

Livestock-Poisoning Vascular Plants of Alabama



AGRICULTURAL EXPERIMENT STATION AUBURN UNIVERSITY
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PREFACE

This bulletin is the result of a project supported by the Auburn University Agricultural Experiment Station. The main goal of our study, initiated in 1969, was to collect information on poisonous vascular plants occurring in Alabama and to present it in a form that will directly benefit livestock producers of the State, and indirectly benefit the consumers of livestock products. The project will have achieved its purpose if the use of this bulletin by producers reduces or eliminates livestock losses due to plant poisoning.

Few publications relating to the poisonous plant problem in Alabama (3,21,22,23,62) exist, and these are mostly out of print or otherwise unavailable. The format employed in this bulletin is essentially that of Hardin (10), which, in our opinion, represents a useful, practical, simple-to-understand means of summarizing pertinent facts about each poisonous species. Much of the non-botanical information presented here has been compiled from the literature (1,2,5,7,9,10,12,13,15,17,18,20,24,28). Data on plant distributions were obtained from taxonomic literature (4,6,8,19,21), field studies of the junior author (16), and herbarium specimens preserved at Auburn University, Florida State University, Jacksonville State University, University of Alabama, University of North Alabama, and University of South Alabama.

No proof of toxicity is claimed for plant species listed in this bulletin but omitted from similar publications about other states. Suspected species, even if incriminated by circumstantial evidence, were included on the basis of information from livestock producers and notes and records compiled by the School of Veterinary Medicine of Auburn University and by Dr. Henry S. Ward, formerly with the Department of Botany and Microbiology. We are indebted to Dr. Ward for photographs and records left with the department, which aided the preparation of this bulletin.

Although plants known to cause human poisoning were largely ignored in this study, certain ones occasionally are cited as being dangerous to humans as well as animals. Other references (11,14,27) will better serve the reader in dealing with problems of this sort, but a list of the Poison Control Centers (25) in Alabama and in cities near its borders, from which immediate information may be requested in an emergency, is included as Appendix II.

We accept sole responsibility for any serious omissions or unnecessary inclusions. Because our training has been in botany rather than veterinary medicine, this publication was approached from a botanical viewpoint. This bulletin, therefore, is not intended to serve as a guide for veterinary practices; it is written so that citizens of Alabama concerned with livestock poisoning can more easily identify causative plants.

J.D.F.
H.D.M.

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Livestock-Poisoning Vascular Plants of Alabama

JOHN D. FREEMAN and HAROLD D. MOORE*

THE SERIOUSNESS of livestock poisoning by plants in Alabama is difficult to estimate, and little concrete information is available. Best estimates are that State losses run into millions of dollars annually. The problem is much greater than it need be, however, because most losses can be prevented. During the past two decades, conversion of much former row crop land into pastures has both increased livestock production and intensified the need for better information about poisonous plants and their distribution in Alabama. This bulletin should help inform veterinarians and producers on the subject and thereby eliminate needless losses.

DEFINITIONS OF PLANT POISONING

As considered in this bulletin, a "poisonous plant" is one that causes a seriously injurious or potentially fatal chemical or physiological disturbance when consumed by livestock. This limitation may exclude several troublesome plant species causing important damage to stock animals by other means, such as mechanical injury, photosensitization, dermatitis, and disagreeable tastes and odors in meat and milk. These are briefly discussed in the following section.

Mechanical Injury

Plant parts with thorns, spines, awns, or heavy woolly pubescence may directly penetrate an animal's skin or cause intestinal obstructions if eaten. Weakness, starvation, or even death from loss of blood may result from such injuries, but the major problem usually is infections that develop in the wounds rather than the injury itself. Severe mouth and lung injury caused by awned seeds and subsequent chronic infections have been linked to the

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deaths of prized hunting dogs and probably also occur in livestock. Several of the more important plants responsible for mechanical injury to domestic animals are listed below:

| <i>Scientific name</i> | <i>Common name</i> | <i>Plant part</i> |
|--------------------------|--------------------|-------------------|
| <i>Aristida</i> spp. | poverty grasses | awns |
| <i>Cenchrus</i> spp. | sandburs | spiny burs |
| <i>Bidens</i> spp. | spanish needles | barbed fruit |
| <i>Centaurea</i> spp. | star thistles | spines |
| <i>Hordeum</i> spp. | barleys | awns |
| <i>Rubus</i> spp. | blackberries | briars |
| <i>Setaria</i> spp. | foxtail grasses | awns |
| <i>Solanum</i> spp. | bullnetties | thorns |
| <i>Stipa</i> spp. | needle grasses | awns |
| <i>Trifolium</i> spp. | clovers | "hairball" |
| <i>Verbascum thapsus</i> | moth mullein | "hairball" |
| <i>Xanthium</i> spp. | cocklebur | awns |

Photosensitization

Ingestion of certain plants causes animals to become extremely sensitive to light, presumably because some photodynamic pigment is absorbed. The consequences of severe photosensitization may include blistering and death of skin, infection, and/or liver damage, depending on the plant species and amount eaten. Important species (many of which are included later in this text) known to affect animals in these ways are listed below:

| <i>Scientific name</i> | <i>Common name</i> |
|--|--------------------|
| <i>Avena sativa</i> | oats |
| <i>Brassica napus</i> | cultivated rape |
| <i>Euphorbia maculata</i> | spotted spurge |
| <i>Fagopyrum sagittatum</i> | buckwheat |
| <i>Hypericum perforatum</i> | St. Johnswort |
| <i>Lantana</i> spp. | lantana |
| <i>Medicago sativa</i> | alfalfa |
| <i>Panicum</i> spp. | panic grasses |
| <i>Polygonum</i> spp. | smartweeds |
| <i>Sorghum vulgare</i> var. <i>sudanense</i> | sudangrass |
| <i>Tribulus terrestris</i> | puncturevine |
| <i>Trifolium</i> spp. | clovers |
| <i>Vicia</i> spp. | vetches |

Dermatitis

Allergic skin reactions are not considered a significant problem in animals, as they are in humans. However, plants with stinging hairs that produce an immediate rash on contact may affect the

senses of grazing animals; they, perhaps, also cause irritations and infections about the mouth and nostrils. Several species that should be avoided by man because they cause skin problems (and conceivably may affect animals in similar ways) are listed below. Several of those with stinging hairs may cause excess salivation, partial paralysis, and incapacitation of hunting dogs.

| <i>Scientific name</i> | <i>Common name</i> | <i>Plant part</i> |
|-------------------------------|--------------------------|-------------------|
| <i>Anthemis</i> spp. | dogfennel, chamomile | allergenic oil |
| <i>Cnidoscopus stimulosus</i> | bullnettle, tread-softly | stinging hairs |
| <i>Laportea canadensis</i> | woodsnettle | stinging hairs |
| <i>Metopium toxiferum</i> | poisonwood | allergenic oil |
| <i>Rhus radicans</i> | poison ivy | allergenic oil |
| <i>Rhus toxicodendron</i> | poison oak | allergenic oil |
| <i>Rhus vernix</i> | poison sumac | allergenic oil |
| <i>Tragia</i> spp. | noseburn | stinging hairs |
| <i>Urtica</i> spp. | stinging nettle | stinging hairs |

Disagreeable Tastes and Odors

Many species of plants produce unpleasant odors in milk and milk products and meat of animals that graze them. Animal products affected by such plants are virtually unmarketable and may account for considerable losses, especially during certain seasons. Both poisonous and non-poisonous species are included among the more important plant taxa in this category listed below:

| <i>Scientific name</i> | <i>Common name</i> |
|-----------------------------------|----------------------------|
| <i>Achillea millefolium</i> | common yarrow |
| <i>Allium</i> spp. | onions |
| <i>Ambrosia</i> spp. | ragweeds |
| <i>Anthemis</i> spp. | dogfennel, chamomile |
| <i>Brassica</i> spp. | mustards, turnips |
| <i>Caltha palustris</i> | marshmarigold |
| <i>Chrysanthemum leucanthemum</i> | oxeye daisy |
| <i>Cichorium intybus</i> | chicory |
| <i>Conium maculatum</i> | poison hemlock |
| <i>Equisetum</i> spp. | horsetails, scouringrushes |
| <i>Euphorbia</i> spp. | spurges |
| <i>Hedera helix</i> | English ivy |
| <i>Helenium amarum</i> | bitter sneezeweed |
| <i>Hypericum perforatum</i> | St. Johnswort |
| <i>Lonicera japonica</i> | Japanese honeysuckle |
| <i>Lupinus</i> spp. | lupines |
| <i>Quercus</i> spp. | oaks |
| <i>Ranunculus</i> spp. | buttercups |
| <i>Rumex</i> spp. | docks, sorrels |

PLANTS CAUSING INTERNAL POISONING

Bacteria and Algae

Polluted streams and farm ponds may occasionally contain toxic bacteria and/or algae in numbers sufficient to poison stock. Records exist of deaths from such poisoning, particularly in animals drinking from dense farm pond blooms of blue-green algae. All classes of livestock are susceptible to this type of poisoning, and it should be considered a possibility when plant poisoning is suspected.

Fungi

Poisonous species of fungi, particularly toadstools and other fleshy types, are consumed by livestock, either deliberately or inadvertently when mixed with other forage. Various other fungi, such as ergot on grasses and certain molds on hay, ensilage, or grains, may cause rapid and painful death to an animal that eats only a small amount. Identification of fungi requires a trained mycologist. Although not dealt with in this bulletin, this potential source of poisoning should be recognized when attempting to determine specific causes of stock poisoning.

Vascular Plants

The category of vascular plants includes all plants treated in this bulletin, as well as other green leafy plants that represent the principal diet of all stock animals. Ferns and their allies, conifers, and flowering plants are vascular plants, characterized by the presence of conducting tissues from their underground roots to their aboveground leaves or shoots. These plants are arranged here by family according to presumed natural relationships based on similarities in structure and external appearance. This classification scheme also tends to place together plants that are most similar in their physiological effects on poisoned animals. Toxins are often identical or similar in closely related species.

CONDITIONS OF INTERNAL POISONING

Causes

Livestock will rarely eat poisonous plants unless forced to do so by unusual or artificial conditions. Apparently many toxic

plants contain substances that render them distasteful, and they are usually avoided except in cases such as the following:

Starvation

Most cases of livestock poisoning are reported during winter and early spring, before there is sufficient growth of desirable forage. Overgrazing and summer droughts create the same problem by limiting the supply of good forage.

Dietary Imbalance

Livestock will sometimes browse harmful plants because of lack of required minerals or other substances, or even a simple lack of variety in the diet. The better pastures will include several plant species (grass and legume, for example) and supplementary minerals (block salt) to prevent this cause of poisoning.

Opportunistic Feeding

Many kinds of livestock will eat poisonous plants when they become available under unusual circumstances, seemingly for no reason other than the opportunity itself. Hedge clippings, garden refuse, and kitchen trash thrown into pastures can be dangerously poisonous to livestock. Likewise, plowed or eroded ground, dried water holes, and ditches may expose roots or plant parts not normally eaten but potentially dangerous if the opportunity to feed on them develops.

Curiosity and Abnormal Appetites

There are a few plants for which animals develop an abnormal or depraved appetite, sometimes to the extent that death can result. Plants normally avoided by animals may be actively sought once tried out of curiosity, by chance, or for some other reason. This behavior seems very much like "addiction" by the animal.

Herbicide-Damaged Plants

Animals sometimes eat poisonous plants that have been treated with herbicides such as 2,4-D or 2,4,5-T. The treatment apparently sometimes increases the palatability of certain toxic species.

Incidental Causes

Animals moved to new or strange pasture may eat poisonous plants that acclimated animals would avoid. Dangerous plants also may be so intermingled with good forage or hay that their consumption is unavoidable. There seems to be no accounting

for the taste of individual animals, either; some for no apparent reason will eat lethal quantities of a plant that most would avoid. The old dictum, "The grass is always greener on the other side of the fence," holds true for most livestock, and this "greener grass" too often includes poisonous species.

Severity

Many factors contribute to the severity of poisoning, or more specifically to the effect of a toxic substance on an animal. Among these factors are: (1) chemical nature of the poison; (2) amount eaten, and over what period of time; (3) part of plant eaten and general condition of plant; (4) environmental conditions under which plants were grown; (5) species of animal poisoned; (6) size, age, and sex of the animal; and (7) general health of the animal prior to ingestion of the poison.

At the local level, a rare species may cause severe poisoning to a large number of livestock. An attempt has been made to identify and rank the plant species representing the greatest hazards to livestock on a statewide basis. Thus, both distribution and abundance affect the seriousness of any given species as a potential problem. The least abundant native species and miscellaneous cultivated species causing only minor disorders are listed in Appendix 1.

POISONOUS SUBSTANCES IN PLANTS

The many poisonous substances in plants can be categorized into relatively few groups on the basis of their chemical nature. Each major group usually causes characteristic symptoms in a poisoned animal, although a given representative may produce unique symptoms. Often more than one class of poison occurs in a given plant, and this results in symptoms different from those either would produce alone. Unless peculiar symptoms are noted under the species, the reader can refer to the following list for information about the symptoms caused by the chemicals in various plants.

Glycosides

The most common glycosides are glucosides, glucose derivatives of complex chemicals that yield toxic breakdown products under certain conditions. These poisons are widely distributed in vascular plants and are of two major types.

