



# Weed Control That Makes Money

Terry Gregoire  
Area Extension Specialist  
Devils Lake



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# Weed Control That Makes Money

- What is a weed?
  - A weed is any plant growing where it is not desired.
    - Volunteer Crop
    - Herbicide Resistant Weeds and Crops

# • • • Weed Control That Makes Money

- Why control weeds?
  - Increase net profits
  - Weeds are expensive to grow and they produce no revenue
    - increase food quality and safety
    - improve harvest ease
    - reduce costs - cleaning, tillage, trucking
    - improve crop productivity, yield

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# Weed Control That Makes Money

- Weeds are expensive to control
  - herbicides
  - time
  - fuel
  - equipment wear and tear
  - weed seed infestation

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# Weed Control That Makes Money

- Economic weed control is interactive
  - 1. Species of weed
  - 2. Crop grown
  - 3. Environment
  - 4. Field history
  - 5. Weed density, emergence time, growth stage
  - 6. Herbicide cost and effectiveness
  - 7. Duration of competition

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# BIOLOGY OF WEED CONTROL

- Weed Control Techniques
  - Complex Rotation
  - Crop Competition
  - Tillage
  - Herbicides
  - Planting date manipulation
  - Smother/cover/hay crops

# Weed Control That Makes Money

- Short term keys to Economical weed control
  - 1. Establish an adequate wheat stand
  - 2. Keep the wheat healthy- monitor diseases and fertility
  - 3. Control weeds early( 2-3 leaf) especially high populations
  - 4. Use effective herbicide at lowest labeled rate for current environmental conditions
  - 5. Be aware of your weed resistance situation.
  - 6. Don't allow a weed population to explode. Use the correct herbicide(s) and be timely. Know your weeds.

# Weed Control That Makes Money

- Long term keys to Economical weed control
  - 1. Establish a diverse rotation-cool and warm season crop mix
  - 2. Understand tillage effects on your predominant weeds.
  - 3. Consider effects of pre-post harvest weed control
  - 4. Pay attention to perennial weed establishment
  - 5. Be aware of weed resistance development with current weed control techniques

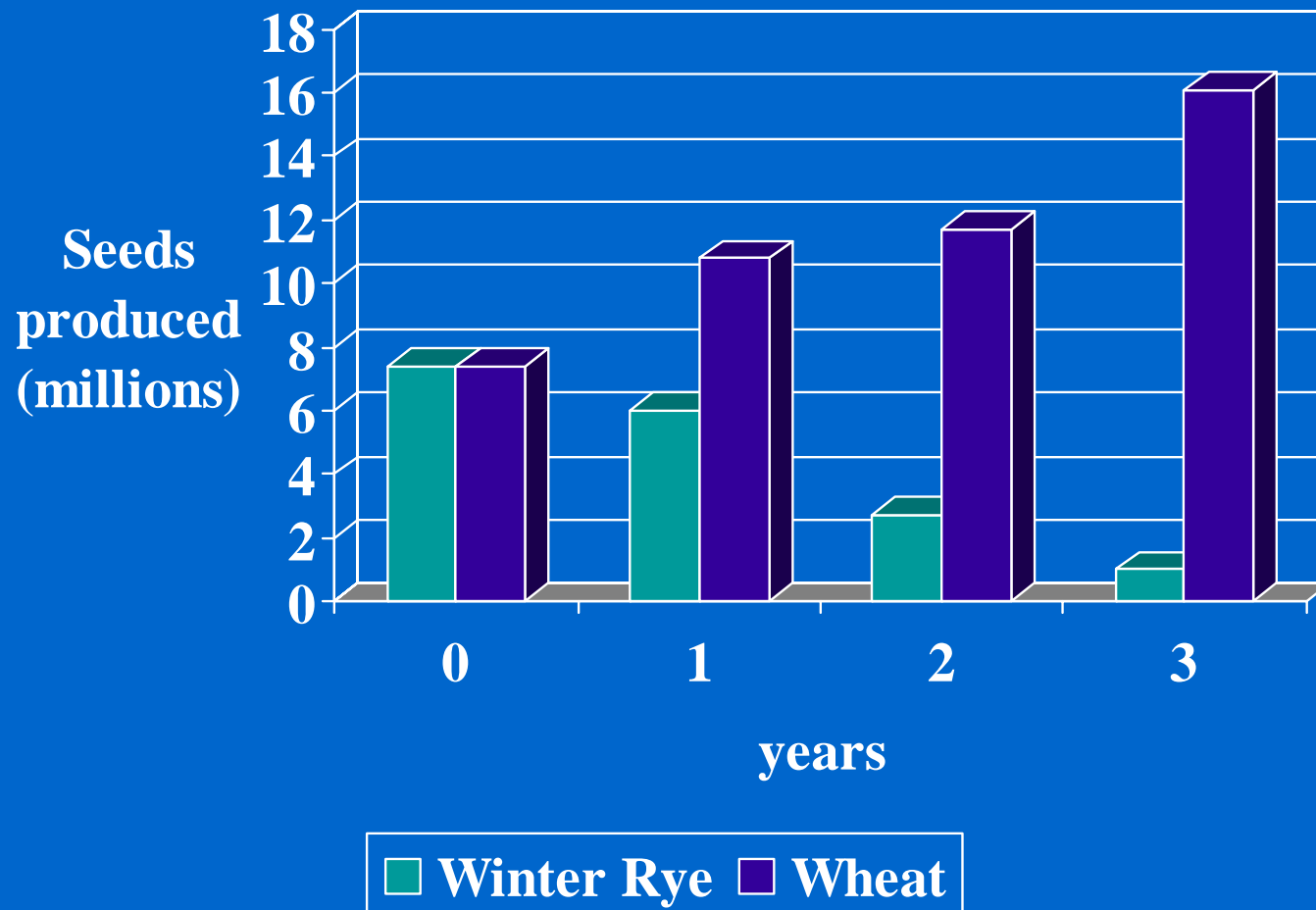
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# Weed Control That Makes Money

- Short term keys to Economical weed control
  - 1. Establish an adequate wheat stand for maximum competition
  - 2. Keep the wheat healthy- diseases and fertility

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## Effect of crop competition on wild oat seed production over three years



