

A photograph of four sheep with thick, light brown wool grazing in a lush green pasture. The sheep are positioned in a line, with their heads down, focused on eating the grass. The background is a soft-focus green field.

# Managing Toxic Weeds in Your Pastures

2013 WI Sheep and Wool Festival  
September 14, 2013

# Drought impacts on pastures...





**Many looked like this in mid summer**





**The only thing not eaten were weeds**





# Managing toxic weeds in your pastures; outline

- When and where poisoning occurs
- What makes plants poisonous?
- Prevention – pasture management
- Toxic plants
  - A4019
  - High, medium, and low levels of toxicity
  - Crop plant issues
  - Misc.



# When and where poisoning occurs

- Mostly in early spring, fall, or dry periods when grasses are in short supply
  - Following drought!
- Pasture margins – fencerows, tree lines, ditches, waste areas
- More common in animals unfamiliar to a pasture e.g. after shipping
- Clippings from ornamentals





# Situations that can favor poisoning:

- Animals have been put onto pasture for the first time in the spring
- Animals are very hungry
- Animals are moved to a new pasture
- Poisonous plants became more palatable following a herbicide application
- Animals not in top condition
- A new forage is being fed





# What about hay?

- It is harder to control poisonous plants that might be present in purchased hay and also harder for your sheep to avoid dried and broken parts of plants
- If possible, walk the hay fields where your hay is harvested



# What makes plants poisonous?

- Alkaloids – nightshade family
- Glycosides – wild cherry and sudangrass; the glycosides they contain are converted to cyanide
- Thiaminase – bracken fern and horsetail
- Photosensitizers – St. Johnswort, alsike clover



# Ruminant vs. Monogastric



# Diet Selection of Livestock

Type	Horses	Cattle	Sheep	Goats
----- % of diet -----				
Forage <sup>a</sup>	90	70	60	20
Weeds	4	20	30	20
Browse <sub>b</sub>	6	10	10	60

<sup>a</sup> A mixture of grass and legumes

<sub>b</sub> Woody material



# Symptoms:



- Slight illness
  - inability to perform to its fullest potential for a few days
- More serious symptoms
  - slobbering, tremors, uncoordination, erratic behavior, convulsions or even sudden death
  - blisters, swelling and lesions (like severe sunburn) on light colored areas of the skin.

# Signs of poisoning differ in clinical symptoms and severity depending on:

- Kind of plant eaten
- Stage of growth
- Amount eaten
- Amount and kind of other feeds eaten
- Tolerance of the animal to the poison ingested





# First Aid

- Remove animal from area where toxic plants are present; remove affected feed or forage if you suspect it is the source of poisoning
- In the case of photosensitizing agents, get animal into shade and treat secondary infections



# If poisoning is suspected?

## Call a veterinarian

## Immediately





# Preventive Measures

- Learn to identify poisonous plants
- Learn the conditions under which these plants can be dangerous to your livestock.
- Scout your pastures; be sure to check fence lines and several feet beyond
- Control poisonous plants where feasible



# Prevention

- Provide hay in sacrifice areas
- When away from the farm for fairs or shows, watch animals closely to ensure that they don't eat something they shouldn't.
- Some toxicities take repeated consumption over time, so monitor animals closely on a daily basis and note any change in physical appearance or behavior.



# Prevention

- DO NOT OVERGRAZE PASTURES!
- Good pasture management is key!
  - Soil testing
  - Fertilization and liming
  - Don't overgraze
  - Clipping
- Develop a grazing plan
- When grazing a new area or newly seeded pasture,
  - Introduce the animals slowly
  - Monitor for any physical change or change in behavior