Cyanogenetic glycosides yield hydrocyanic (prussic) acid upon hydrolysis. Cyanide poisoning usually is rapid and produces few symptoms. Examples include *Hydrangea*, *Prunus*, *Sorghum*, and *Triglochin*.

Saponic glycosides yield saponins, complex polar substances with many of the physical properties of soaps and/or detergents. Saponins generally cause gastric irritations and may induce depression, shallow breathing, bloody diarrhea, vomiting, abdominal pains, and general paralysis. Examples include *Agrostemma*, *Baccharis*, *Daubentonia*, and *Glottidium*.

Other glycosides (including goitrogenic substances, irritant oils, and coumarins) also occur in many other genera but in some may be of secondary importance in poisoning. Examples include *Actaea*, *Aesculus*, *Brassica*, *Chenopodium*, *Convallaria*, *Helenium*, *Melilotus*, *Nerium*, *Ranunculus*, and *Robinia*.

Alkaloids

Alkaloids are complex nitrogen-containing compounds that are alkaline in reaction and mostly insoluble in water. Some are highly poisonous and affect primarily the nervous system and heart. Liver damage occurs in some cases. Symptoms are varied, and affected animals cannot be treated successfully with antidotes. Examples include *Aleurites*, *Amianthium*, *Argemone*, *Baptisia*, *Buxus*, *Cicuta*, *Crotalaria*, *Datura*, *Delphinium*, *Gelsemium*, *Iris*, *Lobelia*, *Sanguinaria*, *Senecio*, *Taxus*, and *Zigadenus*.

Organic Acids

Oxalic and tannic acids are the main organic acids normally toxic to livestock. Large amounts result in dullness, depression, and finally death a few hours after eating. The main cause of death by oxalates is kidney failure because of precipitation of crystals in kidney tubules; tannins are of minor importance. Examples include *Rumex* (oxalates) and *Quercus* (tannins).

Resins and Resinoids

Resin-like compounds comprise a heterogenous assemblage of complex organic materials differing widely in chemistry but similar in physical properties. Symptoms vary with the species, but most affect nervous and muscular tissues, especially the heart. Examples include *Asclepias*, *Cicuta*, *Kalmia*, *Lyonia*, *Melia*, and *Rhododendron*.

Minerals

Minerals accumulated by plants to toxic concentrations include copper, lead, cadmium, fluorine, manganese, nitrogen, selenium, and molybdenum. Though several of these minerals are important in the Central and Western United States, probably only nitrates cause any major problem in Alabama. High nitrate levels in plants are often associated with droughts, heavy applications of nitrate fertilizers, nitrogen-rich soils, applications of 2,4-D herbicides, and the particular plant species. Numerous species, many of them otherwise innocuous, concentrate nitrates and may be poisonous at times. Ruminant animals are most severely affected because of nitrates' conversion to toxic nitrites in the rumen, whereas horses and swine (single-stomached animals) are less likely to be poisoned.

Unknown and Miscellaneous Poisons

The chemical nature of many toxic plants has not been determined, and new substances are continually being discovered. Important compounds and examples in this category include complex alcohols (*Cicuta*, *Eupatorium*); enzymes (*Equisetum*, *Pteridium*); polyphenols (*Gossypium*, *Helenium*, *Ranunculus*); hydroquinone (*Xanthium*); phytotoxin (*Ricinus*, *Robinia*, *Trifolium*); and unknown substances (*Ilex*, *Lachnanthes*, *Ligustrum*, *Modiola*, *Tephrosia*).

Grass Tetany

Under certain conditions normally excellent forage will produce symptoms of poisoning in livestock. A common example of this is grass tetany or grass staggers, a condition developing when livestock are pastured on lush grass pasturage, usually in the early spring. The primary clinical result is reduced magnesium levels in blood serum. Gross symptoms in acute cases include excitement, incoordination, muscular twitching, salivation, grinding of teeth, and staggering followed by prostration. Tetanic seizures become general, and increased heartbeat and dyspnea occur. Convulsions with periodic remissions, and sometimes coma, precede death. The particular species of plant involved, and whether cultivated or wild, seems unimportant, but many losses of cattle and sheep have occurred on winter wheat pasture.

GOOD FARM MANAGEMENT PREVENTS LOSSES

Without doubt the most frequent cause of poisoning is a shortage of desirable forage. Therefore, all of the following suggestions fall under the heading of improved pasture and herd management:

1. Avoid holding or moving animals in areas with dense stands of poisonous plants.
2. Avoid any grazing by excessively hungry or nutritionally deficient animals in areas with poisonous plants.
3. Improve and maintain pasture by fertilization, reseeding, brush control, control of numbers and kinds of livestock, deferred and rotational grazing, and location of water and salt to obtain even distribution of grazing.
4. Fence areas with numerous poisonous plants to exclude them from pastured land, or even from reach through the fence from good pasture.
5. Learn to recognize poisonous plants and eliminate them by any of several recommended control methods. Digging, cutting, burning, and chemical and biological controls work well in various instances, but the last of these – in the form of good pasture and grazing management – is usually preferable.
6. Keep in mind that **prevention** is the easiest, least expensive, and often the only effective way to reduce or eliminate losses due to plant poisoning.

TREATMENT OF ANIMALS

Treatments for most cases of plant poisoning must necessarily be symptomatic because there are few definite antidotes. Unfortunately, by the time a sick animal is discovered and the veterinarian summoned, treatment may be useless for that particular animal. Only a trained veterinarian should attempt to treat a poisoned animal, and successful diagnosis and treatment often depend on correct identification of the responsible plant. Nevertheless, a few general principles will serve as a guide to the veterinarian in prescribing treatment.

Prevention of Absorption

Chemical or physical antidotes may be used to reduce further absorption of ingested toxin from the gastrointestinal tract. **Tannic**

acid has been used to complex and precipitate alkaloids, but these poisons act so rapidly that treatment is rarely possible. **Oxidizing agents**, such as potassium permanganate, may deactivate certain poisons by oxidation. **Adsorbants**, such as animal and wood charcoals, actively adsorb many poisons. **Astringents**, such as bismuth subnitrate, limewater, or alum, also may prevent further absorption by constricting intestinal capillaries.

Stimulation of Elimination

Physical and chemical evacuants, frequently used to remove unabsorbed poisons from the digestive and excretory tracts, include the stomach pump, emetics, purgatives, and diuretics. Saline purgatives are discouraged except for use in animals with the strength to withstand their rigorous effects.

Treatment of Symptoms

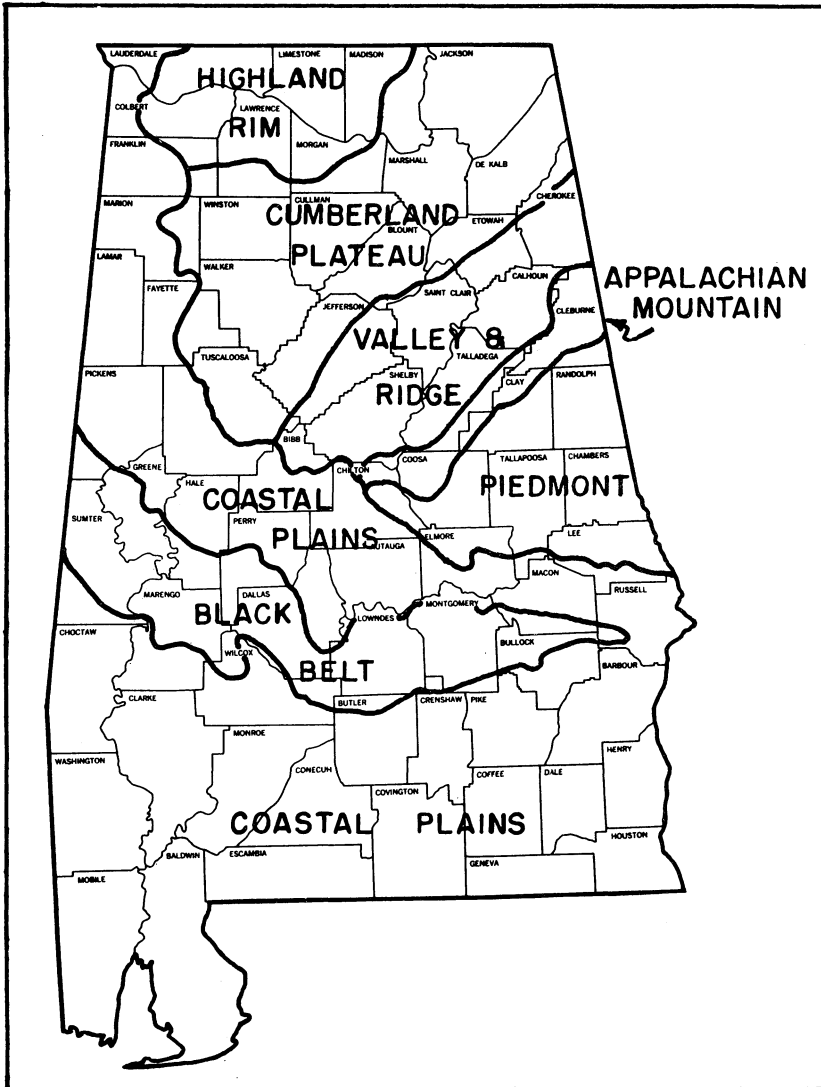
Cramps and convulsions are treated with sedatives and depressant drugs, but symptoms of paralysis and depression are treated with stimulants. Both classes of medication include dangerous drugs; they are often related chemically to poisons that cause similar effects (stimulation or depression) in animals. Their use, therefore, represents counteracting one poison with another, and overdose often may do more harm than good. Raw linseed oil or cottonseed oil may be used to relieve gastrointestinal irritation, and mineral oil administered through a stomach tube speeds evacuation as well.

CONTENT AND USE OF THIS BULLETIN

Under the species discussed herein are included various types of information. This information should aid identification, as well as facilitate treatment if such is possible. The content and potential use of this information is explained below.

Description

The plant descriptions presented are brief and general. Some botanical knowledge on the part of the user is assumed. A glossary is provided and may be consulted for definitions. Illustrations may help with identifications, and these are included for most species placed in Group 1. Tentative or questionable identifications can be checked by sending a fresh specimen in a



MAP 1. Counties and physiographic regions of Alabama.

plastic bag or pressed and dried between newspaper for 2-3 days to:

The Herbarium
Department of Botany and Microbiology
Auburn University
Auburn, Alabama 36830

Positive identifications usually result if an adequate specimen with flowers or fruits or an entire twig with leaves is sent.

Distribution and Habitat

Plant species often occur in characteristic habitats and only in particular regions of the State. Other species seem to lack such restricted distribution. Alabama ranges are described and county dot maps are provided for the more dangerous plants when such data are definitive for the species, maps 2-19. Range maps were omitted for plants found commonly throughout Alabama. The physiographic and topographic features of Alabama are indicated by Map 1, which also lists county names.

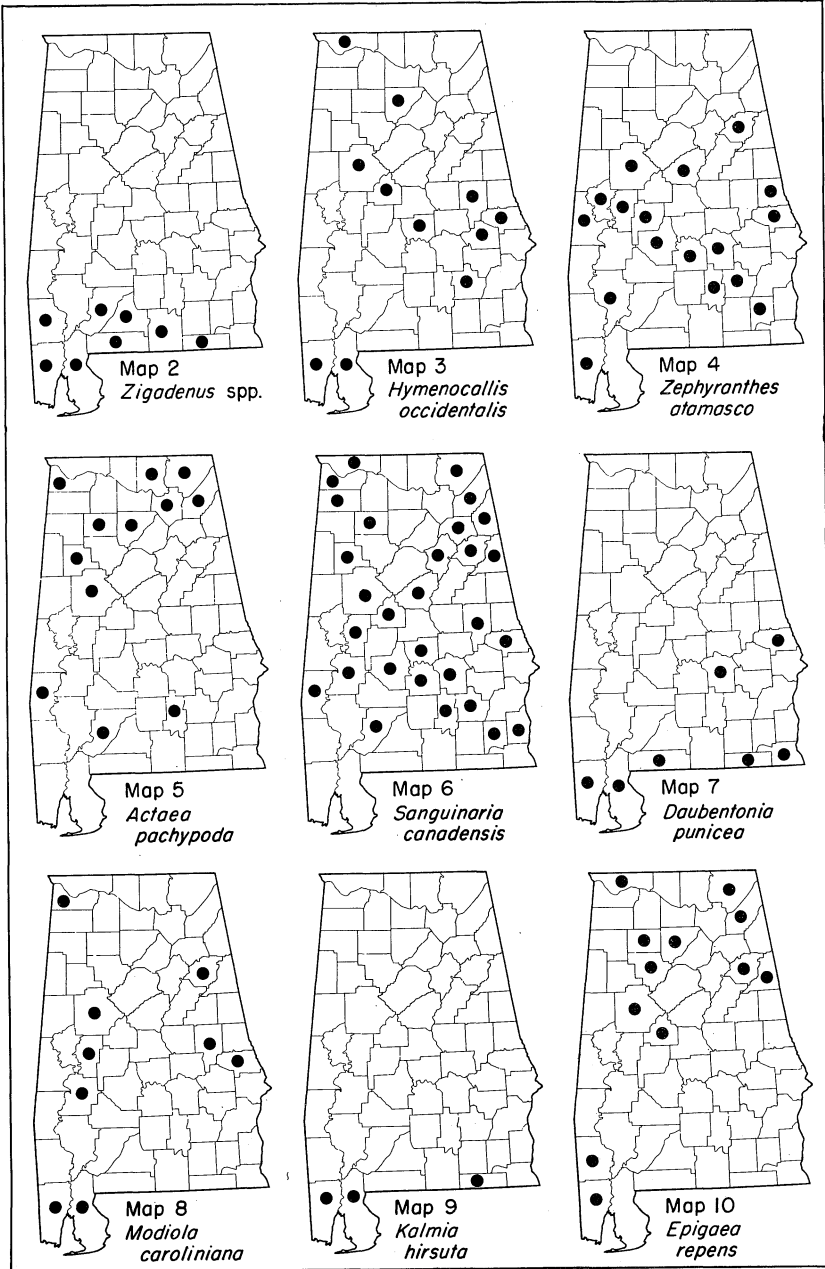
Group Number

Due to the many factors affecting the severity of poisoning by certain plants, ranking them according to the potential hazard they represent is largely subjective. A species that is avoided in a pasture where animals are kept all year may be greedily eaten by animals added to the herd and cause fatal poisoning. All the plants included here could cause losses to the producer, but it seemed advisable to distinguish the most serious ones from those that are less troublesome. The result was the three groups discussed below:

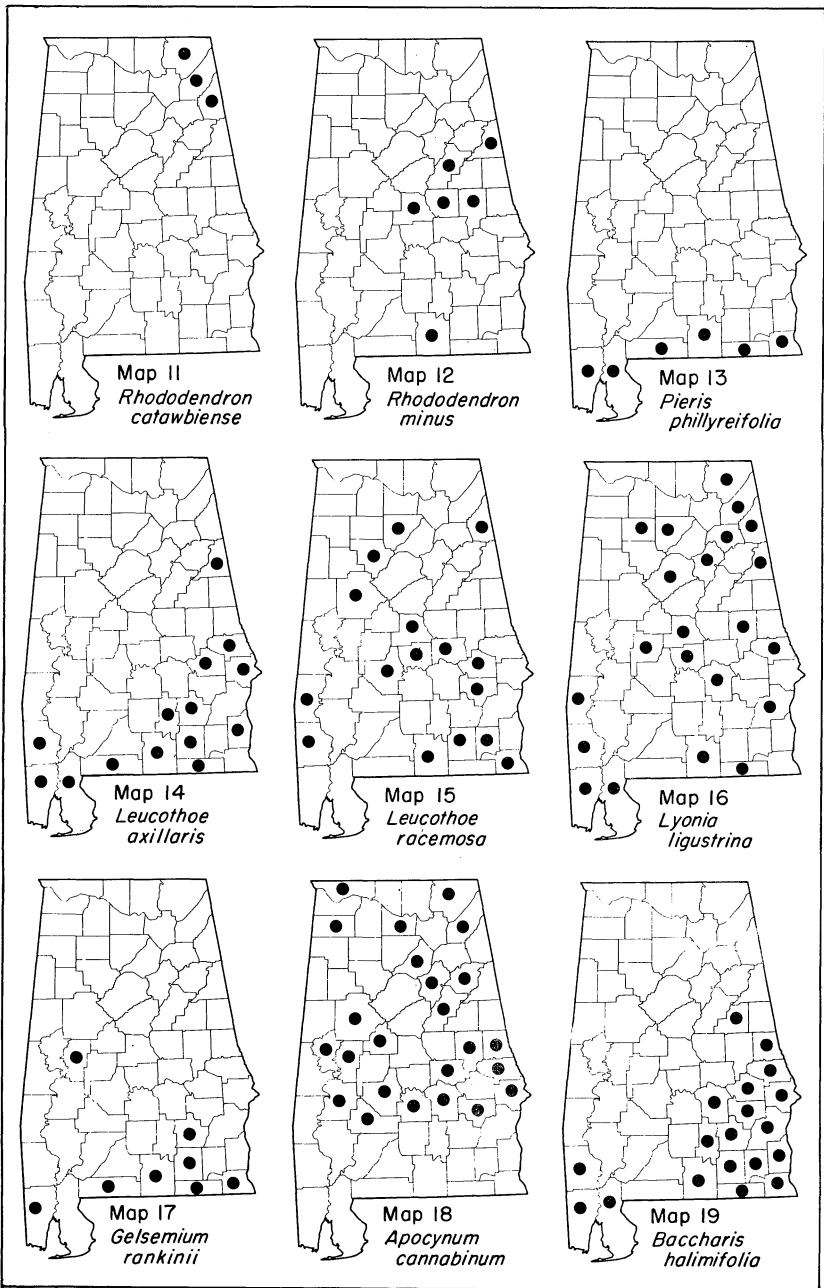
Group 1. Plants that are most likely to cause serious poisoning and death, whether due to the specific toxins, abundance of plants, their palatability, or distribution throughout the State.

Group 2. Plants that may cause serious poisoning or death but are seldom eaten by livestock because of distastefulness or because of scattered or restricted distribution in the State.

Group 3. Plants that cause only minor disorders or irritation or represent insignificant causes of poisoning because they usually are not available to livestock. Many of the plants in this category are simply listed in Appendix 1 and are not otherwise treated in this bulletin.



MAPS 2-10 Alabama distribution of nine poisonous species by counties.



MAPS 11-19. Alabama distribution of nine poisonous species by counties.

Poisonous Principle

The poisonous substance, when known, is listed for each species. The major classes of toxic principles were discussed in an earlier section. Successful treatment often depends on type of poison; thus, correct identification of the plant species is of primary importance.

Toxic Plant Parts

Although all parts of many plants are poisonous, some parts are more so than others. Also, certain plant parts may be safely eaten, whereas others are fatal. Ill-advised addition of the screenings to harvested grain may toxify the entire harvest. Plants whose flowers and fruits and not the vegetative parts are hazardous may be controlled by clipping, or removing the livestock before reproductive stages develop.

Periodicity

Many species have serious poisoning potential only during certain seasons. Some evergreens are dangerous because of their availability when other forage is scarce, and other poisonous plants form luxuriant growth earlier in the spring than desirable forage plants. Drought resistance may cause certain toxic plants to appear attractive and thus to be eaten when good pasture is in short supply.

Animals Affected

Many poisonous species will affect any animal that eats them, including man. Others seem to be more dangerous for certain kinds of livestock because of their eating habits, digestive tracts, and other characteristics. Physiological differences between species also account for various tolerances to poisonous plants; deer can live on a steady diet of species that in small quantity would kill horses and cattle. Where such species differences are known, they are indicated for the plants concerned.

Specific Symptoms

When a particular toxic substance produces one or more unique reactions in a poisoned animal, these are noted. The general symptoms caused by each major class of compounds are not repeated in the text, however, and the reader should refer back to the appropriate section above for this information.

Recommended Treatments

Generally, about all the producer can hope to do when poisoned animals are found is to administer first aid until a veterinarian can examine them. Suggestions offered here are stop-gap measures intended to serve this purpose. They are included only with specific plants for which some good might result from application of the treatment. Proper diagnosis and treatment are best left to the veterinarian. It bears repeating here that **prevention** is the safest, surest, and by far least expensive remedy for the problem of poisoning by plants.

Related Species and Additional Notes

Closely related taxa with poisoning characteristics similar to one discussed in the text usually are listed following the relevant information. Plants listed in this manner represent less severe problems in Alabama as a whole than species dealt with in detail, but in certain cases they may cause extensive losses. These plants are not to be disregarded by the person attempting to identify species responsible for livestock deaths. Additional comments for certain species usually concern their ethnobotany or some other noteworthy fact about earlier uses of extracted substances.

POISONOUS VASCULAR PLANTS

The order of treatment of plant families used here follows that of Radford, Ahles, & Bell (19). The reader is referred to that text for more complete descriptions and usually additional illustrations of the poisonous taxa. All measurements are indicated in English units, with which the expected users of this bulletin are probably most familiar.¹

Lower Vascular Plants: Division Pteridophyta

Pteridophyta are the ferns and related plants that reproduce by spores borne at tips of stems or on edges or backs of the leaves rather than by seeds. These herbaceous perennials usually grow to less than 4 feet from horizontal underground stems (rhizomes). The above-ground parts usually consist only of leaves, each with a stalk (stipe) and a blade (frond) divided into several leaflets.

¹ Conversion table for common metric and English units:

1 inch = 2.54 centimeters (cm)
1 foot = 0.305 meters (m)
1 millimeter (mm) = 0.0394 inch
1 centimeter (cm) = 0.394 inch
1 meter (m) = 3.281 feet

Pteridaceae

Bracken Family

Pteridium aquilinum (L.) Kuhn. Bracken fern, brake.

Description: Herbaceous perennial, 1-4 feet tall, with stout blackish horizontal rhizomes. Leaf blade triangular in shape with three main divisions, each divided into many segments; erect petioles reddish toward base, yellowish apically; becoming firm and leathery when mature. Reproductive spores lining the margins of the fertile leaf segments. Also spreading by branching of the underground stems. Figure 1.

Distribution and habitat: Abundant throughout the State; most common in open, sandy areas, pastures, sandy or gravelly woods, roadsides, abandoned fields, cleared lands, and burned-over areas.

Group number: 1.

Poisonous principle: Enzyme (thiaminase) and unknown compounds.

Toxic parts: All parts, fresh or dry.

Periodicity: Spring to fall.

Animals affected: Cattle, horses, and sheep (the latter rarely fatally).

Symptoms: Cattle and sheep — elevated fever, difficult breathing, bloody feces and internal bleeding; horses — incoordination, lethargy, muscular twitching, constipation, and convulsions followed by death. The disease is often called "Bloody Mary"; failure of blood to clot may cause bleeding from small external wounds, such as fly bites.

Treatment: 10 cc of a 1 percent solution of protamine sulfate, administered intravenously, plus whole blood.

Other poisonous Pteridophytes, including *Equisetum hyemale* L. (scour-



FIG. 1. *Pteridium aquilinum*.

ingrush), *Dryopteris palustris* Schott (marsh fern), and *Onocela sensibilis* L. (sensitive fern), occur in the State and reportedly produce poisoning of horses similar to that caused by bracken fern.

Higher Vascular Plants: Division Spermatophyta

Seed-bearing plants are members of the Division Spermatophyta. Under this division are included the Classes Gymnospermae (conifers and other gymnosperms) and Angiospermae (flowering plants).

Gymnospermae – *Gymnosperms*

Conifers and other plants producing naked seeds (seeds not enclosed by fruit wall) are gymnosperms. These are trees and shrubs with scale- or needle-like evergreen leaves. Representatives of several different families have been implicated in poisoning cases, including those listed below:

| | |
|--------------------------------|------------------|
| <i>Pinus taeda</i> L. | loblolly pine |
| <i>Juniperus virginiana</i> L. | eastern redcedar |
| <i>Taxus</i> spp. | yews |
| <i>Thuja</i> spp. | arborvitaes |
| <i>Zamia</i> spp. | zamia, coonties |

These gymnosperms are seldom eaten, but two effects have been produced in experimentally fed animals: (1) abortions in cattle, and (2) direct poisoning. Usually livestock are poisoned by eating slash from lumbering operations or shrubby cuttings thrown into pastures. The sharp leaves also may cause mechanical injury to the mouth and digestive tract. The only identified toxin in the group is the alkaloid taxine from *Taxus* plants, which are fairly common as ornamental shrubs in north Alabama. Taxine is a heart depressant that can cause death within 5 minutes after ingestion.

Angiospermae – *Angiosperms*

The angiosperms are divided into two subclasses referred to as the Dicotyledonae and the Monocotyledonae. These plants have their seeds enclosed by the fruits, and their reproductive parts form a flower.

Subclass Monocotyledonae – *Monocots*

The Monocotyledonae typically have elongated parallel-veined leaves, 1 cotyledon (seedleaf), floral parts in 3's or multiples of 3's, and usually herbaceous life form.

Poaceae [or Gramineae]

Grass Family

Herbaceous annuals and perennials with alternate leaves arranged in two ranks. Leaves with flattened linear blades and with split sheaths surrounding the jointed, usually hollow stem. Flowers in spikelets arranged in spikes, racemes, or panicles. Fruit a grain or utricle.

Avena sativa L. Cultivated oats.

Description: Tufted annual with leafy stems 1-3 feet tall. Panicles loose, open. Spikelets 2 (-3) flowered, $\frac{3}{4}$ to 1 inch long. Glumes 9-nerved; lemmas 7-nerved. Grain yellowish.

Distribution and habitat: Widely cultivated and escaped in waste places throughout the State.

Group number: 2.

Poisonous principle: Nitrate, photosensitizing substances, alkaloids from associated fungi, and unknown substance causing "grass tetany."

Toxic parts: All parts, fresh or dry, except for the fungal alkaloids produced by organisms infecting the grain only.

Periodicity: Nitrate and fungal alkaloids – fresh plants under certain conditions or year around in hay made from these plants; photosensitization – fall and winter; grass tetany – lush growth usually in spring.