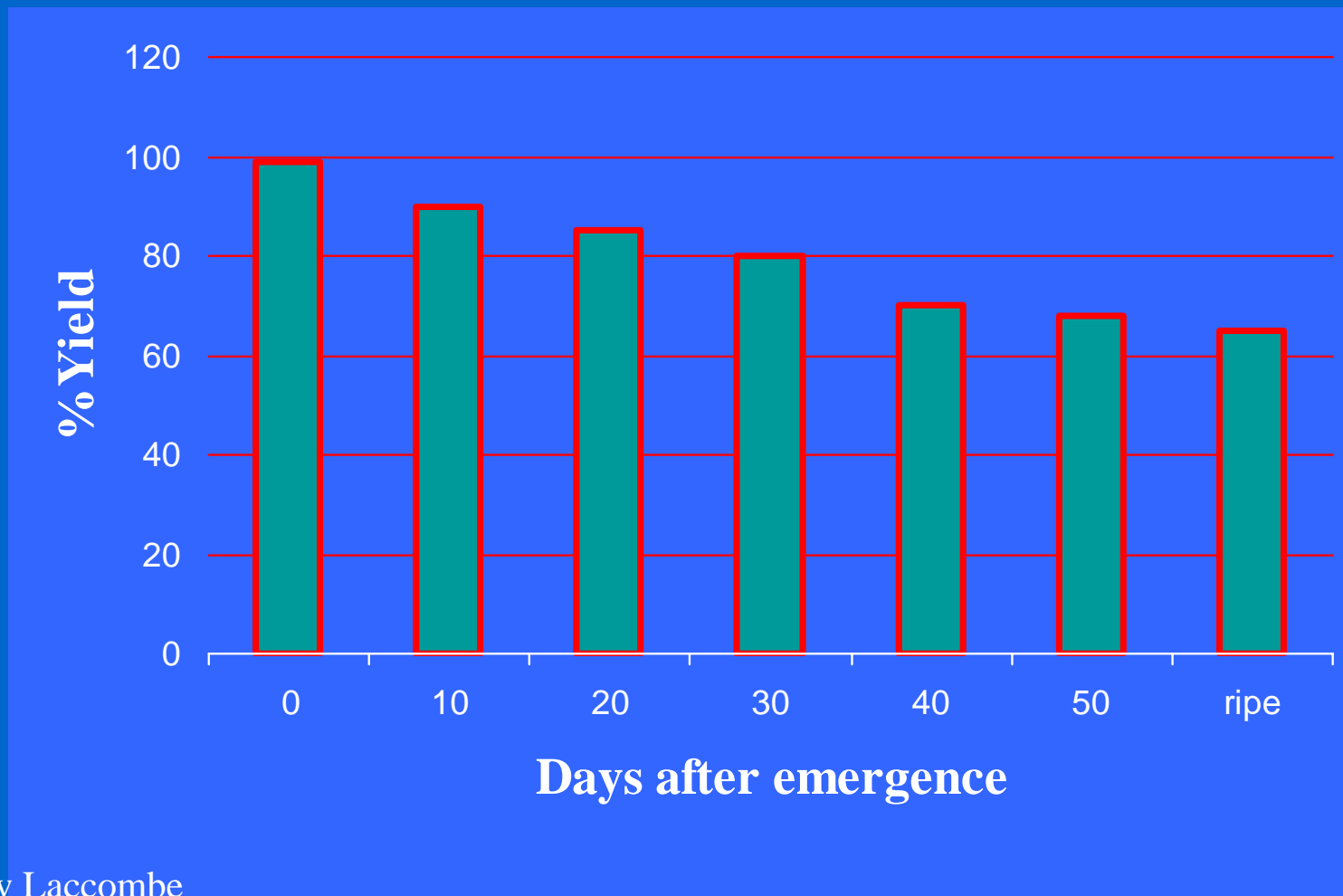
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# Weed Control That Makes Money

- Short term keys to Economical weed control
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## Effect of competition duration on Wheat yield due to Wild Oat



D.A. Dew Lacombe

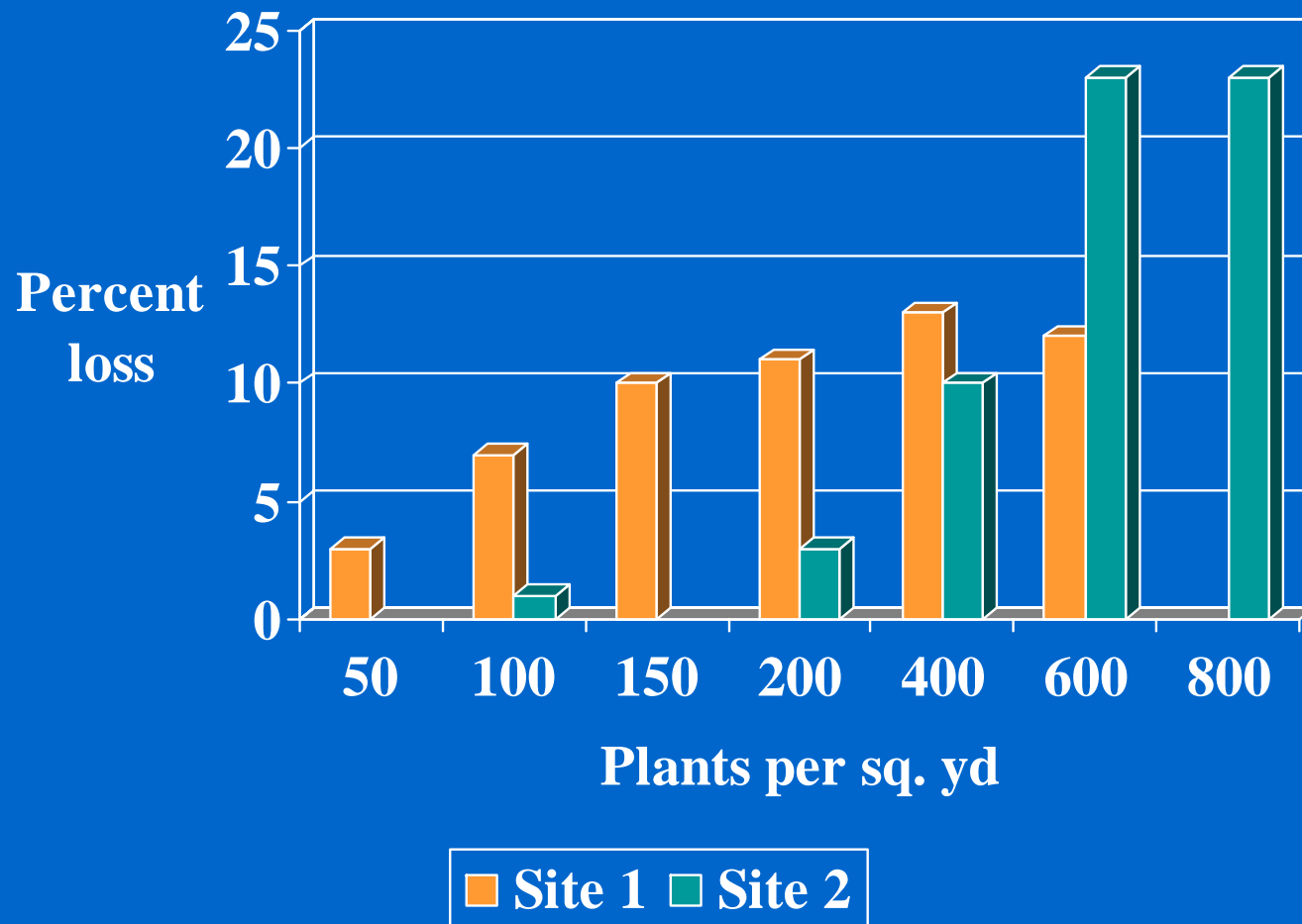
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# Weed Control That Makes Money

