

INVASIVE WEED MANAGEMENT WITH AMINOPYRALID

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Background

- Dow AgroSciences has a number existing active ingredients that provide control of many invasive plant species
- Aminopyralid is an innovative selective broadleaf herbicide ***designed and developed*** for the management of noxious and invasive weeds
- Not a **Federally Restricted Use Pesticide**
- Effective at rates from 52 to 120 g ae ha⁻¹ (equivalent to 3-7 fl oz of Milestone)
- No injury to cool- or warm-season grasses
- Available as Milestone[®], Milestone[®] VM, Milestone[®] VM Plus, Chaparral[™], Opensight[™] and ForeFront[™] R&P herbicides

Reduced Risk Pesticide Program

- Aminopyralid was accepted for evaluation under U.S. EPA's Reduced Risk Pesticide program in October 2004
- Acceptance for evaluation was based, in part, on:
 - Improved control of invasive plants compared to market standards
 - Lower rates than most market standards
 - Data and risk assessment studies for toxicological, eco-toxicological and environmental fate

What is Reduced Risk?

A reduced risk pesticide use is defined as one which "may reasonably be expected to accomplish one or more of the following":

- reduces pesticide risks to human health
- reduces pesticide risks to non-target organisms
- reduces the potential for contamination of valued, environmental resources
- broadens adoption of IPM or makes it more effective

Background

- Even with existing weed laws, noxious and invasive weeds continue to spread and cause significant economic and ecological damage
- Pastures, rangeland, and wildlife habitats, natural area sites often receive less than optimum management and can be a haven for invasive species
- Not many alternatives for control that could be used in certain areas e.g. up to water's edge, seasonally dry wet lands etc.

Aminopyralid reduces the environmental load of natural areas, rangeland/pasture and rights-of-way herbicides

	Aminopyralid	Dicamba	2,4-D	Clopyralid	Metsulfuron-methyl	Picloram	Triclopyr
Weed Species	Application Rate of Aminopyralid (lb ae/A) Equals 1X for Each Key Species						
Musk Thistle	1X (0.035)	8.9X	28.6X	4.5X	0.3X	4.5X	Not effective
Canada Thistle	1X (0.09)	16.7X	16.7X	4.9X	Not effective	4.9X	Not effective
Tropical Soda Apple	1X (0.1)	Not effective	Not effective	Not effective	Not effective	Not labeled in FL	10.0X No residual control
Spotted & Diffuse Knapweed	1X (0.085)	11.8X	11.8X	3.7X	Not effective	3.7X	Not effective
Yellow Starthistle	1X (0.065)	Not effective	15.4X	3.3X	Not effective	4.8X	Not effective
Russian Knapweed	1X (0.08)	Not effective	Not effective	5.5X	Not effective	5.5X	Not effective

Key Weeds Controlled by Aminopyralid

Weed species		Application timing
Common name	Scientific name	
cinquefoil, sulfur	<i>Potentilla recta</i>	Prebud
daisy, oxeye	<i>Chrysanthemum leucanthemum</i>	Prebud
hawkweed, orange	<i>Hieracium aurantiacum</i>	Bolting
hawkweed, yellow	<i>Hieracium pratense</i>	Bolting
knapweed, diffuse	<i>Centaurea diffusa</i>	Bolting
knapweed, spotted	<i>Centaurea maculosa</i>	Bolting
Kudzu	<i>Pueraria lobata</i>	Foliar
starthistle, yellow	<i>Centaurea solstitialis</i>	Rosette
Teasel	<i>Dipsacus sativus</i>	Rosette-bolt
thistle, Canada	<i>Cirsium arvense</i>	Prebud to early flower or fall
thistle, musk	<i>Carduus nutans</i>	Rosette, bolting or fall
thistle, plumeless	<i>Carduus acanthoides</i>	Rosette, bolting or fall
Vetch	<i>Vicia spp.</i>	Preflower
Wild parsnip	<i>Pastinaca sativa</i>	Rosette, bolting

Invasive Plant Species Management

with Milestone® herbicide



— INSIDE — INVASIVE PLANT MANAGEMENT

- *Noxious and Damaging Weeds*
- *Environmental Considerations*
- *Revegetation Guidelines*
- *Calibration Tips*