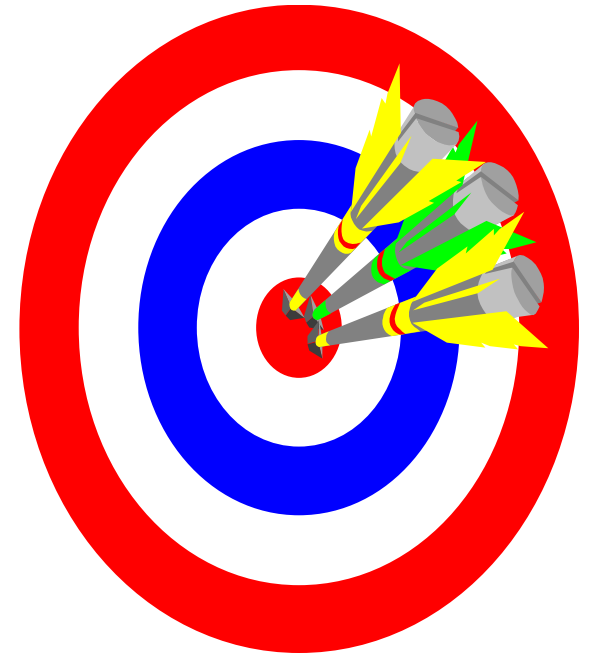


# Weed Control Methods

2 to 5 pounds of grass growth for every  
1 pound of weeds controlled

- **Mechanical**
  - Mowing
  - Fire
  - Hand weeding
- **Biological**
  - Mulch
  - Grazing
  - Crop Competition

- **Chemical**



# Herbicides for Pasture Use and Grazing Restrictions

<b>Herbicide</b>	<b>Rate</b>	<b>Grazing</b>	<b>Harvest</b>
<b>Chaparral</b> ® (aminopyralid + metsulfuron)	1-3.3 oz/acre	14 days	14 days
<b>Crossbow</b> ® (triclopyr + 2,4-D)	1-4 qt/acre	14 days	14 days
<b>Curtail</b> ® (clopyralid + 2,4-D)	2-6 pt/acre	14 days	14 days
<b>Dicamba</b>	0.5-1 pt/acre	10-14 days	14 days
<b>Escort</b> ® (metsulfuron)	0.1-1 oz/acre	14 days	14 days
<b>Forefront</b> ® (aminopyralid + 2,4-D)	19-34 fluid oz/acre		7 days
<b>Glyphosate</b>	Varies	14 days	14 days
<b>Milestone</b> ® (aminopyralid)	3-7 fluid oz/acre		7 days
<b>Overdrive</b> ® (dicamba + diflufenzopyr)	4-8 oz/acre	None	None
<b>Spike</b> ® (tebuthiuron)	20 lb/acre		12 months!
<b>Stinger</b> ® (clopyralid)	0.33-1.33 pt/acre	14 days	14 days
<b>Weedmaster</b> ®	1-2 pt up to 2qt/acre	7 days	37 days

# Calibrating and Spraying

- Follow sprayer instructions to calibrate
- Mix according to label
- In small paddocks
  - spot spraying for weeds is recommended right after animals are removed from a paddock
- Check the herbicide label for the recommended waiting period before animals can be put back into the pasture.
  - If sheep are not listed, call the company(on label).





# Learn to identify plants in your pastures that might be poisonous to your animals



A4019

## *Toxic Plants in Midwest Pastures and Forages*

Rhonda Gildersleeve, Anders Gurda, Peg Reedy, Mark Renz

# A4019 separates plants into three categories:

- Highly toxic – small amounts (<5% of feed can result in serious injury/death)
- Moderately toxic – moderate amounts (>5-25%) can result in injury/death
- Mildly toxic – under certain environmental or management conditions these plants can be toxic