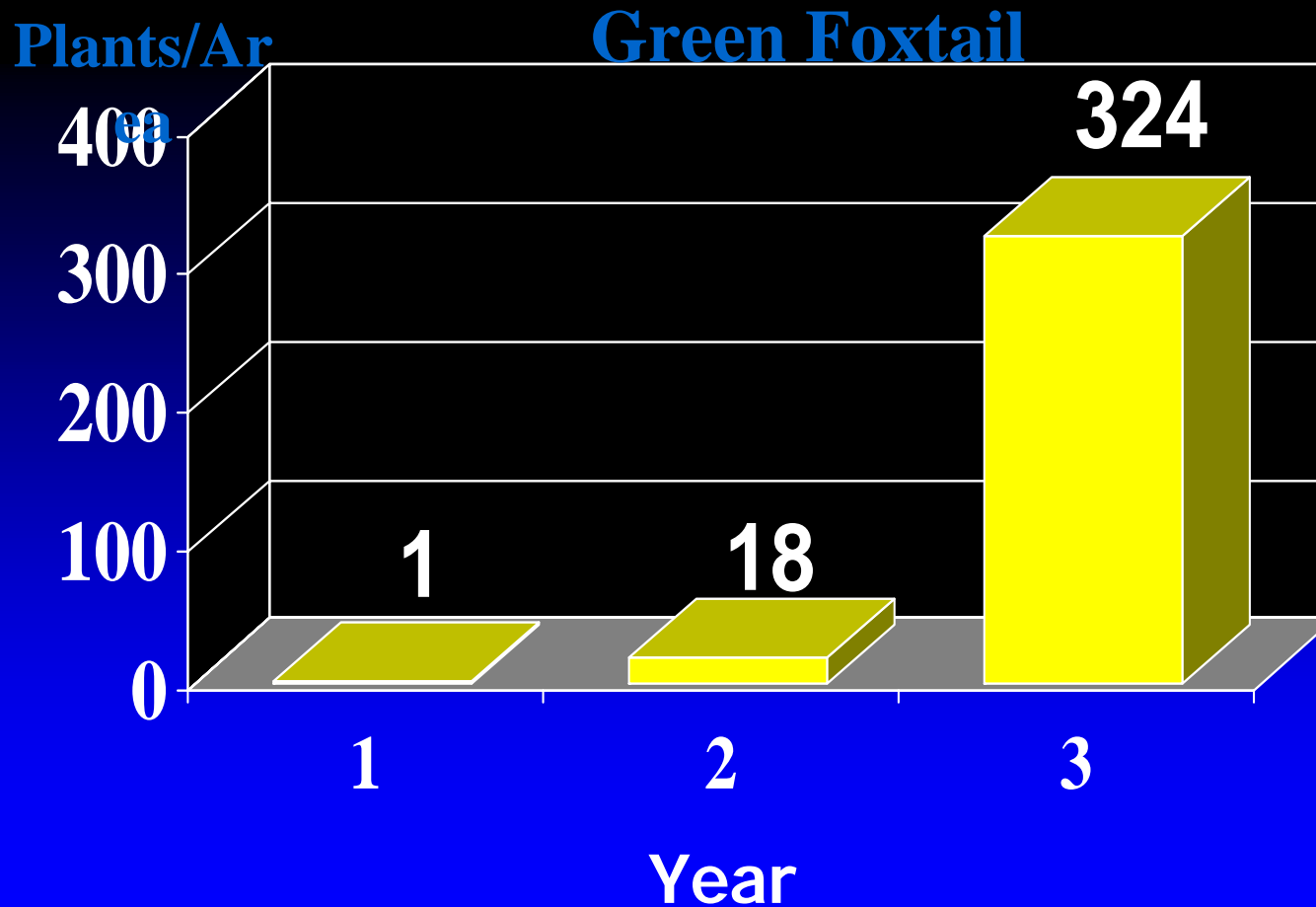
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## Wheat yield losses due to Green Foxtail are influenced by environment

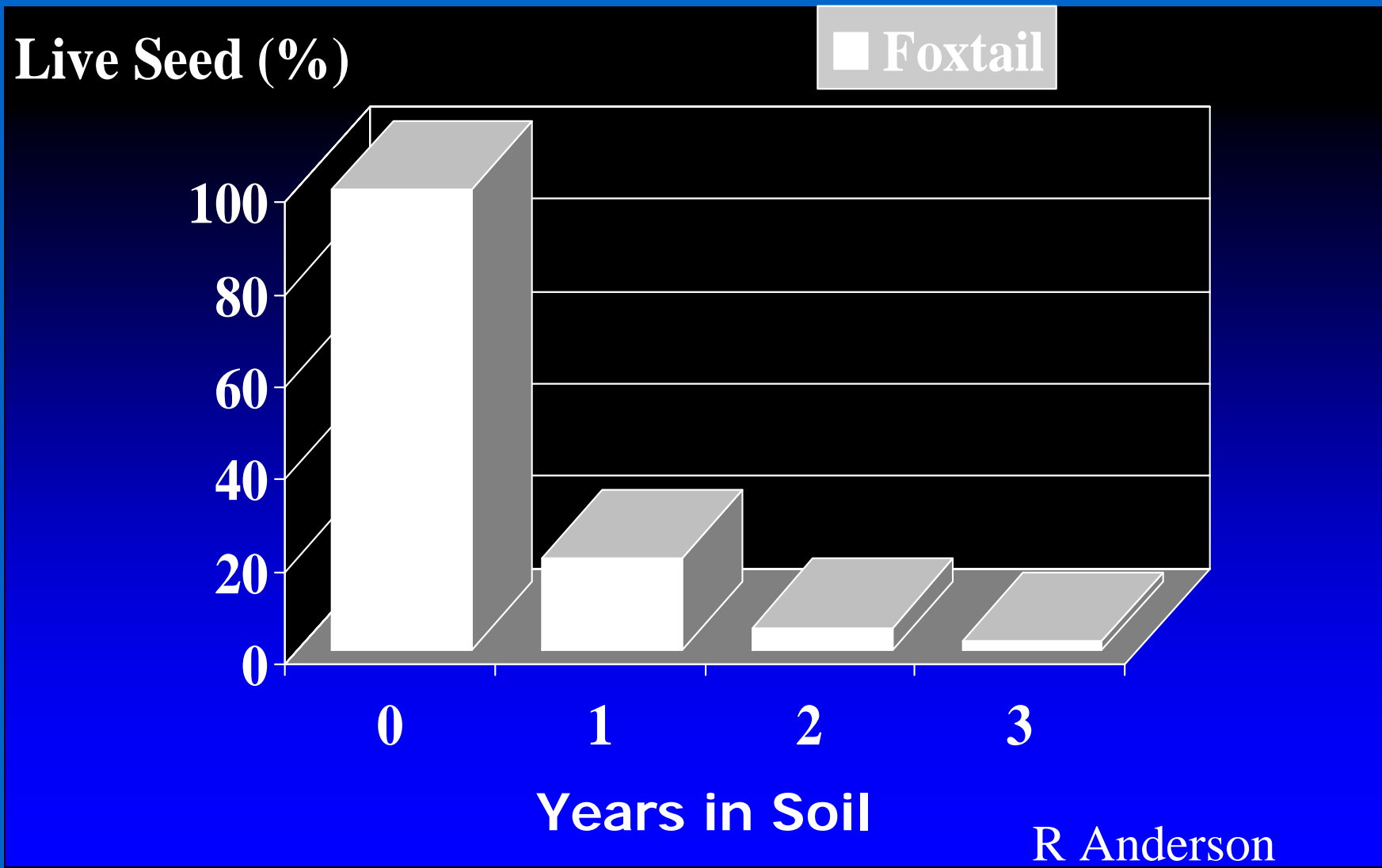


# Rate of Increase - Density



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# • • • Weed Seed Survival in Soil



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# ALS Resistant Foxtail Example

- 200 acre farm, 10 foxtail/sq ft = 100 million foxtail
- Mutation to cause ALS resistance = 1/100 m
- Foxtail = 500 seeds/plant, 5% germ next year

<u>Year</u>	<u>Surviving R Fxtl</u>	<u>Seed Produced</u>
1	1	500
2	25	125,000
3	6,250	3.1 million
4	156,250(4 per sq ft)	78 million
5	3.9 million (still 96% control)	1.8 billion
6	87.5 million	Does it matter?