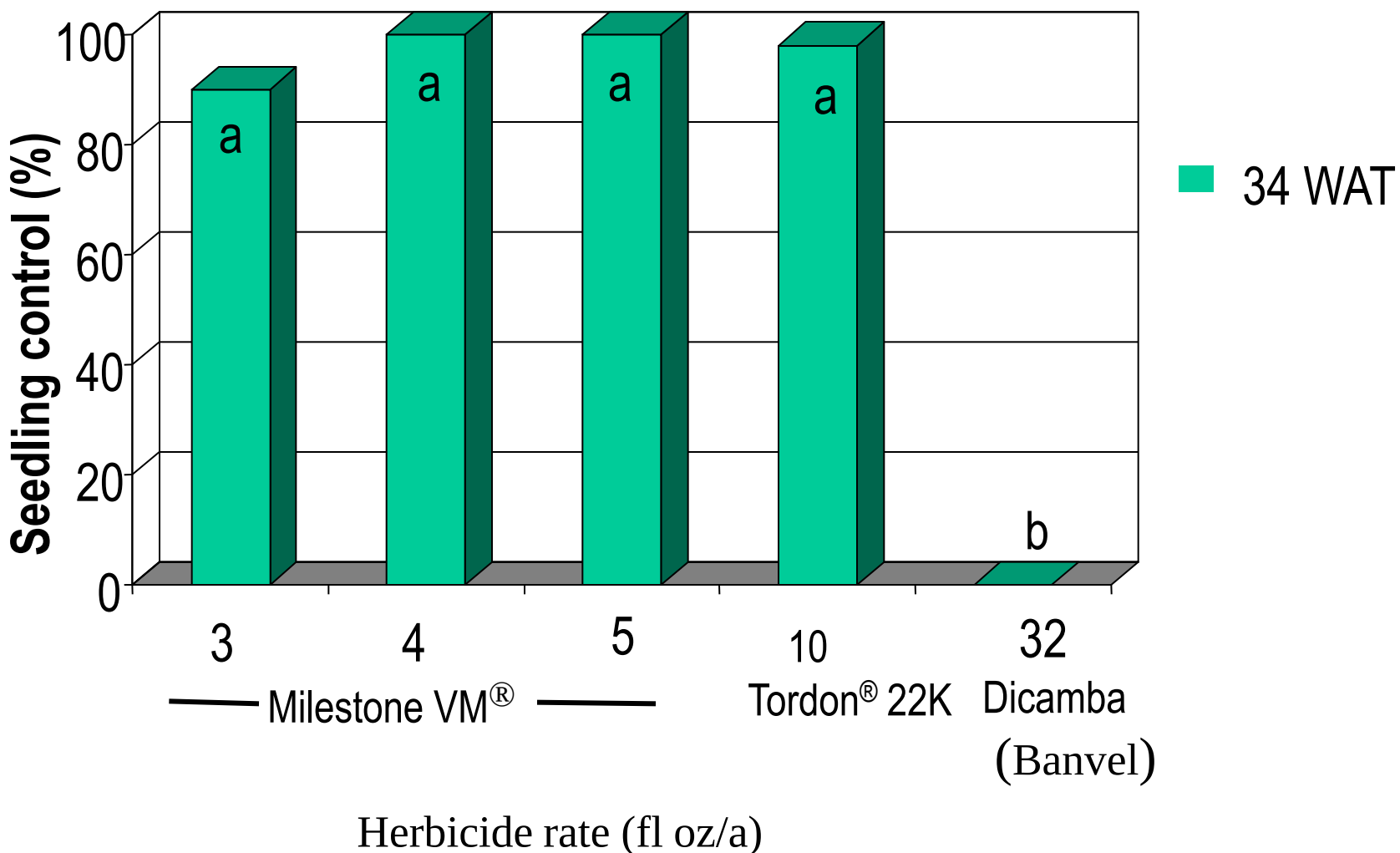
- Section 1: Invasive Plant Species Impacts
- Section 2: Management Considerations
- Section 3: Key Weed Efficacy Data
- Section 4: Recommendations and Rates
- Section 5: Wildlife Habitat and Riparian Area Considerations
- Section 6: Backpack and Spot Treatment Calibration Guidelines
- Section 7: Trees, Grasses, Revegetation and CRP Guidelines
- Section 8: Technical Facts and Answers to Frequently Asked Questions

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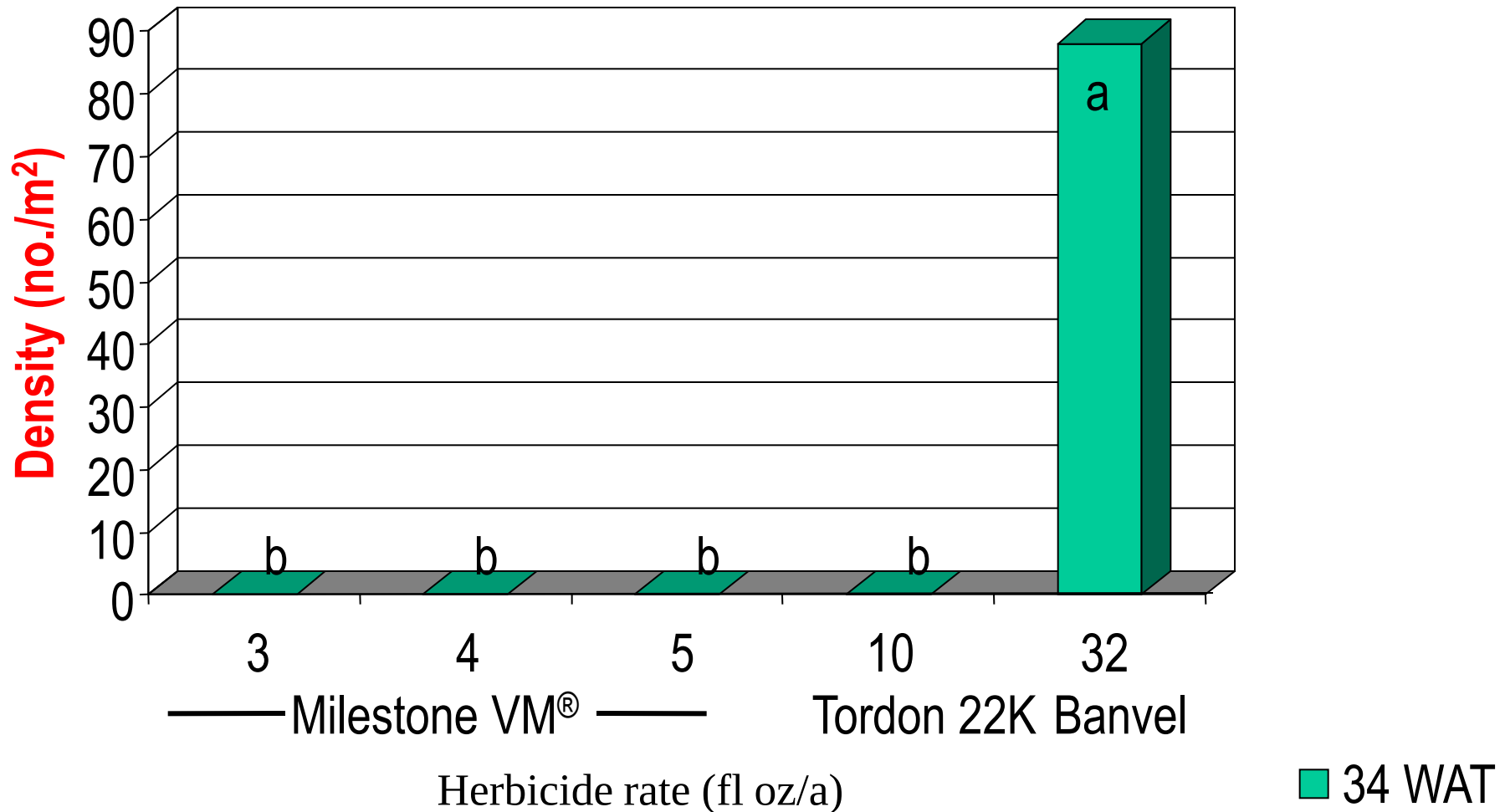
Material and Methods