# Cocklebur

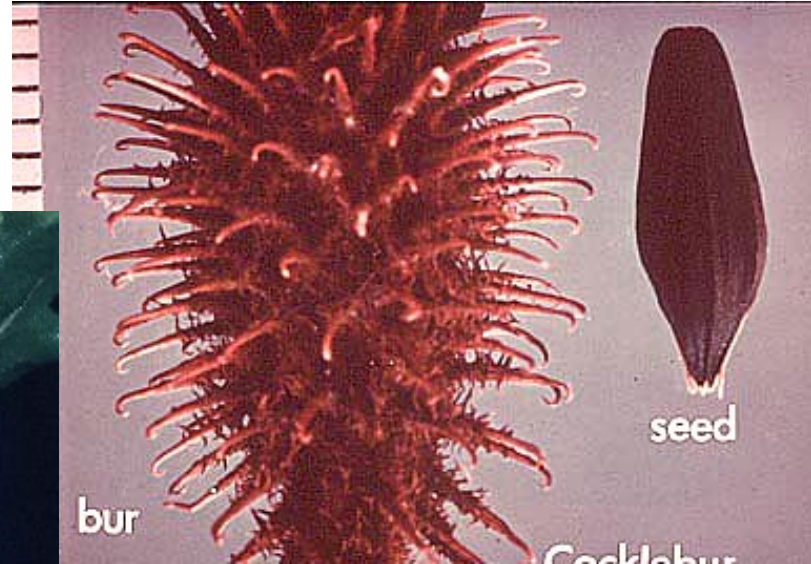
*Xanthium strumarium*

- Annual broadleaf
- Toxin is hydroquinone; causes loss of appetite depression, incoordination, twitching, paralysis
- Especially a problem in spring at 2-cotyledon stage or seeds
- Cultivated fields and pastures; esp. sandy soils





# Cocklebur



# Cocklebur







# Jimsonweed

*Datura spp.*

- Annual Broadleaf
- Toxin
  - Alkaloid
  - atropine, scopolamine, and hyoscyamine
- Parts: flowers, leaves, seeds
- Affects: cattle, humans, horses, goats, sheep
  - Rapid breathing, nervousness, convulsions





# Jimsonweed

- Leaves irregularly shaped; lobes with wavy margins and pointed tips
- Stems hollow and purplish



# Jimsonweed

- Common around feedlots, barnyards, cultivated fields, roadsides, disturbed habitats
- Foul smelling annual; fruit is prickly capsule
- All plant parts, especially seeds are toxic
- Poisoning usually occurs when ingested in hay or seeds mixed in grain





# Jimsonweed

- Flowers white and tubular (moonflowers)
- Fruit with blunt spines, golf ball sized with many seeds

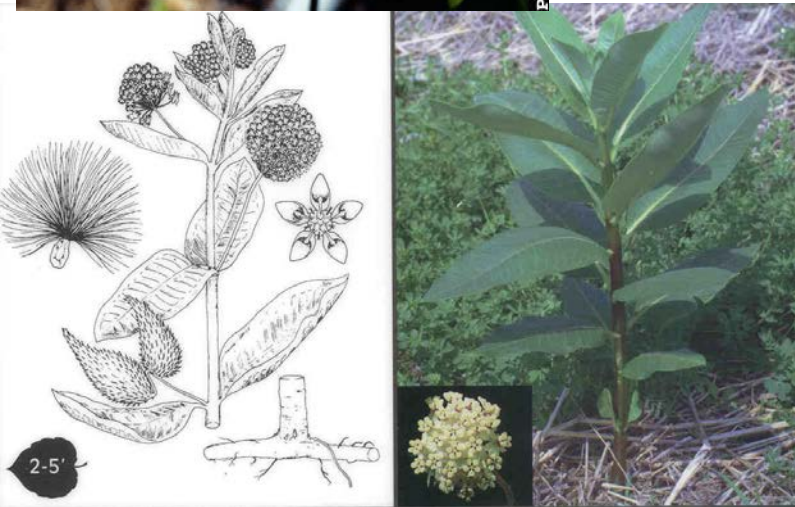


# Milkweed (multiple species)

(Asclepias species)

- Warm season, perennial broadleaf
- Rhizomatous tap root
- latex sap
- Toxin
  - cardenolides, glycosides, resinoids
- Symptoms
  - Abdominal pain
  - Colic
  - bloat
  - diarrhea due to gastroenteritis.
  - Muscle tremors, weakness and recumbency

Milkweeds remain toxic when dry.