Animals affected: Nitrate – cattle, hogs, and turkeys; photosensitization – hogs, goats, and sheep, especially noticeable in white-skinned animals or on the white parts of black-and-white or red-and-white animals; grass tetany – cattle, sometimes sheep, rarely horses; fungal alkaloids – horses and cattle.

Other similarly poisonous grasses: by nitrate and other nitrogen oxides – *Sorghum* spp. (sorghum, johnsongrass), *Zea mays* (corn); photosensitization – *Cynodon dactylon* (bermudagrass), *Panicum* spp. (panic grasses), *Sorghum* spp., and ? *Zea mays*; by moldy or smutty hay – various grasses; by grass tetany – many grasses.

Cynodon dactylon (L.) Pers. Bermudagrass.

Description: Rhizomatous perennial, propagating by runners, with spreading shoots to 1 foot tall; rarely setting seed. Inflorescence of 3-6 digitate spikes in a terminal cluster.

Distribution and habitat: Widely cultivated as a valuable forage, lawn, and erosion control grass throughout the State; escaped in fields, roadsides, gardens, and waste places as a weed.

Group number: 3.

Poisonous principle: Photosynthesizing substance; probably alkaloids similar to those in ergot produced by associated epiphytic fungi.

Toxic parts: Mature grass, especially headed plants after the first frosts.

Periodicity: Fall and early winter.

Animals affected: Cattle, especially white-skinned animals.

Specific symptoms: nervousness, muscular twitching in flanks, wildness, posterior paralysis, prostration, and death, probably as a result of ergot-like alkaloids. The disease is known as "bermudagrass poisoning" or "downers."

Other similarly-poisonous grasses: *Festuca arundinacea* Schreb. (fescue, tall fescue); *Lolium temulentum* L. (poison ryegrass, Darnel); *Paspalum* spp. (dallis- and bahiagrass). The grains of these and many other grasses are parasitized by species of *Claviceps*, the sclerotia of which are known as ergot and produce poisoning known as "ergotism."

Sorghum halepense (L.) Pers. Johnsongrass.

Description: Coarse, rhizomatous perennial attaining heights of 6 feet, forming dense stands. Leaves to 1¼ inches wide with pale midribs on underside, sometimes streaked with red or brown and appearing rusty. Panicle open, of silky green spikelets when young, becoming reddish brown at maturity. Figure 2.

Distribution and habitat: Throughout the State, but most common in agricultural areas as a weed in fields, roadsides, and waste places.



FIG. 2. *Sorghum halepense*.

Group number: 1.

Poisonous principle: Cyanogenetic glucoside (dhurrin); nitrate; photosensitizing substance.

Toxic parts: Leaves and stems, especially wilted or second growth plants or in hay.

Periodicity: Summer and fall, particularly during dry weather or after frost, clipping, or drought.

Animals affected: All livestock.

Treatment: Three parts sodium thiosulfate and 1 part sodium nitrite, 20 percent solution, 4 cc per 100 pounds body weight, administered intravenously.

Other similarly poisonous species: *Sorghum vulgare* Pers. (including sorghum, sudangrass, kafircorn, milo, sorgo, and broomcorn); *Sorghum almum* (putative hybrid between johnsongrass and sudangrass); *Glyceria striata* (Lam.) Hitchc. (fowl mannagrass); *Holcus lanatus* L. (velvetgrass); ? *Zea mays* L. (corn).

Liliaceae

Lily Family

Perennial herbs from bulbs, rhizomes, and stolons, with scapose or leafy stems. Leaves alternate or whorled. Flower parts in 3's; stamens 6; ovary of 3 fused carpels, superior. This family includes a large number of poisonous members, including several that show restricted distribution patterns.

Amianthium muscaetoxicum (Walter) Gray. Crow poison, fly poison.

Description: Herbaceous perennial to 3 feet tall from a bulb. Leaves broadly linear, basal. Flowering stem to 4 feet tall with scattered reduced leaves. Inflorescence a raceme of dense white flowers, turning greenish with age. Fruit 3-lobed and 3-horned at the apex, many seeded. Figure 3.



FIG. 3. *Amianthemum muscaetoxicum*.

Distribution and habitat: Open sandy fields, woods, and bogs at scattered localities throughout the State.

Group number: 1.

Poisonous principle: Alkaloid, cumulative in action.

Toxic parts: All parts.

Periodicity: Early spring to late summer and fall, usually eaten only when little other forage is available.

Animals affected: Sheep and cattle.

Additional note: Before synthetic pesticides became available, plants of this species were crushed in milk or broth which then served as a toxic bait for flies and other pests. The common names reflect certain uses in colonial America.

Melanthium spp. Bunchflowers.

Description: Large herbaceous perennial to 6 feet tall from thick erect rhizomes. Leaves mostly basal, linear, parallel-veined. Flowering stem pubescent, bearing a few leaves smaller than the basal and terminating in a large panicle of greenish-yellow flowers. Two species, distinguished on technical grounds, occur in Alabama.

Distribution and habitat: *M. virginicum* L., occasional throughout the State, and *M. hybridum* Walt., scattered in Mountains and Piedmont in moist woodland, meadows, and marshes.

Group number: 2.

Poisonous principle: Unknown (probably alkaloidal).

Toxic parts: Leaves, flowering stems, and seeds.

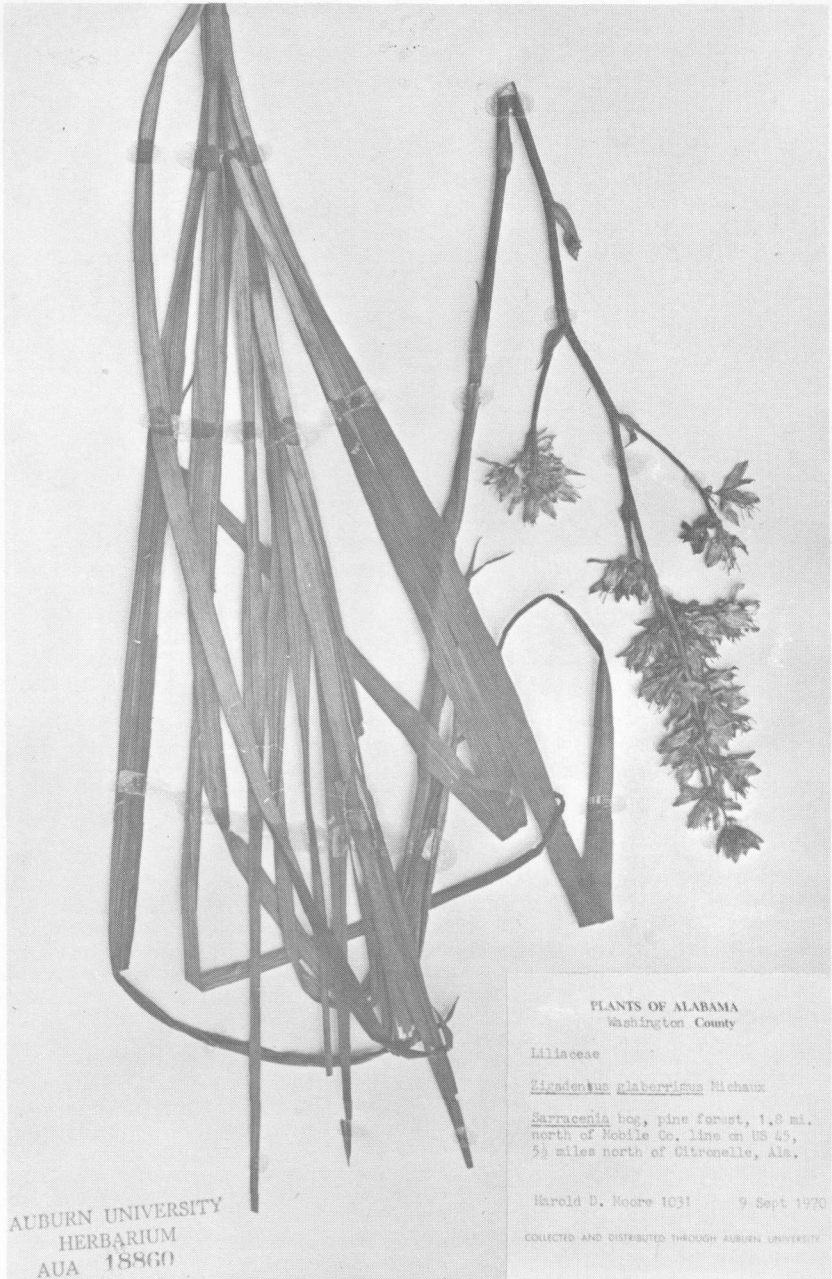


FIG. 4. *Zigadenus glaberrimus*.

Periodicity: Summer.

Animals affected: Sheep, cattle, and horses.

Specific symptoms: Weakened heartbeat and respiration, salivation, muscular weakness, lack of appetite, sweating, and stupor; no deaths have been reported.

Zigadenus spp. Deathcamas.

Description: Perennial subscapose herbs to 5 feet tall, from thick horizontal rootstocks. Stems smooth, leafy. Leaves linear, mostly near base of stem. Flowers white to cream to pink; perianth parts with one or two basal glands on the upper surface. Two species occur in Alabama: *Z. densus* (Desr.) Fernald (black snakeroot, crow poison, deathcamas), distinguished by its taller stems and racemose flowers, and *Z. glaberrimus* Michx. (pink deathcamas, Figure 4), with stems about 3 feet and paniculate flowers.

Distribution (Map 2) and habitat: Open pine woods and boggy areas in the Coastal Plains.

Group number: 1.

Poisonous principle: Alkaloids (zygadenine, zygacine, and others).

Toxic parts: Leaves, stems, flowers, and seeds, either fresh or dried.

Periodicity: Early spring and summer.

Animals affected: Sheep, cattle, and horses.

Symptoms: Similar to those caused by *Melanthium*, except animals may become comatose for a few hours to 2 days or more before death.

Treatment: Keep animals quiet and inactive.

Amaryllidaceae

Amaryllis Family

Leafy or leafless perennial herbs from bulbs or corms with fleshy fibrous roots. Leaves linear to lanceolate or filiform, basal or alternate on above-ground stems. Differing from Liliaceae mainly by the inferior ovary. Many species in the Amaryllidaceae are poisonous, including many cultivated around homes, but few native species are abundant enough to cause serious problems.

Hymenocallis occidentalis (LeConte) Kunth. Spider lily.

Description: Glabrous, herbaceous perennial, 12-20 inches tall from a large bulb. Leaves linear, basal, with tubular sheathing bases. Flowers white, with 6 petal-like perianth segments and 6 stamens connected by a thin white webbing above the perianth tube.

Distribution (Map 3) and habitat: Scattered localities in the Coastal Plains and Piedmont, on banks of shallow streams and drainage ditches, and in marshy areas along roads and low areas in pastures.

Group number: 2.

Poisonous principle: Alkaloid.

Toxic parts: All parts.

Periodicity: Spring and early summer.

Animals affected: Cattle.

Zephyranthes atamasco (L.) Herbert. Atamasco lily.

Description: Low herbaceous perennial from a bulb. Bulb onion-like, brown-coated, white-fleshed, with diameter of 1 inch. Leaves several, flat,



FIG. 5. *Zephyranthes atamasco*.

linear, 4-10 inches long, bluish-green. Flowers solitary, showy, white, 3 inches long, erect on slender stalks. Figure 5.

Distribution (Map 4) and habitat: Throughout the Coastal Plains and adjacent Piedmont, in low woods, wet meadows, grassy fields, and rich wooded slopes.

Group number: 2.

Poisonous principle: Alkaloids.

Toxic parts: Bulbs and to lesser extent leaves.

Periodicity: Early spring and summer.

Animals affected: Cattle, horses, and poultry.

Specific symptoms: Staggering, collapse, and death in less than 48 hours after eating.

Subclass Dicotyledoneae – Dicots

Woody and herbaceous annuals or perennials with net-veined leaves; 2 seed leaves; floral parts arranged in 4's and 5's; stem vascular bundles or tissue in rings.

Fagaceae

Beech Family

Quercus spp. Oaks.

Description: Monoecious trees or shrubs. Leaves deciduous or evergreen, often lobed or divided; margins toothed or entire; lobes or teeth with or without bristles. Staminate flowers in clustered, drooping catkins; pistillate flowers solitary, involucrate, often 2 or more in cluster. Fruit a nut ("acorn") borne in a scaly cup. Important species in Alabama include: *Q. alba* L.

(white oak), *Q. falcata* Michx. (southern red oak), *Q. incana* Bartr. (bluejack oak), *Q. laevis* Walter (turkey oak), *Q. laurifolia* Michx. (laurel oak), *Q. marilandica* Muenchh. (blackjack oak), *Q. nigra* L. (water oak), *Q. phellos* L. (willow oak), *Q. stellata* Wang. (post oak), and *Q. velutina* Lam. (black oak). Many other species also occur less abundantly than these.

Distribution and habitat: Common throughout the State in a wide variety of habitats.

Group number: 2.

Poisonous principle: Tannin.

Toxic parts: Acorns; buds and young leafy shoots.

Periodicity: Acorns – fall; leaves – early spring.

Animals affected: Cattle, sheep, goats, and horses; rarely hogs by the acorns.

Cannabinaceae

Hemp Family

Cannabis sativa L. Hemp, marijuana, "grass."