- Randomized complete block, 3-4 replications
- 0.25% Non ionic surfactant added to all treatments unless otherwise noted
- Multiple treatments based on species
 - Rates and timing vary
 - Each will be described separately
- Some data pooled over years

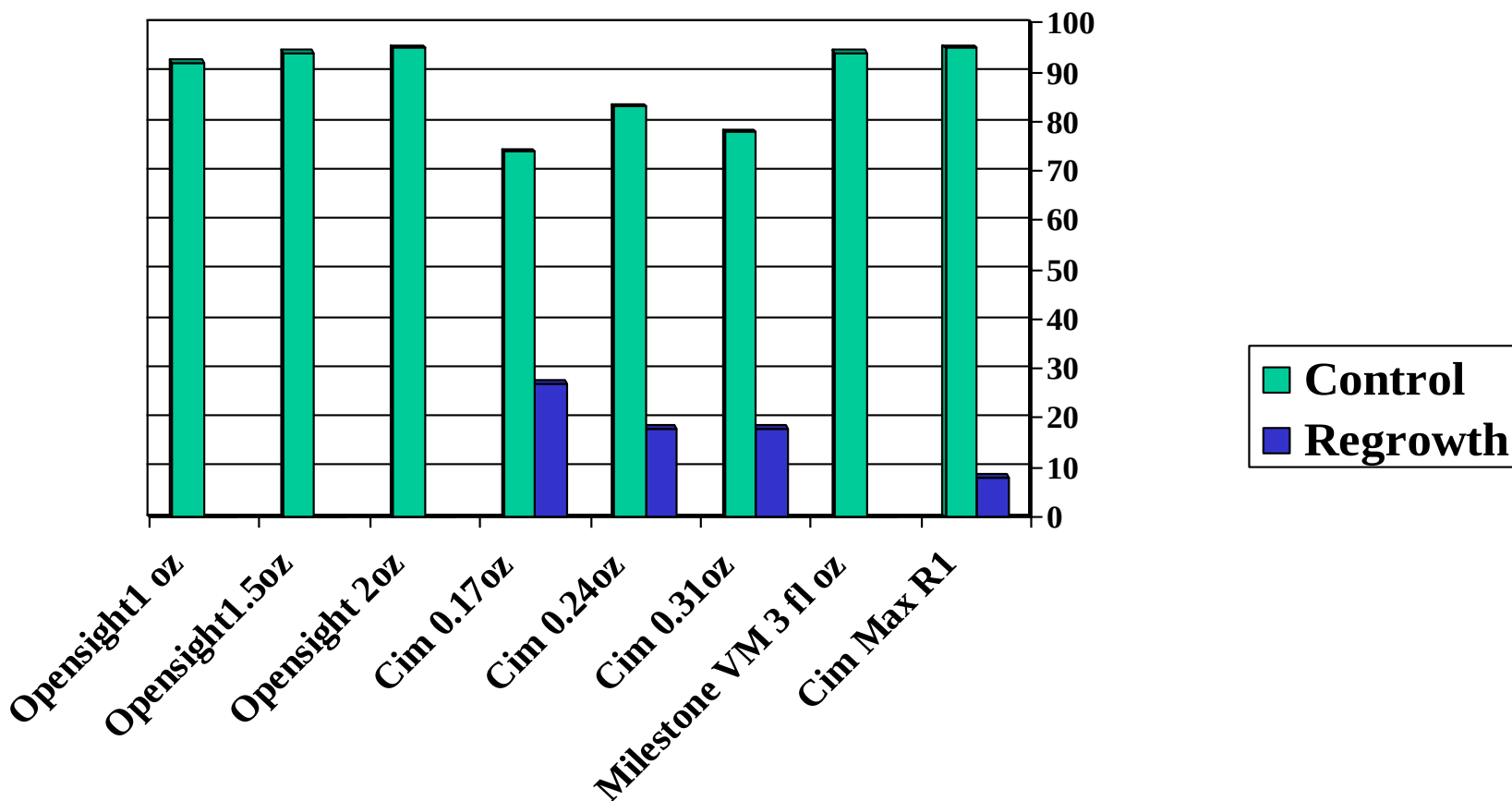
Musk thistle (*Carduus nutans*) Autumn Application (October 26, 2002)



Musk thistle fall application (October 26, 2002)



