Optimizing perennial weed management

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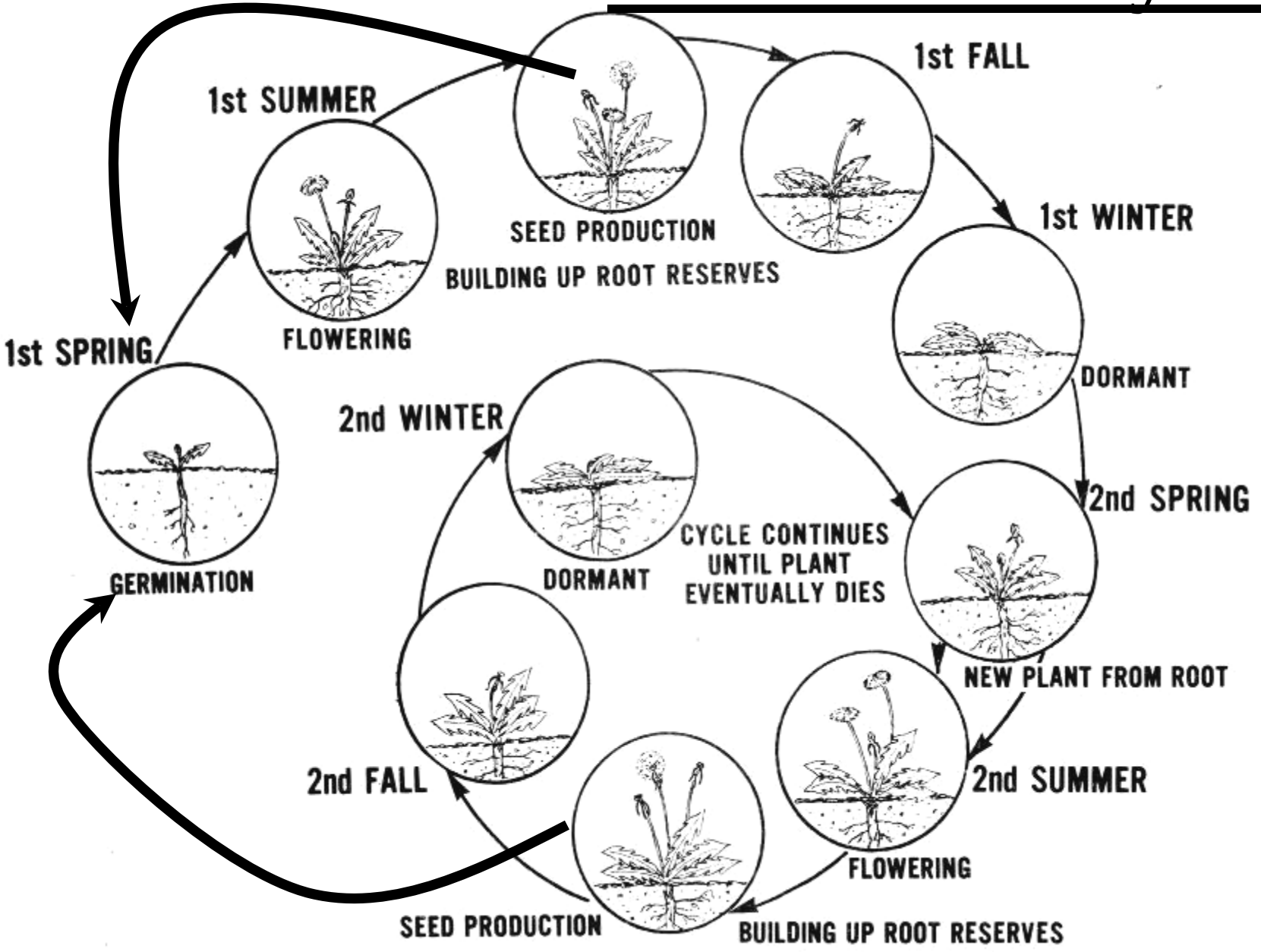
Perennials live for more than two years



Why manage perennials?

- Yield loss
  - if quackgrass is not controlled in the following crops

1. 28% in corn with tillage
2. 94% in no-till corn
3. 40% in soybeans with tillage

Perennial organs

- Shoots can emerge from perennial organs deep within the soil.
- Store large amounts of energy
  - 40%-90% of total plant biomass

- Grow deep into the soil access limiting resources (water)
- Can lead to further spread

Pest management steps

1. Pest identification = WHAT IS IT?
   - What kind of perennial

2. Population size = HOW MUCH?

3. Economics = IS IT COSTING ME ?

4. Available control tactics = WHAT CAN I DO?

Types of perennials

- Simple perennials:
- *Rely on seed for spread*
  - ***Examples:***
    - ***Dandelion, White Cockle, spotted knapweed***




Types of perennials

- creeping perennials
  - Perennials that can establish many shoots from one root/rhizome system!
    - Rhizomes or perennial roots

Population size: HOW MUCH?