Description: Coarse, roughly pubescent annual, 3-6 (-9) feet tall. Leaves opposite on lower stem portions, alternate above, palmate, with 3-7 narrow, coarsely toothed leaflets. Male and female flowers on separate plants, the former mostly at the tips of branches and the latter along the length of a branch.

Distribution and habitat: Throughout the State as an escape from former cultivation for hemp fiber, or illegally planted as a narcotic drug source.

Group number: 2.

Poisonous principle: Resins (tetrahydrocannabinols). Physiologically active alkaloids and glucosides have been reported.

Toxic parts: Mature leaves, stems, flower buds, and seed.

Periodicity: Summer.

Animals affected: Cattle and horses.

Symptoms: Excitation, difficult breathing, muscular trembling, lowered temperature, sweating, salivation, and death within ½ hour after eating.

Santalaceae Sandalwood Family

Pyrularia pubera Michx. Buffalo nut.

Description: Deciduous, dioecious shrub, 5-15 feet tall, probably parasitic on the roots of other deciduous woody species. Leaves alternate, elliptic, 2-6 inches long. Unisexual flowers in spikes, the pistillate spikes ½-1¼ inches long



FIG. 6. *Pyrularia pubera*.

and the staminate to 3 inches. Drupe pear-shaped to ovoid, about 1 inch long, developed from the stalked inferior ovary. Figure 6.

Distribution and habitat: Rich woods in the mountains of northeastern Alabama.

Group number: 2.

Poisonous principle: Unknown.

Toxic parts: Fruit (especially seed) reportedly very poisonous.

Periodicity: Summer and fall.

Animals affected: All livestock and man by ingestion of fruits.

Chenopodiaceae

Goosefoot Family

Chenopodium ambrosioides L. Wormseed, mexicantea, stinkweed.

Description: Erect, coarse annual or perennial herb to 4 feet tall, entirely covered with strongly aromatic glandular resin dots. Leaves alternate, coarsely toothed to nearly entire. Flowers small, numerous, greenish, without petals, usually in leafy-bracted inflorescences.

Distribution and habitat: Common weed of fields, pastures, barnyards, and waste places throughout the State.

Group number: 2.

Poisonous principle: Terpene (ascaridol) in the oil of chenopodium.

Toxic parts: Seeds, and perhaps the leaves.

Periodicity: Summer to frost.

Animals affected: Mainly poultry by eating seeds; other animals avoid the malodorous plant but are susceptible to poisoning.

Specific symptoms: Vomiting, gastroenteritis, muscular weakness, and vertigo.

Recommended treatments: Diuretics and cardiac stimulants; excess of fluids.

Related species: *C. album* L. (common lamb's quarters) as a component of toxic hay has been blamed with nitrate poisoning. Several other representatives of the family concentrate toxic minerals and are responsible for poisoning in other states.

Phytolaccaceae

Pokeweed Family

Phytolacca americana L. Pokeweed, scoke, garget, pigeonberry, inkberry.

Description: Tall perennial herb (up to 10 feet) from a fleshy rootstock. Stalk green to purplish, branching, fleshy, smooth. Leaves light green, lance-shaped. Flowers white to purplish, in drooping axillary peduncled racemes. Fruit a dark purple berry when mature; immature berries bright green. Figure 7.

Distribution and habitat: Common throughout the State in disturbed sites, fence rows, fields, waste places, roadsides, and around old buildings.

Group number: 1.

Poisonous principle: Saponin (phytolaccotoxin) and possibly several more important unknown alkaloids.

Toxic parts: All parts; roots especially toxic but less often eaten.

Periodicity: Spring, summer, and fall.

Animals affected: Cattle, horses, and hogs, the latter mainly by grubbing roots. Man has been poisoned by eating berries and leaves.



FIG. 7. *Phytolacca americana*.

Specific symptoms: Vomiting, spasms, purging, convulsion, and finally death caused by respiratory paralysis.

Recommended treatments: Respiratory stimulants, stomach and nerve sedatives.

Additional comments: The young green shoots are commonly eaten as a boiled vegetable in Alabama and are widely regarded as safe if the cooking water is discarded.

Caryophyllaceae

Pink Family

Annual or perennial herbs with mostly opposite entire leaves. Stems swollen at the nodes.

Agrostemma githago L. Corncockle.

Description: Silky, grayish winter annual, to 3 feet tall. Stems erect, branching above. Leaves opposite, linear, and sessile. Stems and leaves bearing a conspicuous covering of white hairs. Flowers solitary, showy, 5-parted, with pink or purple petals. Figure 8.

Distribution and habitat: Weed throughout the State in grain fields, farm lots, waste places, roadsides, and fields.

Group number: 1.

Poisonous principle: Saponic glucoside (githagenin).

Toxic parts: Seeds; to lesser degree, leaves.

Periodicity: Late spring to fall by seeds; year around by leaves, stems, and roots.

Animals affected: Poultry and cattle, infrequently horses and hogs by seed; other parts poisonous to all livestock but rarely cause fatality.



FIG. 8. *Agrostemma githago*.

Saponaria officinalis L. Bouncingbet, soapwort.

Description: Herbaceous perennial forming colonies from horizontal rhizomes. Stems to 4 feet tall. Leaves opposite, sessile, with 3 nerves. Flowers with 5 white or pinkish showy petals.

Distribution and habitat: Scattered throughout the State in moist ditches, roadsides, railroad beds, waste places, fields, near old home sites, and as a planted ornamental.

Group number: 2.

Poisonous principle: Saponin (probably githagenin).

Toxic parts: All parts, particularly the seeds.

Periodicity: Summer.

Animals affected: All livestock, but distasteful to most and seldom eaten.

Ranunculaceae

Crowfoot or Buttercup Family

Annual or perennial herbs. Leaves mostly alternate, basal, and palmately divided. Stamens and carpels usually numerous; the carpels separate; ovaries superior. Fruit a follicle, achene, or berry.

Actaea pachypoda Ell. Baneberry, white cohosh, snakeberry.

Description: Herbaceous perennial to 3 feet tall from a thick, hard rootstock. Leaves compound, the segments ternately divided. Flowers whitish, in a terminal raceme. Berries white to red, on red pedicels.

Distribution (Map 5), and habitat: Common in the mountains of north-eastern Alabama, scattered in the Piedmont and Coastal Plains, in rich woods.

Group number: 2.

Poisonous principle: Probably an essential oil.

Toxic parts: All parts, especially berries and roots.

Periodicity: Spring to fall.

Animals affected: Cattle.

Symptoms: Gastroenteritis, diarrhea, vomiting, and delirium.

Delphinium spp. Larkspurs, staggerweeds.

Description: Annuals or herbaceous perennials from tuberous, rhizomatous, or clustered-tuberous rootstocks. Leaves alternate, long-petioled, palmately lobed or divided. Flowers bilaterally symmetrical, blue to white or pink, in terminal racemes; sepals 5, the upper one spurred. Carpels 1-5, usually separate, maturing into follicles. *Delphinium ajacis* L. (rocket larkspur), *D. carolinianum* Walter (azure larkspur), *D. exaltatum* Ait. (tall larkspur), and *D. tricorne* Michx. (dwarf larkspur) are the most common species in Alabama.

Distribution and habitat: Scattered localities throughout the State in old fields, sand hills, roadsides, dry woods, and cultivated around homes and in flower gardens.

Group number: 2.

Poisonous principle: Alkaloids (delphinine, ajacine, and others).

Toxic parts: All parts, especially leaves of young plants; seeds.

Periodicity: Spring to fall.

Animals affected: Cattle.

Ranunculus spp. Buttercups, crowfoot.

Description: Low annual or perennial herbs from fibrous roots, thickened rootstock, or bulb, with basal leaves in a rosette. Stem leaves alternate, simple, lobed, or divided. Flowers usually axillary, solitary; sepals 5, green; petals 5 (rarely absent), glossy yellow; stamens and carpels numerous. Fruit an aggregate of achenes. Figure 9. Common species in Alabama in-



FIG. 9. *Ranunculus* sp.

clude in order of abundance: *R. pusillus* Poiret, *R. abortivus* L., *R. recurvatus* Poiret, *R. hispidus* Michx., *R. sardous* Crantz, *R. muricatus* L., and several others.

Distribution and habitat: Throughout the State, usually moist woods, meadows, fields, and pastures, as well as roadsides and drier sites.

Group number: 2.

Poisonous principle: Irritant oil (protoanemonin), higher alcohol (anemonal).

Toxic parts: Leaves and stems.

Periodicity: Spring, summer, and fall.

Animals affected: All classes of livestock, especially cattle.

Symptoms: Salivation, diarrhea, signs of abdominal pain, depression or excitement, slow pulse, finally convulsions and death.

Treatments: Purgatives, demulcents, and heart stimulants.

Berberidaceae

Barberry Family

Podophyllum peltatum L. Mayapple.

Description: One or 2-leafed herbaceous perennial to 18 inches tall from a white horizontal fleshy rootstock. Leaves large, umbrella-shaped with irregular lobes, 2 per flowering plant. Flower solitary, white, nodding in the axil of the 2 leaves.

Distribution and habitat: Throughout the State in open woods, rich woods, low meadows, pastures, and roadsides.

Group number: 2.

Poisonous principle: Complex resin (podophyllin).

Toxic parts: Roots, shoots, and green fruit.

Periodicity: Spring and summer.

Animals affected: Cattle, hogs, and sheep.

Calycanthaceae

Strawberry-shrub Family

Calycanthus floridus L. Sweetshrub, spicebush, allspice.

Description: Shrub to 10 feet tall. Leaves opposite, glabrous or pubescent, simple, lance-ovate, with margins entire. Flowers axillary; petals numerous, brownish to maroon. Seeds enclosed in a fibrous husk.

Distribution and habitat: Locally abundant throughout the State in moist rich woods, hillsides, and streambanks, occasionally cultivated.

Group number: 2.

Poisonous principle: Alkaloid (calycanthine).

Toxic parts: Seeds.

Periodicity: Fall.

Animals affected: Cattle.

Papaveraceae

Poppy Family

Annual or perennial, pubescent or glabrous herbs, usually with milky or colored sap. Stems solitary or branching at the base. Leaves simple or pinnately or palmately divided. Flowers perfect and regular; petals falling soon after blooming. Fruit a capsule.

Argemone albiflora Hornemann. Prickly poppy.

Description: Coarse annual or occasionally perennial herbs, 1-4 feet tall, with spreading prickly branches and white or clear sap. Leaves alternate,

whitish, prickly, with ear-like basal lobes. Flowers solitary, showy, with 4-6 white petals. Fruit a capsule. The related *A. mexicana* L. has yellow petals and yellow sap.

Distribution and habitat: Scattered in the Coastal Plains of Alabama (usually as an escape from cultivation) along roadsides, old fields, barnyards, near old buildings, fence rows, and open waste places.

Group number: 3.

Poisonous principle: Alkaloids (berberine and protopine throughout plant; sanguinarine and others in seeds).

Toxic parts: Mainly seeds; other parts highly distasteful to livestock.

Periodicity: Summer and fall.

Animals affected: Poultry.

Specific symptoms: Edematous swelling of comb and wattles, depression, ataxia, enteritis, bloody feces, and finally death.

Sanguinaria canadensis L. Bloodroot, red puccoon.

Description: Perennial herb, 4-16 inches tall from thick horizontal rhizomes with bright orange-red juice. Leaves solitary, basal, the blades rounded, with 3-9 wavy-margined lobes. Flower solitary; petals white, falling very early. Fruit an elongate capsule.

Distribution (Map 6) and habitat: Throughout the State in rich mixed woods and wooded slopes; scattered in the Coastal Plains, more common northward.

Group number: 2.

Poisonous principle: Alkaloids (sanguinarine and others).

Toxic parts: Rhizome.

Periodicity: Early spring.

Animals affected: Hogs and cattle.

Brassicaceae [or Cruciferae]

Mustard Family

Aromatic perennial, biennial, or annual herbs. Leaves alternate or basal, simple, entire to dissected. Inflorescence a raceme, or flowers solitary on a leafless stem. Fruit capsular, known as a silique or silicle. Common representatives include: *Barbarea vulgaris* R. Brown (yellow rocket, wintercress, others); *Brassica* spp. (mustards); *Descurainia pinnata* (Walt.) Britton (tansymustard); *Lepidium* spp. (pepperweeds); *Raphanus raphanistrum* L. (wild radish); *Thlaspi arvense* L. (field pennycress); and others, all with similar toxic properties.

Distribution and habitat: Common throughout the State in fields, pastures, roadsides, lawns, and certain species in cultivation.

Group number (as a family): 2.

Poisonous principle: Mustard oil (various isothiocyanates); goitrogenic substances.

Toxic parts: All parts; seeds especially.

Periodicity: Spring to fall; also year around in hay.

Animals affected: Cattle, horses, and pigs.

Specific symptoms: Severe gastroenteritis, salivation, diarrhea, paralysis of lungs and heart; abortions and goiters also have been caused by representatives of this family.

Saxifragaceae

Saxifrage Family

Hydrangea spp. Wild hydrangea, sevenbark.

Description: Shrubs, usually 3-6 feet tall, with brown, exfoliating bark on old stems. Leaves opposite and petioled; the blades glabrous or pubescent beneath. Flowers white, in flat-topped or rounded, cone-shaped inflorescences. The common species in Alabama are: *Hydrangea quercifolia* Bartr. (oakleaf hydrangea) and *H. arborescens* L. (wild hydrangea).