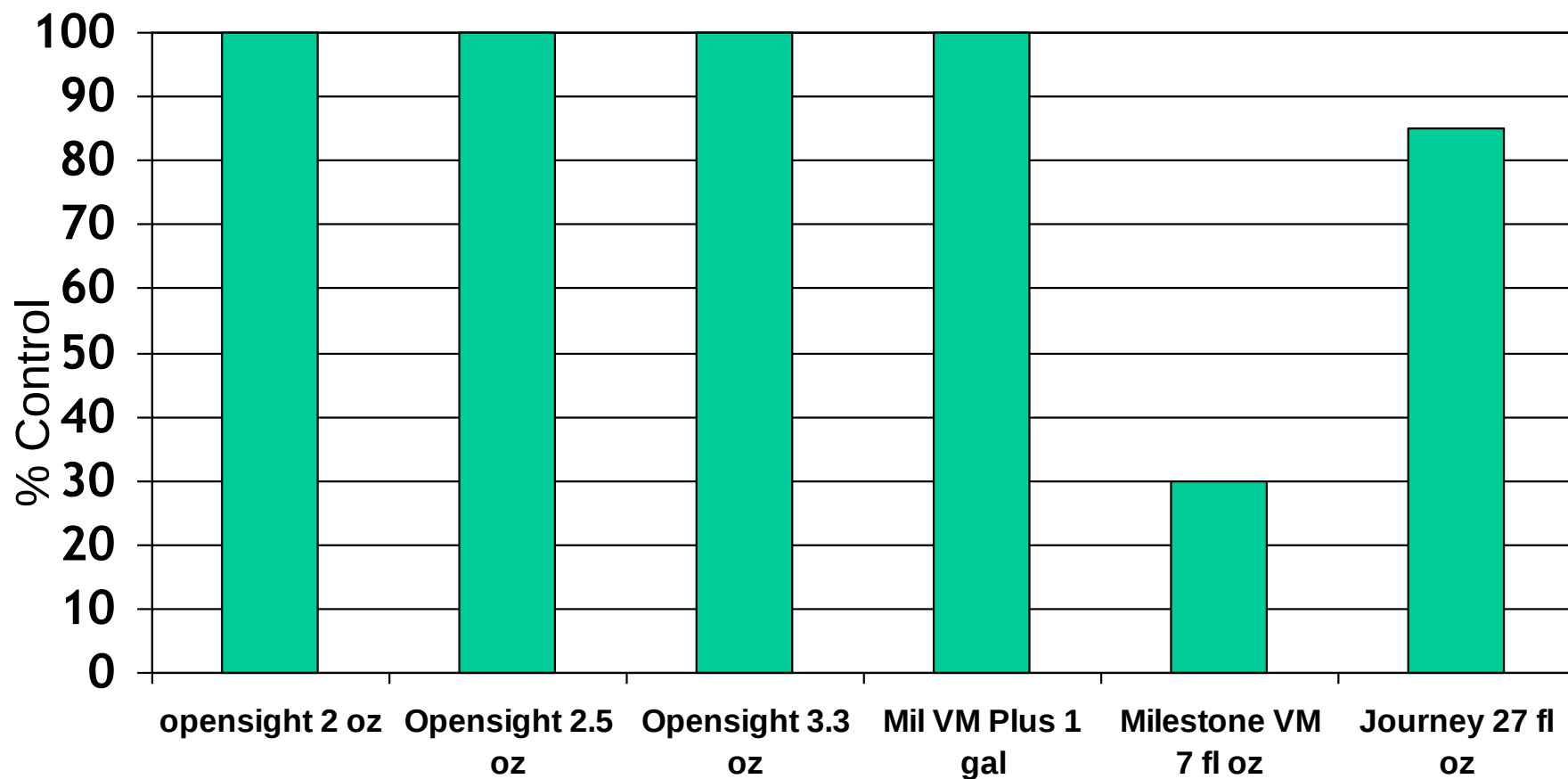
Late bolt stage musk thistle (*Carduus nutans*) control 60-74 DAA in Missouri and Nebraska





Opensight™ 1oz product/acre – 5 WAT

Poison Hemlock (*Conium maculatum*)