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# Weed Control That Makes Money

- Long term keys to Economical weed control
  - 1. Establish a diverse rotation-cool and warm season crop mix

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**If Rotation Selects For Weeds.**

**Than**

**Herbicides Become a Requirement,**

**Not a Choice**

**A good Rotation adds Flexibility and**

**Allows Alternative Control Tactics**

# Rotation and WEED CONTROL

- Similar crops brings selection pressure to increase weeds for that environment.
- Mixing Crops Brings Change.
  - Planting dates
  - Harvest dates
  - Tillage time
  - Herbicides
  - Fertility
  - Crop competition

# Rotation and WEED CONTROL

- Tall, vigorous plants- Corn
- Dense canopy - e.g. canola
- Late Season Tall -- Sunflower
- Poor competitor -- flax, lentils, dry bean
- Cool early competition– winter wheat, rye, small grain
- Cool/Warm season legume – peas/soybean

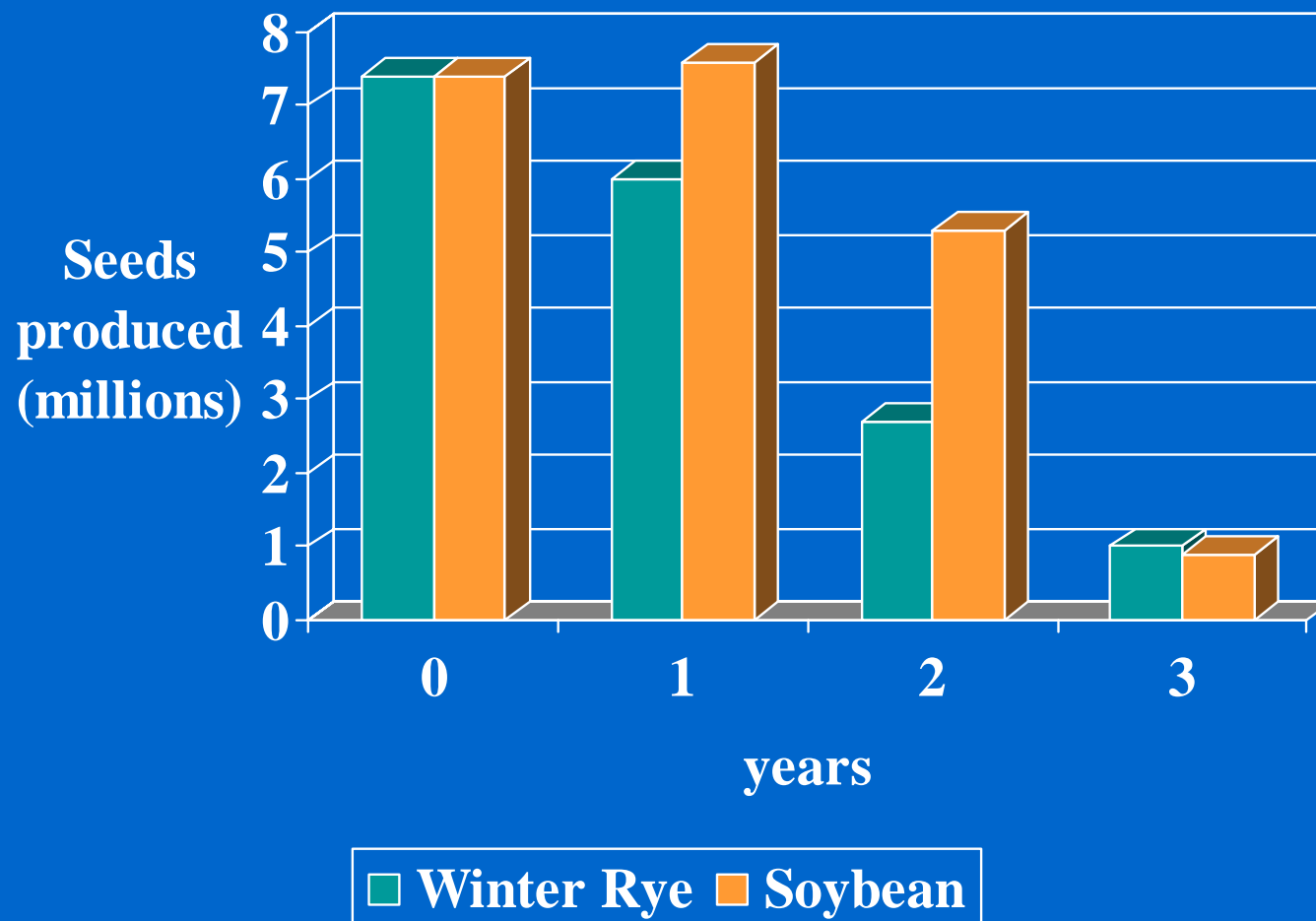
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# Rotation and WEED CONTROL

- Seeding Dates
  - Cool versus warm season
  - Different tillage dates
  - Timing of preharvest treatments
  - Different herbicides/carryover management
  - Different plant residue levels