Distribution and habitat: Both species common throughout the State in rocky woods, bluffs, mountain slopes, stream banks, and moist woods; *H. arborescens* less frequent than *H. quercifolia*, but both widely cultivated as ornamentals.

Group number: 2.

Poisonous principle: Cyanogenetic glucoside (hydrangin); also reportedly a saponin.

Toxic parts: Leaves and buds.

Periodicity: Spring, infrequently summer and fall.

Animals affected: Cattle and horses.

Rosaceae

Rose Family

Poisonous members of this family cause cyanide poisoning. Species of *Prunus* are considered representative of the toxic properties within the family and are relatively abundant in Alabama.

Prunus spp. Cherries, plums, peaches, almond, nectarine.

Trees or shrubs, a few species sprouting from rhizomes or roots. Leaves simple, alternate, petioled, deciduous except for *P. caroliniana* (Carolina

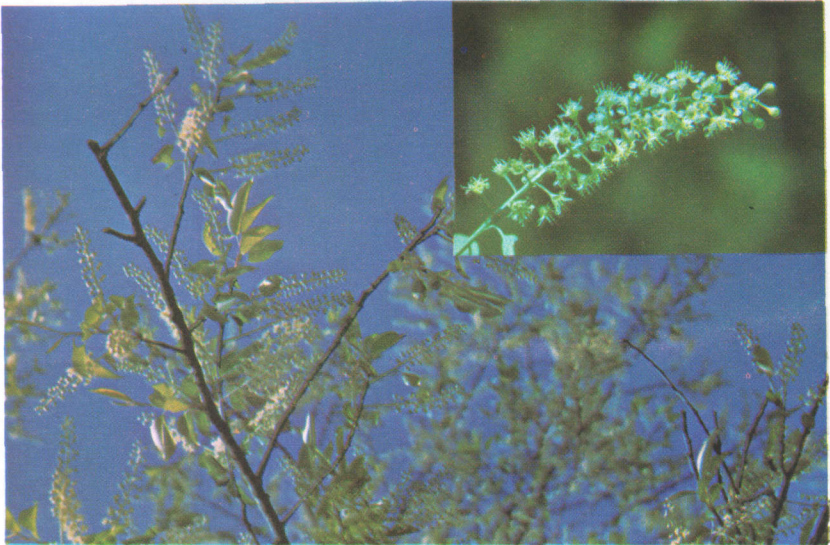


FIG. 10. *Prunus serotina*.

laurelcherry). Inflorescence a raceme, corymb, or fascicle, appearing in the spring. Two common native species are described below.

Prunus caroliniana Aiton. Carolina laurelcherry, cherrylaurel.

Description: Small to fairly large tree. Leaves evergreen, glabrous, elliptic, 2-3 inches long, $\frac{1}{2}$ to 1 inch wide, with entire or remotely toothed margins; apex acute to slightly pointed; base cuneate to nearly rounded. Flowers in axillary racemes in leaf axils from preceding year. Fruit dull black, slightly fleshy, to $\frac{1}{2}$ inch long, persisting often to the next flowering season.

Prunus serotina Ehrh. Wild black cherry, wild cherry.

Description: Tree, 15-60 feet tall, with dark, smooth bark. Bark and twigs bitter to taste. Leaves deciduous, 1-5 inches long; the margin finely toothed with blunt teeth; petiole with glands near or on the base of the blade; under surface lighter in color than the upper. Flowers small, white, in racemes terminating the leafy branches of the current year. Fruit a dark purple or black 1-seeded drupe. Figure 10.

Distribution and habitat: Throughout the State in woods, fence rows, abandoned fields, and forest margins; the former species mainly in the Coastal Plains but also escaped from cultivation northward.

Group number: 1.

Poisonous principle: Cyanogenetic glucoside (amygdalin).

Toxic parts: Leaves, twigs — including young bark — and seeds.

Periodicity: Spring through fall, especially plants wilted from cutting, frost, drought.

Animals affected: Cattle and horses.

Related and similarly poisonous plants: *Malus pumila* Miller (common apple); *Prunus persica* (L.) Batsch (peach); *Prunus virginiana* L. (chokecherry); and probably *Prunus angustifolia* Marshall (wild plum, Figure 11) and *P. umbellata* Ell. (hog plum).

Fabaceae [or Leguminosae]

Pea Family

Trees, shrubs, or herbs with alternate leaves. Leaves usually once or twice pinnately compound, less commonly palmately compound or simple. Flowers usually in axillary or terminal racemes, panicles, spikes, or heads. Stamens 10. Pistil 1; ovary superior, maturing into a legume. This family includes perhaps more poisonous species than any other, and a large number have poisonous legumes.

Crotalaria spp. Rattlebox, rattleweed, crotalaria.

Description: Annual or perennial herbs with simple or compound



FIG. 11. *Prunus angustifolia*.



FIG. 12. *Crotalaria spectabilis*.

leaves; stipules usually conspicuous and fused to the stem. Flowers yellow, in terminal racemes; bracts small to leafy. Legumes inflated, subcylindric, few to many seeded. Seed greenish brown to black, usually kidney-shaped, lustrous. Both native and introduced toxic species occur in Alabama and these include: *C. angulata* L., *C. mucronata* Desv. (rattlebox); *C. purshii* DC.; *C. sagittalis* L.; *C. spectabilis* Roth (showy crotalaria, Figure 12), and others less common than these.

Distribution and habitat: Coastal Plains and Piedmont in open woods, old fields, roadsides, cultivated fields, waste places, and escaped from cultivation into various open habitats.

Group number: 1.

Poisonous principle: Alkaloid (monocrotaline).

Toxic parts: All parts, especially seeds, fresh or in hay.

Periodicity: Spring through fall as green plants; the year around as a dried contaminant of hay or as seeds in livestock feed.

Animals affected: All livestock; particularly troublesome in Alabama as a contaminant of crushed soybean scratch feed for poultry.

Specific symptoms: Acute poisoning results in death a few hours to several days after ingestion of a toxic amount of crotalaria, depending on the species of both plant and animal; chronic poisoning due to the cumulative effect of crotalaria ingestion in small amounts over an extended period is probably more common and may require several months to show symptoms that eventually culminate in death. Liver disorders lead the list of irreversible symptoms in all classes of livestock.

Daubentonia punicea (Cav.) DC. Purple rattlebox, purple sesbania.

Description: Shrub or small tree to 10 feet tall. Trunk slender, stiff, usually crooked, with dark gray to black bark. Leaves 4-8 inches long, even-pinnate with 6-20 pairs of leaflets, deciduous. Leaflets with a minute pointed tip and entire margin, dark green above. Flowers red to orange in conspicuous drooping axillary racemes near the ends of the branches. Legumes about 3 inches long, 4-winged with cross partitions between the seeds. Figure 13.



FIG. 13. *Daubentonia punicea*.

Distribution (Map 7) and habitat: Scattered in the Coastal Plains, mainly in southern Alabama, cultivated around houses and escaped along fence rows, ditch banks, flood plains, and waste places.

Group number: 3.

Poisonous principle: Saponin.

Toxic parts: Seeds.

Periodicity: Summer and fall.

Animals affected: Poultry, sheep, goats, cattle, and children.

Related poisonous plants with saponin-containing seeds: *Erythrina herbacea* L. (eastern coralbean, cardinalspear); *Glottidium vesicarium* (Jacq.) Harper (bladderpod, bagpod, coffeeweed, coffeebean); *Gymnocladus dioica* (L.) K. Koch (Kentucky coffeetree); and *Sesbania exaltata* (Raf.) A. W. Hill (hemp sesbania).

Lupinus spp. Lupines, bluebonnets.

Description: Short-stemmed annual or perennial herbs. Leaves simple or palmately divided; leaflets 5-17, linear to obovate. Flowers in erect



FIG. 14. *Lupinus villosus*.

terminal racemes; petals white, blue, red, or yellow. Legume several-seeded, flattened. The more common species in Alabama are: *L. villosus* Willd. (lady lupine, Figure 14), *L. perennis* L. (perennial lupine), and *L. diffusus* Nutt.

Distribution and habitat: Scattered localities in the Coastal Plains and adjacent Piedmont, more common near the coast, in open sandy soils, pine land, scrub oak woodland, and roadsides.

Group number: 2.

Poisonous principle: Various alkaloids (lupinine, piperidine, and about 20 others).

Toxic parts: Leaves and seeds.

Periodicity: Spring to fall.

Animals affected: Sheep, goats, cattle, pigs, and horses.

Melilotus spp. Sweetclovers.

Description: Annual or biennial herbs. Leaves pinnate, with 3 leaflets. Flowers white or yellow in slender axillary spike-like racemes. Flowers numerous, falling soon after blooming. Legume ovoid to globose, longer than the sepals, inflated, 1-4 seeded. The common species are: *M. alba* Desr. (white sweetclover) and *M. officinalis* (L.) Lam. (yellow sweetclover).

Distribution and habitat: Common throughout the State in waste places, roadsides, fence rows, old fields, and cultivated as a forage crop and soil builder; mostly restricted to alkaline soils.

Group number: 3.

Poisonous principle: Anticoagulant (dicoumarin) formed under certain conditions from coumarin, a harmless substance normally.

Toxic parts: Aerial parts, particularly in hay or ensilage.

Periodicity: Summer and fall, especially following dry weather or frost.

Animals affected: Cattle, rarely sheep and horses.

Specific symptoms: Subcutaneous swellings due to internal hemorrhages.

Robinia pseudo-acacia L. Black locust.

Description: Shrub or tree to 40 feet tall with rough, deeply furrowed thick bark, and with paired stipular spines or thorns at the base of each leaf. Leaves odd-pinnate, to 12 inches long; leaflets 7-25, entire, oval or elliptical. Flowers white in drooping racemes. Legume flat, smooth, to 4 inches long. Figure 15.

Distribution and habitat: Throughout the State in dry woods, old fields, roadsides, and fence rows.

Group number: 2.

Poisonous principle: Phytotoxin ("robinin"); glycoside ("robitin").

Toxic parts: Leaves, shoots, bark, and seeds.

Periodicity: All seasons, but less of a problem in winter.

Animals affected: Horses, cattle, sheep, poultry, and man by the inner bark and seeds.

Specific symptoms: Diarrhea, nausea, muscular weakness, lowered temperature, irregular and weak pulse, and gastrointestinal disturbances; fatal cases are rare.



FIG. 15. *Robinia pseudo-acacia*.

Meliaceae**Mahogany Family**

Melia azedarach L. Chinaberry, umbrella tree, chinaball tree.

Description: Small to fairly large deciduous tree 20-40 feet tall with thick furrowed bark and spreading branches. Leaves alternate, twice pinnate, 1-3 feet long; leaflets 1-2 inches long with toothed margins. Flowers in large terminal panicles, pinkish to lavender. Fruit a small drupe with a diameter of about $\frac{1}{2}$ inch, cream-colored or light yellow, persisting throughout the winter. Seeds dark brown or black and hairy. Figure 16.



FIG. 16. *Melia azedarach*.

Distribution and habitat: Throughout the State, except northern and northeastern border counties, cultivated as a shade and ornamental tree in yards, pastures, around buildings, and escaped into open woods, thickets, and edges of fields.

Group number: 1.

Poisonous principle: Resinoid.

Toxic parts: Fruits especially; leaves, flowers, and bark to lesser extent. Periodicity: Fall and winter (fruits); spring and summer (other parts).

Animals affected: Pigs and sheep; other classes of livestock less susceptible; children have been fatally poisoned by the "berries."

Specific symptoms: Nausea, vomiting, constipation, or scouring, and other signs of severe intestinal irritation; respiratory paralysis, weakened heart action, excitement or depression, and often death within 24 hours.

Euphorbiaceae**Spurge Family**

Trees, shrubs, or herbs, often with milky sap. Leaves simple or compound, alternate, opposite, or occasionally whorled. Flowers unisexual, the male

and female flowers usually on the same plant. Ovary superior. Fruit usually a capsule splitting into 3 single-seeded segments. This family includes a large number of poisonous species.

Aleurites fordii Hemsl. Tungoil tree, tung tree, tung nut.

Description: Small deciduous tree (up to 25 feet) with stout twigs, smooth bark, milky sap; branches often in whorls. Leaves alternate, opposite, or whorled; clustered at the end of branches; long, broadly heart-shaped with palmate veins; and with 2 small reddish-brown petiolar glands at the base of the blade. Flowers pink or white, striped with red or brown, appearing before the leaves in spring. Fruits globular, stalked, green, turning brown at maturity, containing 2-7 white-fleshed, rough-coated seeds.

Distribution and habitat: Scattered in the Alabama Coastal Plains as planted orchards, escaped along fences and roadsides, and occasionally planted around homes.

Group number: 3.

Poisonous principle: Saponin or phytotoxin; two unknown fat-soluble, nitrogen-free compounds.

Toxic parts: Leaves, seeds, and untreated tung meal.

Periodicity: Summer and fall.

Animals affected: Cattle, horses, poultry, and humans.

Euphorbia spp. Spurges.