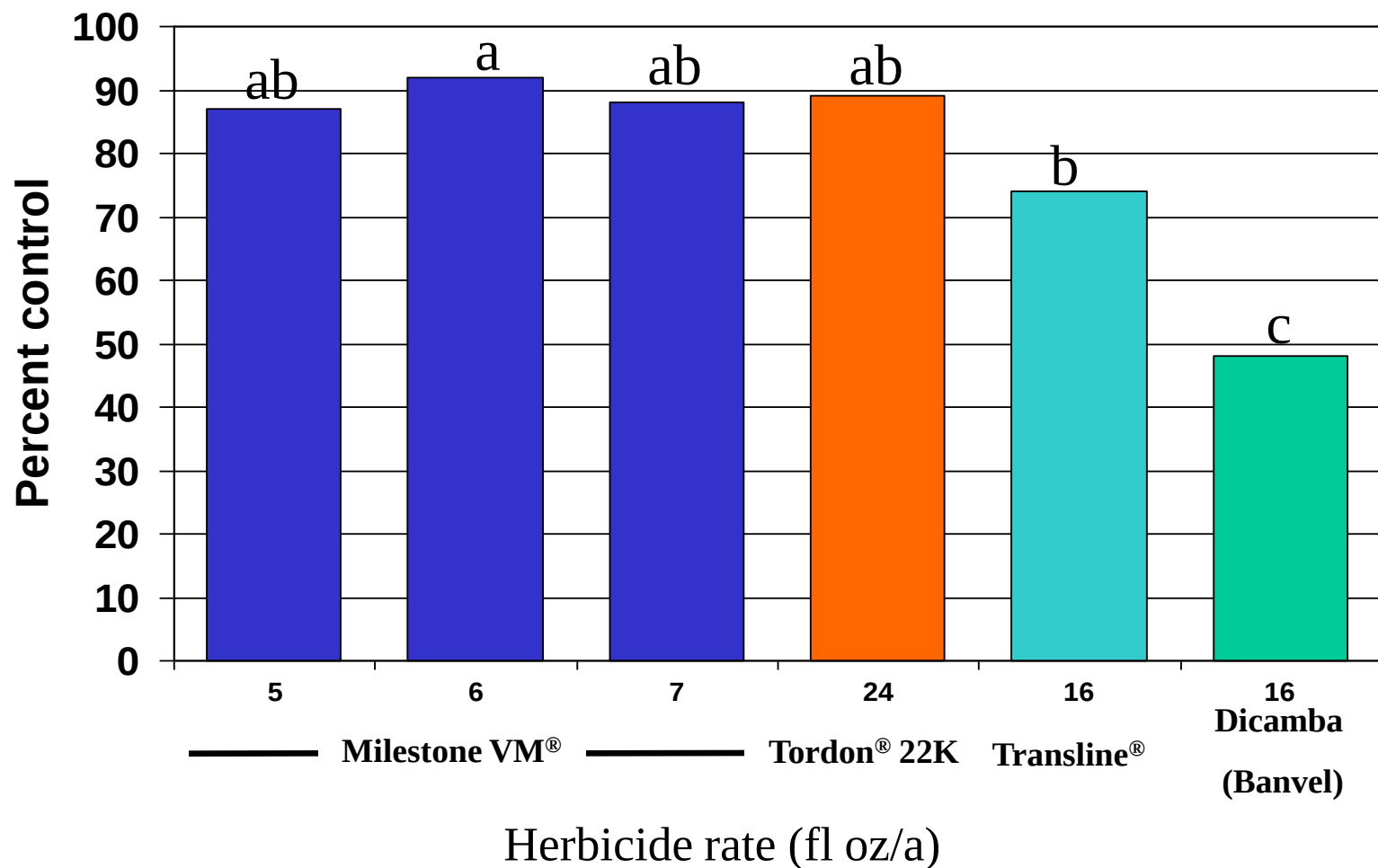


Applied April 29th to
24 inch plants

Missouri-110 DAA

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Canada thistle (*Cirsium arvense*) Control with Fall Applications



Average of 5 sites North Dakota (2), Nebraska, Virginia, and Washington

Key Question from Land Managers

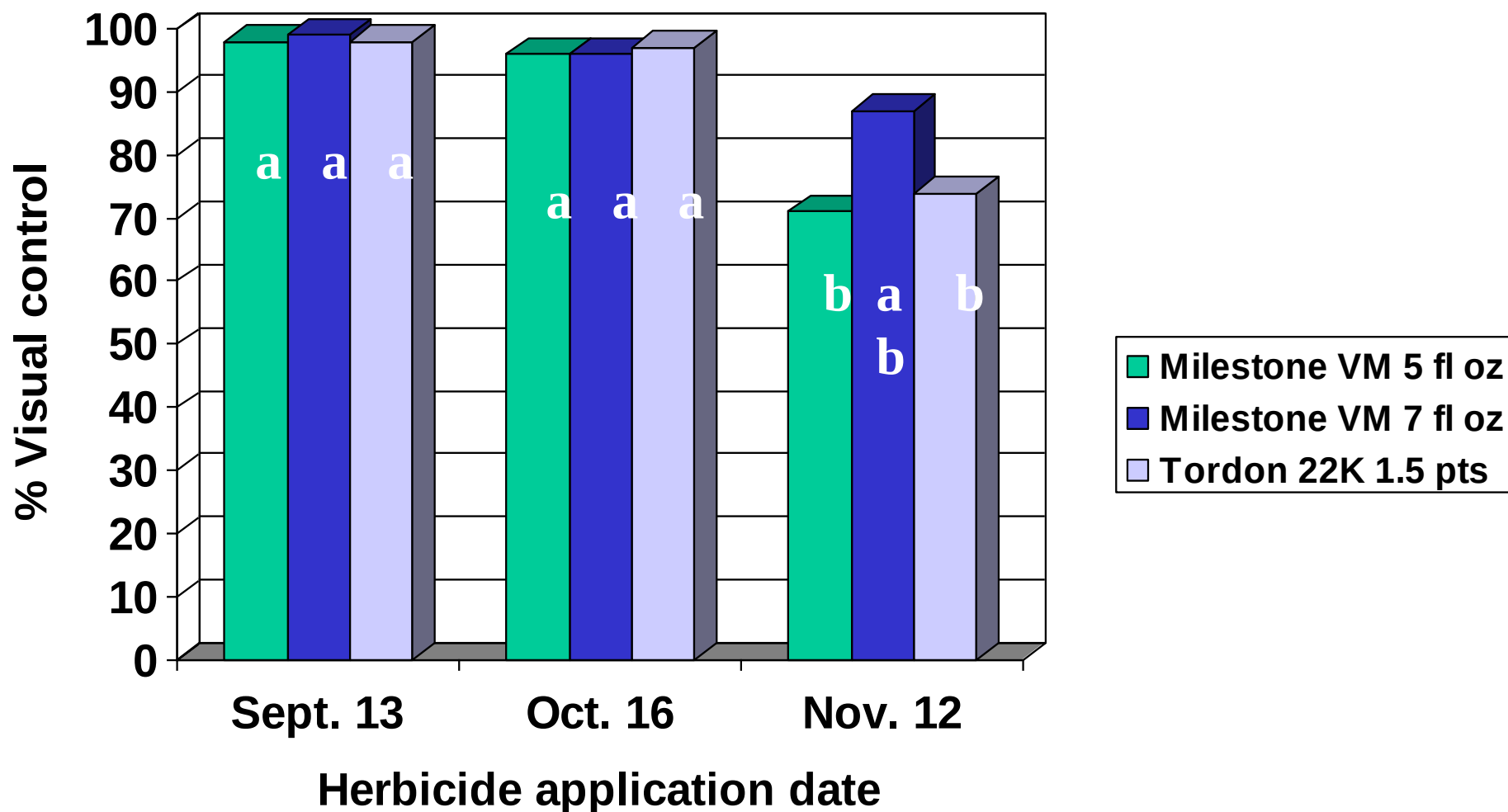
- Current Label:
 - “Apply Milestone VM at 5 to 7 fl oz per acre to plants in the prebud to early bud state.....Applications are also effective in the fall before a killing frost.
- Can aminopyralid still provide excellent control when applied in a wider application window?