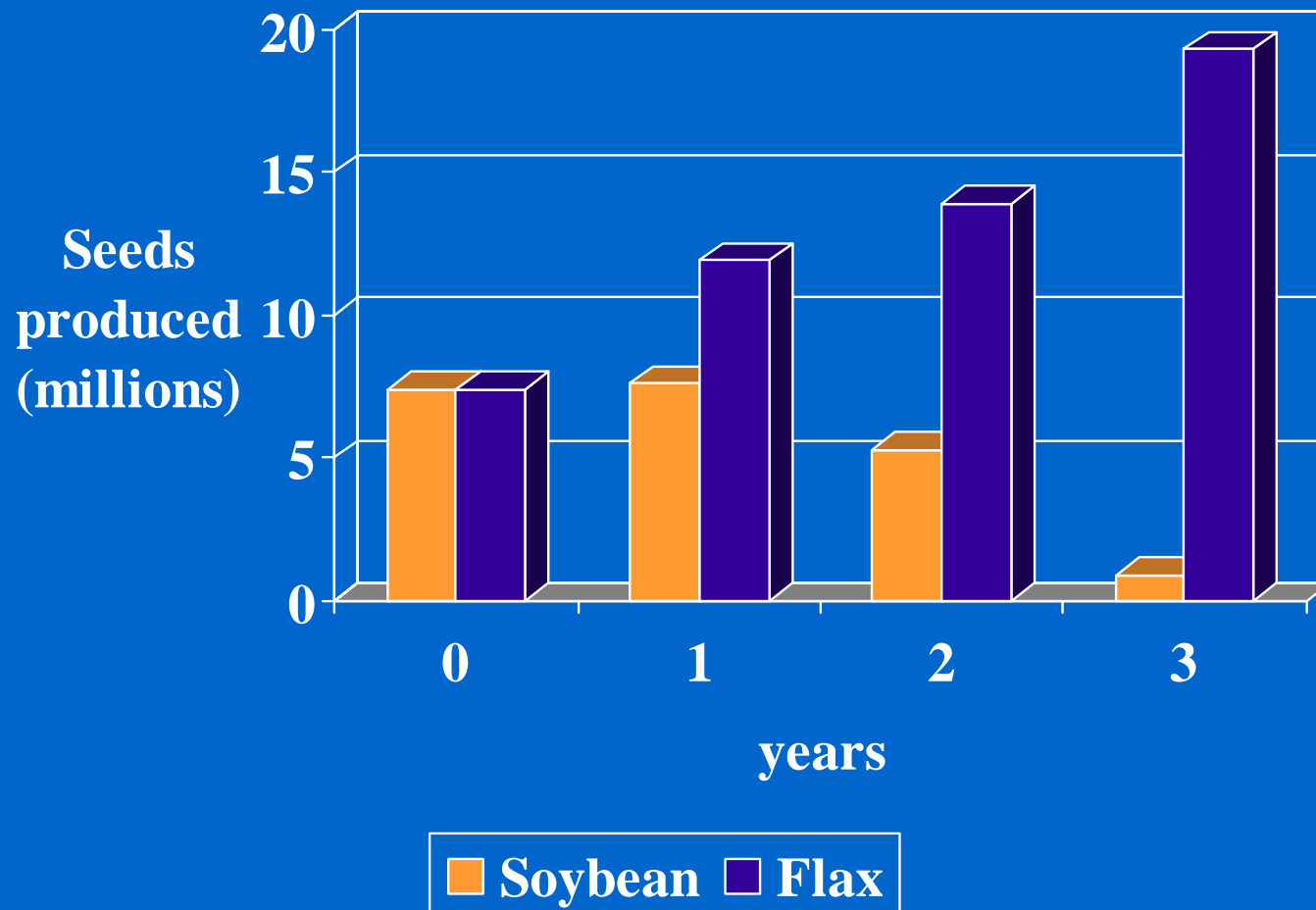
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## Effect of crop competition on wild oat seed production over three years



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# “Stacked” Rotation and WEED CONTROL

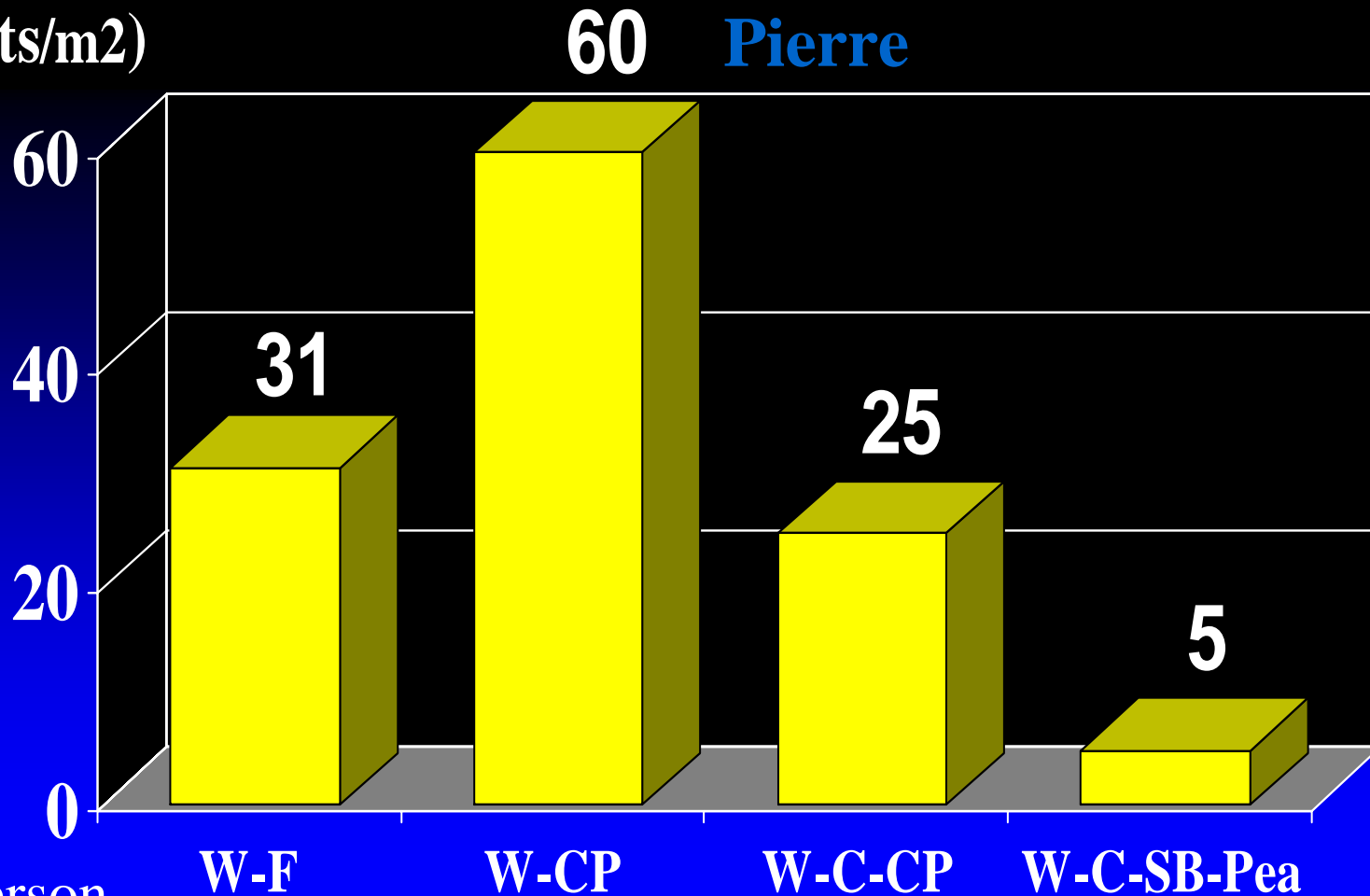
- Similar crop two years in a row. Avoid this crop for at least the next two or three growing seasons
- Wheat/wheat/Flax/Canola/Winter wheat/soybeans
- Barley/wheat/sunflower/soybean/soybean/corn/corn/canola
- Allows use of Residual Herbicide 1<sup>st</sup> year
  - For example. Higher rates of Pursuit in Soybean, Atrazine in Corn

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• **Crop Sequence Influences on  
Weed Densities after Ten Years.**

Pierre, SD

**Weeds  
(plts/m<sup>2</sup>)**

**Beck's Rotation Study -  
Pierre**



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# Weed Control That Makes Money

- Long term keys to Economical weed control
  - 2. Understand tillage effects on your predominant weeds.

