Management of Canada thistle in grass based systems

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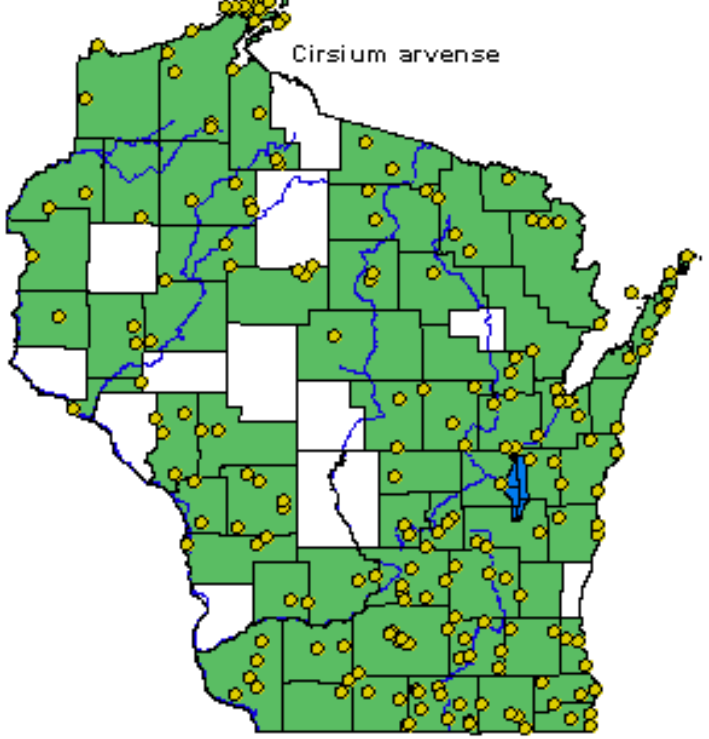
Canada thistle
(*Cirsium arvense*)