- Control is more difficult as infestations age as size of stored energy increases

Economics: IS IT COSTING ME $$$$

- Canada thistle root fragment planted and let grow **for a little over one year**

Optimizing control

Management options for perennials

- Many tools are available, PREVENTION/EARLY DETECTION AND ERADICATION IS THE BEST OPTION

- Tillage
- Mowing/grazing
- Crop competition
- Herbicides

} **TIMING IS IMPORTANT**

- Integrating tools works best

Tillage

Plowing/cultivation:

- Breaking perennial tissue into small fragments
- Burying plants or bring to surface
  - Tissue is sensitive to sub zero temps
  - Can dry-out tissue
- More effective on perennials without perennial roots deep in soil (e.g. alfalfa, white cockle)
- Can spread plants to uninfested areas

Mowing/Grazing/in season Cultivation

TIMING: When minimum stored energy present belowground

Forces plant to use stored energy to grow

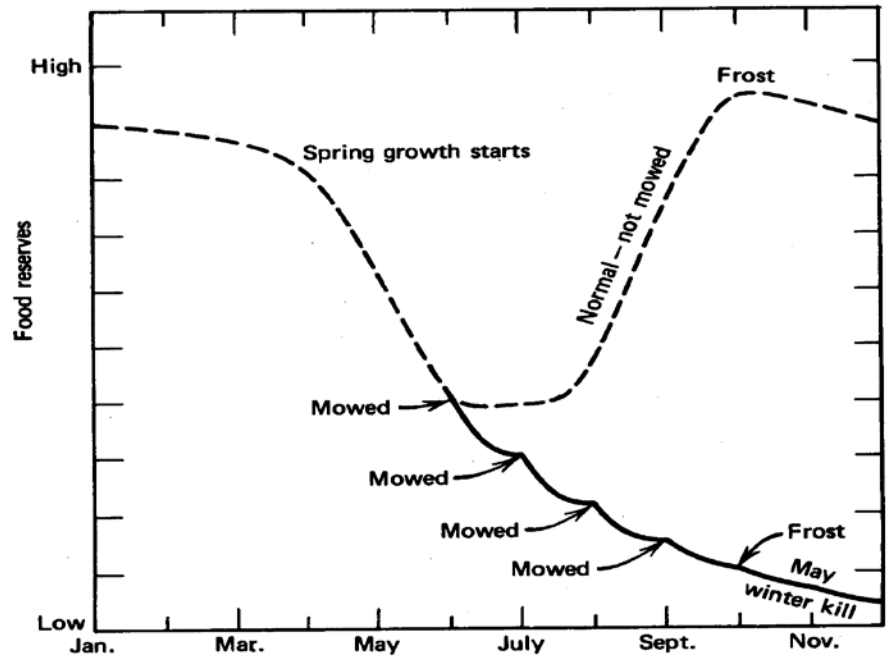
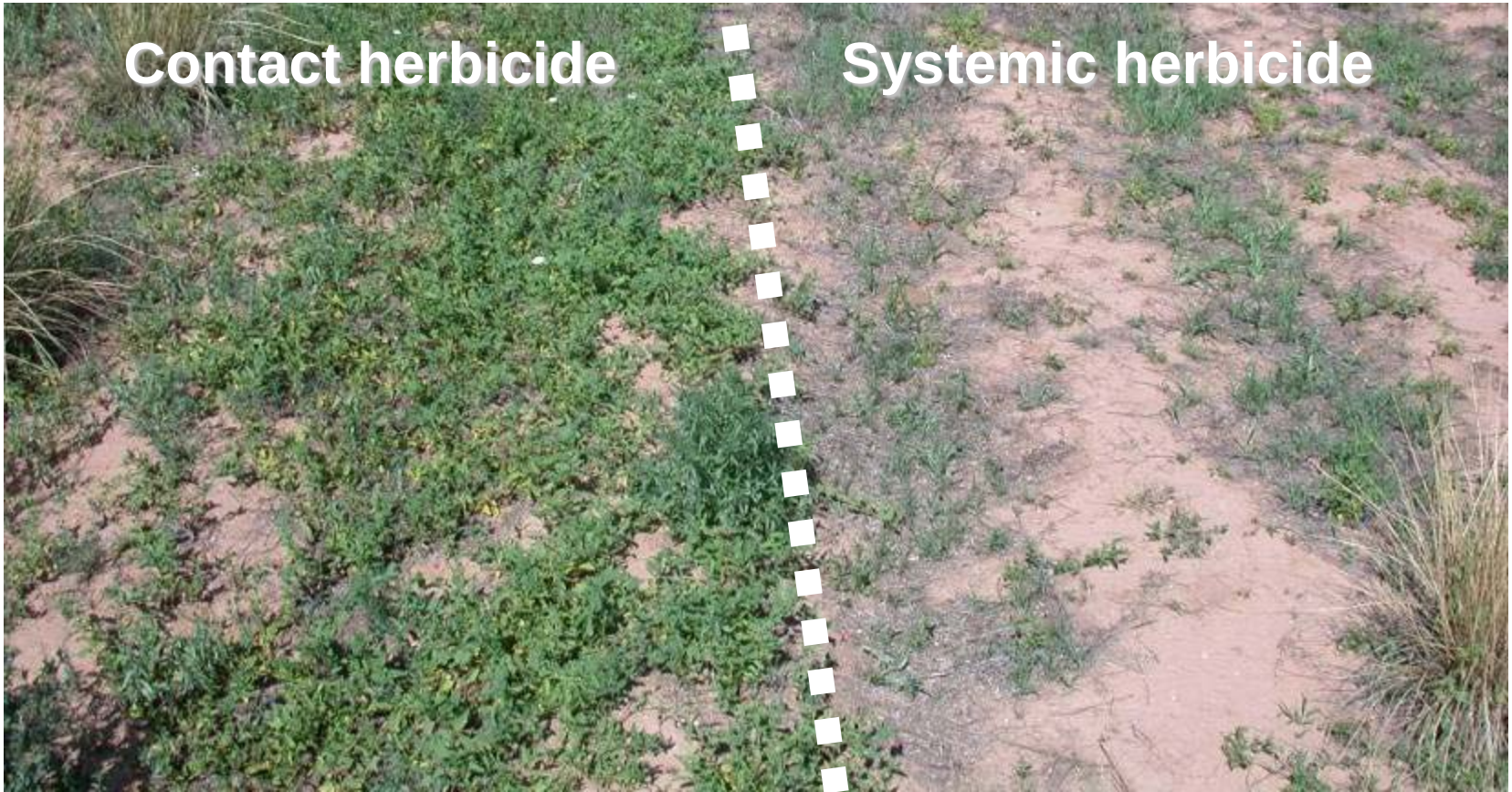