# Milkweeds (*Asclepias* spp.)

- Found in dry areas, waste places, roadsides, stream beds
- Resinoids and glycosides
- Cause loss of control, spasms, bloating, rapid and weak pulse
- Most dangerous in spring
- All parts of plant green or dry are poisonous



# Whorled milkweed

*Asclepias verticillata*

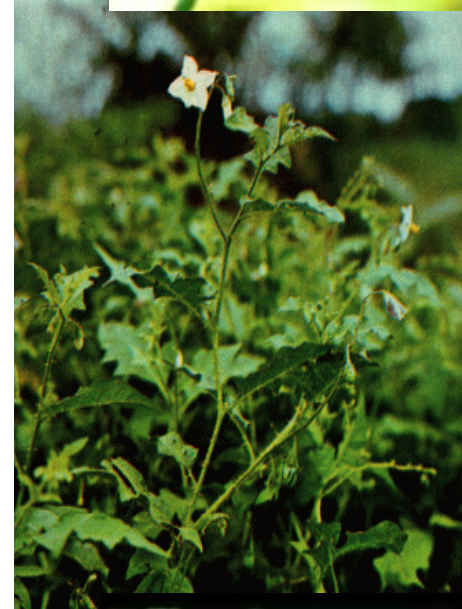
- One of the most toxic of milkweeds
- Emerging problem in pastures
- Largest problem is inability of animals to avoid it in hay
- Where does it come from?
  - Ditches
  - Hay??



# Nightshade family

(*Solanum sp.*)

- Warm Season perennial broadleaf
- Distinctive flower
  - 5 sided tomato type
  - groups of 3-7
- Toxin
  - Solanine Alkaloid
- Parts: leaves, immature fruit
- Affects: cattle, humans, rodents, sheep, horses, goats
  - Nausea, vomiting, diarrhea, respiratory paralysis
- Horse
  - Excess salivation, Colic, Diarrhea, muscle tremors, weakness





# Poison Hemlock

*Conium maculatum*

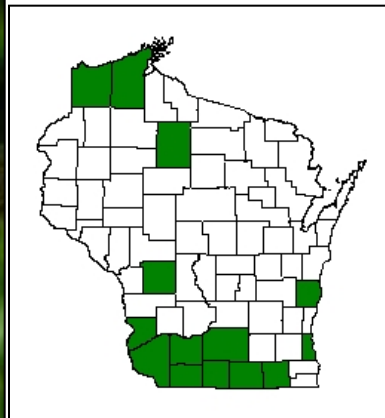
- Biennial
- All plant parts poisonous; especially seeds
- Toxin is an alkaloid, 0.25-0.3% bodyweight lethal
- Symptoms:
  - Weakness, pupil dilation, slowed heart rate, coma, death
- Found on roadsides, edges of fields and waste areas where soil is moist; distinctive purple blotches on stem





# Poison hemlock

(*Conium maculatum*)





# Red Maple

(*Acer rubrum*)



[bio.bd.psu.edu/plant\\_web/Aceraceae/Red\\_Maple\\_Leaf.html](http://bio.bd.psu.edu/plant_web/Aceraceae/Red_Maple_Leaf.html)



[www.bio.brandeis.edu](http://www.bio.brandeis.edu)



- Tree is 40-50 feet tall
  - Bark smooth and grey, darkening and furrowed in narrow ridges with age.
  - Twigs stout and shiny red to grayish brown.
- Toxin
  - unknown (oxidant?)
  - Leaves, especially when fallen, damaged, or wilted.
- Horses only
  - Breathing difficulties
  - Jaundice
  - dark brown urine
  - death

# White snakeroot

*Eupatorium rugosum*

- Perennial found in shady, moist woodlands and wood edges; member of sunflower family
- Toxic compound is tremetol, peak concentrations in summer through fall
- Tremetol is fat soluble; becomes concentrated in milk of lactating animals
- Causes trembling in legs, sweating and labored breathing



# Spotted Water Hemlock

*Cicuta maculata*

- Perennial ; found in wet areas
- Toxin is cicutoxin; yellow oil in plant is most poisonous, smells like parsley
- Symptoms include salivation, muscle twitching, seizures
- Mature leaves and stems lose some toxicity





# Yew

*Taxus spp.*

- Evergreen shrub with needles about 1 inch long
- Not a pasture problem but the most common plant poisoning from clippings fed to livestock or animals browsing on shrubs
- Causes cardiac failure
  - Foliage, bark, seeds are all toxic





# Black Locust

(*Robinia pseudoacacia*, *R. neomexicana*)



Tree up to 70 feet in height.