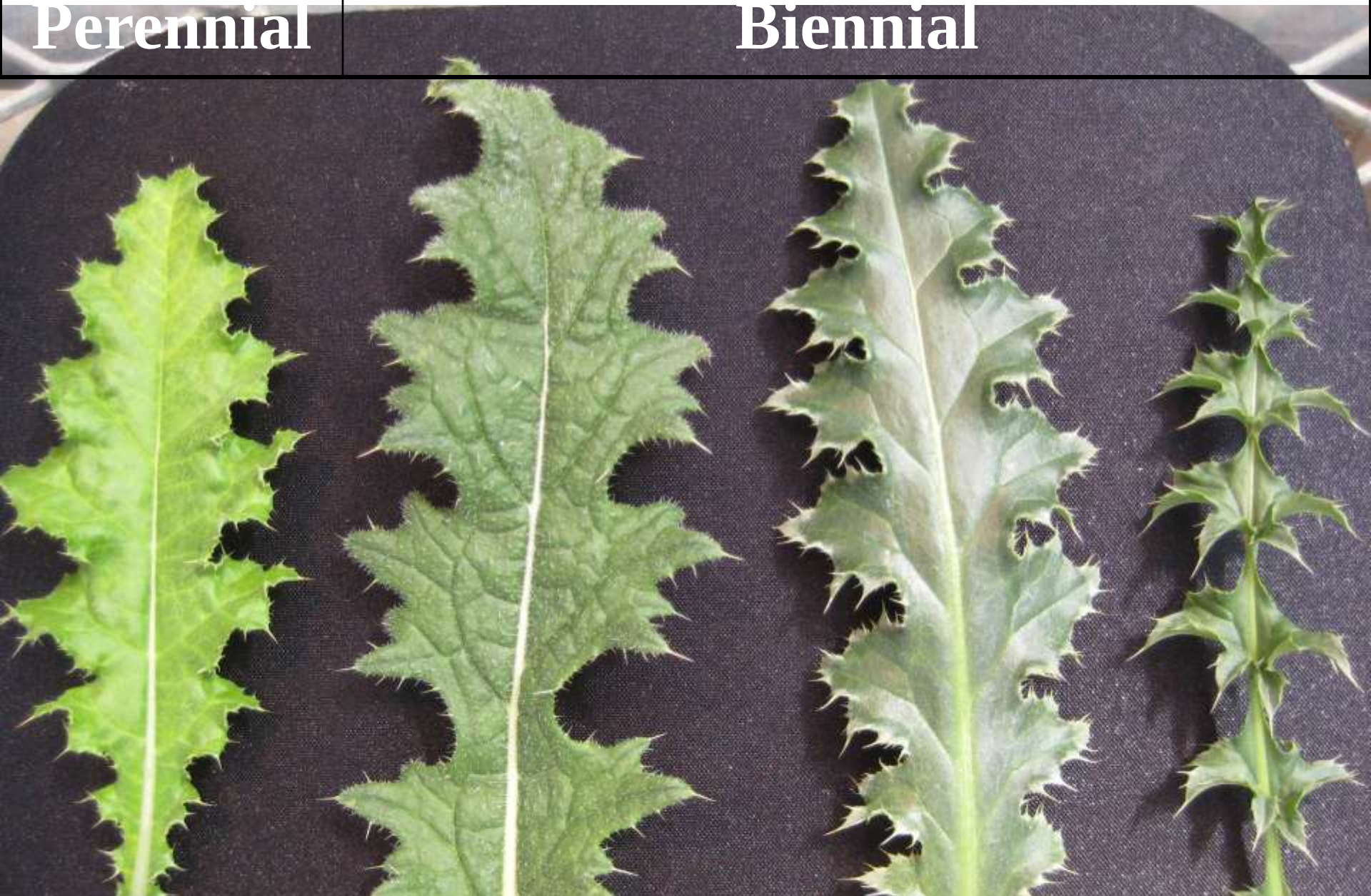


- Life History –
  - Creeping perennial
- Key ID
  - Hairless leaves. Fuzz on bottom of older leaves.
  - Irregularly lobed leaves with a prominent spine at the tip.
  - No spines on the stem.
  - Flowers are fingertip-sized and lack spines.
  - Creeping root system

Canada thistle

(*Cirsium arvense*)

Canada	Bull	Musk	Plumeless
Perennial	Biennial		



No spines on the stem!

Flowers


Paul S Drobot
plantstogrow.com

Canada thistle seed biology

Seed (achenes) characteristics

- 1 to 104 seed per head
- 50% of flowers produce seed
- 50% avg. germ., 10 to 70% range
- Seed can germinate in fall or spring

- **80% of seed falls within 5 ft of mother plant**
  - **Seed moves direction of prevailing wind**

Creeping root system

- Perennial roots
  - Can produce plants from 1/8” to 1/4” fragments

	Canada thistle	Bull thistle	Musk thistle	Plumeless thistle	European marsh thistle
Leaves	Irregularly lobed. Tips have small spines.	Deeply lobed with distinct spines on leaf edge.	Moderately lobed with white midrib.	Heavily lobed.	Heavily lobed with dark edges.
Hair on Leaves	None. Older leaves can have white fuzz on bottom.	Coarse hair on top of leaf. Soft hair on bottom of leaf.	None.	Bottom of leaf and petiole hairy.	Sticky hairs.
Stems	Not spiny.	Spiny, appears winged.	No spines on upper stem below flower.	Spiny.	Appears winged.
Flowers	Fingertip size. Not spiny. Bracts.	1-2”. Teardrop shaped.	1-2”. Stiff bracts.	Fingertip or slightly larger. Prominent bracts.	0.75”. Not spiny. Purple tipped bracts.

Why is Canada thistle so difficult to control?

- Perennial root system stores large amounts of energy that allow for
  - Fast growth early in the season
  - Tolerates management
- Results in vegetative spread

4 steps to managing Canada thistle in grass-based systems

1. Plant and manage desirable plants to compete with CT

2. Minimize disturbance of infested area

3. Manage infestations at the correct stage with the right material

4. Manage small infestations before they become large infestations

Step 1: Plant and manage desirable plants

- Multiple studies have found mixtures of plants successful at competing with Canada thistle
  - cool season grasses (ND, WI)
  - Mixture of cool and warm season grasses (MN)

- Worked best in conjunction with removal as plants establish

Step 2: Minimize disturbance

- CT thrives on disturbance
  - Roots and seeds present in soil of most soils
- Grasslands that are disturbed often see CT appear
  - Disking, Fire, Erosion, and **MOWING**

- If can’t minimize plan to manage areas with disturbance in the future

Step 3: Manage at the correct time with the right tool

- Management methods are timing specific

1. Herbicide = **flowerbud or fall**
2. Grazing=**bolting to flowerbud**
   - Should be repeated 3-4 x/yr
3. Mowing= **bolting to flowerbud**
   - Should be repeated 3-4 x/yr
4. Biological control: species specific
5. Disking= **bolting to flowerbud**
   - NOTE: Can result in spreading infestation

Step 4: Manage small infestations

- Canada thistle tends to increase in size annually
- Management becomes more difficult and expensive as populations grow

