WELCOME!

PURDUE VETERINARY MEDICINE
HORSEMAN’S FORUM
SATURDAY, FEBRUARY 6, 2016
Toxic Plants in Indiana:

What You Need to Know

Indiana Horseman’s Forum
06 February 2016

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Overview

• Knowing the most common poisonous plants in Indiana pastures is key in preventing exposure

• Early recognition of characteristic, clinical signs of exposure is important
Overview

• Prevention can include physical removal of the noxious plants or application of appropriate herbicides

• There are resources available to help identify suspect plants
Horses and Poisonous Plants
Why Does Poisoning Occur?

- **Accidental**
  - Unwittingly fed clippings, parts of noxious plants

- **Boredom**

- **Lack of adequate food source**

- **Malicious**
  - Purposely fed clippings, parts of noxious plants
Poisonous Plants

Trees and Shrubs
• Yew
• Black Locust
• Black Walnut
• Red Maple

Forage and Crop Plants
• Fescue grass/Rye grass (Ergot)
• Alsike Clover
  – Groundsel, Ragwort
Poisonous Plants

- Because they are everywhere!
  - Poison Hemlock
  - White Snakeroot
  - Buttercups
Poisonous Plants

- John and Sally Smith
- Rushed to ADDL with a trash bag full of hay and "suspicious" looking plant branches
- Brother-in-Law (John's brother) doesn’t like Sally…
- Sally found her favorite horse deceased after eating suspect hay
Japanese or English Yew – Taxus species – Ornamental/Landscape Shrub

- Hardy and grow year round
- All parts of the plant are poisonous, including the bark – green or dry Woody perennials
- Long, evergreen leaves
Yew Plants

- **Japanese or English Yew**
  - Poisonous to all animals ("The Tree of Death!"
    - Unwittingly fed clippings from bushes
    - Only takes about ½ to 1 cup of plant material to cause toxicity
  - Horses are especially sensitive
    - Depending on the amount ingested, signs of toxicity may appear within hours to 1 day after exposure
    - Breathing problems
    - Muscle trembling or weakness
    - Collapse due to heart failure (slowed heart rate)
Yew Plants

- **Japanese or English Yew**
  - **Diagnosis of Exposure:**
    - Identification of plant
      - Plant, in forage, in gastric contents
    - History of exposure
Black Locust Trees

- Common in well-drained woods, fence rows, pastures, fields
- Most prevalent in southeastern part of state
- Horses are especially sensitive to black locust
Black Locust

*Robinia pseudo-acacia*

- Rough bark with thorns
- Leaves pinnate, compound, oval
- Flowers resemble pea flowers
- Kidney bean-shaped seeds
- Grow as tall as 70 ft.
Black Locust

- **Horses**
  - Most susceptible species
  - Ingestion of any part of tree

- **Clinical Signs:**
  - Can occur within an hour post-ingestion
    - 1,000 lb horse eats ½ lb of bark/leaves = Bad news!
  - Horse appear unaware of their surroundings ("stupid")
  - Breathing is labored and heart rate increases
  - Low body temperature (feel cold)
  - Colic (decreased intestinal motility)
  - Kidney failure

→ But, horses typically recover with symptomatic/supportive care

- **Diagnosis:**
  - History of exposure
  - Clinical signs
Black Locust Case

- Horse was tied to a black locust tree in pasture
- Got “bored?” and started chewing on the bark of the tree
- Owner stated horse acted “out of it” and was staggering around and head pressing on tree

**Veterinarian**
- Treated with AC and IV fluids
  - Recovered in 2 days
Black Walnut

• **Horses:**
  - Exposed when shavings used as bedding contain black walnut shavings
    - As little as 10% black walnut in bedding can cause clinical signs
    - Roots, leaves, bark, nuts, pollen, & wood all toxic
  - Depending on how much is present, clinical signs may come appear within 8 – 12 hours post-exposure
  - The mechanism and toxin that causes issues in horses is not known

[Link to OMAFRA website](http://www.omafra.gov.on.ca/english/livestock/horses/facts/walnut.htm)
Black Walnut

• **Clinical Signs:**
  – Black walnut causes vasoconstriction of blood vessels and inflammation in hooves
    • Lamellae in hoof becomes inflamed and weakens connection between hoof wall and coffin bone ➔ *Laminitis*
  – Lameness
  – Depressed
  – Colic
  – Pitting edema of distal limbs
Black Walnut

• **Diagnosis:**
  – Identification of black walnut in bedding
    • Department of Forestry (Purdue University)
Red Maple

- Trees common throughout Indiana and most of eastern U.S.
  - Leaves turn from green to bright red in fall

- Reported cases in ponies, horses, zebras
  - Unidentified toxin in wilted or dried leaves, bark
  - Exposure typically happens fall or after winds/storm that blows leaves or branches to ground
Red Maple

- Horses:
  - Gallic acid and tannins
    - Bacteria in small intestine convert them to pyrogallol*

Clinical Signs (1-2 days):
- Depressed
- Anemic
- Red-brown urine
- Pregnant mares - abort