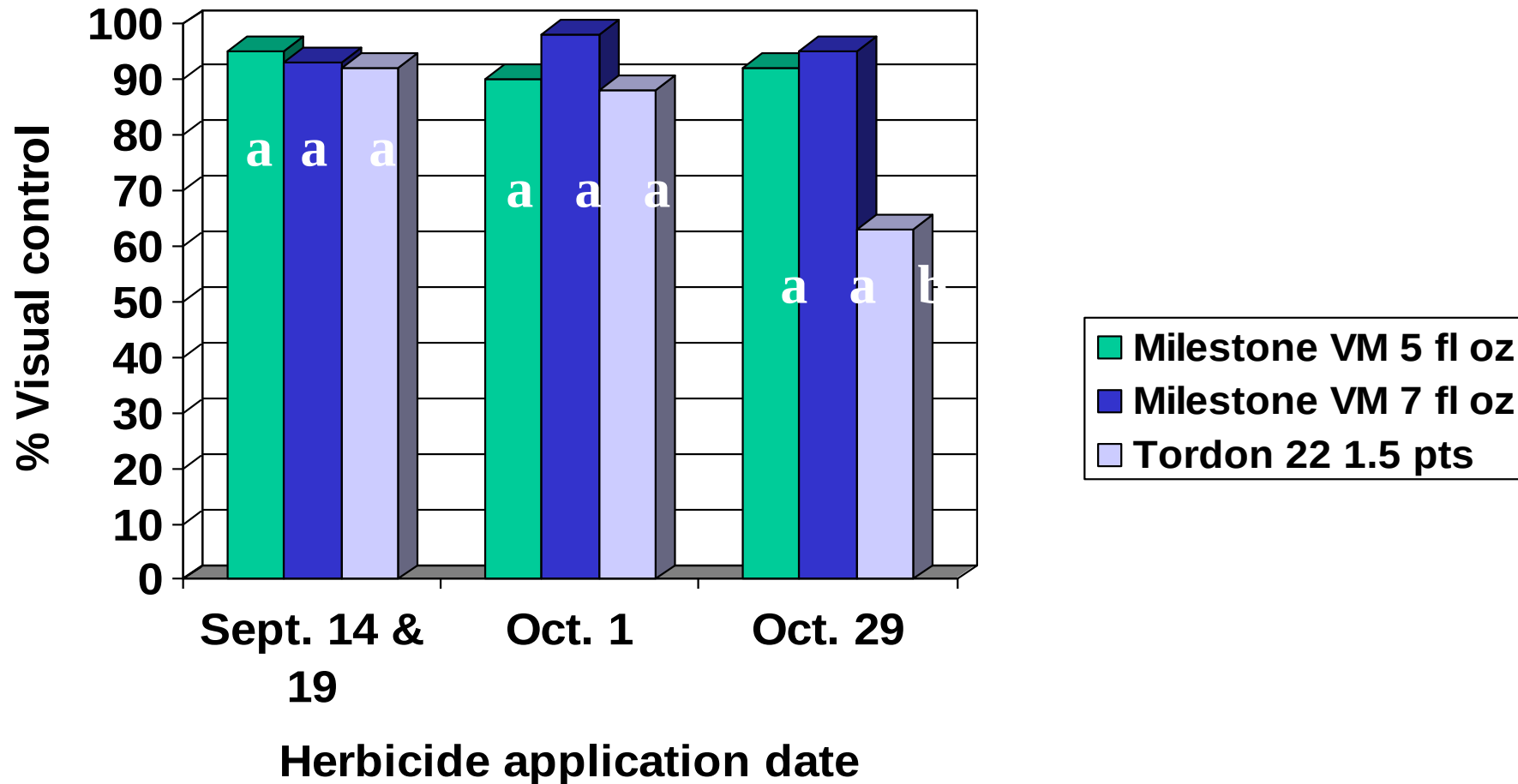
Materials and Methods

- Locations and application dates - 2007:
 - Fargo, ND — Sept. 19, Oct. 1, Oct. 29
 - Ecklestone, ND - Sept. 14, Oct. 1, Oct. 29
 - Scotts Bluff, NE — Sept. 13, Oct. 16, Nov. 12

Herbicide efficacy on Canada thistle at different application timings - Nebraska



Herbicide efficacy on Canada thistle at different application timings- North Dakota



