Scotch Thistle

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Outline

- Background
- Biology
- Control Methods

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Why "Scotch Thistle"?

- Story
- 13th century
- Norse king invading Scotland
- Stealthy night attack
- "Barefoot"
- Thistle!
- Now symbol of defense

Image Courtesy of: Wikipedia

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Native Range

- Eurasia

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Historical Uses

Edible

- Immature flower heads - boiled
- Stems blanched, or raw in salad

Hair on leaves used for pillows

Medicinal values

- Rashes
- Ulcers
- Nervous disorders
- Etc.

Photo courtesy of: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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Introduction

- Introduced North America late 19th century
- "Decorative plant"

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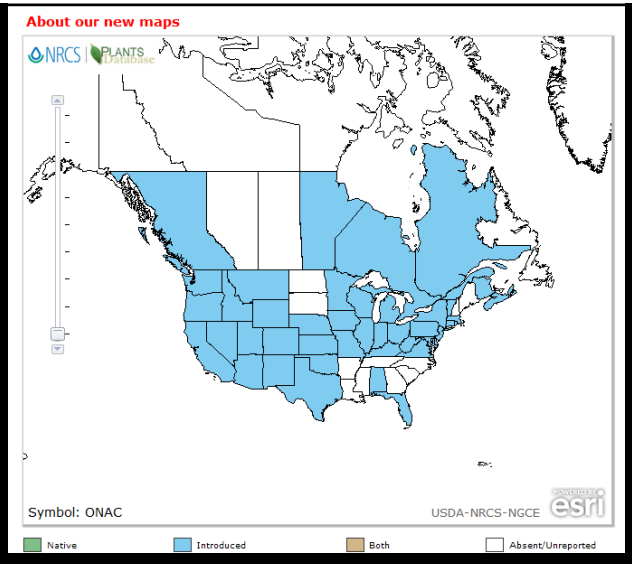

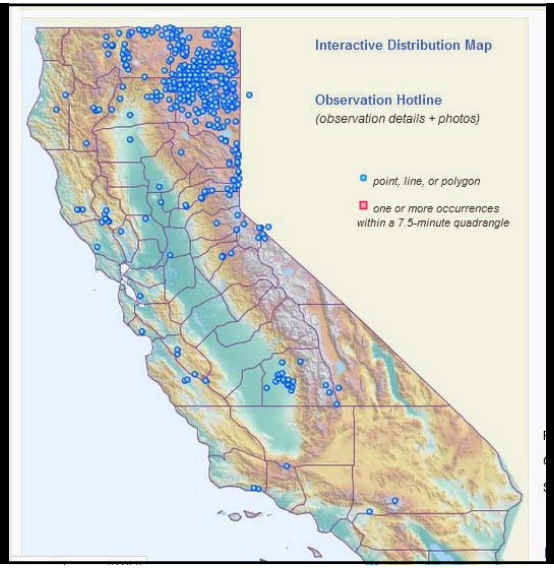

Invasive

- Noxious weed in all but 12 states
  - A list weed in California
- Cal IPC- "High Invasiveness"
- Also problematic in Canada, Argentina, and Australia, and New Zealand.
  - Can hybridize with Illyrian thistle
- "Weedy" behavior grazed lands - Spain, Turkey Russia and UK

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Wide range of environments

- Full sun
- Soils
  - Fertile to poor
  - Sandy to clay
  - Neutral to alkaline
- Typically not in waterlogged soils
- Associated with disturbance
- Large plants more fertile loamy soils

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Ecological Impacts

- Monoculture
- Reduced biodiversity
- Wildlife habitat

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Societal Impacts

- Reduced forage value
- Physical barrier
  - Livestock
  - People
- Injuries
- Cost to control!

