

Poisonous Plants
of the Southeastern United States

PB 1586 TENNESSEE AGRICULTURAL EXTENSION SERVICE

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Foreword

Poisonous plants cause significant annual losses of money through injury to humans and livestock. No verifiable sums are available, but figures as high as “several million dollars” are often quoted. Undoubtedly, poisonous plants reduce productivity, and some can even kill people and all classes of livestock.

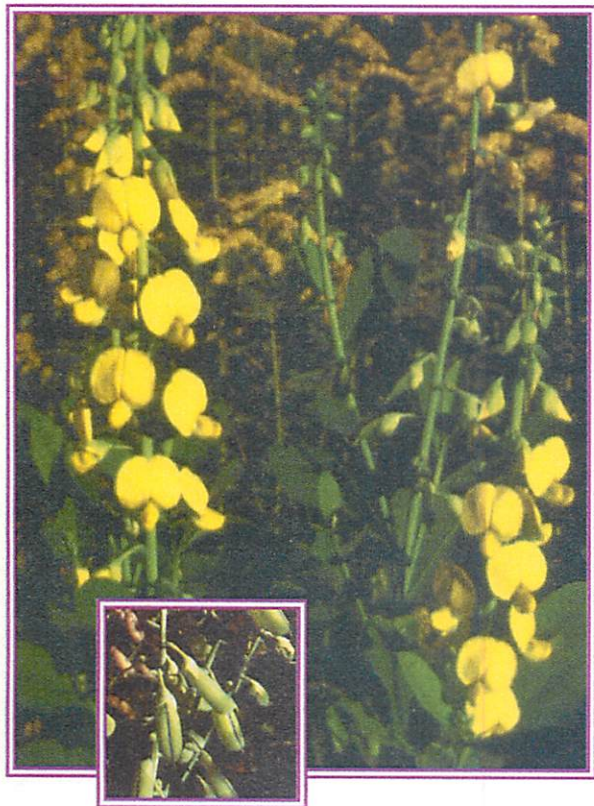
If people could quickly recognize some of the more common poisonous plants, they might avoid injury. In addition, livestock producers could remove poisonous plants from fence lines and pastures where feasible.

The need for a regional publication on the identification and toxicity of common poisonous plants was discussed at the annual meeting of southern Extension Directors held July 1974. Dean William D. Bishop (Tennessee) appointed a committee to prepare such a publication. Extension weed specialists and Extension veterinarians in the South were surveyed to develop a master list of poisonous plants. The publication committee and authors of the original publication were Dr. A. H. Kates, Extension (Virginia Polytechnic Institute and State University); Dr. D. E. Davis, Botanist (Auburn University); Dr. John McCormack, Extension Veterinarian (University of Georgia); and Dr. James F. Miller, Chairman—Extension (University of Georgia).

In general, plant species in this publication were shown in order of their poisoning frequency and relative importance according to the survey of southeastern states. In cases where the toxic principle was the same or similar, plants were grouped together within the list.

The current publication is a revision of the original publication, which was reprinted several times over the years. Changes have been made in taxonomic nomenclature, plant descriptions, and suggested treatments. In addition, several new poisonous plants have been included. The contributing authors to this revised publication are Dr. John W. Everest, Extension Weed Scientist, Professor, Agronomy and Soils (Auburn University); Dr. Thomas A. Powe, Jr., Professor, Large Animal Surgery and Medicine (Auburn University); and Dr. John D. Freeman, Extension Plant Taxonomist, Associate Professor (Retired), Botany and Microbiology (Auburn University).

Showy crotalaria *Crotalaria spectabilis*



Annual herb, 0.2 to 0.5 m tall, puberulent to glabrate. Leaves simple, alternate. Lower leaves spatulate, 2 to 3 cm long, 6 to 15 mm wide; upper leaves oblanceolate, 3 to 6 cm long, 4 to 10 mm wide. Stipules conspicuous, tardily deciduous, fused to stem. Flowers showy, 1.5 to 2.5 cm long, yellow, in terminal racemes. Widely distributed from Florida to Texas in Coastal Plain and Piedmont; abundant along roadsides, in fields, and in waste places; once cultivated as a green manure crop. [Inset: fruit]

Toxicity

The toxic principle is the alkaloid monocrotaline. Chickens, horses, cattle, and swine are the species usually affected, but sheep, goats, mules, and dogs can be affected to a lesser degree.

All parts of the plant are poisonous, whether green or dried in hay. The seeds are especially poisonous. Poisoning occurs when animals consume the green plant, hay contaminated with crotalaria, or dried seed in harvested grain.

Symptoms

Chickens can die from eating as few as 80 seeds. Fatalities may occur within a few days or up to several weeks after ingestion. Symptoms include diarrhea, a pale comb (signifying anemia), ruffled feathers, and depression. Quail are also easily poisoned, but turkeys are more tolerant.

Horses develop chronic unthriftiness, become uncoordinated, walk aimlessly, and may "head press" against objects. Mucous membranes often exhibit jaundice, related to severe liver damage.

In cattle, three syndromes are recognized: acute, chronic, and intermediate types. The chronic type is most commonly seen with animals dying several months after consuming

the toxic material, usually hay contaminated with crotalaria. Symptoms include bloody diarrhea, icterus, rough hair coat, unthriftiness, edema, and weakness.

Swine may exhibit either an acute form, characterized by sudden gastric hemorrhage and death, or a chronic form with anemia, ascites, loss of hair, and unthriftiness.

Treatment

There is no specific treatment.

Bracken fern *Pteridium aquilinum*



Coarse perennial fern to 1 m tall. Older fronds leathery, 0.3 to 1 m long, triangular in outline with three main divisions and many small subdivisions. Rhizomes horizontal, underground, about 0.5 cm in diameter. Distributed throughout all southern states; most common in old fields, waste places, open woods, and roadsides, particularly on relatively dry sites.

Toxicity

The poisonous principle is the enzyme thiaminase, which inactivates thiamine (Vitamin B₁) in the horse. In ruminants, an aplastic-anemia factor causes depression of the bone marrow. Sheep are less susceptible to the toxic effects than cattle and horses.

All portions of the plant are toxic whether green or dry. Poisoning by the plant is cumulative, and symptoms may not appear until several weeks or months later. Clinical cases are most often seen in the spring or late summer or fall, especially after periods of drought when other forage is short or not available. Animals have shown toxicity from consuming hay containing the dried plants.

Symptoms

Horses exhibit incoordination, often standing with their legs spread apart as if bracing themselves. The affected animal arches its back and neck into a crouching stance. Occasionally a fever is present up to 104°F. Before death horses may "head press" objects and have spasms with the head and neck drawn backwards.

Cattle may exhibit two types of symptoms. The laryngeal form is seen often in younger animals and is characterized by edema of the throat region, resulting in difficult and loud

breathing. The enteric form may be preceded by the laryngeal form. The enteric form is characterized by bloody feces, blood in the urine, and excessive bleeding from fly bites. The blood is slow to clot since platelets are deficient. Death usually occurs within a few days after symptoms appear.

Sheep have shown blindness due to degeneration of the retinal epithelial cells after grazing bracken fern.

Treatment

Remove animals from areas infested with bracken fern.

Give horses injections of thiamine at a dosage of 100 to 200 mg per day for 7 to 14 days.

In cattle, use whole blood transfusions, broad spectrum antibiotics, DL-batyl alcohol, and protamine sulfate.

Mountain laurel *Kalmia latifolia*



Large, densely branched shrub or small tree up to 5 m tall. Leaves thick, leathery, evergreen, mostly alternate or in whorls of threes, elliptical, 8 to 15 cm long, 1.5 to 5 cm wide; margins entire and rolled in. Flowers white to pink, 2 to 3 cm in diameter, in large showy clusters. Found in all the southern states but less common in the Coastal Plain; most common on dry, rocky slopes and ridges and in open woods. [Inset: flower of *K. hirsuta* (wicky), a common shrub, mostly of the lower Coastal Plain, more common than sheep laurel]

Sheep laurel *Kalmia angustifolia*

Very similar to mountain laurel and also toxic. Shrub to 1.5 m tall. Usually a smaller plant than *K. latifolia* with narrower and smaller leaves and smaller flowers that are more often pink than white. This species usually occupies wetter sites and is limited mostly to mountainous areas of Georgia, the Carolinas, and Virginia.

Toxicity

The resinoid andromedotoxin and the glucoside arbutin are the toxic principles responsible for symptoms. Sheep, goats, and cattle are susceptible to poisoning if they eat the plant, especially the leaves. There are recorded cases of toxicity in humans and monkeys.

Most clinical cases of laurel toxicity are seen in the winter and early spring months. When other forage is not available, livestock may consume the toxic evergreen laurels.

Symptoms

Signs of toxicity occur usually within 6 hours after the plants are eaten. Symptoms include incoordination, excessive salivation, vomiting, bloat, weakness, muscular spasms, coma, and death. The animals are often found down, unable to stand, with their heads weaving from side to side.

Treatment

In severe cases, do not drench animals or give medicine by mouth since they may be unable to swallow due to weakness of the throat muscles. Administer mineral oil or saline laxatives by stomach tube. Give intravenous electrolyte solutions.

Great laurel *Rhododendron maximum*



Very similar to *R. catawbiense*, but flowers white, leaves larger and narrowed to base; *R. catawbiense* leaves are rounded to base. Distribution is also similar but *R. maximum* is mostly below 3,000 feet and along stream banks and in moist woods; *R. catawbiense* is mostly in well-drained sites above 3,000 feet.

Rosebay *Rhododendron catawbiense*

Shrub or densely branched small tree 1 to 3 m tall. Leaves alternate, leathery, evergreen, entire, lanceolate to elliptic, 8 to 15 cm long, 3 to 7 cm wide. Flowers showy, pink to purple, 1.5 to 2 cm long, in terminal clusters. Found almost exclusively in the mountains of Alabama, Georgia, Kentucky, Tennessee, West Virginia; mostly on rocky slopes and on ridges sometimes called "hog-backs."

Toxicity

Most of the many species of *Rhododendron* are considered poisonous (deciduous *Rhododendron* spp. are known as azaleas). The toxic principle is called andromedotoxin, which is a white carbohydrate material. Some may also contain a glucoside of hydro-

quinone. While *Kalmia* spp. are also termed "laurel," they cause poisoning by other toxic principles and result in other symptomology.

Poisoning can occur at any time of the year but is more commonly seen in the early spring or in wintertime when snow covers other vegetation. Sheep, goats, and cattle are commonly affected by grazing all portions of the plant, but particularly the leaves. Deaths have also been recorded in humans and in sheep.

Symptoms

Symptoms include vomiting, bloating, salivation, and abdominal pain as evidenced by straining. Eventually the animals grow weak, stagger, and become prostrate. Occasionally, pneumonia is present due to inhalation of rumen contents into the lungs during vomiting.

Treatment

Use sound judgment in treatment. For instance, don't drench or otherwise orally medicate animals that are vomiting or showing excessive swallowing movements. Inhalation pneumonia may result. Veterinarians may be able to pass a large bore stomach tube to relieve bloat or perform gastric lavage (This is very difficult on roughage diets).