Figure 3-3. Food reserves of a perennial unmowed plant compared with reserves of a repeatedly mowed plant.

From *Weed Science Principles and Practices.* Ashton & Monaco 1982

Herbicide applications

- One application will rarely eradicate a population
- Use systemic herbicides



Herbicide application

- Maximize herbicide movement into perennial tissue
  - Best herbicide
  - Timing
    - Flowerbud-flowering stage
    - Fall just prior to hard frost
- Reduced control when applied
  - In early spring
  - stressed plants

Glyphosate resistant crops are a great tool!

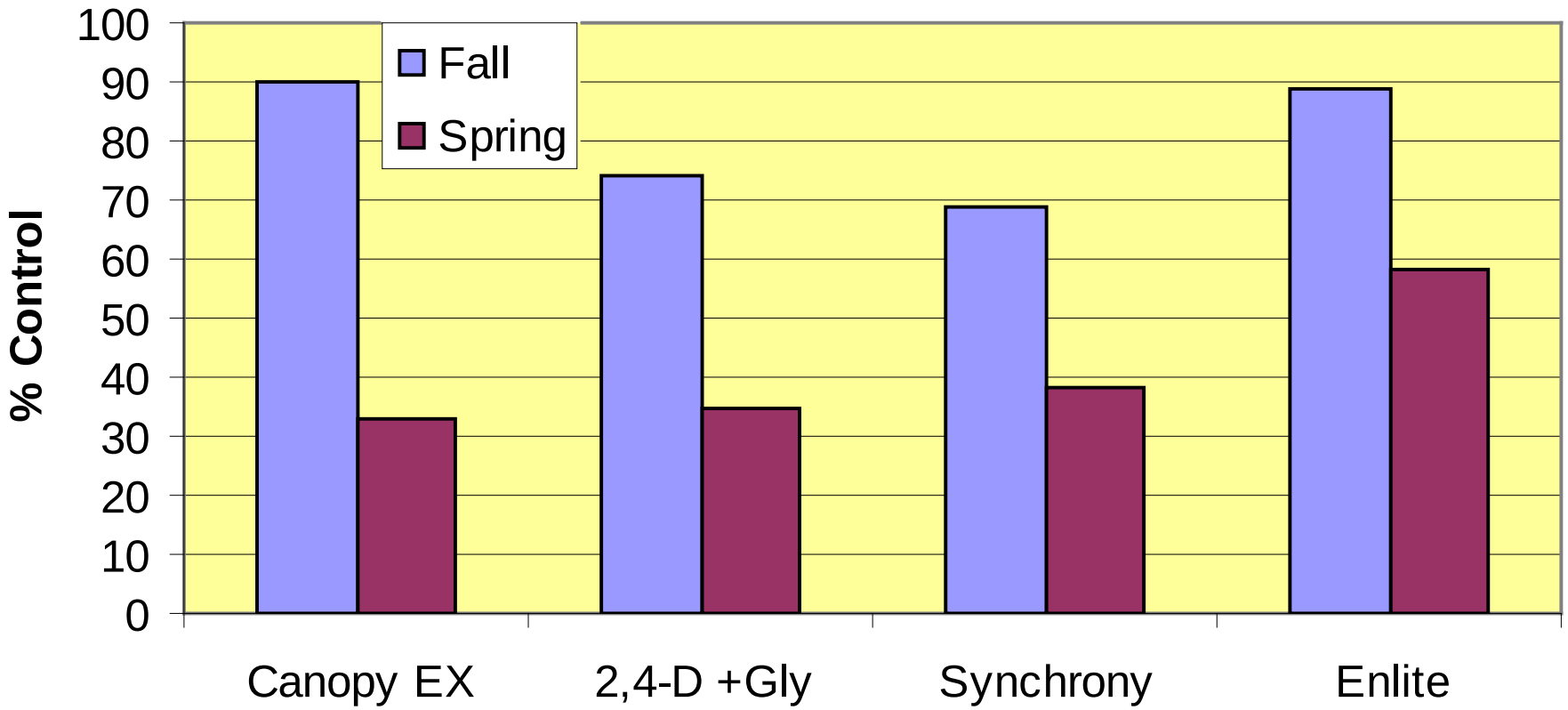
Hemp Dogbane in RR Soybeans One Year After Applications

Hemp Dogbane in RR Soybeans

Glyphosate (lb/a)	Vegetative	Bud	Early Flower	Full flower
	Early spring	Spring	Early summer	Summer
.56	22	73	64	88
.75*	58	72	93	99
1.125	43	91	92	100
1.50	57	78	100	100

Spring or fall, which is the best time?