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Hooper, Young, and Evans 1970

- Economic Evaluation of Scotch Thistle Suppression
- In Northeastern California
- Loss of forage utilization/production
  - Estimated 80% in Scotch stands
- Estimated annual loss
  - Wet meadows - $10.20/acre (Adj to 2016 - $64/acre)
  - Wheatgrass - $6.70/acre (Adj to 2016 - $42/acre)
  - Cheatgrass - $ 3.40/acre (Adj to 2016 - $21/acre)

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Biology

- Biennial
  - *occasionally annual or short lived perennial
- Can germinate spring or fall
- Basal rosette
  - 1st year 5-12 inches diameter
  - 2nd year up to 4 feet diameter
- Bolt
  - Typically 3-8 feet tall

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Why ID?

- Nearly 50 native thistle California
- 16 native thistles Lassen and Modoc county
- Other invasive thistles as well

Photo courtesy: of Richard Spellenber Cal flora

Bull Thistle

Musk Thistle

Photo Courtesy of: L.L. Berry, Bugwood.org

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Canada Thistle

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Flower heads

Photo Courtesy of: Steve Dewey, Utah State University, Bugwood.org

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Identification

- Leafs and stems
  - Covered white hairs
  - Bluish color
  - Cotton thistle
- Winged stems
- Large spines!

Photo courtesy of: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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Flowers

Flowers
- Purple
- 1-3 inches in diameter
- Solitary or clusters
- 70-100 per plant

Seeds

- Seeds
  - Up to 20,000 per large plant
- Dormancy
  - 7-39 years
  - 80% innate dormancy

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Dispersal

- Wind
  Not particularly adapt to this
- Water
- Livestock
- Wildlife
- Humans
- Machinery

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Scotch Thistle Control

- One goal - Eliminate seed production!

UC IPM

Cultural

- Prevention!

Cultural Control

- Prevention!
- Clean equipment
- Reduce disturbance
- Competitive pastures/rangelands
  - Suppress Scotch establishment
- Control before establishment/seed production!

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Mechanical

- Sever plant below soil surface
  - Hand pulling
  - Tillage
  - Grubbing
  - Digging
- Mowing
  - Suppress

Photo courtesy of: This old house.com

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Bio control

- Successful control program in Australia
- Weevils
  - *Lixus carduis*
  - *Larinus latus*

Photo Courtesy of: Natureswonders.org

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Bio control

What makes Australia different?

Australia
- No native thistles

North America
- We have lots of natives
- No biocontrol agents tested feed exclusively on Scotch
- Still looking

Photo Courtesy of: Natureswonders.org

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Grazing

- Conflicting information?
- Goats
  - Will eat heads
  - Digest seeds
- Sheep
  - Will eat rosettes
- Both can have an impact
- Need to maintain grass!
- Cattle
  - Typically avoid grazing Scotch

Timing Chemical Control

- Smaller plants=Better control
- Rosettes
  - Fall or Spring
- Bolting plants
  - Harder to control
  - Higher herbicide rates
  - Sometimes ineffective
- Flowering plants
  - May still set seed!

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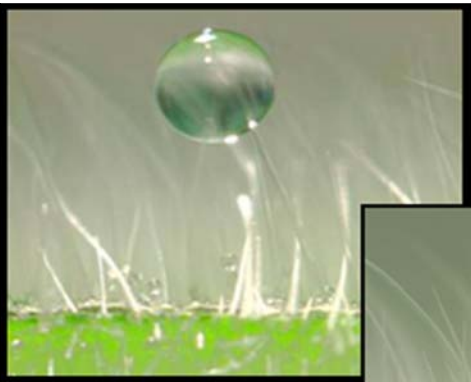
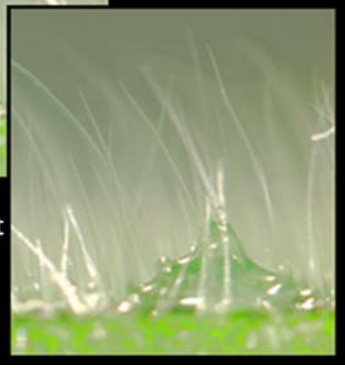


Use a Surfactant!