Extending spring/summer application window

- Milestone VM at 5 and 7 fl oz/a at 4 timings

MN- June 25
SD-May 28th

30 % Bud

MN- July 9
SD- July 1

Full Flower

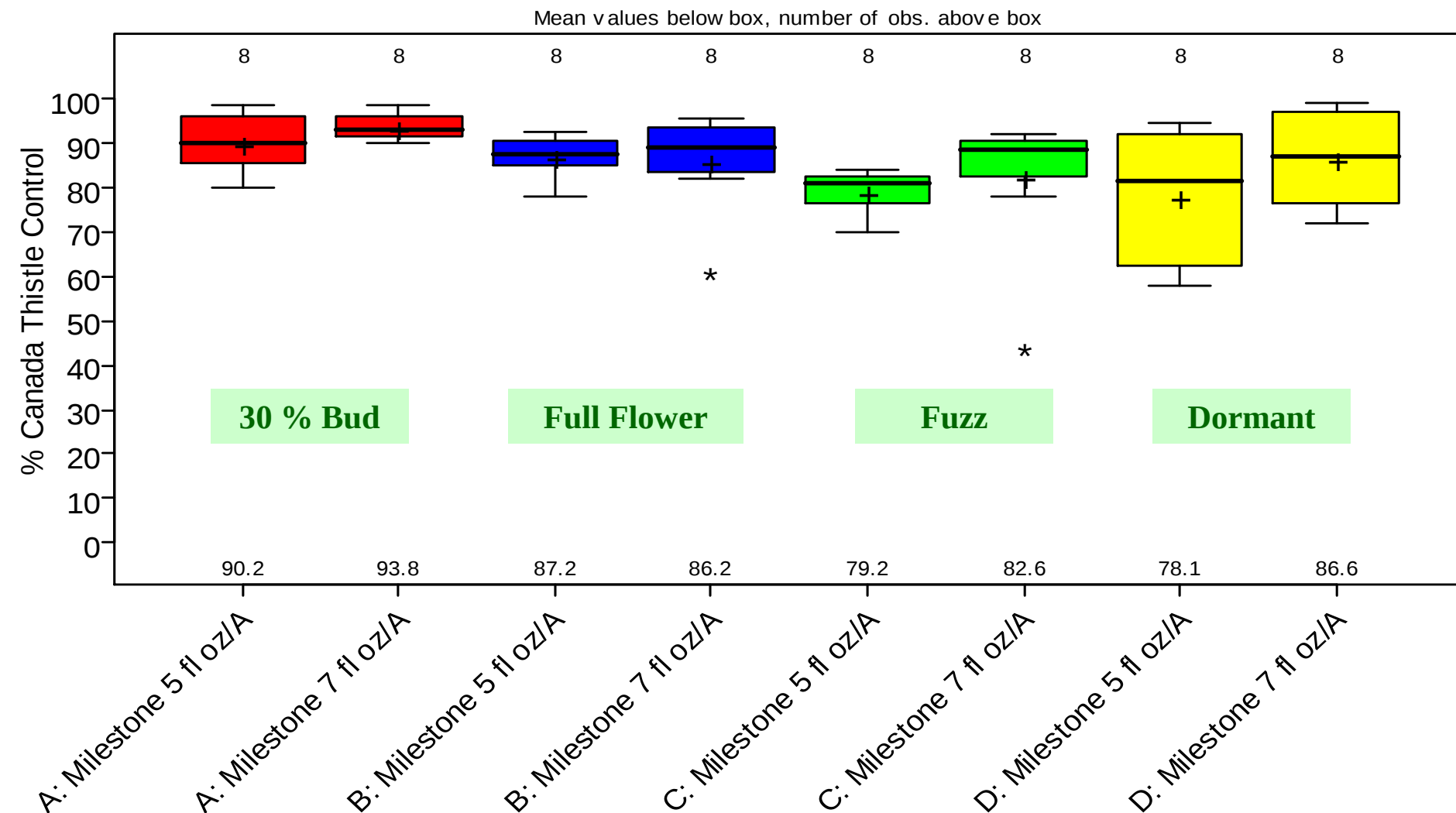
Fuzz

MN-July 23
SD- July 17th

Dormant

MN - August 25th
SD – August 17th

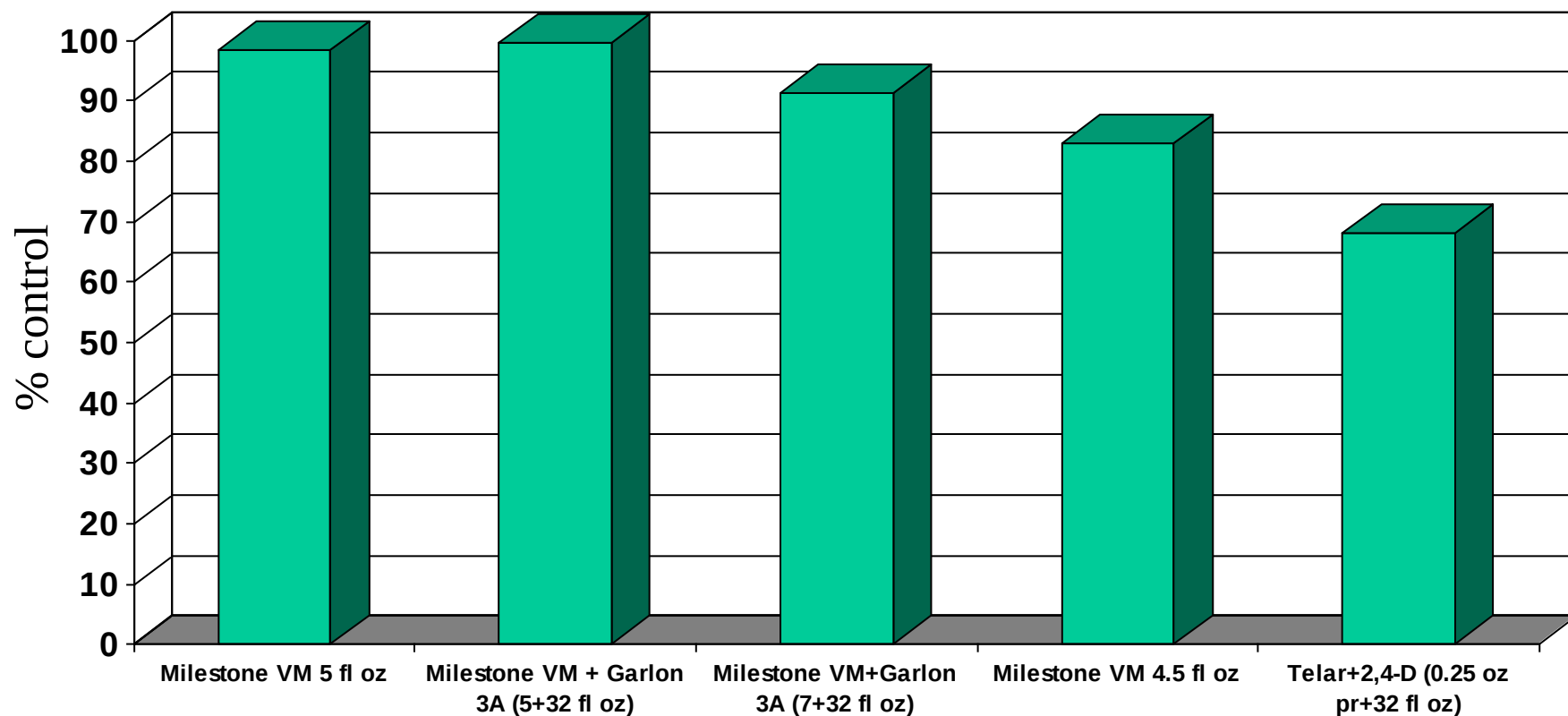
Canada Thistle Control at 4 Summer Timings