Use mineral oil, magnesium sulfate, and calcium gluconate. Administer intravenous fluids, such as glucose and saline solution.

Fetterbush *Leucothoe racemosa*



Shrub similar to *L. axillaris* but with deciduous leaves, 3 to 9 cm long and 1 to 4 cm wide. The racemes of flowers are terminal and bear flowers on only one side. Seeds wingless, 0.8 to 1.2 mm long. Distribution similar to *L. axillaris* but perhaps extending farther north.

Fetterbush

Leucothoe axillaris

Shrub up to 1.5 m tall with green, slightly arching branches. Leaves alter-

nate, simple, evergreen, lanceolate to elliptic, 5 to 13 cm long, 1.5 to 5 cm wide. Racemes 2 to 7 cm long, bearing white flowers on all sides of the rachis; flowers 2 to 6 mm long. Fruit a capsule 3 to 3.5 mm long, 5 to 6 mm broad. Seed shiny, light brown, 1 to 1.4 mm long. Found from Virginia to Florida to Mississippi in Coastal Plain and sometimes in adjacent Piedmont; mostly along streams and in bogs, swamp forests, and moist woods.

Fetterbush *Leucothoe recurva*

Shrub similar to *L. axillaris* but with deciduous leaves and growing to 4 m tall. Differs from *L. racemosa* in that the anthers are four-awned while they are two-awned for *L. racemosa*. The capsule of *L. racemosa* is rounded on the sutures, and the seeds are wingless and 0.3 to 1.2 mm long; the capsule is angular and seeds winged and 2 to 2.5 mm long for *L. recurva*. *Leucothoe recurva* is found primarily in rocky woods at higher elevations in Georgia, Tennessee, Virginia, and West Virginia.

Toxicity

The resinoid andromedotoxin and the glucoside arbutin are the toxic principles responsible for symptoms. Sheep, goats, and cattle are susceptible to poisoning if they consume the plant, especially the leaves. There are recorded cases of toxicity in humans and monkeys.

Most clinical cases of toxicity are seen in the winter and early spring months. When other forage is not available, livestock may consume the toxic plants.

Symptoms

Signs of toxicity occur usually within 6 hours after the plants are consumed. Symptoms include incoordination, excessive salivation, vomiting, bloat, weakness, muscular spasms, coma, and death. The animals are often found down, unable to stand, with their heads weaving from side to side.

Treatment

In severe cases, do not drench animals or give medicine by mouth since they may be unable to swallow due to weakness of the throat muscles. Administer mineral oil or saline laxatives by stomach tube. Use intravenous electrolyte solutions.

Maleberry *Lyonia ligustrina*



Shrubs 2 to 3 m tall, usually in clumps from underground rhizomes. Leaves alternate, deciduous, pubescent on both sides, obovate to elliptic, 3 to 7 cm long, 1 to 3.5 cm wide, finely serrate to entire. Flowers white, globular, 3 to 5 mm long, borne in clusters at ends of branches. Fruit a dry, globose, pubescent capsule, 2.5 to 3 mm long. Seeds very narrow, 1.5 to 2 mm long. Found throughout the southern states east of the Mississippi River; in dry woods or thickets to moist or wet habitats.

Toxicity

The resinoid andromedotoxin and the glucoside arbutin are the toxic principles responsible for symptoms. Sheep, goats, and cattle are susceptible to poisoning if they consume the plant, especially the leaves. There are recorded cases of toxicity in humans and monkeys.

Most clinical cases of toxicity are seen in the winter and early spring months. When other forage is not available, livestock may consume the toxic plants.

Symptoms

Signs of toxicity occur usually within 6 hours after the plants are eaten. Symptoms include incoordination, excessive salivation, vomiting, bloat, weakness, muscular spasms, coma, and death. The animals are often found down, unable to stand, with their heads weaving from side to side.

Treatment

In severe cases, do not drench animals or give medicine by mouth since they may be unable to swallow due to weakness of the throat muscles. Administer mineral oil or saline laxatives by stomach tube. Use intravenous electrolyte solutions.

Laurel cherry *Prunus caroliniana*



Small to medium-sized tree, 1 to 3 m tall, sometimes clipped to form dense hedges. Leaves alternate, evergreen, dark green, shiny, elliptic to elliptic-lanceolate, 5 to 10 cm long, 1.5 to 4 cm wide; leaf margins variable, entire to serrate or denticulate. Flowers small, white, in axillary racemes 1.5 to 3 cm long. Ripe fruit dull black, only slightly fleshy. Georgia to Florida, west to Texas; most common in fence rows, low, moist woods, and maritime forests of Coastal Plain; planted and escaping widely further inland.

Black cherry *Prunus serotina*

Medium-sized tree with dark, smooth bark. Bruised twigs and leaves with a distinctive acrid taste and odor. Leaves alternate, deciduous, light green, elliptic to lanceolate, 6 to 12 cm long, 2 to 5.5 cm wide, crenate to crenate-serrate, with two small glands near the juncture of blade and petiole. Flowers small, white, in terminal racemes 4 to 10 cm long. Ripe

fruit black, shiny, juicy, 0.7 to 1 cm long. Distributed throughout the South; most common in fence rows, open woods, and pastures.

Choke cherry *Prunus virginiana*

Shrub with extensive rhizomes, thus often appearing in clumps. Leaves are smaller and have smaller, sharper teeth than *P. serotina*, and ripe fruit are dark red to purple. Uncommon except along streams in Tennessee or in moist places in Oklahoma and Texas.

Toxicity

The toxic principle is hydrocyanic acid (also called prussic acid), which is created by enzymatic action on the glucoside amygdalin. It is present primarily in the wilted leaves of trees that have fallen. The bark and twigs are also toxic.

Ruminants (cattle, sheep, and goats) are most often affected, but single-stomach animals, like the horse, can also be affected. Poisoning may occur in spring, summer, or fall.

Symptoms

Symptoms are difficult breathing, bloat, an anxious expression, moaning, staggering, recumbency, and convulsions before death. Animals may show signs within 15 to 30 minutes after consuming plants containing cyanide and may die within 1 hour of consuming plants. Both the mucous membranes and the blood are bright red in color.

Treatment

Give intravenous injection of sodium nitrite and sodium thiosulfate as early as possible. If necessary, repeat treatments within a few hours.

Johnsongrass *Sorghum halepense*



Coarse grass up to 2 m tall with stout rhizomes, appearing in dense clumps or nearly solid stands. Leaves on vigorous plants up to 0.6 m long and 3 cm wide, pilose on upper leaf surface near the base. Panicle often appearing purplish, up to 0.6 m long and 0.2 m broad. Spikelets 4 to 6 mm long, each enclosing a 2 mm long grain. Found throughout the South; most abundant in fields, waste places, and fence rows and on ditch banks.

Particularly abundant in rich delta lands such as in Mississippi. Once widely cultivated as a hay and pasture crop.

Toxicity

Under conditions of drought, trampling, frost, or second growth, the plants may contain cyanide. In addition, if plants are heavily fertilized with nitrogen and drought stricken, nitrate poisoning can occur in animals that eat the grass.

All animals can be poisoned by cyanide, but ruminants are more susceptible. Nitrate poisoning occurs most commonly in ruminants, although cases of nitrite poisoning have occurred in monogastric animals.

Symptoms

Cyanide poisoning is very acute, and affected animals exhibit difficult breathing, anxious expression, staggering and usually become recumbent, have convulsions, and die. Animals may show signs within 15 to 30 minutes after consuming plants containing cyanide and may die within 1 hour of consuming plants. The blood is usually bright red.

In nitrate poisoning, the symptoms are similar except the blood is characteristically chocolate brown.

Treatment

For cyanide poisoning, use sodium thiosulfate and sodium nitrite given intravenously as an antidote.

For nitrate poisoning, use methylene blue as an antidote.

Prevention

Be careful when allowing cattle to graze johnsongrass, sorghums, etc., that have been frosted, wilted, trampled, or drought stricken.

Ensilage plants containing cyanide, or cut for hay. Drying eliminates most of the cyanide. Analyze hay if you suspect that it may contain nitrate.

Yellow jessamine *Gelsemium sempervirens*



Climbing or trailing, somewhat woody perennial vine. Leaves opposite, evergreen, lanceolate, 3 to 7 cm long, 1 to 2.5 cm wide, tips acute to acuminate, margins entire. Flowers showy, yellow, fragrant, to 3 cm long, one to three in axils of leaves, blooming in early spring. Fruit a many-seeded, compressed capsule. Found from bluffs to swamps throughout the South;

most abundant along fence rows and in open woods. Often confused in the vegetative stage with *Lonicera japonica*, which has broader, deciduous leaves.

Toxicity

The toxic principles are the alkaloids gelsemine, gelseminine, and gelsemoidine. These toxins are related to strychnine.

Livestock are affected, usually in the winter and spring months, from eating any part of the plant. Humans have been poisoned from sucking nectar from the flowers or from eating honey made from the flowers. Bees have died from consuming the nectar.

Symptoms

Animals are usually found staggering and incoordinated, with dilated eyes and convulsive movements. Often the animals are found down in comatose condition. Death usually occurs soon after animals become comatose.

Treatment

There is no specific treatment.

Provide supportive therapy with intravenous fluids. Give cardiac and respiratory stimulants such as caffeine and sodium benzoate.

Pokeweed *Phytolacca americana*



Perennial herb, to 3 m tall, often with many stems from large fleshy rootstock. Stems green to purplish, fleshy, smooth. Leaves alternate, light green, lanceolate, 8 to 30 cm long, 3 to 12 cm wide, glabrous, margins entire. Flowers white to purplish in drooping axillary racemes. Ripe fruit black, juicy, many seeded, when mashed produces a red "ink." Distributed throughout the South; most

common on waste ground, fence rows, pasture, and old homesites. Young leaves often used as a cooked green vegetable; older leaves are quite poisonous.

Toxicity

The poisonous principles are oxalic acid and a saponin called phytolaccotoxin. In addition, alkaloids may be present. The root of the plant is the most toxic portion, but all other parts of the plant contain smaller amounts of the toxic principles. Cattle, horses, swine, and humans have all been poisoned after consuming this plant. Recognizable clinical cases are rare, however. Swine are most often affected since they grub up the roots.

Poisoning occurs during spring, summer, or fall. In the springtime people commonly cook the leaves and consume them. This "poke salad" is generally safe if the water in which the leaves are cooked is poured off.

Symptoms

The most common symptom is a severe gastroenteritis with cramping, diarrhea, and convulsions. Postmortem lesions include severe ulcerative gastritis, mucosal hemorrhage, and a dark liver. In most cases the animal recovers within 24 to 48 hours.

Treatment

Give gastrointestinal protectives such as mineral oil or various clays. Administer tannic acid and sedatives; a specific antidote is dilute vinegar. Provide respiratory stimulants.

