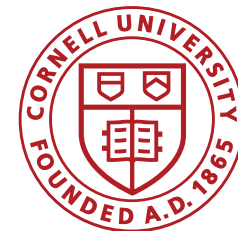


Devrinol DF-XT 2 lb PPI
+ Goaltender 0.5 pt POSTTR



Devrinol DF-XT 2 lb PPI
+ Goaltender 0.25 pt + Spartan 3 fl oz POSTTR

Summary

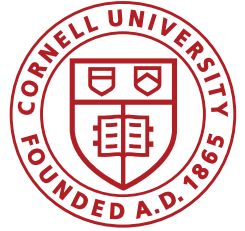


Relative Performance:

Rank	Product	% Weed Control 50 DAT (Aug-3)					
		RW	HG	LQ	PW	SW	Fox
1	Devrinol DF-XL	68.8	100	96.3	100	100	100
2	Dual Magnum	33.8	97.7	100	100	100	97.8
3	Devrinol 50-DF	51.3	96.3	94.3	99.5	97.5	96.3
4	Prowl H2O	17.5	76.3	98.3	97.8	100	76.3
5	Treflan	18.8	52.9	71.3	98.8	75	42.5

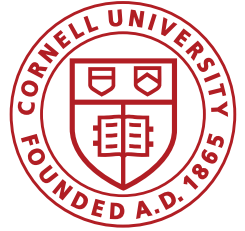
 >95% control  < 50% control

Summary



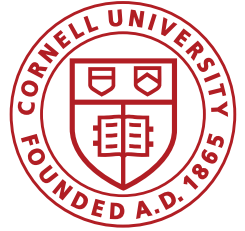
- Addition of Goaltender 0.5 pt to Devrinol DF 50/XT, Dual Magnum, Treflan and Prowl H2O:
 - Increased control of ragweed
 - Increased control of hairy galinsoga with Treflan & Prowl H2O, which needed some help, unlike Dual Magnum and Devrinol
- Chateau improved control of LQ and ragweed better than Goaltender
- Spartan was not as good as Goaltender for control of ragweed.
 - $\frac{1}{2}$ rates of Spartan + Goaltender was no different than Goaltender for control of ragweed

Future Research



- Continue to evaluate crop tolerance and yield of these treatments for improved crop safety
 - In a “normal” year
 - 2017:
 - Extremely wet conditions impaired ability to detect stunting
 - No yield data
- Investigate Prowl H2O and Chateau for improved control of mustards and lamb’s quarters
- Investigate Prowl H2O in combination with Chateau, Devrinol DF-XT and Dual Magnum, mostly for improved control of LQ and mustards.

Recommendation



- Try Devrinol DF-XT PPI +/- Goaltender for improved crop safety and weed control, especially for ragweed under cool soil conditions.

Let me know how it goes!