Description: Annuals or herbaceous perennials with milky acrid sap. Leaves simple, alternate or opposite, entire or toothed. Flowers much reduced, unisexual, clustered in small cup-like structures resembling typical flowers. Fruit a 3-lobed, 3-seeded capsule borne on a stalk extending from the cup-like involucre or cyathium. Many species, both native and introduced, occur in Alabama, including (in order of abundance): *E. corollata* L. (flowering spurge); *E. marginata* Pursh (snow-on-the-mountain); *E. maculata* L. (spotted spurge, eyebane); *E. cyparissias* L. (cypress spurge, graveyardweed); *E. pulcherrima* Willd. (poinsettia); and others.

Distribution and habitat: Throughout the State in old fields, open woods, roadsides, waste places, or cultivated or escaped around dwellings.

Group number: 3.

Poisonous principle: Resinoid (euphorbin) and others unknown in the milky sap.

Toxic parts: All parts, green or dry.

Periodicity: Spring to fall.

Animals affected: Cattle, sheep, horses, and humans.

Specific symptoms: Severe gastrointestinal irritation with vomiting and diarrhea, contact dermatitis with loss of hair, emaciation, collapse, and death.

Ricinus communis L. Castorbean, castoroil plant, palma christi.

Description: Stout, robust, annual shrub-like plant to 12 feet tall, with reddish to purplish stems. Leaves large, alternate, with blades deeply and palmately 6-11 lobed, long petioled, umbrella-like with the petiole attached near the center of the blade. Flowers unisexual, small, in panicles, the pistillate flowers above the staminate. Fruit a 3-lobed capsule with a soft spiny exterior. Seeds 1 per lobe of capsule, smooth, resembling large brown female ticks. Figure 17.



FIG. 17. *Ricinus communis*.



FIG. 18. *Aesculus pavia*.

Distribution and habitat: Scattered in the Coastal Plains as an ornamental or escaped along roadsides, ditches, fields, and waste places.

Group number: 1.

Poisonous principle: Phytotoxin (ricin).

Toxic parts: All parts, especially seeds and leaves.

Periodicity: Summer and fall; rarely winter and spring (by seeds).

Animals affected: All classes of livestock, and man.

Hippocastanaceae

Horsechestnut Family

Aesculus spp. Buckeyes.

Description: Deciduous trees or shrubs with large, opposite, palmately compound leaves; leaflets 5-7, with irregularly toothed margins. Flowers red, pinkish, yellow-green, or white in terminal panicles, usually appearing with the leaves. Fruit a smooth to spiny, leathery, tri-lobed capsule. Seeds dark brown and glossy with a pale scar. Common species in Alabama include: *A. pavia* L. (red buckeye, Figure 18); *A. parviflora* Walter (bottlebrush buckeye, Figure 19); and *A. sylvatica* Bartram (Georgia, piedmont, or painted buckeye, Figure 20).

Distribution and habitat: Throughout the State in moist deciduous forests, rich low woods, swamp margins, streambanks, edges of woods, and roadsides.

Group number: 1.

Poisonous principle: Glycosides (aesculin and others); also perhaps alkaloids and saponins.

Toxic parts: Sprouts, young leaves, and mature seeds.

Periodicity: Spring and fall.

Animals affected: All classes of livestock, and humans.

FIG. 19. *Aesculus parviflora*.FIG. 20. *Aesculus* sp.**Malvaceae****Mallow Family**

Herbs or shrubs. Leaves alternate, simple, unlobed or lobed, usually palmately veined. Plants covered with stellate pubescence. Flowers axillary, racemose or paniculate; sepals 5; petals 5, united at base, often very showy. Stamens usually numerous, forming a tube around the ovary and style. Pistil 1; ovary superior, 2 to many locular, producing 1 to many seeds. Fruit a capsule, or ovary splitting into 1-seeded sections.

Gossypium hirsutum L. Upland cotton.

Description: Herbs, shrubs, or small trees with glabrous or pubescent twigs. Leaf blades palmately lobed or rarely entire. Flower subtended by 3 large bracts. Sepals 5, united into a cup-like calyx. Petals 5, usually cream-colored to white, with purplish bases becoming pink with age. Fruit a 3-5 celled capsule (boll). This species includes most cotton varieties presently cultivated in the United States. Sea Island cotton (*G. barbadense* L.) is also cultivated, but sparingly.

Distribution and habitat: Cultivated throughout the State.

Group number: 3.

Poisonous principle: Polyphenol (gossypol).

Toxic parts: Seeds and untreated cottonseed meal; possibly leaves also.

Periodicity: Throughout the year in freshly processed seed meal.

Animals affected: Swine; to lesser degree cattle and sheep. Cotton leaves are the probable cause of occasional abortions in cattle.

Modiola caroliniana (L.) G. Don. Bristly mallow, groundivy.

Description: Erect spreading or prostrate, sub-shrubby perennial, rooting at the nodes; stems stellate pubescent. Leaves 1-2 inches long, ½-1 inch wide, palmately 6-7 lobed, toothed, remotely pubescent. Flowers solitary, axillary; petals bright orange-red. Fruit a ring of 15-25 carpels, separating at maturity, each 1-seeded. Seeds dark brown and smooth.

Distribution (Map 8) and habitat: Scattered throughout the Coastal Plains and Piedmont as a weed in lawns, gardens, pastures, roadsides, and waste places.

Group number: 3.

Poisonous principle: Unknown.

Toxic parts: Stems and leaves.

Periodicity: Summer.

Animals affected: Cattle, sheep, and goats.

Specific symptoms: Nervous disorders, incoordination, staggers, posterior paralysis, prostration, and death.

Apiaceae [or Umbelliferae]

Parsley Family

Herbaceous, often aromatic, annuals, biennials, or perennials. Leaves alternate or basal, simple, often so divided as to appear compound. Flowers small, arranged in flat-topped, simple or compound umbels, or rarely heads. Ovary inferior, 2 lobed, the lobes separating when mature into single-seeded sections.

Cicuta maculata L. Waterhemlock, spotted waterhemlock, spotted cowbane.

Description: Glabrous, branching perennial herb 3-7 feet tall from fleshy or tuberous fibrous roots. Stems purple striped or mottled, hollow except for partitions at the nodes. Bases of the hollow stem and rootstock with partitions of pithy tissue, visible when cut lengthwise. Leaves alternate,



FIG. 21. *Cicuta maculata*.

2-3 times pinnately compound, toothed; leaf petioles partially sheathing the stem. Flowers small, white, borne in compound flat-topped umbels at the tops of the stem and branches. Fruits small, dry, with prominent, rounded ribs. Figure 21.

Distribution and habitat: Throughout the State in swampy areas and marshes, on streambanks, wet meadows, pastures, and low roadsides. *Cicuta mexicana* C. & R., a closely related species, also occurs at scattered localities in the State.

Group number: 1.

Poisonous principle: Alkaloid and resinoid (cicutoxin).

Toxic parts: All parts, especially roots.

Periodicity: Early spring; occasionally at other times of year.

Animals affected: All classes of livestock, particularly cattle, and humans.

Specific symptoms: Frothing at the mouth, uneasiness, jerking and then stiffening of muscles, dilated pupils, rolling of eyes, violent spasms, slow and shallow breathing, and convulsions usually terminating in death.

Conium maculatum L. Poison hemlock, hemlock.

Description: Rank, glabrous biennial with hollow, spotted, branching stems to 7 feet tall from a thick taproot. Leaves twice pinnate, triangular in outline and laternate on the stem. Basal leaves borne as a rosette from the taproot. Flowers small, white, in flat-topped umbels. Fruits grayish-brown with wavy, somewhat knotted ridges. Root a fleshy unbranched, white taproot. Often confused with *Cicuta maculata* but lacks rootstocks with partitions of pithy tissue and is not as poisonous.

Distribution and habitat: Local throughout the State in various moist habitats.

Group number: 3.

Poisonous principle: Alkaloid (coniine, and several others).

Toxic parts: Stem, leaves, and maturing fruits.

Periodicity: Spring to fall.

Animals affected: Cattle, sheep, horses, hogs, goats, poultry, and humans.

Ericaceae

Heath Family

Trees or shrubs with simple, alternate, whorled or opposite, entire or toothed leaves. Flowers perfect; petals united, usually showy. Fruit a capsule or berry. All poisonous members of this family produce the same toxic principle and nearly identical symptoms.

Kalmia latifolia L. Mountain laurel, mountain ivy, ivybush.

Description: Large shrubs or rarely small trees to 15 feet tall, with pubescent twigs becoming smooth with age. Leaves mostly alternate or in whorls of 3's, elliptical, 2-5 inches long. Flowers showy, rose to white with purple markings, about 1 inch across in terminal corymbs. Fruit a flat-topped globose capsule with 5 sections. Figure 22.

Distribution and habitat: Throughout the State in rocky or rich woods, along streams, and sandy slopes, but more common northward.

Group number: 1.

Poisonous principle: Resinoid (andromedotoxin); glucoside (arbutin).

Toxic parts: Leaves, young twigs, flowers, and nectar.

Periodicity: Winter and spring.



FIG. 22. *Kalmia latifolia*.

Animals affected: Sheep, goats, and cattle; humans have been poisoned by honey made from *Kalmia* nectar, but bitterness usually renders such honey unpalatable.

Specific symptoms: Frothing at the mouth, nausea, attempting to vomit, watering of eyes, mucous nasal discharge, spasms, slow pulse, incoordination, muscular paralysis, and death by respiratory failure.

Related and possibly similarly poisonous species: *K. hirsuta* Walter (wicky, kalmiella, Map 9); *Epigaea repens* L. (trailing arbutus, Map 10); *Rhododendron catawbiense* Michx. (purple laurel rhododendron, rosebay, purpleivy, Map 11); and *R. minus* Michx. (Map 12); *Pieris phillyreifolia* (Hooker) DC. (climbing heath, Map 13); and others described briefly below:

Leucothoe spp. Fetterbush, leucothoe.

Description: Colonial or solitary shrubs with deciduous or evergreen leaves. Leaves alternate, lanceolate, slightly toothed. Flowers in racemes, small, white and urn-shaped in axillary or terminal clusters. Fruit a globular 5-sectioned capsule with a slight depression at one end. Seeds light brown, lustrous, winged or wingless. Two species are commonly recognized in Alabama.

L. axillaris (Lam.) D. Don. Leucothoe, fetterbush.

Description: Shrubs to 5 feet tall with green, slightly arching branches; twigs pubescent becoming smooth with age. Leaves evergreen, sharply or gradually pointed, toothed. Racemes axillary, short, with flowers on all sides. Fruit not lobed.

Distribution (Map 14) and habitat: Rare throughout the Coastal Plains in bogs, along streams, seepages, swamp forests, and moist woods.

L. racemosa (L.) Gray. Fetterbush.

Description: Shrubs 12-18 feet tall, with hairy twigs becoming gray and smooth with age. Leaves deciduous, pubescent along midrib. Racemes terminal, straight, with flowers on one side only. Fruit not lobed. Seeds wingless, lustrous, light brown.

Distribution (Map 15) and habitat: Coastal Plains and Cumberland Plateau in bogs, seepages, ditches, and pond margins.

Lyonia ligustrina (L.) DC. Male blueberry, fetterbush, lyonia.

Description: Shrubs to 10 feet tall, usually from rhizomes. Leaves decid-

uous, pubescent on both sides, alternate, entire or toothed, with short petioles. Flowers in terminal racemes or panicles; corolla white, about $\frac{1}{4}$ inch long, globe-shaped with spreading lobes. Fruit globose or pear-shaped, hairy, not depressed at the apex. *Lyonia lucida* and *L. mariana*, both similar to the above, may also be poisonous.

Distribution (Map 16) and habitat: Infrequent throughout the State in moist fields and woods, bogs, seepages, and pond margins.

Loganiaceae

Logania Family

Gelsemium sempervirens (L.) Aiton f. Yellow jessamine, Carolina jessamine.

Description: Climbing or trailing woody evergreen vine, twining clockwise. Main stem gray in older plants, younger stems much branched, tangled, shiny red-brown, and wiry. Leaves opposite, lance shaped, about 2 inches long. Flowers yellow, fragrant, tubular, about 1 inch long, solitary or 2-3 clustered, axillary, showy, appearing in early spring. Figure 23.



FIG. 23. *Gelsemium sempervirens*.

Distribution and habitat: Throughout the State in thickets, woodlands, fence rows, and edges of woods; infrequent in northeastern Alabama.

Group number: 1.

Poisonous principle: Alkaloids (gelsemine, gelseminine, and gelsemoldine) related to strychnine.

Toxic parts: All parts.

Periodicity: Winter and spring.

Animals affected: All classes of livestock, and occasionally humans from nectar or honey made from it.

Related poisonous species: *G. rankinii* Small, infrequent in the Coastal Plains of Alabama (Map 17).

Apocynaceae

Dogbane Family

Perennial or annual herbs, shrubs, or vines with milky sap. Leaves simple, entire, alternate or opposite. Flower parts in 5's. Ovary consisting of 2 separate carpels, each maturing into a pod-like fruit (follicle).

Apocynum cannabinum L. Dogbane, indian hemp, indian physic.

Description: Erect, branching perennial herbs 1-4 feet tall with milky sap, from creeping underground rootstocks. Leaves opposite, smooth margined, glabrous. Flowers in terminal clusters usually overtopped by leafy branches; petals greenish to milky white, the lobes ascending. Follicles long, narrow, pencil-like, hanging in pairs at maturity.