Jimsonweed *Datura stramonium*



Coarse, foul-smelling, glabrous Annual, 0.5 to 1.5 m tall, with green or purple-tinged stems. Leaves alternate, coarsely and irregularly toothed, 7 to 15 cm long, 2 to 12 cm wide. Flowers large, white to lavender, funnellform, 7 to 10 cm long. Fruit an erect, dry, spiny capsule 2.5 to 4 cm long, 2 to 3.5 cm wide, with many black, shiny seeds. Distributed throughout the South; most abundant in fertile fields, gardens, and barn lots.

Toxicity

The toxic principles of this common hog lot and barnyard plant are the alkaloids atropine, hyoscyamine, and scopolamine. All parts of the plant are considered poisonous, whether green or dry. However, the seeds are particularly poisonous. Usually, this plant is not eaten except when other forage is unavailable. Cattle and swine are primarily affected,

but horses, poultry, dogs, and humans have been affected. Cows can be poisoned by consuming 0.5 to 1 pound of the green plant. The toxin is not destroyed by drying. Plants may also take up nitrates.

Symptoms

Early symptoms include a weak and rapid pulse and heartbeat, widely dilated eyes, and dryness of mouth and other mucous membranes. Animals may appear blind. Later symptoms include slow breathing, lowered temperature, convulsions, or coma.

After eating the plants, sheep may have abnormal leg movements, disturbed vision, and intense thirst; they may bite at imaginary objects in the air.

Pregnant sows consuming jimsonweed during their second and third months of gestation have produced deformed pigs. Some pigs may be born alive but exhibit varying degrees of flexed hips, stifles, and forelegs. The hocks may be overextended.

Treatment

Nonspecific. Use tannic acid, gastric lavage, and respiratory stimulants. Destroy weeds in order to prevent problems.

Buttercup (crowfoot)

Ranunculus sardous and other species



Low annual or perennial herbs from fibrous roots or thickened rootstocks or bulbs, often with a basal rosette of leaves. Stem leaves alternate, simple, lobed or divided. Flowers usually axillary and solitary, with five green sepals and five glossy yellow petals that give the plant its common name, buttercup. Fruit a head of achenes. Potentially poisonous buttercups occur throughout the South; most common in low, moist areas along creeks and in open woods and pastures. [Inset: flowers and fruit cluster]

Toxicity

This plant contains an irritant oil called protoanemonin. This oil is not a highly toxic substance and is present in various species of buttercup in differing amounts. In general, the flowering plant contains more toxin than the younger plant. The toxin is present in the stems and leaves. The plant is very distasteful to livestock. All livestock are affected.

Symptoms

Signs include abdominal pain, severe diarrhea, convulsions, and death. Milk from affected cows will be bitter and may be reddish in color. Although buttercup poisoning is uncommon, it occasionally occurs in cattle when other forages are in short supply.

Treatment

Nonspecific. Give purgatives initially, then gastrointestinal protectives later.

Lantana *Lantana camara*



Erect or spreading shrub, 0.5 to 1.2 m tall, with recurved prickles on the angles of the square stem. Leaves opposite or whorled, deciduous, ovate to lanceolate, 2 to 7 cm long, margins toothed, aromatic when crushed. Flowers initially cream, yellow or pink changing to orange or scarlet, thus resulting in a multi-colored, short, head-like spike. Fruit greenish blue or black, one seeded. Found in sandy Coastal Plain soils, Florida to Texas; common along roadsides and in waste places, yards, and gardens; persisting after cultivation and escaping.

Toxicity

This ornamental shrub contains lantainin, a triterpenoid, and other compounds irritating to the mucosa of the gastrointestinal tract. All parts of the plant are quite toxic, and poisoning may occur year-round but is most common in summer and fall. Many poisoning cases occur when clippings are thrown into the pasture.

Sheep, cattle, horses, and humans are sensitive to the effects of the plant. Cattle are most often affected. Children have been poisoned by eating the berries.

Symptoms

There are two forms of toxicity: acute and chronic. The acute form usually occurs within 24 hours after the plants are eaten. Animals exhibit gastroenteritis with bloody, watery feces. Severe weakness and paralysis of the limbs are followed by death in 3 to 4 days. The chronic form is characterized by jaundiced mucous membranes, photosensitization, and ulcerations of the mucous membranes of the nose and oral cavity. The skin may peel, leaving raw areas that are vulnerable to blowfly strikes and bacterial infection. Severe keratitis may result in temporary or permanent blindness.

Treatment

Remove animals from direct sunlight. Use antibiotic injections and topical applications of protective antibiotic creams. Treat with 20 percent sodium thiosulfate (1 ounce per 100 pounds); repeat treatment every other day. Use topical application of cortisone to relieve itching.

Oleander *Nerium oleander*



Ornamental shrub or small, densely branched tree, 1 to 10 m tall. Leaves opposite or whorled, evergreen, leathery, narrowly elliptic to linear elliptic, 6 to 15 cm long, 1 to 3 cm wide, margins entire. Flowers showy, white, pink, red, or yellow, 3.5 to 4 cm wide, in large terminal clusters. Found in Coastal Plain from Florida to Louisiana; particularly abundant on sandy soils near the coast; widely cultivated and escaping along roadsides and edges of woods and in lawns and gardens.

Toxicity

The toxic principles are two glycosides, oleandroside and nerioside, which can be isolated from all parts of the plant. Toxins may also be inhaled in smoke when plants are burned. Human poisoning occasionally occurs from eating hot dogs roasted on sticks from nearby oleander plants. This extremely toxic plant can poison livestock and humans at any time of the year.

Symptoms

Severe gastroenteritis, diarrhea, abdominal pain, sweating, and weakness are the usual symptoms. These signs appear within a few hours after eating the leaves. Cardiac irregularities are common, often characterized by increased heart rate. However, a slower heart rate is often detected in the later stages.

Treatment

Nonspecific. Treat symptoms although symptomatic treatment is usually unsuccessful.

Bladderpod *Glottidium vesicarium*



Robust annual, 1 to 4 m tall, often becoming quite woody at base. Leaves alternate, deciduous, compound, 10 to 20 cm long, evenly pinnate with 24 to 52 leaflets. Flowers yellow or sometimes pinkish or purplish in clusters of two or more on long slender stalks. Pod flattened, swollen, ends pointed, 5 to 8 cm long, two seeds per pod. Found in Coastal Plain, North Carolina to Florida to Texas; most abundant in moist, fertile soil in waste places, along ditches, and in pastures.

Toxicity

Saponins have been detected in this plant. Cattle, sheep, goats, chickens, and hogs have all been poisoned from consuming the seeds and green plant. The green seeds are the most toxic part.

While the plant seems to be distasteful to some animals, others appear to develop a craving for the seeds even when other forage is available. Poisoning most often occurs in the fall or early winter when pasture or other feed is in short supply. Animals are often affected when they are first placed in pastures containing the plants.

Symptoms

Sheep and cattle exhibit hemorrhagic diarrhea, shallow and rapid respiration, and fast irregular pulse; they become comatose before death. Affected cattle may become constipated.

Postmortem examination reveals hemorrhages in the abomasum and intestines, rumen stasis, and dark tarry blood. The rumen usually contains seeds of the plant.

Treatment

Remove all animals immediately from pastures containing the plant and confine them to clean pastures or a dry lot. Provide general supportive treatment, including saline laxatives, rumen stimulants, and intravenous fluid therapy. Specific antidote is dilute vinegar for saponins in the early stages of toxicosis.

Sicklepod *Senna obtusifolia*



Coarse annual herb, 0.4 to 0.5 m tall. Leaves alternate, pinnately compound with four to six obovate leaflets; largest leaflets 3 to 5 cm long. Flowers yellow, 1 to 1.5 cm long, in small axillary clusters. Pods splitting along two lines, sickle-shaped, 0.3 to 0.4 cm

wide, 10 to 20 cm long, many seeded. Reportedly found through-

out the South, commonly on sandy soils of Coastal Plain; most abundant in cultivated fields, roadsides, waste places, and open pinelands. [Coffee senna, left, and sicklepod, right. Inset: flower]

Coffee senna *Senna occidentalis*

Coarse herb very similar to *S. obtusifolia* but having mostly eight or more leaflets rather than four to six. Pods flattened whereas those on *S. obtusifolia* are nearly four-sided. Pods tend to be straighter and shorter than those of *S. obtusifolia*.

Toxicity

The toxic principles have not been clearly established. The seeds appear to exert their toxicity upon the skeletal muscles, kidney, and liver. The leaves and stem, whether green or dry, also contain toxin. Sicklepod is much more prevalent but somewhat less toxic than coffee senna. Animals can be poisoned by consuming the plant in the field, in green chop, in hay or if the seed is mixed with grain. Cattle are susceptible to the effects of these plants, and other animals are probably susceptible as well.

Symptoms

Diarrhea is usually the first symptom. Later, the animals go off feed, appear lethargic, and tremors occur in the hind legs, indicating muscle degeneration. As muscle degeneration progresses, the urine becomes dark and coffee colored. The animal becomes recumbent and is unable to rise. Death often occurs within 12 hours after the animal goes down. There is no fever.

Treatment

Once animals become recumbent, treatment is usually ineffective. Do not give selenium and Vitamin E injections because they will potentiate the disease. Vitamin E is the more important component in this potentiation.

Sesbania *Sesbania exaltata*



Annual herb, 0.7 to 2 m tall, becoming quite woody at base. Leaves alternate, evenly pinnately compound; leaflets 20 to 70, oblong to linear elliptic, 1 to 3 cm long, entire. Flowers yellow, often streaked with purple, to 1.5 cm long, borne in axillary clusters of two to six flowers each. Pods linear, 10 to 20 cm long, 3 to 4 mm broad, each containing 30 to 40 seeds. Found mostly in Coastal Plain from Virginia to Florida to Texas; most abundant along ditches, on stream banks, and in low fields and waste places.

Toxicity

The poisonous principle is a saponin that is toxic to livestock and humans. The seeds are the most toxic part of the plant and are consumed in the late summer, fall, or winter when other forage is scarce. Cattle are often affected when moved into new pastures containing the plant. Cattle often develop a craving for the seeds.

Symptoms

Affected cattle are often found dead. An opened rumen may reveal the sprouted seeds, and there will be a hemorrhagic inflammation of the abomasum and intestines. Symptoms are variable and include hemorrhagic diarrhea, but constipation can also occur. The animals walk stiffly with an arched back, have shallow respiration and a weak rapid pulse. They become prostrate and comatose before death.

Treatment

Symptomatic. In severe diarrhea, insert a stomach tube and administer intestinal protectives. If animals are constipated, give mineral oil by the same route. Administer intravenous fluids in dehydrated animals. Use dilute vinegar to counteract saponin in the early stage of the toxicity.

Rattlebox *Sesbania punicea*

Shrub or small tree to 4 m tall. Leaves alternate, deciduous, 10 to 20 cm long, evenly pinnately compound with 12 to 40 leaflets. Flowers conspicuous, orange to red, shaped like a sweetpea, 2 to 2.5 cm long, in drooping axillary clusters. Pods four-winged, 6 to 8 cm long, indehiscent, tough and somewhat leathery. Found in lower Coastal Plain from Florida to Louisiana; most abundant in moist, fertile soils, marshes, pastures, and waste places and along ditches and fence rows; planted as an ornamental and widely escaping.