Shoot and root growth 1 year after planting

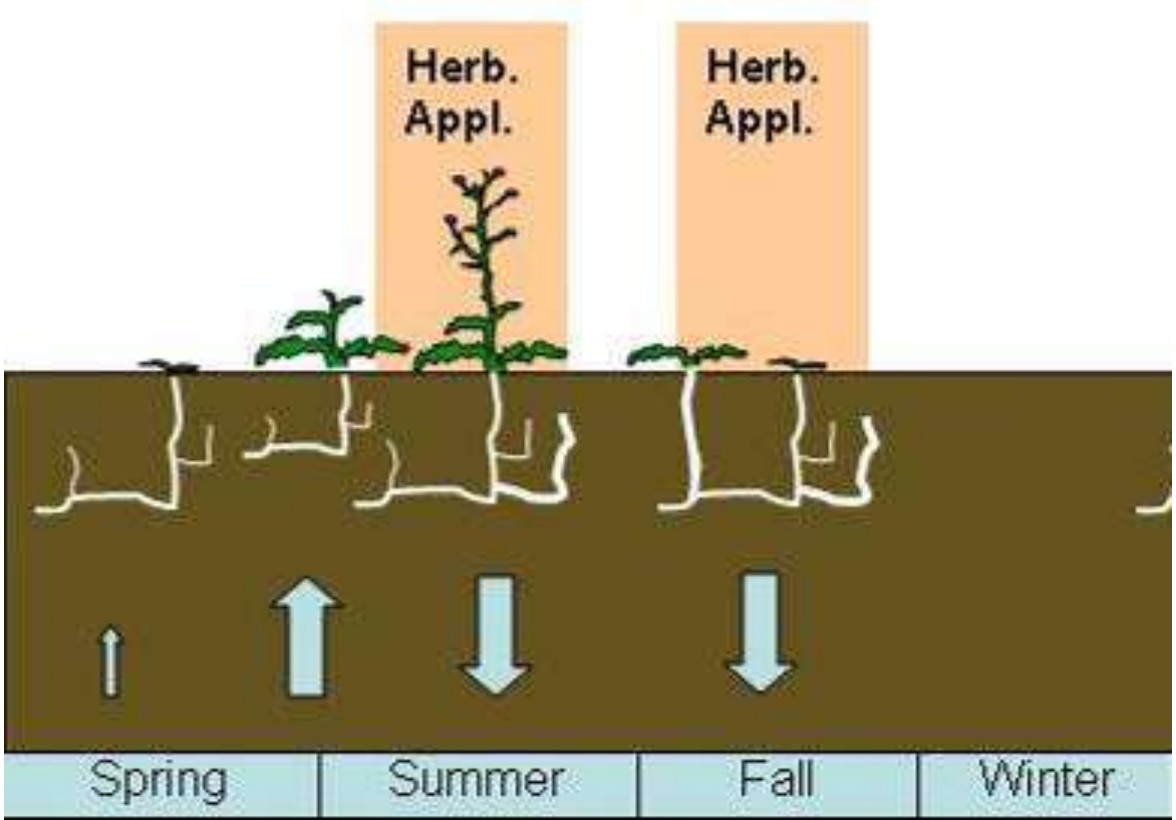
644 ft of roots and 336 ft of shoots

SIZE MATTERS

- Which would you rather manage?

Herbicide applications

- Timing of application *is critical*
- One application will rarely eradicate a population
- Use systemic herbicides: Flowerbud stage or fall regrowth