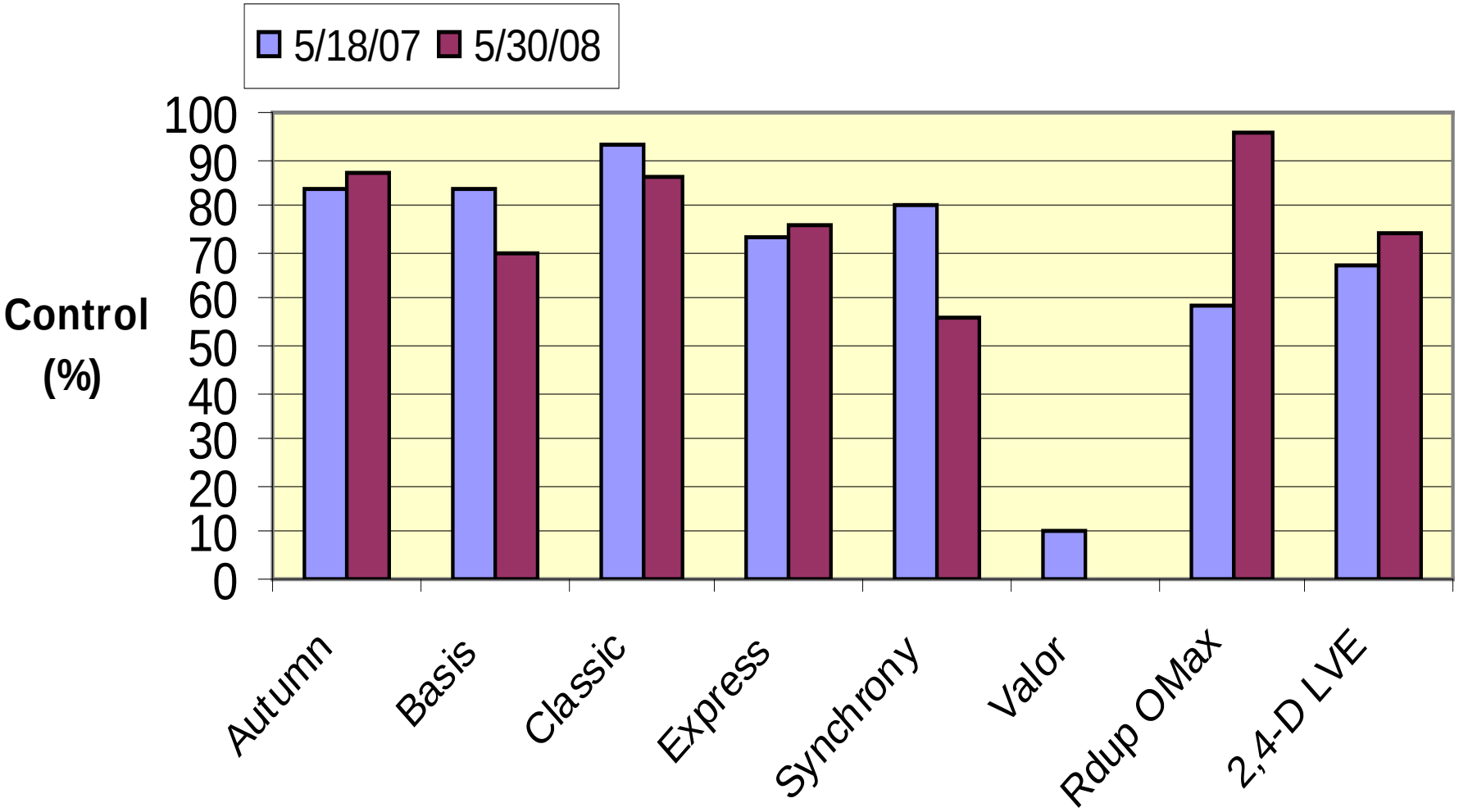
Fall applied 11/14
Spring applied 5/4



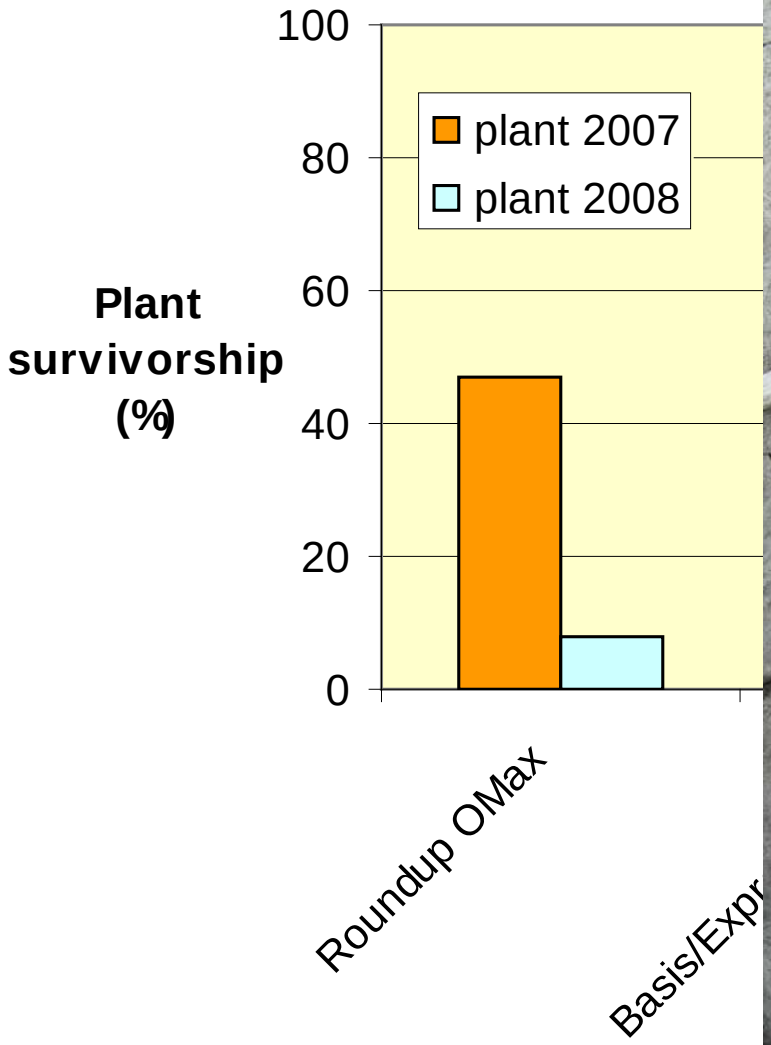
Fall herbicide timings

- Can vary based on:
  - Herbicides used
  - Air/soil temps
    - Before and after applications
  - Status of weed
    - Leaf area
    - Stress level