Toxicity

The seeds contain a saponin that is quite toxic to poultry, cattle, sheep, goats, and humans. As few as nine seeds per bird can be fatal. Sheep can be killed by consuming as little as 50 grams per 100 pounds of body weight. Poisoning usually occurs in the fall when other forage is scarce.

Symptoms

Animals appear severely depressed and have a rapid pulse and diarrhea.

Treatment

Give saline purgatives. Specific antidote is dilute vinegar in early stages of toxicosis to counteract saponin.

Sweet clover *Melilotus* spp.



Coarse biennial herb, 0.4 to 2 m tall. Leaves alternate, pinnately compound; leaflets three, obovate, mostly 1 to 2.5 cm long, 0.5 to 1.5 cm wide, stipules lanceolate. Flowers yellow in *M. lutea*, or white in *M. officinalis*, 5 to 7 mm long, fragrant; borne in racemes, 4 to 12 cm long. Pods small, 0.2 to 0.4 cm long. Found throughout the South; most abundant on calcareous or alkaline soils, fields, roadsides, and waste places. Cultivated as a forage crop and soil builder.

Toxicity

Under certain conditions, such as mold accumulation in the hay, coumarin, a harmless substance, is converted into dicoumarin. This compound interferes with the blood-clotting mechanism, thus leading to hemorrhage.

Cattle are primarily affected, although losses in horses and sheep have occurred. Sheep are much more resistant to the effects of the toxic principle than are cattle.

Symptoms

Symptoms are related to massive blood loss. Swellings appear under the skin due to accumulations of blood. These swellings vary in size and may occur at any site on the body but particularly in areas that are susceptible to bruising. Other symptoms can include pale mucous membranes, rapid and weak pulse, and weakness. Females may hemorrhage following calving. Occasionally animals hemorrhage internally and exhibit signs of shock.

Treatment

Remove sweet clover hay from animals immediately. Give Vitamin K injections and transfusions of whole blood.

Scotch broom *Cytisus scoparius*



Erect, bushy shrub, 1 to 2.5 m tall, with stems and branches dark green. Leaves alternate, simple or palmately three-foliate; leaflets obovate to elliptic, 0.5 to 1.5 cm long, entire, evergreen or deciduous. Flowers showy, yellow, 1.5 to 2.5 cm long, shaped like a sweet pea; borne in terminal racemes. Pods long ciliate, flattened, broadly linear, 4 to 5 cm long, several seeded. Found mostly in Alabama, Georgia, Kentucky, Tennessee, Virginia, and West Virginia; cultivated and sometimes escaping from lawns to roadsides, open woods, and waste areas.

Toxicity

Poisoning from this shrub is usually of a mild type. Large amounts are required to cause symptoms in animals. Alkaloids have been identified as being the toxic principle. Cytisin, sparteine, and isosparteine are found in the twigs, leaves, and seeds in small

amounts. A glycoside, scoparin, has also been isolated. Horses are most susceptible to poisoning by Scotch broom.

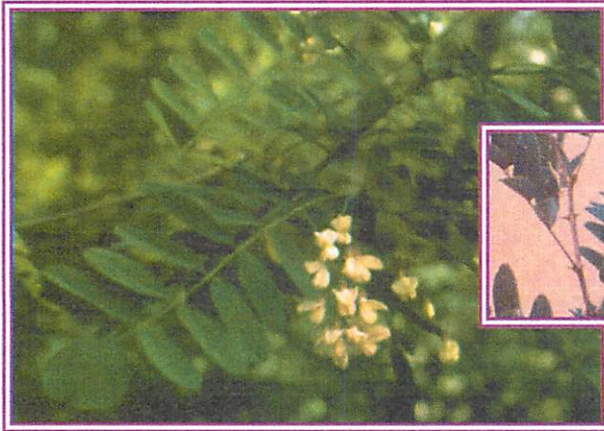
Symptoms

The alkaloid portions cause depression of the nervous system, and the glycoside causes a diuretic effect. Symptoms include incoordination and occasional excitement. Ingestion of large amounts of this shrub can cause coma and death.

Treatment

Nonspecific. Treat symptoms.

Black locust *Robinia pseudoacacia*



Shrub or tree to 25 m tall with deeply furrowed, thick bark and usually paired thorns at the base of each compound leaf; thornless varieties have been developed. Leaves alternate, deciduous, pinnately compound; leaflets nine to 19, elliptic to ovate, 2 to 5 cm long, 1 to 2 cm wide. Flowers showy, white, 1.5 to 2 cm broad, very fragrant; borne in drooping racemes, 10 to 20 cm long. Pod 5

to 10 cm long, 1 to 2 cm broad, mostly four to eight seeded. Plant has been cultivated throughout the region and has widely escaped into open woods, roadsides, fence rows, old fields, and pinelands; sometimes in sandy areas but more common on clay soils. [Inset: paired thorns on stem]

Toxicity

Toxic principles include the phytotoxin robinin and the glycoside robinin. Horses, cattle, sheep, poultry, and humans may be poisoned by ingesting roots, bark, sprouts, seed pods, or trimmings. Horses are the animal most susceptible to the effects of black locust.

Symptoms

Symptoms include weakness, posterior paralysis, depression, loss of appetite, irregular pulse, difficult breathing, and diarrhea.

Treatment

Insert a stomach tube, and administer a laxative, such as mineral oil. Use stimulants, such as Digitalis ($\frac{1}{8}$ grain every 15 minutes for four doses).

Chinaberry *Melia azederach*



Small to medium-sized, round-headed tree to 12 m tall. Leaves alternate, deciduous, bipinnately compound, 0.3 to 0.9 m long; leaflets 2.5 to 5 cm long with deeply toothed margins. Flowers pinkish to lavender, 1 to 1.5 cm long, borne in large, terminal panicles. Fruit barely fleshy, one-seeded, greenish yellow to yellow-tan, 1 to 1.5 cm in diameter, persisting on the tree throughout much of the winter. Found throughout the South, but rare in the more northern areas and at higher alti-

tudes. Once widely cultivated as a fast-growing shade tree around small homes, but escaping widely; along roadsides and fence rows, in waste places, and around buildings.

Toxicity

The toxic principles are tetranortriterpene neurotoxins and unidentified resins. The fruit (berries) are the most toxic part of the tree. The leaves, bark, and flowers are only mildly toxic and usually cause no problem. Most poisonings occur in the fall or winter when the berries ripen.

Swine and sheep are most often affected. Toxicity may occur after consumption of more than 0.5 percent of body weight. Poultry and cattle can be poisoned, but larger amounts are required. Children have been poisoned by eating the berries.

Symptoms

The gastrointestinal tract is affected; therefore, common symptoms include vomiting and diarrhea. Occasionally, the central nervous system is affected, and animals are severely depressed or excited.

Treatment

Evacuate the affected animal's gastrointestinal system. Use lentin-carbocal gastrointestinal protectives, respiratory stimulants, and caffeine.

Common cocklebur *Xanthium strumarium*



Coarse, widely branching annual herb 0.2 to 1.7 m tall. Leaves alternate, simple, coarsely pubescent, shallowly three to five lobed. Flowers green, inconspicuous, male and female borne in separate clusters. Fruit a broadly cylindrical to nearly spherical, spiny burr, 1.5 to 3 cm long (including spines), containing two seedlike nutlets, greenish to brown at maturity.

Found throughout the South; most abundant in fertile soil gardens, fields, roadsides, and other areas having nearly full sunlight. [Inset: seed and seedlings]

Toxicity

The toxic principle is the glycoside carboxyotractyloside. It is concentrated in the seeds and seedlings (cotyledon state). Mature plants are distasteful to animals and contain less of the toxin.

Swine are the animals most commonly poisoned. They root up and ingest the two-leaf stage of the plant in the springtime. Chickens and other livestock have also been poisoned.

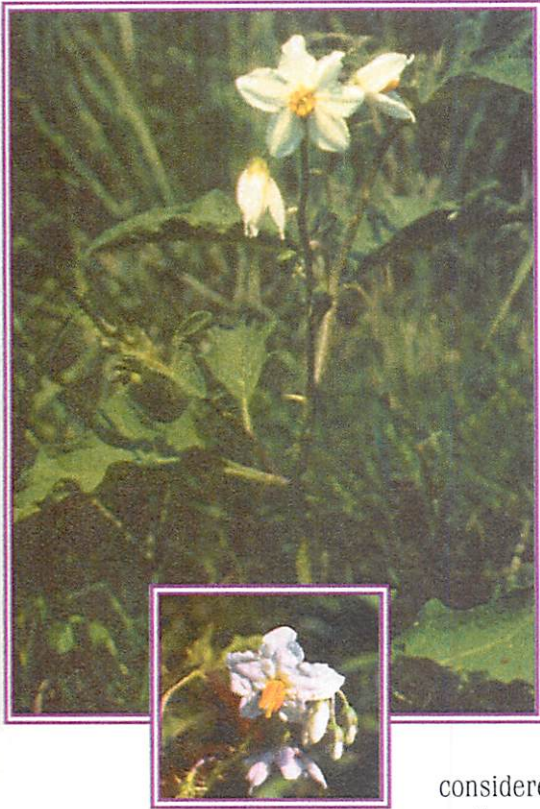
Symptoms

Symptoms include vomiting and gastrointestinal irritation with occasional diarrhea. Large amounts often cause nervous symptoms, including spasmodic running movements and convulsions.

Treatment

Treatment is of little or no value once symptoms have been observed. Try neutralizing the toxin with vegetable oil, whole milk or cream, or activated charcoal.

Horsenettle *Solanum carolinense*



Perennial, thorny herb, 0.2 to 0.8 m tall. Leaves alternate, simple, irregularly pinnately lobed, 7 to 12 cm long, 3 to 8 cm wide, stellate pubescent. Flowers white to purple, 2.3 to 3.1 cm broad, borne in few-flowered, terminal racemes. Fruit green, turning yellow, 1 to 1.5 cm in diameter, resembling a small tomato. Found throughout the South; common in pastures, old fields, waste places, and sometimes in cultivated ground. [Inset: flower]

Toxicity

The toxic alkaloid solanine has been isolated from *Solanum* spp. Toxicity of these plants varies depending upon maturity, environment, and portion of plant ingested. The berries are the most toxic part and are more toxic when they have matured and turned yellow. Immature green fruit are also considered toxic. Leaves are also toxic, but to a lesser degree. Humans and all classes of livestock have been poisoned.