1.5 to 3.0 lbs. leaves for the average 450 kg horse → hemolysis
Red Maple

• **Diagnosis:**
  – History of exposure
  – Observation of red-brown urine
  – Test urine for pyrogallol and gallic acid

• **Prognosis:**
  – Guarded to poor since rapid development of red blood cell hemolysis

• **Prevention:**
  – Remove red maple leaves and fallen branches from pasture or horse pen
  – Don’t plant them around horse enclosures
Poisonous Plants

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Forage and Crop Plants
• Fescue grass/Rye grass (Ergot)
• Alsike Clover
  – Groundsel, Ragwort
Ergot

• What it might mean to you all:

Small callosity on underside of fetlock

Ergot: comes from word meaning rooster’s spur
Ergot

- What it means to you and to toxicology:

Endophyte fungus: *Neotyphodium coenophialum, Claviceps purpurea*

Toxins: Ergot/Ergopeptide alkaloids - Ergovaline
Ergot

• What it might have meant to this guy:

Nature’s LSD

“Ergot” took this guy on a lot of “trips” in the 60s!

Ergot Alkaloids are Lysergic Acid Amides
Lysergic Acid Diethylamide
When it becomes an issue:
– Cool wet weather followed by high heat and humidity
– Promotes growth of endophyte fungus and production of ergopeptide toxins in tall fescue grass or rye grass
– Toxin concentrations can vary with the season in fescue pastures
  • Lower in spring ➔ peaking in summer months
  • Decrease again in early fall and then rebound with fall re-growth
  • Stockpiled fescue pastures have more toxins in early winter than late winter
– Ergot bodies look like “rodent droppings” on seed heads
  • Can be “knocked off” and baled up in hay during harvesting
Ergot

- **Species Susceptibility:**
  - Horses (pregnant mares) > Cattle > Sheep

- **Horses:** Reproductive problems dominate
  - Reproductive Term Dysfunction
    - Most susceptible prolonged/late gestation (> 300 days)
    - Prolongs pregnancy 20-27 days, retained placenta (thickened), agalactia
  - Infertility
    - Early embryonic mortalities or late term abortions
Ergot

- **Treatment:**
  - **Equidone®**
    - Helps promote low milk production by blocking the action of the ergot toxins

- **Diagnosis:**
  - Ergot toxins can be detected in urine (within 12 hours of exposure) and in feed/hay samples

- **Prognosis:** Good with treatment and removing the source
  - After removing horses from pasture, ergot toxins not present in urine after 48 hours
  - When removed from ergot-containing fescue pastures, post-term mares may show signs of milk production and give birth in 48 hrs
Ergot

Prevention and Recommendations:

- Fescue or rye/cereal grass pastures
  
  - Mow grass pastures to keep them in a vegetative state rather than letting them produce seed heads
  
  - Have pasture/hay seed mixes containing tall fescue and perennial rye grass tested to ensure they are endophyte free
  
  - Prevent late-gestation mares from eating cereal rye straw or bedding
Photosensitizing Plants

- **Alskie Clover:**
  - Perennial commonly used in hay and in pastures
    - Problems only when the plants are wet (dewy)
      - “Dew Poisoning”
  - Toxin not known
    - Poisoning occurs with high humidity and rainfall

Grow to 1 ½ “ to 2 ½ ‘ tall
3-leaflet (clover leaves)
Photosensitizing Plants

- **Groundsel and Ragwort:**
  - In the daisy family
  - Perennials that grow to ≈ 1 ft.
  - Found along roadsides, pastures
  - Bloom in early spring
  - All parts of the plant are toxic
Photosensitizing Plants

• **Alsike Clover, Groundsel and Ragwort:**
  – Pyrrolizidine alkaloid toxins

  • **Can cause liver damage to horses**
    – Liver breaks them down into toxic compounds that cause damage to the liver

  • **Can cause secondary photosensitization in horses**
    – Secondary to liver damage: liver cannot breakdown a product of chlorophyll and it accumulates in blood and reaches the skin

    » When light-colored portions of skin are exposed to UV light, causes dermatitis and “sun burns”
Photosensitizing Plants

- Alskie Clover, Groundsel and Ragwort:
  - **Horses:** Chronic condition (Weeks – Months)
    - Tend to lose condition and become nervous
      - “Sleepy staggers” or “Walking disease”
        » Bump into things, head pressing
        » Due to build up of blood ammonia because the liver cannot break it down due to liver damage

- Lighter-colored skin becomes sensitive to sunlight and will cause sunburns or severe dermatitis
Photosensitizing Plants

• **Key Points:**
  
  – Horses typically don’t eat groundsel or ragwort unless other forage is limited – ensuring adequate forage and limiting access (removing suspect) plants is key

  – The toxin content in plants can remain stable for months if present in hay (issues in winter when fed out)

  – Flowers contain the greatest amount of toxin

• **Diagnosis:**
  
  – Identification of plant
  – Detection of toxins in plant, gastric contents
Indiana’s State “Plant!”
Poison Hemlock