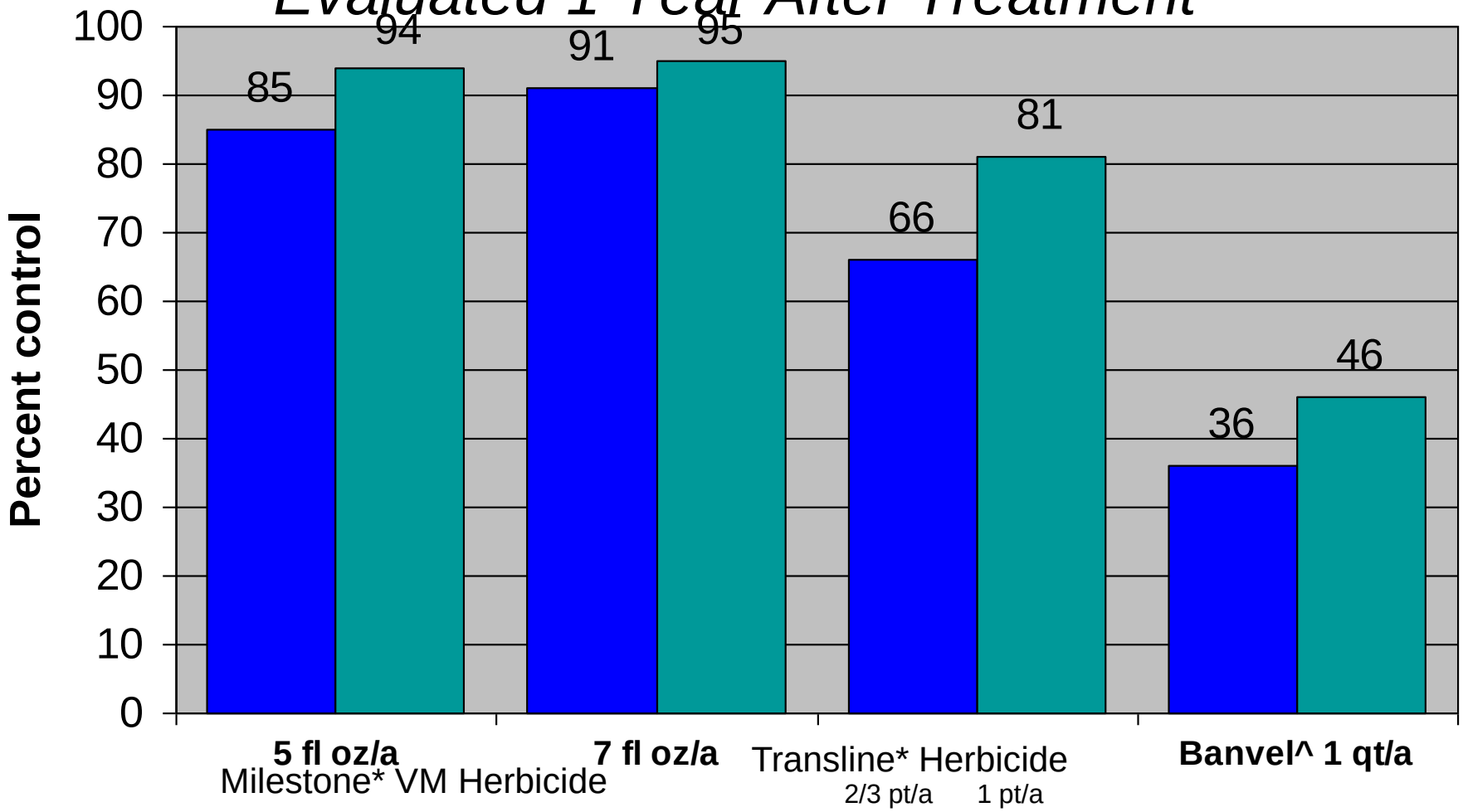


Bob Hartzler, ISU

Herbicide	Cost	Selectivity	Soil activity	control
Banvel/Clarity	$-$$	Many broadleaf	Several weeks	Fair
2,4-D	$	Most broadleaf	Week(s)	Fair
Forefront	$$	Most broadleaf	Several months – year(s)	Good-Excellent
glyphosate	$	Not selective	None	Good-Excellent
Milestone	$$	Some broadleaf	Several months – year(s)	Excellent
Stinger/ Transline	$$$	Some broadleaf	Several months – year(s)	Good-Excellent

Control of Canada Thistle with Milestone®
Applied Flowerbud or Fall

Evaluated 1 Year After Treatment



Pre-bud: Average of 36 trials (CO, MN, MT, ND, SD, NE, OR, VA, SD, OR, WA, and WY)

Fall: Average of 22 sites VA, ND (2), SD, NE, WY, CO, and WA

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Herbicides will remove legumes if broadcasted!

Grazing

- Continuous grazing not effective
- Rotational grazing for multiple years
  - Need multiple years
  - Mob grazing to get animals to feed on CT

Treatment	Year 1	Year 2	Year 3	Yr 4 (no trt)
	Canada thistle stem density/m2			
Continuous	34 a	39 a	32 a	18 a
Rot graze to 6 in	20 ab	19 b	24 a	9 b
Rot graze to 1 in	10 b	5 c	2 b	0 c

Mechanical removal/mowing

- 3-4 cuttings per year for 3 years eliminated stands
- 2 cuttings per year for 3 years + planting competitive perennial grasses gave >90% control
- 1 mowing/yr NOT RECOMMENDED
  - Studies show increase or similar population

Insects for Biological Control

Product	Quantity	Price
Canada Thistle Stem Gall Fly *Urophora cardui*	105	$100.00
Canada Thistle Stem Mining Weevil *Ceutorhynchus litura*	105	$150.00
Thistle Defoliating Beetle *Cassida rubiginosa*	105	$90.00

1. Several native *Cirsium* spp. may also be injured by these agents, DATCP may not give permission

2. Suppression has been variable in controlled studies

Bacteria for biocontrol?

Pseudomonas syringae

Check (top left) plus 4 degrees of control

Jurg Hiltbrunner

Summary

- Canada thistle has been here a long time and will talk many years of management to eliminate it from an area
- Select management method(s) carefully and apply at the correct timing
  - Integrating methods can provide best control
- Plan to scout and treat infestations before they spread
- Many sources for re-invasion so continually scout for new invasions