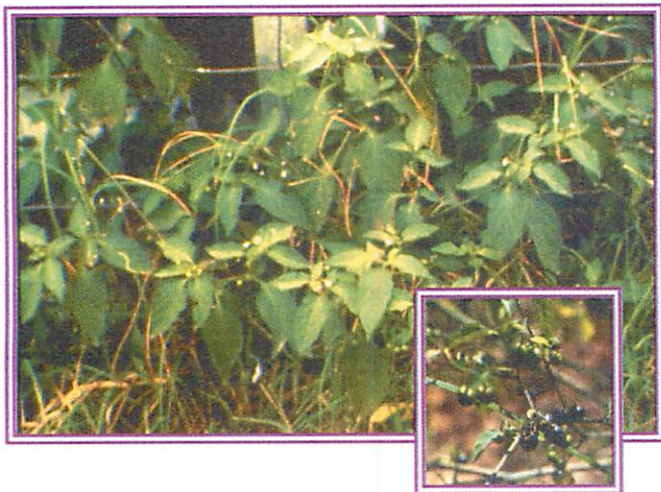
Symptoms

Two syndromes have been described: acute and chronic. The acutely poisoned animal is characterized by irritation of the mouth and gastrointestinal lesions. In the chronic form, symptoms include unthriftiness, jaundiced mucous membranes, abdominal dropsy, and constipation.

Treatment

Nonspecific. Treat early symptoms with tannic acid, charcoal, protectants, and evacuation of the stomach.

Black nightshade *Solanum nigrum*



Annual, thornless, essentially glabrous herb, 0.1 to 1 m tall. Leaves alternate, sinuately or coarsely toothed, 5 to 10 cm long, 2 to 5 cm wide. Flowers white, 6 to 8 mm broad. Fruit shiny, black when ripe, several seeded, 5 to 9 mm in diameter. Found throughout the South, but seldom abundant; in fields, waste places, and cultivated ground. [Inset: black and green fruit]

Toxicity

The toxic alkaloid solanine has been isolated from this group of plants. Toxicity of these plants varies, depending on maturity, environment, and portion of plant ingested. The berries are the most toxic part and are more toxic when they are green and immature. The berries are somewhat less toxic when they mature and turn black. Leaves are also toxic but to a lesser degree. Humans and all classes of livestock have been poisoned.

A closely related plant *S. intrusum* is known as "garden huckleberry" or "wonderberry." Garden huckleberry is a cultivated plant with nontoxic fruit. However, distinguishing *S. intrusum* from *S. nigrum* is almost impossible.

Symptoms

Two syndromes have been described: acute and chronic. The acutely poisoned animal is characterized by irritation of the mouth and gastrointestinal lesions. In the chronic form, characteristic symptoms are unthriftiness, jaundiced mucous membranes, abdominal dropsy, and constipation.

Treatment

Nonspecific. Treat early symptoms with tannic acid, charcoal, protectants, and evacuation of the stomach.

Red buckeye *Aesculus pavia*



Shrub or sometimes a small tree, to 4 m tall. Leaves opposite, palmately compound; leaflets 6 to 17 cm long, 3 to 6 cm wide. Flowers showy, scarlet, 2.5 to 4 cm long, borne in large, terminal panicles. Fruit leathery, 3.5 to 6 cm broad, splitting at maturity, with one to four, shiny tan or light brown seeds, to 4 cm in diameter. Found through-

out the South, but most abundant in Coastal Plain; in moist, fertile soils of deciduous forests. [Inset: open fruit]

Toxicity

The glycoside aesculin has been detected in the buckeye sprout, young leaves, and the mature seed. Humans and all classes of livestock can be affected by ingestion of the buckeye. Cattle are most frequently affected, usually by consuming young shoots and leaves in the early springtime.

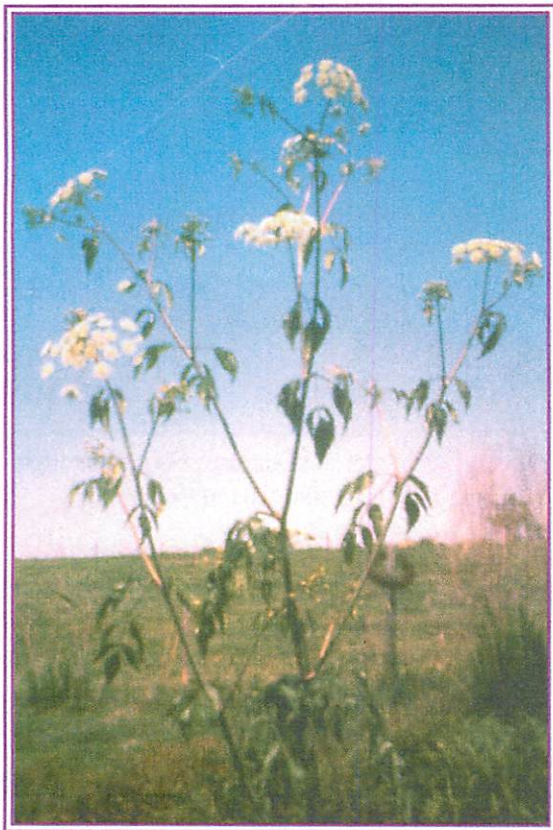
Symptoms

Generally, symptoms are drunkenness, trembling, muscular weakness, and incoordination, with affected animal having extreme difficulty going downhill. Other symptoms include vomiting, irritated mucous membranes, and paralysis.

Treatment

Normally, no treatment is required. If animals are removed from infested areas, they will usually recover.

Spotted water hemlock *Cicuta maculata*



Glabrous, branching perennial herb, 0.6 to 2 m tall, with purple-striped or mottled, glabrous, hollow stems arising from fibrous or fleshy roots. Lengthwise splitting of the juncture of the stem and roots shows the center is hollow with broad partitions of pithy tissue. Leaves alternate, pinnately, bipinnately, or pinnate-ternately divided, uppermost leaves not dissected. Flowers white, borne in compound, flat-topped umbels at the ends of stems and branches. Fruits ovoid, prominently ribbed, two-parted, 2 to 4 mm long. Found throughout the South, but seldom common; in swamps, stream banks, marshes, wet pastures, and roadside ditches.

Toxicity

A very poisonous alkaloid and a resinoid toxin are found in all parts of the spotted water hemlock, but primarily in the roots. The pithy area between the nodes contains a greenish yellow oil, which contains the toxins.

Livestock and humans are especially susceptible to this poison. The plant grows in wet, damp soil, which enables animals to easily pull up the plant. Most livestock poisoning cases occur in the springtime; children have been poisoned by making "pea-shooters" from the hollow stem segments.

Symptoms

Animals exhibit nervous symptoms because of the toxin, which is a convulsant. Trembling and jerking motions are followed by convulsions. In addition, animals froth at the mouth, move jaws as if they are chewing, and may vomit. Eyes are widely dilated, and temperature is elevated. Death occurs from respiratory failure. Chronic ingestion may lead to abnormal fetal development and malformation in swine and horses.

Treatment

Nonspecific. Treat symptoms.

Poison hemlock *Conium maculatum*

Glabrous, branching biennial herb, to 2 m tall, with hollow spotted stems arising from a thick taproot. Very similar to the much more poisonous *Cicuta maculata* and often confused with it. However, poison hemlock usually has only one fleshy taproot; there are no pithy partitions in a hollow area at the juncture of stem and root; and stem and upper stem leaves are divided. Probably more common than spotted water hemlock and found in drier, more upland habitats.

Toxicity

The poison hemlock contains coniine, an alkaloid, and other compounds that are capable of poisoning livestock, poultry, and humans. The stems, leaves, and mature fruits are toxic. The leaves are more dangerous in the springtime, and the fruit is the most dangerous in the fall.

Symptoms

Symptoms are gastrointestinal irritation, nervousness, trembling, staggering, coldness of the extremities, and slow heartbeat. Eventually coma and death occur.

Treatment

Use respiratory stimulants or intestinal protectives.

Castor bean *Ricinus communis*



Large, robust annual (in the South) or perennial (in tropics and subtropics) woody herb, to 3 m tall. Leaves alternate, up to 40 cm long, simple, palmately seven to nine lobed, serrate with gland-tipped teeth. Flowers green, inconspicuous; staminate flowers near the base and pistillate flowers mostly near the top of a small panicle. Fruit a three-lobed capsule with a soft, spiny exterior, 1.5 to 2 cm long; seeds three per capsule, shiny,

grayish brown mottled with reddish brown, 10 mm long and 6 to 7 mm wide, each resembling a female tick. Found throughout the Southeast; cultivated and occasionally escaping and persisting in pinelands, waste places, and roadsides.

Toxicity

The poisonous principle is a phytotoxin called ricin. In the Southeast the plant is commonly planted not only as an ornamental but also in vegetable gardens to repel moles. Horses are most susceptible to poisoning, but all livestock and humans can be affected. All parts of the plant are toxic, especially the seeds. Toxicity is seen most often in spring and summer.

Symptoms

Animals are most often poisoned when feed grains have become contaminated with the castor bean seeds. Depending upon the amount consumed, symptoms appear several hours to several days after animals consume the toxin. Violent purgation in the form of straining and bloody diarrhea is the classical sign. Other signs are dullness, abdominal pain, weakness, trembling, and incoordination.

Treatment

Administer intestinal protectives in large amounts by stomach tube. If affected animal is dehydrated, provide large amounts of intravenous fluids.

Chinese tallowtree (popcorn tree)

Sapium sebiferum



Fast-growing, small to medium-sized tree, up to 15 m tall; twigs containing a "milky sap" or latex.

Leaves alternate, deciduous, simple, rhombic, up to 10 cm long and 6 cm wide, entire, turning red in the fall. Leaves widest near the middle and long tip acuminate with two glands at the base of each blade. Male and female flowers borne in spikes. Fruit a rounded, three-lobed capsule, 1.5 cm

diameter, producing white seeds in the fall. Becoming a noxious weed throughout the South. [Inset: white fruit clusters]

Toxicity

All parts of plant are poisonous, especially the fruit. The unripe capsules and the plant sap contain saponin and toxalbumin (protein toxin).

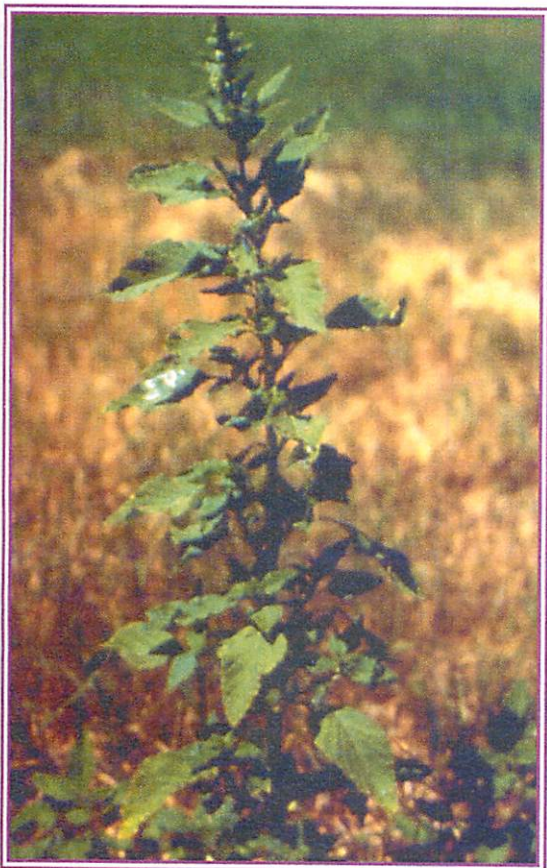
Symptoms

Symptoms are diarrhea, watery green feces with blood, listlessness, weakness, and dehydration. Symptoms are frequently delayed 2 to 4 days after consumption of the plant.