Distribution:
Noxious, invasive weed

Waste areas with sufficient water
Roadsides, edges of fields

Early spring - May
Poison Hemlock

- Poisonous, biennial plant
  - Parsnip/Wild Carrot family
  - Grows to 3 - 8 feet tall
  - Purple-spotted, hollow stem
  - Leaves resemble wild carrot/parsley
  - Flowers are small, white, clustered
    - 4 to 6” across
  - Crushed leaves and root emit a rank odor → alkaloids present in plant
Poison Hemlock

• Poison hemlock contains piperidine alkaloid toxins
  – Toxins that block the neuromuscular junctions in horses
    • Paralyzes muscles – can occur within an hour
  – Horses:
    • Initial nervousness → loss of appetite
    • Muscle weakness
    • Weak heart rate
    • Respiratory paralysis
Also because it is everywhere.....
White Snakeroot

• Found in low, moist areas
  – Usually by rivers, streams

• Perennial growing up to 5-6 feet tall

• Leaves are long and serrated

• Flowers are white-composite
White Snakeroot

- **Toxin**: Tremetone
  - Plants remain toxic green or dried in hay
- **Horses**:
  - Ingesting 0.5% of their body weight can cause clinical signs
  - May take up to 1 week before signs of toxicity
    - Sweating, muscle tremors (become reluctant to move)
    - Depressed
    - Ataxic
    - Irregular heart rate
    - Choking due to paralysis of pharyngeal muscles
White Snakeroot

- **Toxin**: Tremetone

  - Gets excreted in milk – “Milk Sickness”

  - Dry year – cattle seeking forage ate WSN plants → Abe Lincoln’s mother drank milk from dairy cows and died from WSN poisoning

  - Foals may be poisoned when they drink milk from dam that has eaten plants
White Snakeroot and Poison Hemlock

• **Cases:**
  – More common in cattle
  – Inquiries concerned about accidental exposure in horses due to prevalence on or near pasture
  – Lactating animals exposed to WSN should be repeatedly milked to help remove toxin

• **Diagnosis:**
  – Identification of plant
    • Gastric contents
  – Detection of coniine toxin in urine, plant, gastric contents
  – Detection of tremetone in gastric contents, plant, liver
Buttercups

- A lot of inquiries from horse and livestock owners this year!

- **Horses:**
  - Not very palatable…
  - GI and oral irritation
  - Salivation
  - Colic and diarrhea
  - Convulsions and death
  - But must be heavy consumption, infested pasture

- When dried in hay, loses its toxicity
So, You Have a Poisonous Plant?

• Prevention can include physical removal of the noxious plants or application of appropriate herbicides

• There are resources available to help identify suspect plants
# Prevention

Guide to Toxic Plants in Forages

Table 2. Grazing and Harvest Intervals

This table shows the time one must wait after applying a particular herbicide before animals can graze there again or the pasture can be harvested.

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Grazing</th>
<th>Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ally®</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Banvel®</td>
<td>7 days</td>
<td>37 days</td>
</tr>
<tr>
<td>Cimarron®</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Cimarron Max®</td>
<td>7 days for lactating animals; none for others</td>
<td>37 days</td>
</tr>
<tr>
<td>Clarity®</td>
<td>7 days</td>
<td>37 days</td>
</tr>
<tr>
<td>Crossbow®</td>
<td>next season for lactating animals; none for others</td>
<td>14 days</td>
</tr>
<tr>
<td>Curtail®</td>
<td>14 days for lactating animals; none for others</td>
<td>30 days</td>
</tr>
<tr>
<td>Escort XP®</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Stinger®</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Glyphosate products</td>
<td>7 days</td>
<td>14 days</td>
</tr>
<tr>
<td>Weedmaster®</td>
<td>7 days for lactating animals; none for others</td>
<td>37 days</td>
</tr>
</tbody>
</table>

*Nice, G. Guide to Toxic Plants and Forages. Purdue University Extension Weed Science, WS-37.*
Poisonous Plants in Indiana

• There are > 100 plants, trees, and shrubs in Indiana that are potentially toxic to horses and livestock

• So, what do you do if you suspect exposure to a plant?
Resources

• **Purdue Plant and Pest Diagnostic Laboratory**
  – Plant and seed identification specialists

• **Purdue Large Animal Hospital**
  – 765.494.8548

• **Animal Disease Diagnostic Laboratory**
  – 765.494.7440
Resources

• Purdue Agriculture and Purdue Extension
  – Publications and Information
    • Indiana Plants Poisonous to Livestock and Pets
    • Guide to Toxic Plants in Forage

• 1-888-EXT-INFO
• www.btny.purdue.edu/weedscience
• www.extension.purdue.edu
Resources

- **Purdue Agriculture and Purdue Extension**
  - Weed science specialists
    - Weed and herbicide management
  - Forage crop specialists
    - Pasture management
    - Site visits
Questions?

That moment when you realise it spells horse.
Nightshades and Nettles

Sources:

- *Solanum spp.*
  - Potato plants
  - Tomato plants
  - Belladonna (*Atropa sp.*)
    - Deadly nightshade

- **Toxins:**
  - Solanine, solanidine, tomatine, tomatadine glycoalkaloids

Clinical Signs:

- GI irritation
- Salivation
- Mydriasis
- Incoordination
- Prostration