- Typically a Non Ionic Surfactant
- Read the label!

Milestone (Aminopyralid)

- 5-7 oz per acre
- $15-$21 per acre
- Apply to rosettes and young bolting stage
- Has post and pre-emergence activity
- Safe on established grasses

Transline (Clopyralid)

- 2/3 pints to 1 1/3 pints per acre
- $17 to $33 per acre
- Apply to rosettes and young bolting plants
- Not as long of residual as Milestone
- Safe on established grasses

Telar (Chlorsulfuron)

- 1 to 2.6 oz per acre
- $19-$49 per acre
- Apply from rosette to flower bud stage
- Post and pre-activity
- Safe on established grasses
- Not safe for reseeding

2,4-D

- 1-2 quarts per acre
- $6-$12 per acre
- Apply to rosettes and young bolting plants
- No pre-emergence activity
- Safe on grasses
- Ester and Amine formulations
- Can be tank mixed with Banvel, Milestone, and Telar-Quicker burndown

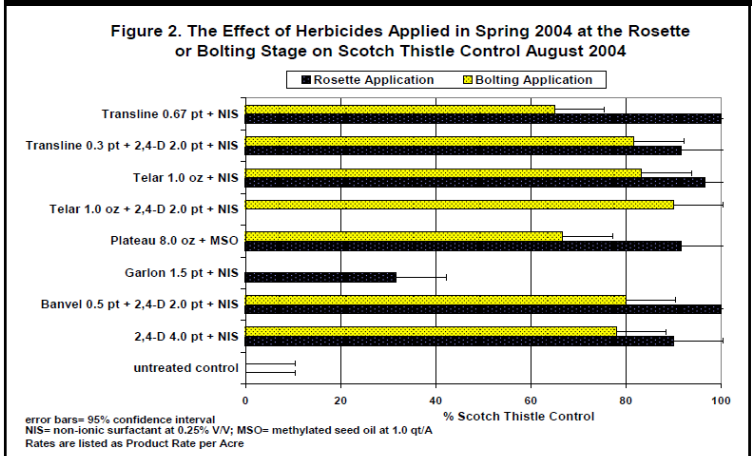
Banvel (Dicamba)

- ½ to 2 pints per acre
- $5-$20 per acre
- Typically tank mixed with 2,4-D
- Apply to rosette to young bolting stage
- Safe on grasses
- Only post activity

Rob Wilson- 2004

- Scotch thistle trial
- Rosette and bolting treatments
- Various herbicides

Rob Wilson- 2004



DiTomaso, Kyser, and Wilson 2007

- Rosette and Bolting Stage
  - Milestone
  - Milestone + 2,4-D
  - Telar
  - Telar + 2,4-D
  - Banvel + 2,4-D
  - Transline

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DiTomaso, Kyser, and Wilson 2007

- Rosette Stage
  - All treatments gave 95-100% control
  - Foliage and Seedheads

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DiTomaso, Kyser, and Wilson 2007

- Bolting Stage
  - Milestone and Transline
    Not effective (30-50% control)
  - Telar alone (1 oz)
    88% control of seedheads
  - Telar (1 oz) + 2,4-D (1 quart)
    90% control foliage
    95% control seedheads
  - Dicambia (8 oz) + 2,4-D (1 quart)
    87% control foliage
    90% control seedheads
- No Treatments gave 100% control

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Hard Species to Manage

- Joe Moreo and Craig Hemphill
  Agricultural Commissioners in Lassen and Modoc
  Treating same areas for years and years
  Lots of money goes into spraying year after year
- Need multiyear control

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Scotch Thistle Trial (South of Doyle)

- Fall Rosettes
- Spring Rosettes
- Bolting
- Method, Milestone, Telar, Esplanade, 2,4-D+Banvel

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