Treatment

There is no antidote. Correct dehydration with intravenous fluids and electrolytes. Use intestinal protectives. May do rumenotomy or flush. In chronic poisoning of cattle, stimulate rumen movement. Try to improve appetite. Use intravenous fluids for energy.

Redroot pigweed *Amaranthus retroflexus*



Large, coarse annual herb, 1 to 1.5 m tall. Leaves alternate, simple, elliptic to lanceolate, 8 to 15 cm long, tapered at both ends. Flowers green, inconspicuous, borne in short, compact panicles interspersed with long, green floral bracts. Seeds small, lenticular, less than 1 mm long. Found throughout the South; particularly common in cultivated fields, barnyards, and waste places.

Toxicity

This plant may accumulate nitrates after treatment with herbicides such as 2,4-D and also after heavy nitrogen fertilization. This plant also becomes more palatable after treatment with herbicides. Cattle, sheep, and other ruminants are susceptible.

Symptoms

Symptoms suddenly appear 5 to 10 days after animals consume plants. Animals exhibit weakness, trembling,

and incoordination. In 48 hours, symptoms progress rapidly from knuckling of posterior to paralysis, sternal recumbency, and death.

Another syndrome in swine and cattle occurs in which incoordination is followed closely by coma and death. Necropsy examination reveals degeneration of the brain and edema in the kidney region with degeneration of the kidney tubules.

Treatment

To treat non-nitrate type toxicosis, use mineral-corticoid hormones, IV calcium gluconate to normalize ECG, and dextrose IV.

Eastern baccharis *Baccharis halimifolia*



Much branched shrub or small tree, 1 to 4 m tall. Leaves alternate, evergreen, simple, elliptic to ovate, 3 to 7 cm long, 1 to 4 cm wide; margins coarsely serrate to rarely entire. Flowers inconspicuous, but fruits with white bristles on top sufficiently numerous to give the whole plant a white or silvery appearance in the fall (hence one common name, "silverling"). Found in all

the coastal states, Virginia to Florida to Texas; much more abundant in lower Coastal

Plain; in salt marshes, low grounds, fence rows, open woods, pastures, and roadsides.

[Inset: closeup]

Toxicity

The leaves and flowers of this plant contain a cardioactive glycoside and are attractive to cattle and sheep in the early spring. The evergreen appearance is particularly attractive to cattle when other forage is not available.

Symptoms

Staggering, trembling, convulsions, diarrhea, and other gastrointestinal symptoms are common signs.

Treatment

There is no specific treatment. Use gastrointestinal protectives if diarrhea is present. Use sedatives if convulsions occur.

White snakeroot *Eupatorium rugosum*



Perennial herb, 0.6 to 1.5 m tall, with erect branched or unbranched stems arising from a mat of fibrous roots. Leaves opposite, simple, ovate, 3.5 to 17 cm long, 2.5 to 11 cm wide, crenate to serrate. Flowers showy, white, borne in open, terminal clusters, blooming late in summer or fall. Easily confused with near relatives that are not poisonous. Positive identification may re-

quire the services of a trained botanist. Probably found in all southern states east of the Mississippi River except perhaps Mississippi, rare in the southern portion of the region and at lower elevations; in rich, moist, open, deciduous woods or bordering streams.

Toxicity

The toxic principle has been identified as an alcohol called tremetol. It is found in all parts of the plant whether green or dry. All domestic livestock, some laboratory animals, and humans are susceptible to the effects of this plant. Animals may be poisoned from consuming the actual plant or from ingesting milk from cows, sheep, or mares that have eaten the plant. Drinking milk from cows that have eaten white snakeroot has accounted for an illness called "milk sickness" and for deaths in humans.

Symptoms

Trembling is the most common symptom; in fact, this condition has been called "trembles." Animals are stiff and sluggish, stand with feet wide apart, and may eventually become recumbent. Slobbering, vomiting, constipation, and dribbling of urine also occur. The breath has a ketone odor. Humans may exhibit delirium after drinking toxic milk.

Treatment

There is no specific treatment. Provide laxatives for some relief.

Autumn sneezeweed *Helenium autumnale*



Clump-forming perennial herb from a crown, 0.5 to 2 m tall. Leaves alternate, simple, elliptic to lanceolate, 6 to 15 cm long, 1 to 3 cm wide, serrate to almost entire; bases of leaves continuing as lines down the stem. Flowers yellow; borne in conspicuous heads. Found throughout the South but less common in the Coastal Plain; in moist places in pastures, bogs, and ditches.

Toxicity

The toxic principles are the glucoside sesquiterpene lactone and a phenol. Autumn sneezeweed appears to cause more severe symptoms than does bitter sneezeweed (see page 33). In the Rocky Mountain area, sheep have been severely poisoned by consumption of all portions of the autumn sneezeweed plant. Cattle may also be affected but require a much larger amount.

The plant retains its toxicity even after drying; therefore, heavily contaminated hay can cause problems. Most cases occur when animals are on summer pasture and other forage is not available.

Symptoms

Autumn sneezeweed is a severe irritant to the mucous membranes. Dullness, trembling, and weakness are first symptoms. In many instances, vomiting is prominent. For this reason, the illness is called "spewing sickness." Many vomiting animals inhale part of the regurgitated material into the trachea and develop inhalation pneumonia. These animals usually survive only to become chronically poor performers and perhaps die later from secondary ailments.

Treatment

There is no effective treatment.

Remove from source. Feed high protein feed, mineral supplement of 75 pounds salt and 25 pounds dicalcium phosphate; or feed sodium sulfate.

Bitter sneezeweed (bitterweed)

Helenium amarum



Annual, 15 cm to 1 m tall, much branched herb with taproot. Stem leaves narrow, numerous, 2 to 7 cm long, 1 to 4 mm wide; bases not continuing as lines down the stem. Leaves, when crushed, have a strong disagreeable odor. Flower similar to *H. autumnale*. Found Virginia to Florida to Texas and extending into southern parts of adjacent northern states; most abundant in Coastal Plain where it is common in pastures, roadsides, and waste places. [Inset: flower]

Toxicity

The toxic principles are the glucoside sesquiterpene lactone and a phenol. Bitter sneezeweed causes less severe symptoms than does autumn sneezeweed. The plant retains its toxicity even after drying; therefore, heavily contaminated hay can cause problems. Most cases occur when animals are on summer pasture and other forage is not available.

Symptoms

Bitter sneezeweed is a severe irritant to the mucous membranes. Dullness, trembling, and weakness are first symptoms. In many instances, vomiting is prominent. For this reason, the illness is called "spewing sickness." Many vomiting animals inhale part of the regurgitated material into the trachea and develop inhalation pneumonia. These animals usually survive only to become chronically poor performers and perhaps die later from secondary ailments.

Bitterweed can cause similar problems under experimental conditions. Cattle consume bitterweed only if other forage is unavailable.

Treatment

There is no effective treatment.

Remove from source. Feed high protein feed, mineral supplement of 75 pounds salt and 25 pounds dicalcium phosphate; or feed sodium sulfate.

Poison ivy *Toxicodendron radicans*



Perennial, high-climbing, woody vine. Leaves alternate, deciduous, pinnately compound; leaflets three, thin, bright green, shiny, ovate to elliptic, 2 to 12 cm long, 2 to 12 cm wide, entire to serrate to shallowly lobed. Flowers small, yellowish green, in clusters of two to six in lower leaf axils. Fruit a scarcely fleshy drupe, glabrous to short pubescent, 0.4 to 0.5 cm

broad. Found throughout the southern states east of the Mississippi River; most abundant in moist woods but also in pastures, fence rows, roadsides, and waste places.

Poison oak *Toxicodendron toxicarium*

Low shrub, 0.3 to 2 m tall; very similar in appearance to *T. radicans*; however, it does not climb, and leaflets are thicker, dull green, hairy on both surfaces, broadest above the middle, and often lobed or coarsely serrate. Fruit is densely pubescent rather than glabrous or short pubescent. Found throughout the South; most abundant on relatively dry, sunny sites in woodlands, thickets, and old fields.

Toxicity

The toxic principle is a phenolic compound called urushiol. It is a skin and mucous membrane irritant and is found in all parts of the plant. Some humans are quite sensitive to the effects of the toxin, whereas others show no ill effects from coming into contact with the plant. The toxin has little or no effect on animals, but pets may carry the irritating substance on their hair and thereby transmit it to humans.

Symptoms

Susceptible humans exhibit intense itching with inflammation and the formation of blisters at the areas of contact. Animals are rarely affected. Burning may be dangerous because the irritant may be transmitted by smoke.

Treatment

Consult a physician for proper treatment.

Poison sumac *Toxicodendron vernix*



Shrub or small tree, to 4 or 5 m tall. Leaves alternate, deciduous, pinnately compound; leaflets seven to 13, elliptic to oblong, 5 to 12 cm long, 2 to 5 cm wide, entire, rachis usually reddish and not winged. This species varies from the nonpoisonous species of sumac in that the leaflets are entire and the rachis is not winged; other species have serrate margins or if entire, the rachis is

winged. Flowers in panicles in axils of lower leaves. Fruit similar to *T. toxicarium* but glabrous and smaller. Found throughout the southern states east of the Mississippi River but limited in distribution to very moist areas; in bogs, pocosins, wet pine barrens, and stream borders.

Toxicity

The toxic principle is a phenolic compound called urushiol. It is a skin and mucous membrane irritant and is found in all parts of the plant. Some humans are quite sensitive to the effects of the toxin while others show no ill effects from coming into contact with the plant. The toxin has little or no effect on animals, but pets may carry the irritating substance on their hair and thereby transmit it to humans.

Symptoms

Susceptible humans exhibit intense itching with inflammation and the formation of blisters at the areas of contact. Animals are rarely affected. Burning may be dangerous because the irritant may be transmitted by smoke.

Treatment

Consult a physician for proper treatment.

Atamasco lily *Zephyranthes atamasco*



Perennial, scapose, bulbous herb, 10 to 25 cm tall. Bulbs onionlike, brown-coated. Leaves linear, sheathing at the base, 20 to 40 cm long, 3 to 8 cm wide. Flowers solitary, very showy, white, 7 to 10 cm long. Found in Coastal Plain and lower Piedmont, from Virginia to Florida to Mississippi; most abundant in moist, open woods and low meadows.

Toxicity

The toxic principle is an alkaloid. The bulb of this plant is the most toxic portion. The leaves are also toxic but to a much lesser degree. Animals are usually poisoned in the springtime when the ground is wet and there is little forage. Cattle, horses, and poultry have been poisoned by this plant.