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## Tillage Influences weed Ecology

**Tillage Buries Weed Seeds in Soil.**

**No-Till Leaves seeds on Surface**

Differences depend on Rates of:

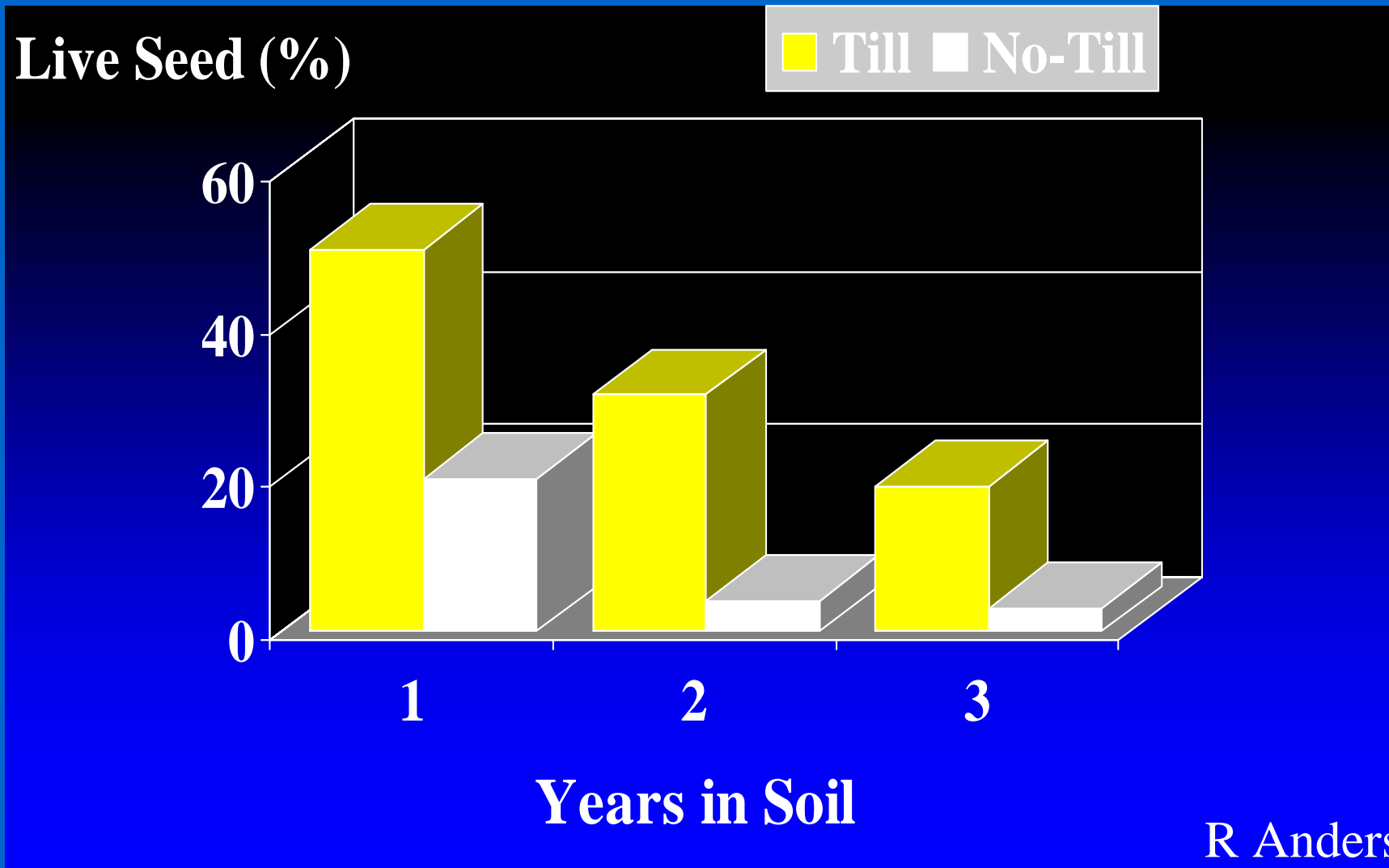
Germination, Predation,  
Dormancy, Natural Death

# Weed Control That Makes Money

## – Tillage

- No tillage favors perennials however doesn't spread roots.
- Shallow tillage favors foxtails, kochia
- Deep tillage favors dormancy
- Implement and repair costs
- Fuel and time

