GETTING STARTED IN THE MEAT GOAT BUSINESS


Plants Poisonous to Goats and Other Livestock in the Southeast

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New publications from the “Getting Started in the Meat Goat Business” series are coming soon

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Introduction

When life first evolved on earth millions of years ago, certain plants began to develop toxic or repugnant substances that protected them and made them distasteful to many mammals including man. As a result of this evolutionary process, poisonous plants were able to survive because they induced discomfort to anyone that disturbed them (Nellis, 1997).

Poisonous plants are plants that contain harmful toxins in high enough concentration that can cause serious injuries if they are ingested or touched (Turner and Szczawinski, 1991). They can be found everywhere in the U.S, from flower and vegetable gardens, in crop fields, in areas where there are ornamental trees, in homes where there are household plants, in pastures where animals graze and throughout various woodland areas.

Plant Poisoning

In the U.S. each year, millions of animals die due to plant poisoning (West and Emmel, 1987). The severity of the poisoning depends on the quantity of the plant eaten, the part of the plant that was eaten, the season in which the plant was eaten, the age of the plant, the ground moisture, the health of the animal prior to consuming the plant and the size and age of the animal (Ace and Hutchinson, 1984). Young animals are generally more susceptible to plant poisoning than older animals. Older animals, can consume enough poisonous plants to build-up resistance to these toxins after being exposed to small quantities overtime. When the animal consumes larger quantities of these toxic substances, they already have resistant to it and their system knows how to handle it (Robinson, 1989).

Ruminant animals such as goat, cattle, sheep, have a four chambered stomach which also enables them to tolerate toxic plants to a certain degree. Their digestive system has the unique ability to be able to breakdown toxic substances and convert them into less harmful ones. Microorganisms in the rumen of the ruminant are predigested and the toxins are further digested and absorbed by the mammal as it passes through the gastrointestinal (GI) track. However, under favorable conditions ruminants and older animals are also susceptible to plant poisoning.

Mongastric animals such as horses, swine, cats and dogs are particular vulnerable to plant poisoning because
their digestive system lacks this ability.

**Symptoms of Plant Poisoning**

Symptoms of plant poisoning may range from showing no signs of illness to showing symptoms of bloat (swollen abdomen), lameness, cries of pain, colic, frothing of the mouth, severed digestive disturbance, sunburn, listless, weight loss or death.

Toxic plants can also cause irreparable damage to the liver and kidneys as well as lower the glucose level in the body, interfere with blood clotting, prevent cell division, affect the immune system or affect the skin and eyes of the animal if they touch certain plants (Turner and Szczawinski, 1991). Therefore, early diagnosis can mean the differences between life or death.

**Why Do Animals Consume Toxic Plant Materials?**

In most instances, ruminants will resort to eating toxic vegetation when there is a shortage of food and if their ration is unbalanced (nutrient in the wrong proportions). Goats in this situation may crave for nutrients that they are missing.

To compensate for these deficiencies, goats may consume vegetation they would normally not eat. Therefore, if you are unsure about the nutritional composition of the feed or hay your providing for your herd, have it analyzed at a forage testing laboratory for protein, energy, vitamin, minerals, dry matter and fiber content.

Overgrazed pastures or drought areas are other factors that can put the herd at risk for plant poisoning. If there is nothing to eat the animals may consume toxic plant materials in order to sustain life. In this case, don't overstock the grazing or browsing areas.

The stocking rate for pastures should be 7-10 goats per two acres for a year-round basis. The number of goats can be increased in these areas, but this will depend on the quantity and quality of the vegetation that is available. Also, provide supplements for the herd during the drought. This may include hay, feed or grain and make sure you have plenty of fresh water for the goat herd.

Goats and other livestock may also ingest toxic plant materials out of curiosity or if they have access to yard wastage. Animals that are fed discarded plants or other toxic substance are at risk for poisoning. Therefore, it is best to keep the herd away from areas where there is yard wastage.
waste to prevent accidental exposure to toxic roots, leaves or seedlings. Pastures that have been recently plowed must be checked for exposed poisonous roots which could make a good meal for the goat herd.

Toxic roots can also be found in areas where dry or partially dry water holes are located and the plant-material may be ingested either on purpose or by mistake. Sometimes poisonous plants are mistakenly baled in the hay.

What Can I Do?

When you are placing the herd in a new grazing area, always check the pastures or woods for poisonous plants. It is important to note that most woodland or swampy ground pastures contain poisonous plants that can be accidentally consumed by the animals.

The toxins may be found in the seedlings, leaves, roots, young shoots fruit or the entire plant. In some cases, only certain parts of the plant may be toxic and the concentration of the toxins may vary from season to season and from year to year.

So, learn which plants are toxic on your farm and when they can become a threat to your livestock.

Other ways the herd can be poisoned on the farm may include exposure to the following: (1.) creosote-treated wood, (2.) anti-freeze, (3.) rodent poisoning, (4.) herbicides, (5.) insecticides, (6.) lead paint, or from (7.) overdosing them with their medications, (8.) consuming excessive grain and (9.) nitrate poisoning from releasing the herd on freshly fertilized pastures.

In the case of nitrate poisoning, allow the pastures to lie dormant until there has been a heavy rainfall or enough rain that the fertilizers have been absorbed through the soil. Lastly, keep all of the other potential poisonings out of the reach of children and all farm animals.

If you suspect your animal has been poisoned do the following: (1.) Prevent further exposure to the poisoning, (2.) Isolate the animal and provide fresh water, (3.) Avoid stressing the animal, (4.) If possible, keep samples of the toxic substance for further diagnosis and (5.) call a veterinarian for immediate diagnosis and treatment (Pygmy Goat Basic Owners Manual).