Symptoms

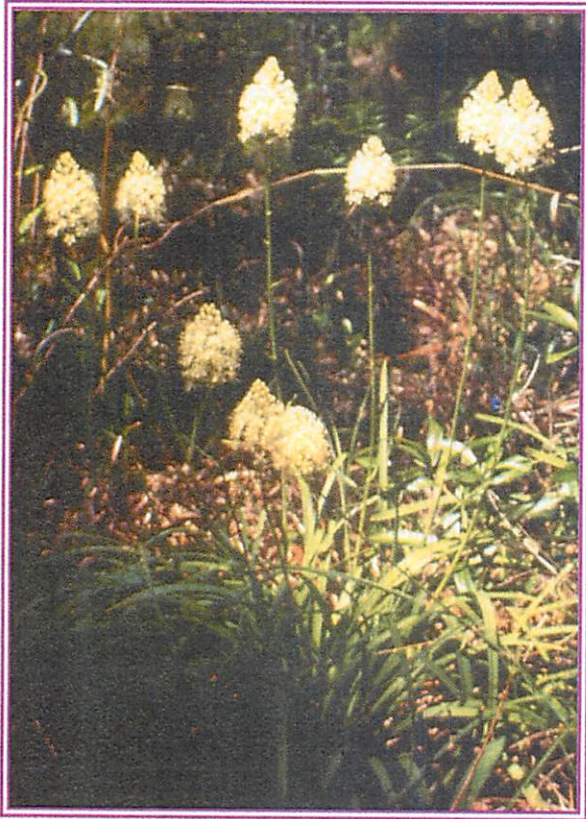
Symptoms usually appear in 24 to 48 hours after the bulbs are eaten. Staggering, diarrhea with blood, collapse, and death are the usual symptoms.

Treatment

Give gastrointestinal protectives.

Fly poison (stagger grass)

Amianthium muscaetoxicum



Perennial, subscapose, bulbous herb, 0.3 to 1.4 m tall. Leaves mostly basal, linear, 10 to 60 cm long, 0.4 to 2.3 cm wide. Flowers white, turning greenish in age; borne in dense racemes, 3 to 13 cm long. Found throughout the southern states east of the Mississippi River; mostly in moist, wooded slopes, meadows, open fields, and bogs.

Toxicity

The highest concentration of the toxin, an alkaloid, is found in the bulb of the plant. The alkaloid, which is cumulative, is also found in the fruit and leaves. Animals consume the plant only when other forage is unavailable. Cases of toxicity occur in the spring, summer, and fall. Cattle and sheep are most commonly affected.

Symptoms

Animals exhibit vomiting, frothing at the mouth, staggering, rapid respiration, subnormal temperature, and weakness. Death is caused by respiratory failure.

Treatment

Keep animals quiet. Give sedatives. Administer gastric protectives by stomach tube unless this procedure excites the animal.

Milkweed *Asclepias tuberosa* and other species



Nearly all members of the milkweed genus (*Asclepias*) are erect or spreading, perennial herbs with milky sap from thick rootstocks or rhizomes. Leaves opposite, whorled or rarely alternate, simple, linear to widely ovate, entire. Flowers borne in dense, often showy umbels, often white or greenish white but may also be red, orange, lavender, or pale green. Fruit, an elongated follicle splitting on one side and releasing many seeds topped with white, silky hairs that enable them

to be widely dispersed by the wind. The milkweed genus is found throughout the southern region; in fields, along roadsides and fence rows and in open woods, pastures, and waste places. [Inset: fruit of butterfly milkweed]

Toxicity

Various species of milkweeds have yielded resinoids, alkaloids, and glycosides. All parts of the plant are toxic, whether consumed green or dried in hay. Cattle, sheep, goats, horses, and poultry are all sensitive to the effects of milkweed. Consuming the toxic plant in the amount of 2 percent of body weight can cause symptoms.

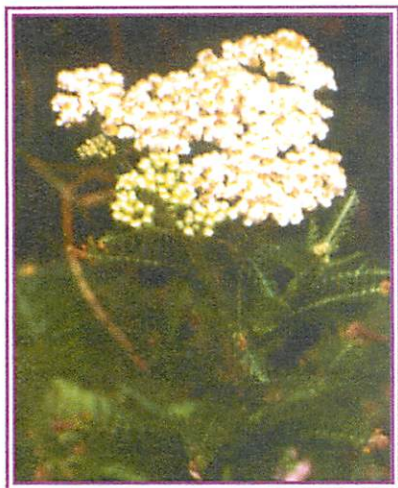
Symptoms

Losses usually occur when animals are forced to graze the plant due to lack of other forage. Usual signs include staggering, depression, weakness, labored respiration, and dilated pupils. Animals go down and exhibit tetanic spasms before going into a coma and dying.

Treatment

Give laxatives and intravenous fluids.

Common yarrow *Achillea millefolium*



Perennial, silky villous, rhizomatous herb with erect stems, 0.3 to 1.2 m tall. Leaves finely two to three pinnately divided, the smaller segments linear to ovate, hairy. Flowers borne in heads about 0.5 cm broad, with white to pink ray flowers and small disc flowers; heads borne in dense terminal clusters. Nutlets oblong, slightly flattened, 2 to 3 mm long; pappus absent. Found throughout the southern area east of the Mississippi River; most common in pastures, roadsides, dry hillsides, open woods, and waste places.

Toxicity

This plant contains the alkaloid achillain and glycosides but is not considered to be highly toxic. Consumption of the plant may cause a disagreeable odor or taste in milk or in the meat of slaughtered animals. All livestock are susceptible.

Symptoms

Mucous membrane contact with the plant causes irritation and inflammation. Gastrointestinal upset including diarrhea may occur.

Treatment

Use intestinal protectives.

Common buttonbush *Cephalanthus occidentalis*



Shrub or rarely a small tree, 1 to 3 m tall. Leaves opposite or whorled, deciduous, ovate to elliptic, 6 to 15 cm long, 3 to 10 cm wide. Flowers white; borne in terminal or axillary, showy, dense, nearly spherical heads, 2 to 3.5 cm in diameter. Found throughout the South; in low areas, margins of lakes, rivers, creeks, swamps, marshes, and poorly drained pastures.

Toxicity

Bitter glycosides, cephalin and cephalanthin, are found primarily in the leaves of this plant. Other parts of the plant are less toxic. Cattle are usually affected in the summer and fall when other forage is scarce.

Symptoms

Symptoms include vomiting and muscular weakness. Occasionally convulsions and death result.

Treatment

Administer laxatives by stomach tube.

Mustard *Brassica* spp.



Annual, biennial, or perennial herbs with a pungent odor when crushed. Leaves alternate, simple to highly dissected, often basal with only a few on the upper stem. Flowers borne in a raceme or solitary on a leafless or nearly leafless stem, mostly bright yellow. Fruit dry, dehiscent, 1.5 to 7 cm long, much longer than wide. Seeds numerous, black or brown, globular, 1.5 to 3 mm in diameter. Found throughout the South; in fields, pastures, roadsides, lawns, and waste places; some species in cultivated ground.

Toxicity

Members of the mustard family contain isothiocyanates, commonly called mustard oils. Certain members, such as the rutabaga, have a high concentration of goitrogenic substance that has produced goiter in livestock. Animals are most often poisoned from spring to fall but can show symptoms of toxicity throughout the year if hay is contaminated with a large amount of mustard. All parts of the plant are toxic, especially the seeds. Swine, cattle, and horses are susceptible.

Symptoms

Symptoms are primarily those of a severe gastroenteritis due to irritation of the mucous membranes. Abdominal pain, salivation, and diarrhea are commonly seen.

Rape, a winter annual, often causes a series of problems including pulmonary emphysema, diarrhea, blindness, and hemoglobinuria. Photosensitization can occur in swine and light-skinned animals. Abortions can occur in sows.

Treatment

There is no effective treatment.

Include hay free of mustards in the diet. If rape forage is being used, allow access to other types of pastures.

St. John's wort *Hypericum* spp.



Erect, diffusely branched perennial herb; smaller stems wing-angled. Leaves opposite, elliptic to oblong, usually five-veined, 1 to 2.5 cm long, 2.5 to 11 mm wide, entire; leaves with tiny, nearly clear spots, base clasping, sessile. Flowers deep yellow; petals 7 to 10 mm long, with tiny, black spots, borne in decompound, flat-topped clusters. Fruit, a many-seeded capsule, ovoid, 3.5 to 5.5 mm long, 2.5 to 4 mm broad.

Seeds brown, 1 to 1.2 mm long. Found throughout the South; in dry fields, waste places, roadsides, mostly in Piedmont or mountains. [Inset: flower]

Toxicity

A red fluorescent pigment, hypericin, is the toxic agent. It is a primary photosensitizing compound, but the liver is not affected. Cattle, sheep, and horses are affected; goats are also affected, but to a lesser degree. Animals are poisoned by eating the fresh plant or dried hay. The toxic principle is not destroyed by drying or excessive heat. Younger plants are more palatable than the older ones.

Symptoms

In cattle, consumption of the plant equal to 1 percent of the body weight is toxic. Photosensitization is noticed within 2 days to 3 weeks after ingestion. Light areas of the skin

surface become hypersensitive to sunlight. The white skin peels off and may hang from the body before falling away. Affected animals exhibit itching and try to scratch themselves on objects. Blindness often results from inflammation and secondary infection of the cornea. Animals occasionally have convulsions in the acute form of poisoning. More commonly, however, the photosensitization results in secondary infection of the affected areas. Animals may actually die of starvation.

Treatment

Remove animals from contaminated pastures to barns, woods, pasture, or areas where animals have access to shade. Treat affected skin areas with antibacterial preparations; administer antibiotic injections to prevent infection.

Sweetshrub *Calycanthus floridus*



Shrub with opposite branches, 1 to 3 m tall. Leaves opposite, deciduous, entire, lanceolate to ovate, 5 to 18 cm long, 2 to 8 cm wide, entire. Flowers axillary with many linear or lanceolate, maroon petals and sepals, very fragrant. Fruit dry, tough, obovate, fibrous, 8 cm or more long and 5 cm or more in diameter, drooping and somewhat resembling an insect gall. Found in Alabama, Florida, Georgia, Mississippi, Tennessee, Virginia; mostly in rich, deciduous woods along stream banks and other moist places. [Inset: flower]

Toxicity

An alkaloid is contained in the seed of the plant. It has been reported to be toxic to cattle. The plant is dangerous but not commonly eaten.

Symptoms

Strychnine-like action results in an increased excitability in which tetanic convulsions are exhibited.

Treatment

Use sedatives to control the convulsions caused by the strychnine-like action of the toxin.

Mexican pricklepoppy *Argemone mexicana*



Annual or biennial herb, 3 to 9 m tall, more or less spiny; plant sap bright yellow. Leaves alternate, glaucous, auriculate-clasping, sessile, lanceolate to obovate, 7 to 20 cm long, 3 to 9 cm wide, coarsely pinnately cleft or parted; margins spinose dentate. Flowers showy on very short stalks; corolla bright or rarely pale yellow; petals 3 to 5 cm wide. Found throughout

most of the South; mostly in sandy roadsides, waste places, and fields. (Bluestem pricklepoppy, *A. intermedia*, is shown.)