- Leaves are alternate, pinnate in 3-10 pairs.
- Drooping clusters of perfumed, white or pink
- Fruits are straight, flat, many brown pods

- Toxin
  - Bark, leaves and seeds
  - highest levels of Robin, a lectin (glycoprotein)
- Affect: horse, cattle, human, poultry, sheep, goat
  - Rapid heartbeat, diarrhea, cardiac failure



# Bracken Fern

*Pteridium spp.*

- Found in full sun, partial shade, woods, old pastures, thickets; indicator of poor soil
- Poisoning symptoms appear 2-4 weeks after continuous grazing; acute poisoning related to vitamin B1 deficiency.
- Leaves and rhizomes are toxic





# Hoary Alyssum

*Berteroa incana*

- Annual
- Toxin: unknown, primarily affects horses
- Symptoms: lameness, stiffness, limb swelling, fever, diarrhea, abortion
- Common in pastures, small grain fields and roadsides; mustard family



# Horsenettle

*Solanum carolinense*

- Perennial
- Toxins are alkaloids, including solanine; unripe fruits are most toxic
- Symptoms include depression, decreased heart and respiratory rate, muscle weakness, paralysis of hind legs



# Horsetail (*Equisetum* spp)

- Found in wet or dry areas of pastures and roadsides; all parts of plant toxic
- Two distinct growth forms
- Toxic component is thiaminase; most problems in hay
- Very tolerant to herbicides





# Oaks/Acorns

*Quercus spp.*

- Found in most deciduous woods, native
- Young leaves, acorn buds, green acorns most toxic
- Toxic agent is gallotannins; cause a loss of appetite, constipation, black pelleted feces
- Sheep and cattle most commonly affected





# Wild Cherry, Black Cherry, Choke Cherry

*Prunus spp*

**Tree/ bush - 3- 9 feet tall**

- Ripe fruit dull black, only slightly fleshy.

**Toxin:** hydrocyanic acid (also called prussic acid)

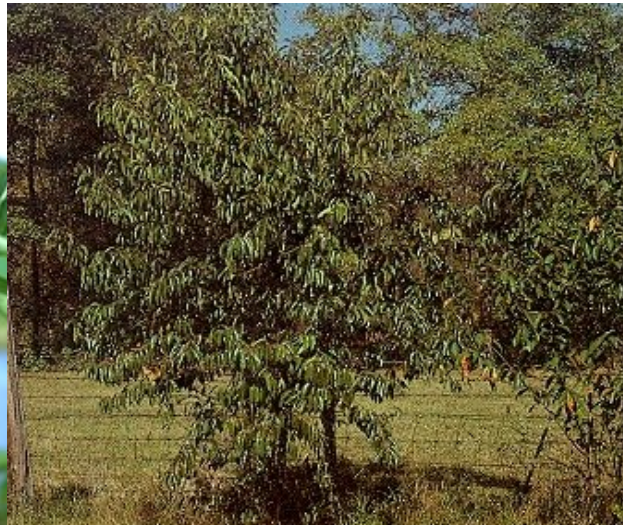
- primarily in fallen, wilted leaves trees, seeds

**Affects:** horses, cattle, moose, sheep, swine, goats

- difficult breathing, bloat, moaning, staggering, recumbency and convulsions before death.

- Animals may die within one hour after eating leaves.