Classification of Poisons

There are a variety of toxic substances that
have contributed to plant poisonings. However, the exact nature of the toxins in each plant has not been thoroughly researched, but in Florida and other southeastern states the toxic agents in most poisonous plants derive from one or more of the following groups:

**Alkaloids** - have a bitter taste and generally irritate the gastrointestinal tract causing nausea, colic, diarrhea, produce blindness, muscular weakness, convulsions and death. Some alkaloids can be found in the following plants: *Death camas, lupines, buttercups, marshmarigolds, larkspurs, the nightshades, squirrel corn and Dutches breeches.*

**Glycosides** - are natural plant products that contain the sugar glucose. They can be further subdivided into three main groups:

- **Cyanogenic glycosides (HCN)** - are not poisonous by themselves, but in the presence of certain enzymes are hydrolyzed (broken down into smaller molecules with water) to form hydrocyanic acid which is very toxic. The symptoms are muscle tremors, difficult rapid respiration and convulsions. There are several factors that influence the concentration of cyanogenic glycosides in plants. Some plants normally have high levels of this toxin in them which decreases as the plant matures.
  - High nitrogen and low phosphorus content, wilted frost, low soil moisture, shade are other factors that may increase cyanogenic glycoside contents in plants. HCN occurs in *sorghums, sudan grass, marsh-arrow grass and wild cherries.*
- **Saponin Glycosides** - produces a violent gastroenteritis, vomiting, diarrhea and colic. If this toxin is absorbed into the bloodstream of the animal then HCN may cause the breakdown of red blood cells and injury to the central nervous system resulting in convulsions and paralysis. This toxin can be found in purple cockle, bouncing bet and pokeweed.
- **Mustard glycosides** - are found in plants belonging to the Mustard family. The symptoms include severe colic and purging.

**Nitrate Poisoning** - when nitrate is reduced to nitrite in the gastrointestinal track of the goat, it is then absorbed by the bloodstream where it interacts with hemoglobin and forms
methemoglobin. This toxic, brownish compound is capable of releasing oxygen. The symptoms of nitrate poisoning are trembling, staggering, rapid breathing and death. In animals that are chronically poisoned they will experience poor growth, poor milk production and abortions. This toxin can accumulate in several legumes and grass species that are used for pastures or hay crops, but under the appropriate conditions they can potentially become hazardous for animal consumption. The examples are the following: (1.) poison hemlock, (2.) milk thistle, (3.) prickly lettuce, (4.) annual and perennial sow thistle, (5.) tumbling, rough and prostrate pigweed, (6.) oats, (7.) rye, (8.) wheat, (9.) barley, (10.) corn, (11.) sorghum, (12.) sudan grass), (13.) sugar beets, (14.) turnips, (15.) rutabaga, (16.) rape, (17.) kale, (18.) broccoli, (19.) cucumbers, (20.) squash and (21.) celery.

Molybdenum - poisoning can occur when there is abnormally high levels of this mineral in the soil. Symptoms of this poisoning are acute scouring, emaciation, low milk production, rough a coat and often a faded coat. Plants associated with this particular problem include red and alsike clovers.

Copper - If the soils are rich in copper or deficient in molybdenum the plant may accumulate this mineral which may cause toxic effects in goats, cattle and especially sheep. Plants to watch for are clovers.

Selenium - Plants that accumulate high levels of selenium are extremely toxic. The level of selenium is correlated to the level in the soil for most plants. The symptoms of selenium poisoning are dullness, stiffness of joints, lameness, loss of hair from the mane or tail, hoof deformities and blind stagers in acute poisoning.

Ergot - is a fungus that accumulates on grasses and if sufficient quantities are eaten the animal will become poisoned from the production of mycotoxins. This toxin can usually be observed on flowering grass heads that are hard, dark-colored and are in masses on the plant. The masses are generally two to five times larger than the grass seeds which is called “ergot bodies.” The symptoms include dry gangrene in the extremities, possible abortion in pregnant animals and death if eaten in large quantities.

Coumarin - is a compound that is found in sweet clovers. This toxin will reduce
palatability of the legume and reduce blood clotting of the animal. Dicoumarin is actually the chemical compound that is responsible for the latter symptom. Mycotoxins: can occur when the plant is in the field or right after it has been harvested. This is a toxin that affects cereals and grain under favorable conditions. Usually the symptoms involve the animal refusing to eat the feed and vomiting (Robinson, 1989).

What are the Treatments Available?

There are a few plants that have a specific treatment for poisoning. Most plant toxins must be removed from the body by vomiting before the animal can start to recover while the skin must be washed thoroughly with soap and water for goats that were exposed to external irritants from toxic plants. The remedies that are used commonly for plant poisoning are the following:

Gastric Lavage or Washing the Stomach:

This procedure involves the passage of a tube into the stomach to remove the stomachs contents with water or normal saline solution. This procedure is usually repeated until the washings are clear and free and clear from toxic materials. This treatment is generally followed by a dose of activated charcoal and a saline cathartic.

Cathartics:

This is a substance that can be very useful in the treatment of poisoning. This treatment is generally administered at the same time the activated charcoal, after the animal has vomited or after gastric lavage has been performed. Cathartics include epsom salts, sodium phosphate-biphosphate complex and sorbitol. This treatment should not be used if the animal has been poisoned by corrosive substances.

Skin and Eye Irritants:

Treatment for eye irritants should include flushing the eye with a stream of tepid water. For mechanical injuries to the eye (i.e., spine, thorns, barb or chemical) remove the irritant and treat the wound with a disinfectant. Before you proceed to perform any treatments with the animal you suspect that has plant poisoning (Turner and Szczawinski, 1991) consult with your veterinarian.