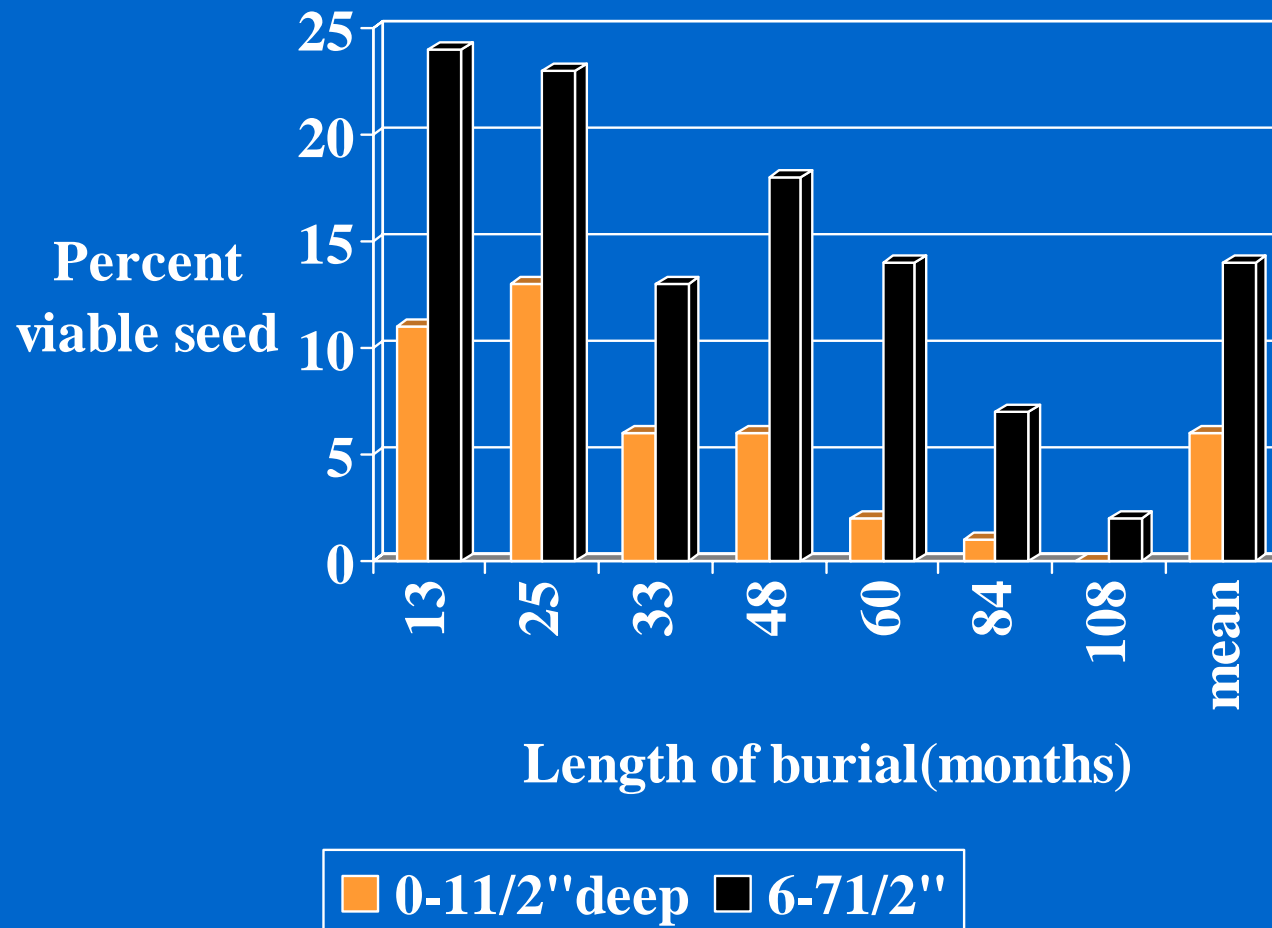
# Tillage - Green Foxtail Survival



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Percent viable wild oats seed as influenced by length of burial, burial depth, and location



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# Canada Thistle

- Herbicides
- Greatest activity with
- Clarity
- Roundup
- Curtail
- Harmony Extra
- Express



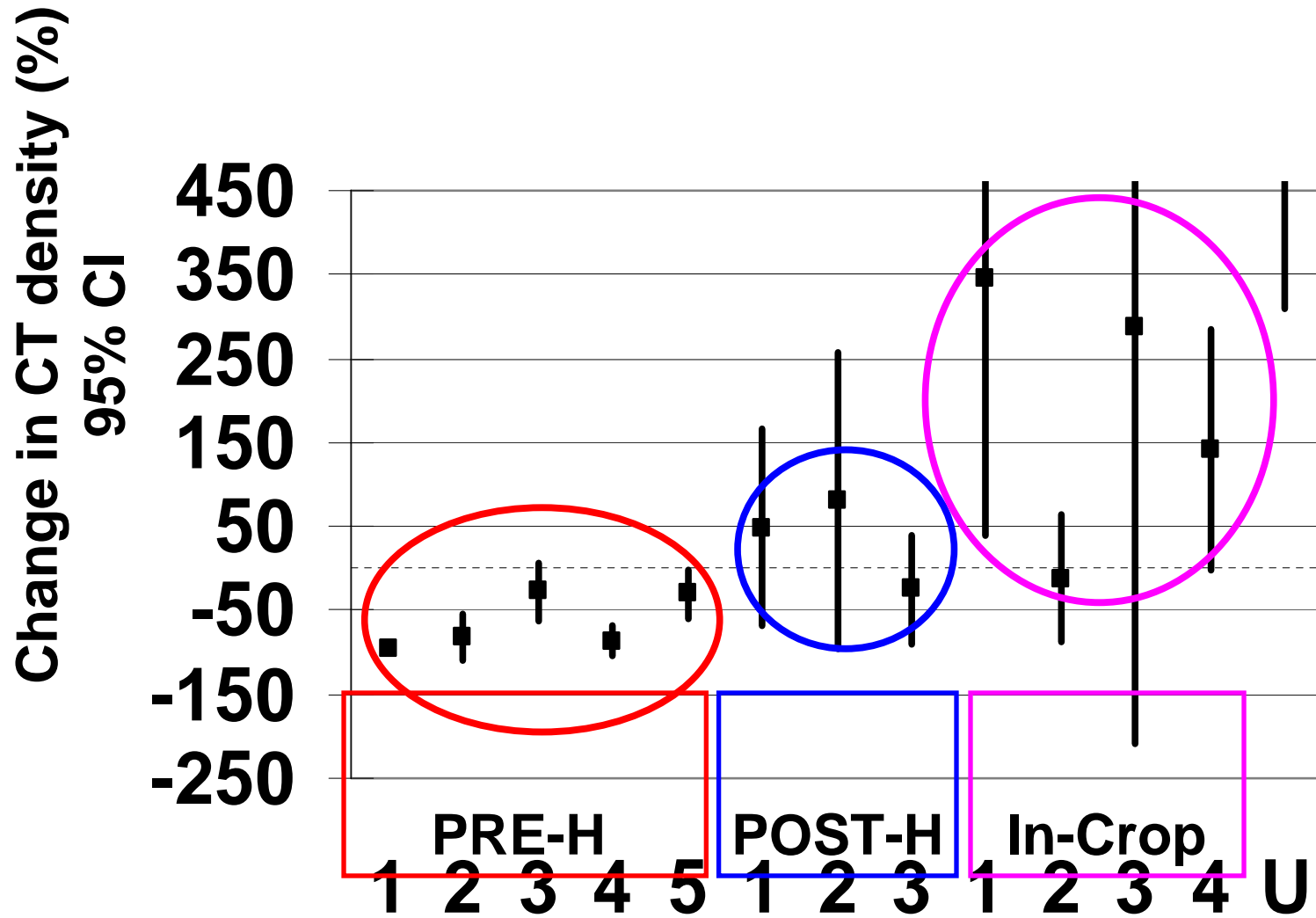
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# Canada Thistle

- Rosette technique
- Use with fall application
- Key- Day length less than 15 hours
- Thistle stays in rosette
- Control in early summer must allow fall regrowth
- Sept. herbicide application



# CT population in 2000 compared to 1998



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# Weed Control That Makes Money

- Herbicides
  - Cost?
  - Effectiveness?
  - Carryover?
  - What's the next rotational crop?
  - What's the weed? Perennial, annual
  - Will the weed cause uncontrollable problems in the next crop?

# Weed Control That Makes Money

- Economic Threshold
  - The weed density at which it becomes economically beneficial to apply a herbicide. Generally refers to short term benefits
  - Long term population reduction not considered