Dandelion control spring after fall applications



Survivorship
fall t



Viability of tissue to resprout after herbicide application

	GLY	MOW	24D	ALLY	BANVEL
CROWN	B	A	B	B	B
1 CM	A	A	A	B	B
2CM	A	A	B	B	B
3CM	A	A	B	B	A
4CM	B	A	B	B	B
5CM	A	A	B	B	A
6CM	A	A	A	A	A
7CM	A	A	B	B	B
8CM	A	A	A	B	A
9CM	A	A	A	B	B
10CM	A	A	A	B	B

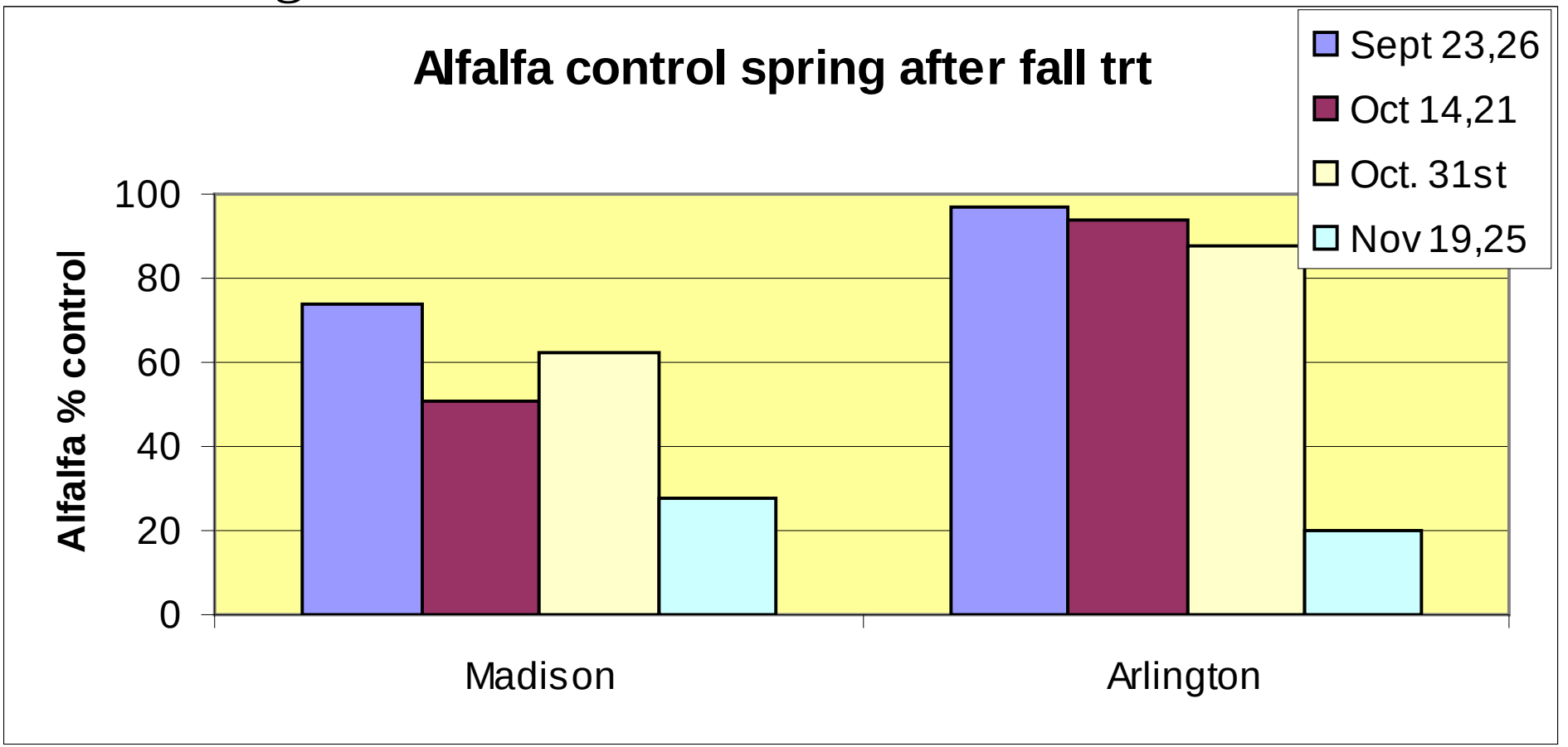
4 inches

= healthy

= dead

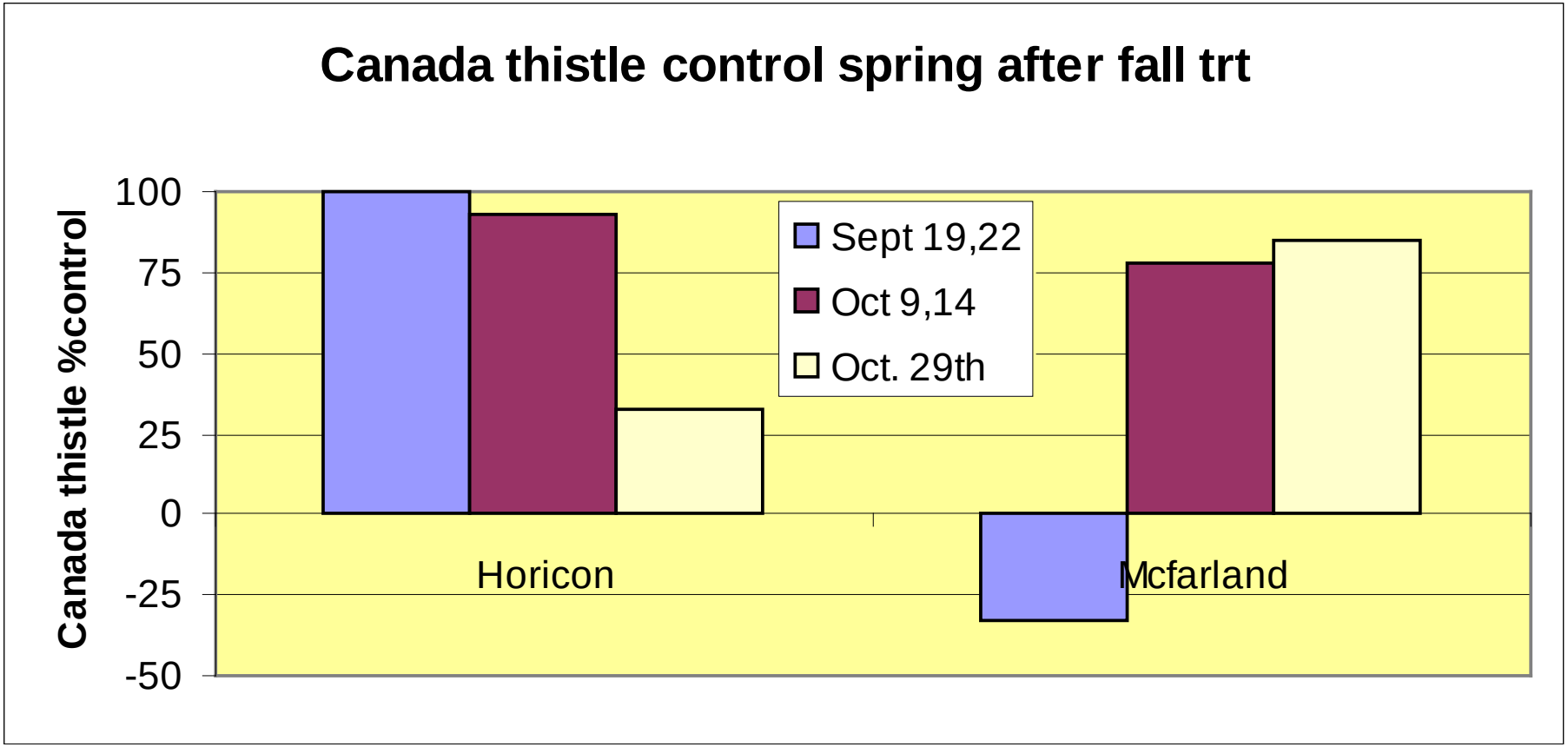
When in fall to treat?

