

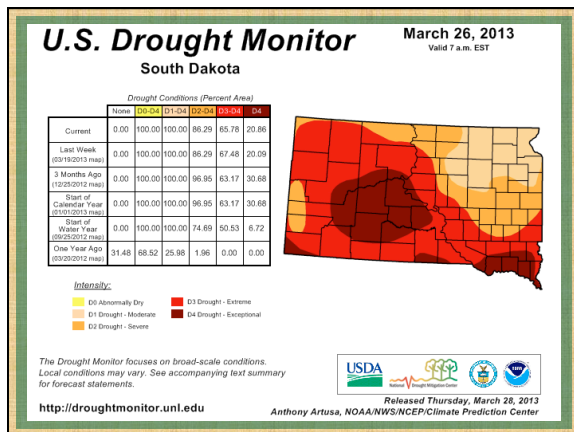


“Range Weed Control; During and After Drought”

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Plant Stresses

- Stresses:
 - weather (drought, flooding, hail etc.)
 - over grazing (livestock)
 - other grazers (prairie dogs, pocket gophers, grasshoppers etc.)



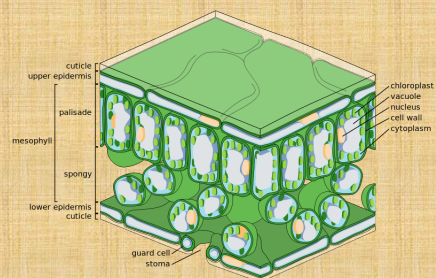
Managing for Drought

- Common occurrence in South Dakota
- Stress impacts
- Perennials
- Biennials
- Annuals
- Invasives

Drought Tolerant Plants

- Leaf structure
- Cuticle thickness
- Root depth
- Root type
- Maturity
- Growth type
- Going dormant

Leaf Structure



Leaf Cuticle



- Holly leaf waxy surface
- Water beads on the waxy cuticle of the leaves
- waxy coating on the leaf surface keeps plants from having rapid water loss and can reflect light keeping leaf temperature from becoming too high
- Leaf hairs (pubescence) can also reflect light and reduce water loss.

Changes in Moisture

- Hot dry conditions trigger responses in the plant
- Leaf cuticle thickens
- When moisture resumes some plants will respond to drought recovery with quick growth and maturity

Common Mullein



- Biennial
- Coverage- hairs on leaves repel liquids
- Rosette stage
- Less competitive grass stands

Non-ionic surfactant (0.25% v/v)



Growth & Maturity

- Quick growth
- Maturity
- Seed production
- Early dormancy
- Seed germination triggered by ample moisture

Roots

- Perennials
- Root depth and makeup
- Water recovery
- Carbohydrate storage

Roots!



This slide illustrates the importance of roots. It features a photograph of a soil cross-section showing a thick layer of roots, a target icon with an arrow hitting the bullseye, and a silhouette of a tree with its root system against a blue background.

Canada Thistle


- Perennial
- Responds quickly after drought



This slide shows a Canada thistle plant with purple flowers and a close-up of its leaves.

Early Dormancy


- Plants shut down
- Go dormant



This slide illustrates early dormancy. It shows a photograph of a dormant plant with dry, brown stems and a photograph of a plant with green leaves and small flowers.

Canada Thistle Roots

- Extensive root system
- After its established – primary means of spreading
- Penetrates 10 + deep
- Lateral growth = 10 -12 feet per year



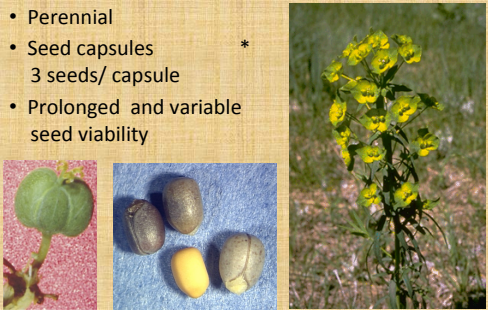
This slide shows the extensive root system of a Canada thistle. It features a photograph of a soil cross-section with a dense network of roots and a silhouette of a tree with its root system against a blue background.

Seed Bank

- Seeds remain viable for longer periods of time (micro organisms that attack and breakdown the seed need moisture to grow)
- Dry conditions will prolong this process

Leafy Spurge

- Perennial
- Seed capsules *
3 seeds/ capsule
- Prolonged and variable seed viability



This slide shows a leafy spurge plant with yellow flowers and a close-up of its seed capsules.

Root Control is Critical

- Dense roots down to 4 ft
 - Penetrate 15 ft
- 8,500 lbs roots/A
 - Down to 4 ft
 - 52% in upper 6 inches
- May produce shoots for 5 years



Leafy spurge

SICKLE WEED *Falcaria vulgaris* (biennial or perennial)

- Growth cycle -- *
– responds to drought *
– shortens growing
– period and produces
– seed



Common mullein (biennial)

- 2 or more years to flower and die
- Flower time is a function of stalk length
- * Responds to drought and drought recovery
- Rapid growth, prolific seed production
- 100,000-180,000 seeds per plant
- Viable more than 100 years



Drought Stress

- Slow or restricts translocation
- Perennials
- Prevents water loss from the plant
- Herbicides don't translocate well either