Conclusion for timing studies

- Milestone VM at 5 and 7 fl oz/acre in the autumn provided excellent control of Canada thistle
- Milestone VM provide better efficacy when **applied later into the season** than picloram.
- Even though Canada thistle leaves were beginning to senesce, there was still excellent efficacy by all herbicide applications up to late October as long as there was some green foliage.
- Milestone VM at 5 and 7 fl oz/acre provided excellent control **at later growth stages** (early flower) in the spring than currently recommended on the label

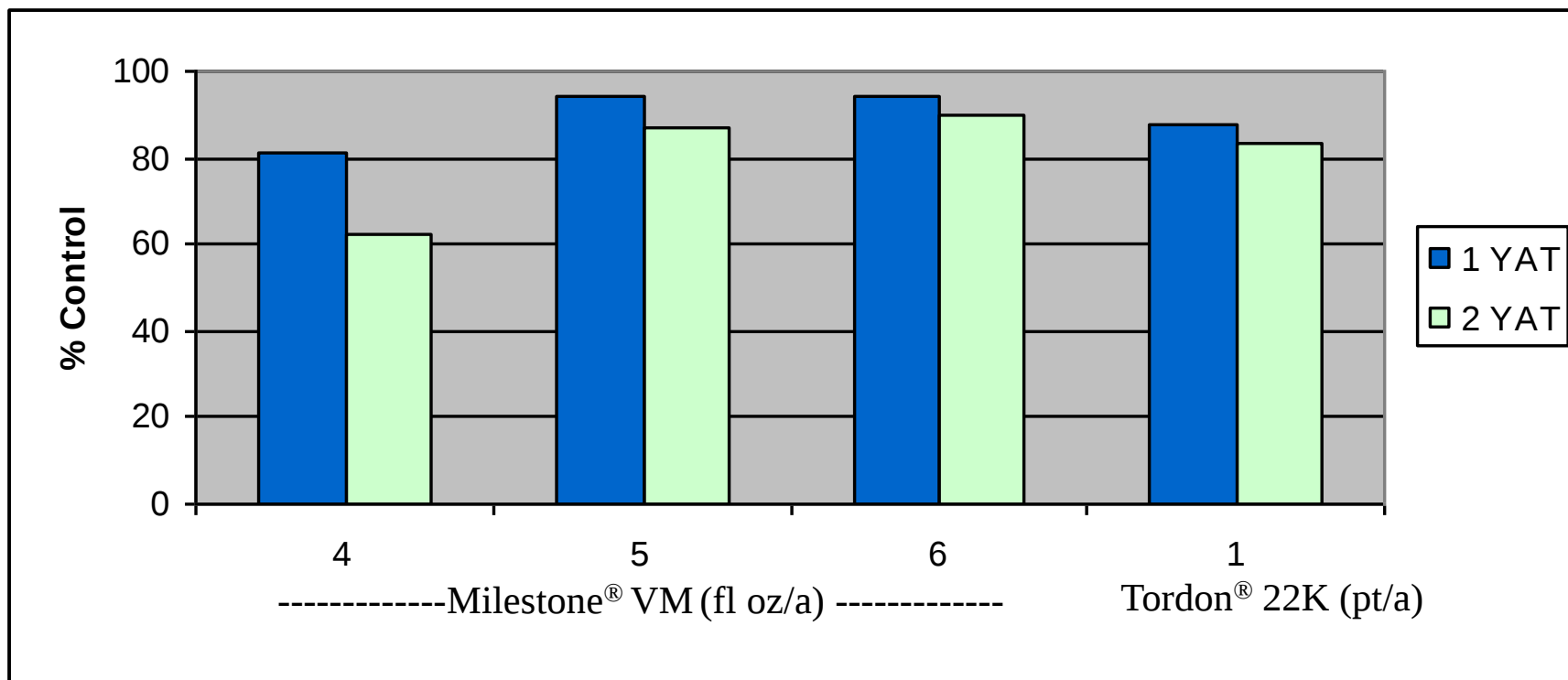
Common teasel (*Dipsacus sativus*)



Avg. of 3 trials across 2 states.

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Spotted knapweed (*Centaurea maculosa*) Rosette/bolting growth stage application



Evaluations averaged over 5 locations

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Spotted Knapweed Control – WI



Milestone[™] VM herbicide applied at 5 fluid oz/acre - 3 yrs after treatment

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Summary and Conclusions

- Aminopyralid and aminopyralid-containing mixtures provide excellent control of key noxious and invasive species.
- Aminopyralid can be applied over longer period of time to control Canada thistle compared to previous standards.
- Aminopyralid possesses the efficacy and key toxicological and environmental fate attributes that make it an excellent fit in invasive weed management programs.

Thank you.
Questions?