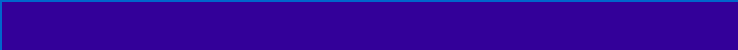
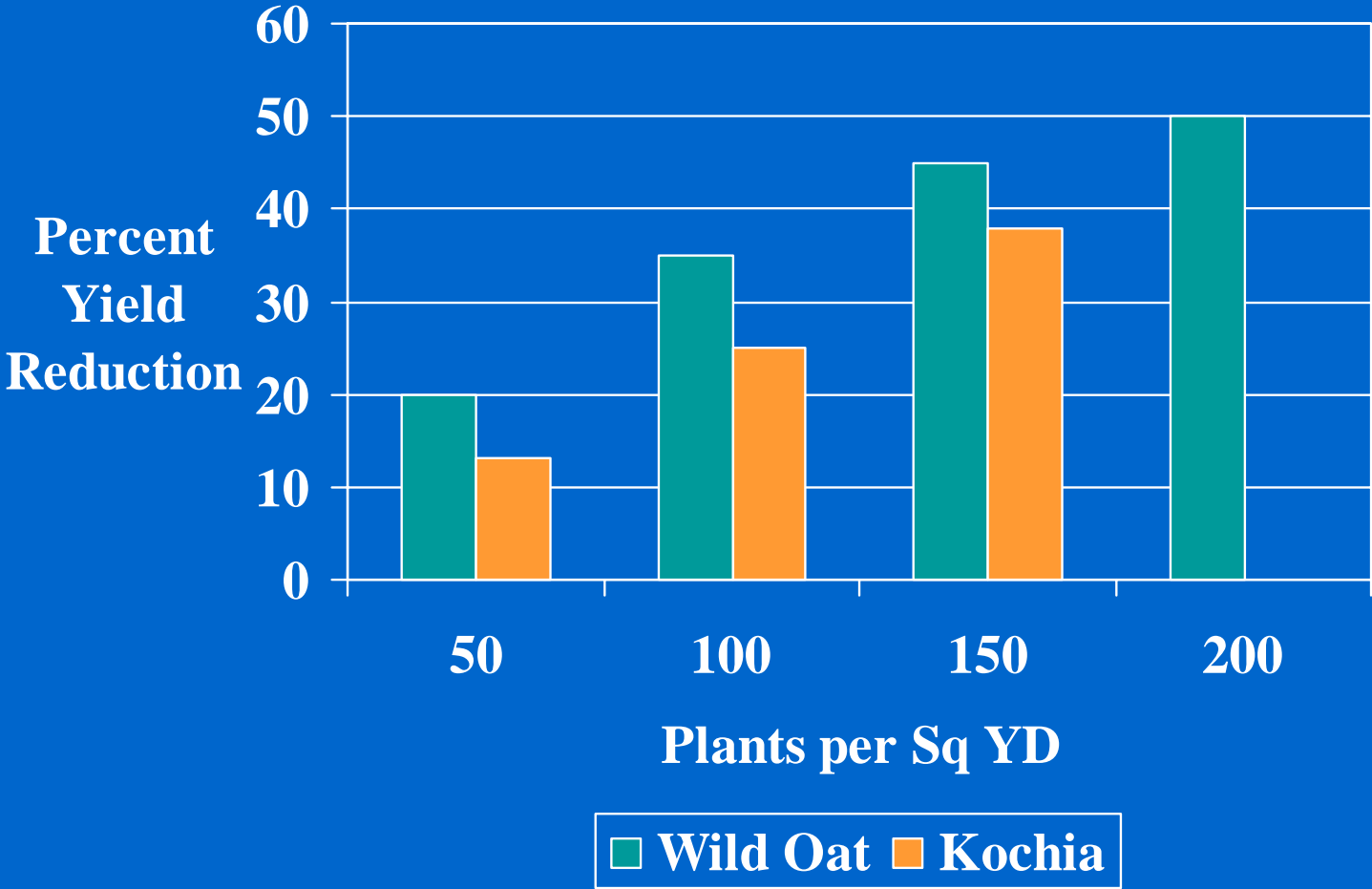
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## Weed Species Example

- Wild Oat
  - Tall Cool season grass
  - Deep root system
  - Long seed dormancy
  - Wet and Cool promotes germination

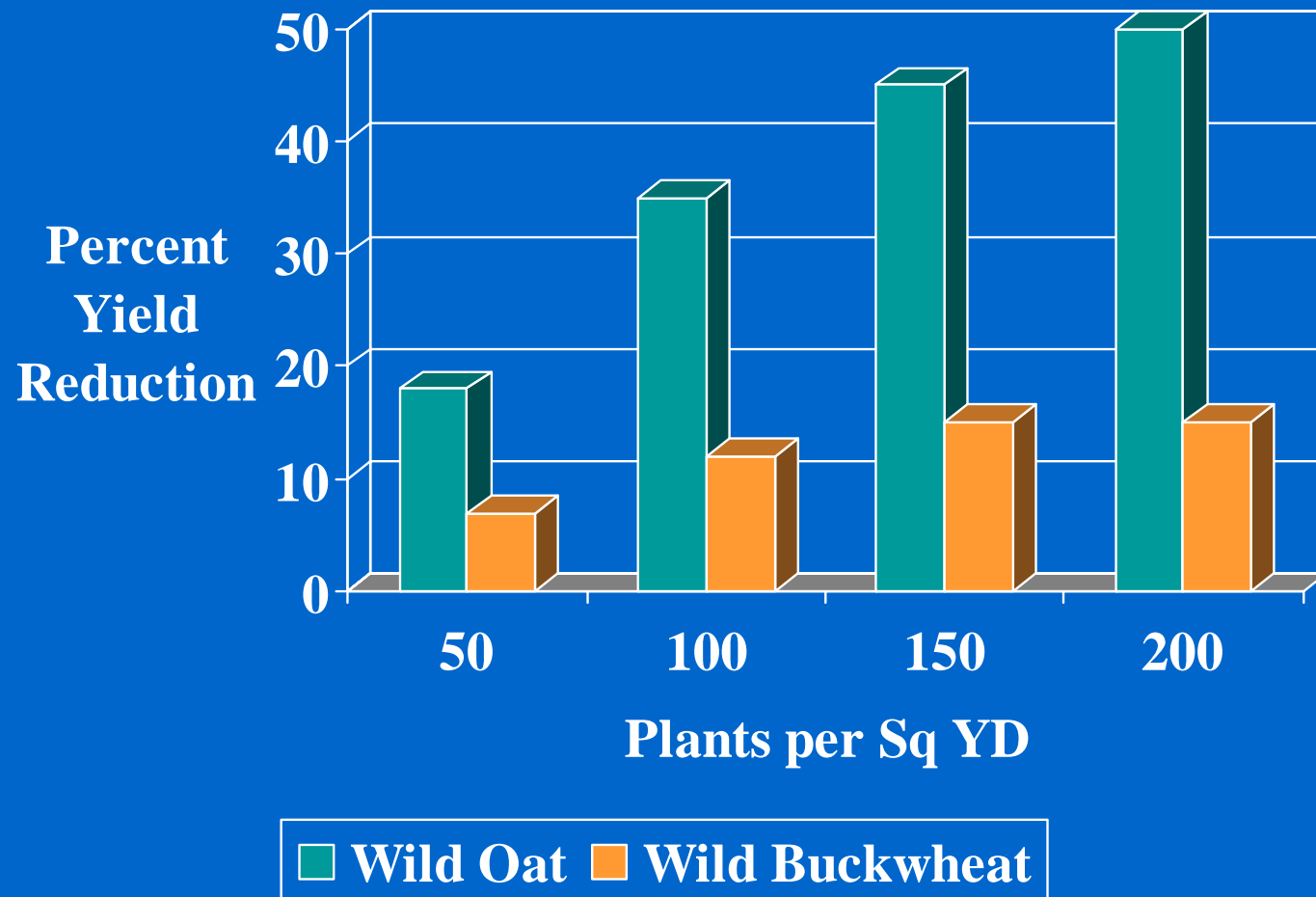
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# Wheat yield losses due to Wild Oat and Kochia



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## Effect of weed density on Wheat yield



# Weed Control That Makes Money

- Herbicides for Wild Oat control in wheat.
  - Assert
  - Avenge
  - Achieve
  - Discover
  - Everest
  - Puma
  - Silverado(label pending)

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# Weed Control That Makes Money

- Herbicides for Foxtail control in wheat.
  - Trifluralin
  - Achieve
  - Discover
  - Everest
  - Puma
  - Silverado(label pending)
  - Stampede

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