Toxicity

The alkaloids berberine and protopine are contained in the entire plant. In addition, the seeds contain sanguinarine and dihydrosanguinarine. If seeds are consumed in sufficient quantities, livestock, humans, and chickens can be poisoned. One ounce of seed causes symptoms in poultry, and 2 ounces usually produce death.

Symptoms

In humans and chickens, widespread edema (dropsy) is the main symptom. In chickens, wattles swell, the tips of the comb darken, and egg production decreases. Other symptoms in chickens are weakness, hemorrhagic enteritis, and death.

Treatment

Nonspecific. Give diuretics to livestock.

Hairy vetch *Vicia villosa*



Annual, biennial, or rarely
Aperennial, trailing or climbing herb, 0.5 to 1 m tall, with densely hairy stems (a cultivated variety is not hairy). Leaves alternate, pinnately compound, with terminal leaflet modified into a branched tendrils; leaflets 10 to 29, narrowly oblong to linear, 1 to 3 cm long. Flowers violet or rarely white, 1.2 to 2 cm long; 10 to 40 flowers borne together in racemose axillary clusters. Fruit, a flattened pod, 2 to 3 cm long, 7 to 10 mm

broad. Found throughout the southern states east of the Mississippi River; mostly in fields, roadsides, and waste places.

Toxicity

A cyanogenic glycoside is present in vetch seed. In Alabama, cattle have exhibited signs of cyanide poisoning after eating from a sack of vetch seed left in a barnyard.

Symptoms

Symptoms include bellowing, sexual excitement, a wild appearance, crawling on the ground, and death. Some species of vetch have been known to cause liver damage and photosensitization.

Treatment

Treat cyanide poisoning with sodium thiosulfate and sodium nitrite. If cattle exhibit photosensitization, keep them in a shady area and give antibiotics to prevent secondary infection.

Perilla mint *Perilla frutescens*



Annual herb, 0.2 to 0.6 m tall; stems four-sided and freely branched. Leaves opposite, purple or green, ovate, 5 to 13 cm long, 4 to 10 cm wide, coarsely serrate, with a strong pungent odor when crushed (also true of stems). Flowers small, white to purple, with a ring of hairs in the throat of the five-lobed corolla; borne in terminal panicles or singly in the axils of leaves. Found throughout the South; mostly in pastures and fields, along roadsides, about homesites, and in waste places. [Inset: portion of four-sided stem]

Toxicity

This toxic plant contains "perilla ketone," which produces pulmonary edema and pleural effusion in a variety of animals. Toxic cases are seen sporadically, usually in the late summer or fall after grazing of the plant, most often in cattle and horses. May account for birth defects in calves when hay containing perilla mint is fed to cows early in the gestation period.

Symptoms

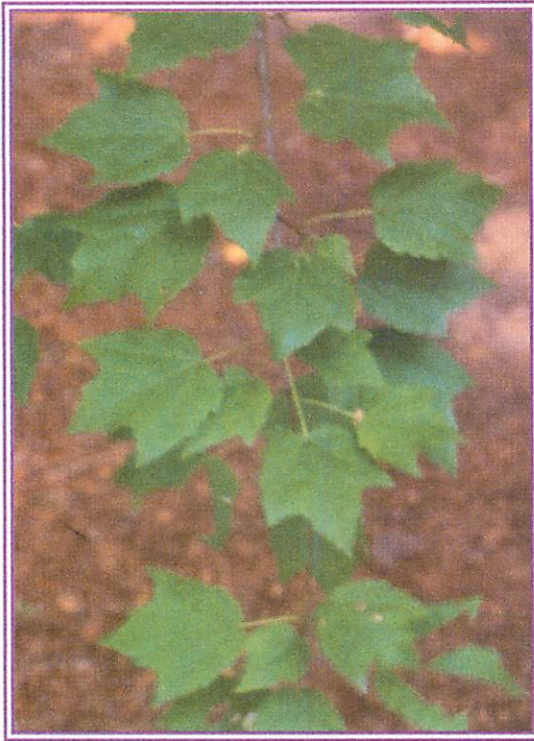
Affected animals exhibit respiratory distress. They have difficulty breathing especially when exhaling. They may grunt when exhaling and may have a nasal discharge and an elevated temperature; friction sounds occur through the chest wall.

Postmortem examination reveals pulmonary emphysema and edema. The perilla mint seeds are often found in the rumen of the cow.

Treatment

Once symptoms of severe pulmonary edema and emphysema occur, treatment is usually ineffective. Try injections of antihistamines, steroids, and antibiotics. Handle cattle quietly to prevent further respiratory complication and subsequent death.

Red maple *Acer rubrum*



Medium to large tree, up to 30 m tall. Leaves opposite, deciduous, doubly serrate, up to 15 cm long, each with principal veins palmate, three to five sharp lobes and base cordate. Flower opening prior to appearance of leaves in spring. Male and female flowers borne in different clusters usually on the same tree or rarely on different ones. Mature fruit, a red winged samara produced in pairs. Occurs throughout the South; most common in swamps, along streams, or in rich woods. In open, disturbed sites, almost pure stands of red maple may occur.

Toxicity

The wilted leaves of this plant contain an unknown compound, which is believed to be an oxidant. Cattle and horses have been poisoned when wilted leaves were ingested.

Symptoms

Weakness, rapid heartbeat and respiration, depression, icterus, cyanosis, and brownish discoloration of blood and urine are the major symptoms.

Treatment

Treat symptoms by providing fluids and oxygen. Use methylene blue in the early stages of the disease.

Glossary

- abomasum* – the fourth stomach of a ruminant animal.
- achene* – a small, dry, hard one-locular, one-seeded, indehiscent fruit.
- acuminate* – a type of apex with concave sides that taper to a sharp point.
- acute* – a type of apex or base with straight sides that meet at less than a 90° angle.
- ascites* – an excessive accumulation of fluid in the peritoneal (abdominal) cavity.
- axil* – the angle between any two structures; usually applied to the angle between the leaf and stem.
- axillary* – in an axil.
- bipinnate* – twice pinnate.
- blade* – the expanded portion of a leaf.
- bract* – a leaflike structure subtending a flower or flower cluster.
- capsule* – a dry, or occasionally leathery, dehiscent fruit.
- ciliate* – fringed with hairs at the margin.
- comatose* – affected with a coma, which indicates a state of complete loss of consciousness from which the animal cannot be aroused.
- compound* – composed of two or more similar and united parts, as in a compound leaf.
- cordate* – heart-shaped with the point at the apex.
- crenate* – shallowly round-toothed or teeth obtuse; scalloped.
- cyanosis* – bluish discoloration of skin and mucous membranes due to poor oxygenation of the hemoglobin in the blood.
- dehiscent* – opening regularly, usually by slits like a pea or pod or cotton boll.
- dentate* – sharp-toothed, the sharp or coarse teeth perpendicular to the margin.
- denticulate* – minutely or finely dentate.
- diuretic* – a drug or other agent that promotes the secretion of urine.
- dropsy* – an abnormal accumulation of fluid in the cellular tissues or in a body cavity.
- drupe* – a fleshy, indehiscent fruit, containing one or more single-seeded pits or stones, such as a cherry or plum.
- edema* – the accumulation of abnormally large amounts of fluid in the intercellular tissue spaces of the body.
- elliptic* – being narrowed to relatively round ends and widest at or about the middle.
- entire* – a margin without teeth or other irregularities.
- follicle* – a dry, usually several- to many-seeded fruit dehiscent along one line.
- funnelform* – gradually widening from base to apex; funnel-shaped.

gastritis – inflammation of the stomach.

gastroenteritis – inflammation of the stomach and intestines.

glabrate – losing hair with aging or maturity of the plant part or structure.

glabrous – without hairs.

hemorrhage – excessive bleeding; copious escape of blood from vessels.

hemorrhagic enteritis – inflammation of the intestines characterized by the passing of blood in the droppings.

icterus – a yellow appearance of the skin and mucous membranes. It is caused by liver damage, impairment of bile flow, or excessive destruction of red blood cells.

indehiscent – not regularly opening.

jaundice – a common term for icterus.

lanceolate – lance-shaped, much longer than wide, widened at or above the base and tapering to the apex.

linear – long and narrow with essentially parallel margins, as the blades of most grasses.

necropsy – an examination of the body after death. An autopsy or postmortem examination.

nutlets – one of the sections of a mature ovary; a small nut.

ob – a prefix signifying inversion, as obovate.

oblancoolate – much longer than wide, with widest point above the middle and the petiole at the narrower end.

ovate – with an outline like that of a hen's egg, the broader end below the middle.

palmate – lobed, divided or ribbed like the fingers from the palm of the hand.

panicle – a cluster of flowers (inflorescence) in which the branches of the primary axis are racemose and the flowers pedicellate.

pappus – a ring of appendages (modified calyx), often hairs, capping the fruit of many Compositae.

petal – one unit of the corolla.

petiole – leaf stalk between blade and stem.

photosensitization – sensitivity to light. Usually used to indicate a condition in animals when superficial layers of non-pigmented skin exhibit dermatitis when exposed to sunlight. The condition may develop when animals consume certain poisonous plants or other agents that are not properly metabolized by the liver.

pilose – covered with long, soft, spreading hairs.

pinnate – with the leaflets arranged along a common axis (rachis); featherlike.

pistil – one or more fused carpels consisting of stigma, style (if present), and ovary.

pistillate – flower type with pistils and without fertile stamens; female.

puberulent – covered with fine, minute hairs.

pubescent – covered with hairs, often soft and downy.
raceme – a simple, elongated inflorescence with stalked flowers.
rachis – central elongate axis bearing leaflets (in a pinnate leaf) or flowers (in an inflorescence).
recumbent – lying down. Usually used to indicate an animal that is down and unable to arise.
rhizome – usually elongate, horizontal, underground stem.
rhizomatous – producing or possessing rhizomes.
rhombic – diamond-shaped.
rootstock – subterranean stem; rhizomes.
rumenotomy – surgical opening of the rumen.
samara – a dry, indehiscent, winged fruit.
scape – a flowering stem that is leafless above ground level.
scapose – resembling a scape; stem essentially naked.
sepal – a single unit of the calyx.
serrate – margin with teeth like a saw, teeth pointing toward the tip of the leaf.
simple – leaf type of one continuous area, not divided into leaflets.
sinuate – the margin wavy in and out with regular strong indentations.
spike – an elongated, simple inflorescence with sessile flowers.
spikelet – a secondary spike; a part of a compound inflorescence; the “flower” of grasses.
stamen – the pollen-bearing organ of a seed plant.
staminate – flower type having stamens and no functional pistils; male.
stasis – a stoppage of the flow of blood or other body fluid in any part. In animals, this term often indicates a paralysis or abnormal slowing down of the gastrointestinal tract.
stellate – starlike, with radiating branches.
tetanic spasm – a sudden, persistent, violent, involuntary contraction of a muscle or a group of muscles. The body becomes rigid, often with the head drawn backwards.
umbel – an inflorescence with pedicels or peduncles (rays), or both, arising from a common point.
wattles – small fleshy pendulous processes usually about the head or neck.

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