Absinth wormwood



Applied mid June



DROUGHT MANAGEMENT
Herbicide Treatments

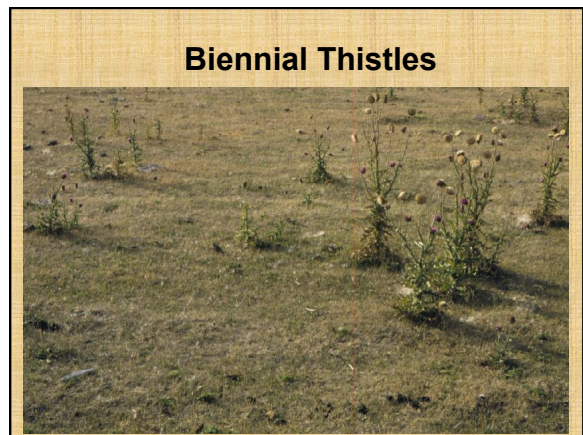
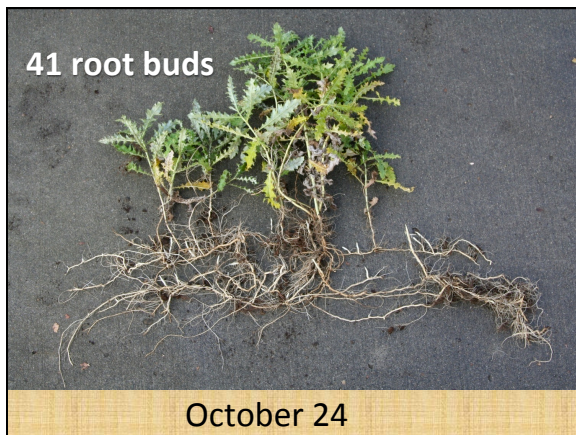
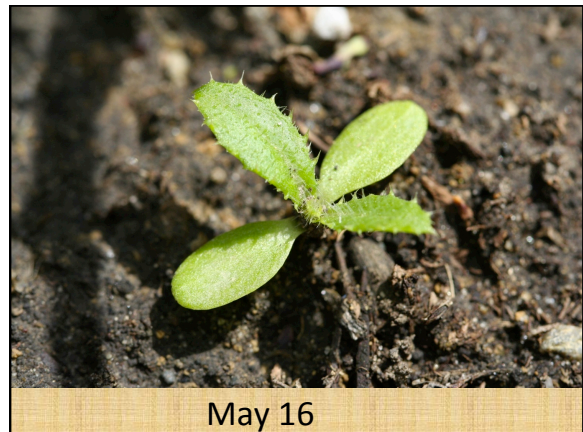
- Timing – young plants (vegetative)
- High end of labeled rate range
- Recommended adjuvants or additives
- Good coverage



Canada Thistle Application Timing




May Pre-Bud	June Flower	July Fuzz	August Dormant	September Regrowth
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Biennial Thistles


- Nearly 100% control at rosette stage
- Control declines by 30% after bolting
- High end of rates if bolting
- Growth regulator herbicides



Curly Cup Gumweed




Biennial
Native
Treat early to mid June
Vegetative stage
Surfactant helps




Curly Cup Gumweed Timing Study

- CHECK
- * rated September 9




- Grazon P+D 2 pt/A
- * rated September 9
- * applied June 21

- 2,4-D ester 2 qt/A
- * applied June 21
- * rated September 9



- 2,4-D ester 2 qt/A
- * applied July 26
- * rated September 9


Native Plants That Can Increase Due To Stress on the Grass



- Native plants:
 - goldenrod species
 - vervains
 - iron weed
 - sages
 - sunflower species
 - aster species
 - Flodman's & wavyleaf thistles

Good Plants

- Many forbs & native plants are highly nutritious and palatable at early growth stages and are readily eaten by wildlife and livestock
- can reduce grazing pressure on desirable grass species recovering from drought.
- These plants can also provide for ground cover, soil benefits and be an asset for insects (pollinators), birds, and other wildlife
- Many weeds (immature stages) can be quite nutritious for livestock



Maximilian sunflower

Grazing Weeds

- Yellow toadflax
- Flowers – delayed seed maturity




Poisonous Plants

- Poisonous plants are commonly found in South Dakota pasture and rangeland
- Animals do not usually choose to graze most poisonous plants when forage is abundant; however, when quality forage is limited due to poor growing conditions or overstocking they may graze these plants.
- Herbicide applications also make some poisonous plants more palatable because the plant material is drier as it dies and there may be a build-up of salts in the plant (2,4-D)

Toxic Plants of SD Pastures and Rangeland

- Hemlock species
- Death camas
- Cocklebur
- Locoweed
- crazyweeds
- Poison vetch
- Larkspur
- Broom snakeweed

Death camas



Pasture Management During & After Drought

- Main emphasis ----
 - ** maintain a healthy grass stand
- Grazing management
 - * maybe deferred grazing
 - (desirable species)
 - * (build root reserves – grasses)
- Early control of weeds during drought recovery period
- Utilize IPM Tactics:
 - * Cultural Controls
 - * Physical Controls
 - * Chemical Controls
 - * Biological Controls

Integrate Control Methods

- Cultural controls are methods that favor desirable plant growth, such as proper grazing management, irrigation, and seeding vigorously growing, competitive, desirable plant species.
- Mechanical control physically disrupts weed growth and includes such methods as tillage, mowing, mulching, burning, and flooding.
- Chemical control is the use of herbicides.
- Biological control is the use of an organism to disrupt weed growth. Classical biological control uses natural enemies of weeds, such as insects or disease organisms. Biological control also may include use of sheep, cattle, goats, or other large herbivores to control weeds.