- Alfalfa treated with 2,4-D (1 pint/A) at four timings in fall

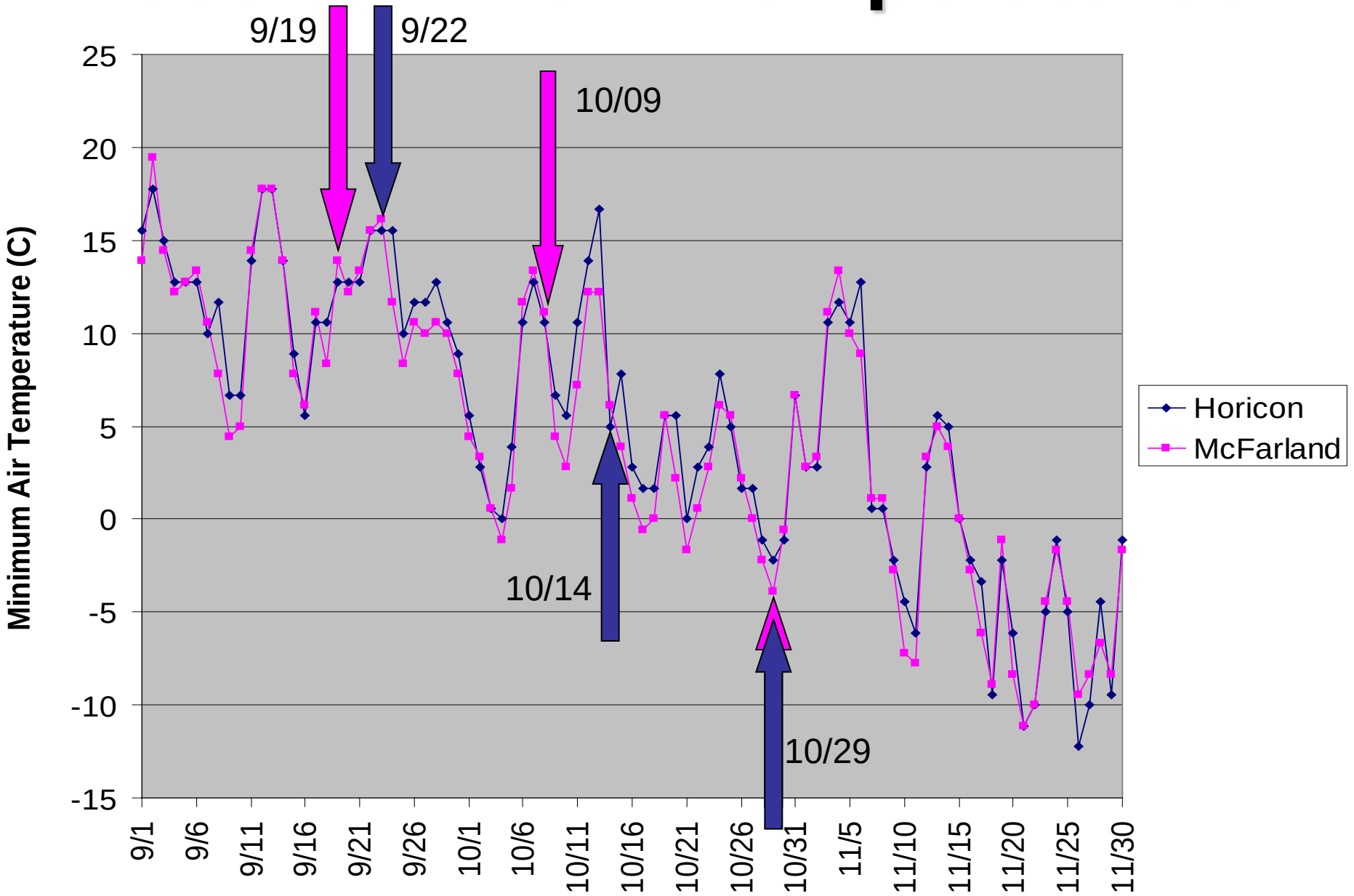


When in fall to treat?

- Canada thistle treated with milestone at three timings in fall



2008 Minimum Temperatures



September

McFarland

Horicon

Early October

McFarland

Horicon

Late October

McFarland

Horicon

Crop Competition

- Select crops that will establish and compete with above ground growth
  - Alfalfa
  - Pasture
  - Sorghum/sudangrass
- Integrate with other techniques
  - Herbicides
  - Cultivation can suppress populations, but spread propagules
  - Mowing

Tricks to successful management of perennials

- PREVENTION/EARLY DETECTION:
  - Scout the fields often, especially on the edges
- RAPID RESPONSE:
  - take action when you see a new infestation
  - Prevent establishing perennials from storing energy

Tricks to successful management of perennials

- Integrate control methods if possible

- Use crop rotation effectively
  - Manage perennials aggressively in crops when have effective/affordable tools
    - Alfalfa (perennial grasses)
    - Small grains (perennial broadleaf weeds)
    - RR crops (anything sensitive to glyphosate)