- Mucous membranes are bright red in color, as is the blood







Chokecherry





# Buttercup or Crowfoot

*Ranunculus spp.*



- Cool season broadleaf
- Distinctive yellow flower
- Toxin
  - Alkaloid
  - Ranunculin (oily glycoside), is converted to protoanemonin by the action of plant enzymes released when the plant is chewed.
- Dried plant none toxic?
- Affects: cattle, goats, horses
- Horse
  - Excessive salivation
  - reddening of oral mucous membranes
  - diarrhea

# St. John's Wort (Klamath weed)

*Hypericum perforatum*

- Found in old meadows, pastures, roadsides, waste areas
- Leaves have large stomata that appear as small holes when held up to the light; 5-petaled flowers
- Leaves and flowers contain hypericin – causes photosensitization on white or light colored skin
- Properties persist in hay
- Recently sheared sheep esp. susceptible





# Sweet Clover

*Melilotus officinalis*, *M. alba*



- Mainly an issue when moldy or spoiled hay with large % of sweet clover is consumed
- Fungi (*Aspergillus* spp.) grows on clover, converts coumarin to dicoumarol.
  - interferes with prothrombin and vitamin K dependent coagulation factors.
- Minor losses in sheep



# Wild parsnip

*Pastinaca sativa*

- Biennial
- Toxin: furanocoumarin
- Animals affected: horses and cattle
- Symptoms: severe photosensitivity
- Most palatable prior to flowering; large doses necessary for poisoning



# Pigweed

*Amaranthus spp.*

- Annual
- Toxin: Protoanemonin
- Species: cattle, pigs, sheep, horses
- May cause kidney damage, weakness, muscular tremors, staggering gait, abortion
- Dose dependent on nitrate level. Commonly associated with plants that uptake nitrate from fertilizers or treated with herbicides. Stems most poisonous



Photo by:  
Richard Old  
[www.xidservices.com](http://www.xidservices.com)



# Curly Dock

(*Rumex crispus*)



- Toxic levels of oxalate
  - leaves
- Affects: horse cattle, sheep
  - Muscle tremors, tetany, death
- Horse:
  - Muscle tremors
  - Tetany
  - Weakness
  - Reluctance to move
  - Depression
  - Recumbency result from hypocalcemia.



# Box Elder trees/seeds

- Seasonal pasture myopathy in horses caused by ingestion of box elder seeds in the fall
- Previously thought to be white snakeroot toxicity
- Toxic to sheep and other ruminants??



# Forage species with potential problems

- Alsike clover
- Sweet clover
- Endophyte infected tall fescue
- Sorghum/Sudangrass/hybrids/Johnsongrass
- Switchgrass
- Goose grass
- Foxtail millet

# Other concerns

- Ergot
- Plants with burs, sharp awns
  - These are an issue both for wool quality, eye health, and trauma when ingested



# When should I worry about poisonous plants?

- First grazing in the spring
  - poisonous plant more palatable and other forage not available
- Limited desirable forage available
  - When animals are hungry, their selectivity decreases
- After an herbicide application
  - Palatability can increase after weeds are treated with a herbicide
- After application of N
  - nitrate accumulating plants (pigweed spp, common lamb's-quarter, common ragweed) can become toxic
  - Limiting uptake if feed is > 20% of these weeds

# References

Rutgers Cooperative Extension harmful plant page  
[www.rce.rutgers.edu/harmfulplants/default.asp](http://www.rce.rutgers.edu/harmfulplants/default.asp)

Cornell University Poisonous Plants Database  
<http://www.ansci.cornell.edu/plants.comlist.html>

Colorado State University Guide to Poisonous Plants  
[http://www.vth.colostate.edu/poisonous\\_plants/](http://www.vth.colostate.edu/poisonous_plants/)

Purdue Toxic Plants by Degree of Toxicity  
<http://www.vet.purdue.edu/toxic/cover1.html>

## References

- A Guide to Plant Poisoning of Animals in North America – A. P. Knight and R. G. Walter
- Poisonous Plants of Pennsylvania – R. J. Hill and D. Folland
- Poisonous Plants of the Central US – H. A. Stephens  
(<http://www.kansaspress.ku.edu/order.html>)
- Pasture Plants Toxic to Livestock in Michigan – Alice Marczewski
- Guide to Toxic Plants in Forages – Glenn Nice, Purdue University Extension



# Questions?

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