Distribution (Map 18) and habitat: Scattered throughout the State in open wet or dry woodlands, roadsides, and waste places.

Group number: 2.

Poisonous principle: Resinoid (apocynin); glucosides (apocynein and cymarin).

Toxic parts: Leaves and stems, fresh or dry.

Periodicity: Spring, summer, and fall.

Animals affected: Cattle, horses, and sheep.

Related species: *A. androsaemifolium* L., with nodding, pinkish flowers, infrequently occurs in the upland, northeastern portion of Alabama.

Nerium oleander L. Common oleander.

Description: Ornamental evergreen shrubs or small tree, 5-25 feet tall with stout straight branches. Leaves opposite or whorled, numerous, leathery, 3-10 inches long, with smooth margins. Flowers white, pink, red, or



FIG. 24. *Nerium oleander*.

yellow, in terminal clusters. Follicles long, narrow, cylindrical, in pairs. All parts with a gummy clear sap. Figure 24.

Distribution and habitat: Cultivated throughout the southern half of the State, rarely northward, and occasionally escaped or persisting along roadsides, edges of woods, and around buildings.

Group number: 1.

Poisonous principle: Glycosides (oleandroside and nerioside), similar in action to digitalis.

Toxic parts: All parts, especially leaves, fresh or dry; usually made available to livestock as clippings carelessly discarded. Humans have been poisoned from eating meat (especially weiners) skewered and cooked on the smooth straight branches.

Periodicity: Throughout the year.

Animals affected: All classes of livestock, and humans.

Asclepiadaceae

Milkweed Family

Asclepias spp. Milkweeds.

Description: Erect or spreading perennial herbs usually with milky sap, arising from a thick rootstock or deep rhizome. Stems solitary or clustered. Leaves opposite or whorled, or rarely alternate, with entire margins. Flowers in terminal or axillary umbels, white to purple or orange. Fruit an elongated follicle containing many seeds fringed or topped with white silky



FIG. 25. *Asclepias tuberosa*.

hairs. Many milkweed species occur in Alabama and might be considered poisonous until proven otherwise, but the two species described briefly below seem to represent the major problems:

A. tuberosa L. Butterfly milkweed.

Description: Erect perennial, 1-3 feet tall. Stems with alternate leaves and watery sap. Flowers bright orange, arranged in simple umbels. Figure 25.

A. verticillata L. Eastern whorled milkweed.

Description: Slender perennial, 1-3 feet tall. Leaves narrow, whorled, with curled margins. Flowers greenish, in small umbels. Figure 26.

Distribution and habitat: Generally throughout the State in dry, open woods, hillsides, roadsides, sand hills, and rocky slopes.

Group number: 2.

Poisonous principle: Resinoid (galitoxin), several glucosides, and alkaloid.

Toxic parts: All parts, green or as contaminants of hay.

Periodicity: Summer and fall (green plants).

Animals affected: Sheep, cattle, and horses.

Related species: *A. incarnata* L. (swamp milkweed) and *A. syriaca* L. (common milkweed) also may occur in sufficient numbers to occasionally cause problems.



FIG. 26. *Asclepias verticillata*.

Verbenaceae

Verbena Family

Lantana camara L. Common lantana.

Description: Erect or spreading shrub or herbaceous perennial reaching a height of 3-5 feet, with ridged or angular, green or brown stems armed with spines. Leaves opposite or whorled, ovate, with toothed edges, aromatic when crushed, dark green above, pale below. Flowers multicolored in short, head-like spikes on axillary peduncles; corolla with a tube about ½ inch long, and spreading lobes of white, yellow, pink, red, or purple. Fruit a greenish-blue or black, fleshy 1-seeded drupe, about ¼ inch in diameter, maturing in late summer.

Distribution and habitat: Scattered in the Coastal Plains and adjacent Piedmont as a garden and yard ornamental, and sometimes escaped to roadsides, fence rows, and waste places.

Group number: 2.

Poisonous principle: Triterpenoid (lantinin); gastrointestinal irritants.

Toxic parts: All parts, especially the berry-like fruits.

Periodicity: Summer, fall, and early winter.

Animals affected: Cattle, sheep, horses, and children.

Related species: *L. horrida* HBK., a closely related species, seems to be more common in northern parts of the Coastal Plains of Alabama.

Solanaceae

Nightshade Family

Annual or perennial herbs or shrubs. Leaves alternate, simple to 1-2 times pinnately lobed or divided. Flowers perfect, solitary or appearing in clusters; ovary superior. Fruit a many-seeded capsule or berry. A large number of species in this family cause poisoning.

Datura stramonium L. Jimsonweed, thornapple.

Description: Coarse, rank-smelling, glabrous annual 2-5 feet tall, extending branches above the first terminal flower, often purple or marked with purple. Leaves alternate, thin, simple, 3-8 inches long, irregularly toothed, glabrous. Flowers erect, solitary in leaf axils or stem branches, trumpet-shaped, large, white or purplish. Fruit a hard, spiny capsule splitting into 4 valves at maturity. Seed numerous, black. Figure 27.

Distribution and habitat: Abundant throughout the State as a weed of barnyards, pastures, hog lots, waste places, and roadsides.

Group number: 1.

Poisonous principle: Alkaloids (atropine, hyoscyamine, and several other chemically related compounds).

Toxic parts: All parts, especially seeds; either fresh or dry. Expressed sap was once used as knock-out drops to shanghai sailors.

Periodicity: Summer and fall.



FIG. 27. *Datura stramonium*.

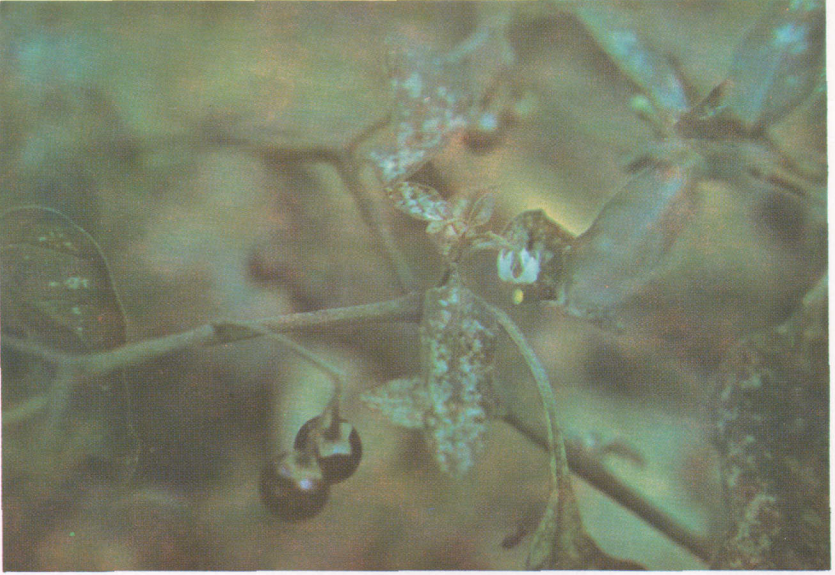


FIG. 28. *Solanum americanum*.



FIG. 29. *Solanum carolinense*.

Animals affected: All classes of livestock, and humans.

Related species: *D. meteloides* Dunal (sacred datura, angeltrumpet); *Nicotiana* spp. (tobaccos).

Solanum spp. Nightshades.

Description: Annual or perennial herbs or vines, often covered with spines. Leaves petioled, entire, or irregularly lobed. Flowers rotate, the petal lobes often spreading or reflexed, white, yellow, blue to purple. Fruit a berry, 2-locular, mealy or fleshy. *Solanum* species that occur abundantly in Alabama and are considered poisonous include: *S. americanum* Mill. (deadly nightshade, Figure 28); *S. carolinense* L. (horsenettle, bullnettle, Figure 29); *S. nigrum* L. (black nightshade); *S. tuberosum* L. (common potato); and others.

Distribution and habitat: Various species represented throughout the State in old fields, pastures, roadsides, disturbed areas, and cultivated.

Group number: 1.

Poisonous principle: Glycoalkaloid (solanine) and other alkaloids.

Toxic parts: Leaves and green fruit.

Periodicity: Spring, summer, and fall.

Animals affected: All classes of livestock, and humans.

Related species: *Physalis* spp. (groundcherry, jerusalemcherry); *Lycopersicon esculentum* Mill. (tomato).

Rubiaceae

Madder Family

Cephalanthus occidentalis L. Buttonbush.

Description: Shrubs or small trees, 2-12 feet tall. Leaves opposite or whorled, thin, simple, with a short petiole. Flowers in globose heads; corolla tubular, 4-lobed, white, blooming from June to frost. Figure 30.

Distribution and habitat: Throughout the State on creek, swamp, and pond margins, seepages, ditch banks, and low open woods and pastures.

Group number: 2.

Poisonous principle: Glucosides (cephalanthin and cephalin).

Toxic parts: Leaves; other parts much less toxic.

Periodicity: Summer and fall.

Animals affected: Cattle.

Caprifoliaceae

Honeysuckle Family

Sambucus canadensis L. Elderberry, elder.

Description: Shrubs with numerous stems arising from the ground,



FIG. 30. *Cephalanthus occidentalis*.

usually stoloniferous and colonial. Pith of second year or older wood white. Stems covered with small white spots (lenticels) on older bark. Leaves deciduous, opposite, 1-2 times pinnate, having 5-11 leaflets with toothed margins. Flowers white, in flat-topped clusters. Fruit a purple-black juicy berry.

Distribution and habitat: Throughout the State along streams, pond margins, open ditches, low woods; usually in moist, open habitats but sometimes in woods.

Group number: 2.

Poisonous principle: Alkaloid, glucoside, and under certain conditions, cyanide.

Toxic parts: Roots, leaves, and young shoots.

Animals affected: Cattle, hogs, and sheep.

Campanulaceae

Bellflower Family

Lobelia spp. Lobelias.

Description: Annual or perennial herbs with alternate leaves. Leaves with entire or toothed margins. Flowers appearing axillary in terminal, often leafy racemes; corolla tubular with 5 irregular lobes (2 forming the upper lip and 3 the lower). Fruit a capsule. *Lobelia* species commonly found in Alabama include: *L. cardinalis* L. (cardinalflower); *L. inflata* L. (indian or wild tobacco); *L. siphilitica* L. (great blue lobelia); and others.

Distribution and habitat: Throughout the State, usually in low or moist woods, along streams, pond margins, fields, marshes, or cultivated in flower gardens.

Group number: 2.

Poisonous principle: Alkaloid (lobeline, and others chemically related to nicotine) and a volatile oil.

Toxic parts: All parts, but roots seldom eaten.

Periodicity: Spring, summer, and fall.

Animals affected: Cattle, goats, and sheep; potentially dangerous to all livestock.

Asteraceae [or Compositae]

Aster Family

Herbs or, in rare cases, shrubs. Leaves simple or sometimes divided and appearing compound, alternate, opposite, or whorled. Inflorescence basically a dense head subtended by bracts, usually consisting of two types of flowers: tubular (disc flowers) in the center of the head surrounded by others (ray flowers) slightly tubular basally, with an elongated flattened portion extending outward. Ovary inferior. Fruit dry, a 1-seeded achene or nutlet.

Baccharis halimifolia L. Eastern baccharis, silverling, groundseltree, consumptionweed.

Description: Much branched deciduous shrub or small tree. Leaves alternate, simple, leathery, elliptic to broadly inverted pear-shaped, toothed above the middle, resinous-dotted. Flowers unisexual, usually in clusters about the leaves, the sexes located on different plants. Mature fruits tan, lustrous, with apical silvery-white tufts.

Distribution (Map 19) and habitat: Locally abundant in the southern

half of the State in moist or dry fields, fence rows, brackish marshes, open woods, and roadsides.

Group number: 2.

Poisonous principle: Saponin and perhaps other glycosides.

Toxic parts: Leaves and flowering shoots.

Periodicity: Spring to fall.

Animals affected: Sheep, cattle, and poultry.

Related species: *B. angustifolia* Michx. (false willow) also occurs in Baldwin and Mobile counties.

Eupatorium rugosum Houtt. White snakeroot, fall poison.

Description: Herbaceous perennials, 1-5 feet tall, with erect, branched or unbranched stems from a mat of fibrous roots. Leaves opposite, oval, with pointed tips and sharply toothed edges; the blade strongly 3-ribbed, the upper surface dull, the lower shiny. Flowers showy, snow-white in open terminal clusters, blooming in late summer.

Distribution and habitat: Scattered in upland provinces but rare in the adjoining Coastal Plains, usually in low, moist areas or bordering streams in open woods.

Group number: 2.

Poisonous principle: Alcohol (tremetol); unknown resin.

Toxic parts: All parts, fresh or in hay.

Periodicity: Late summer and fall.

Animals affected: All classes of livestock; dangerous to animals nursing affected dams and humans drinking milk or eating milk products from affected cows.

Specific symptoms: Trembling, especially in muscles of the nose and legs, preceded or accompanied by depression and inactivity, quickened and labored breathing, and pungent odor of the breath. The symptoms of constipation, vomiting, and delirium in humans caused by drinking the milk of poisoned cows are referred to as "milk sickness."

Helenium spp. Bitterweed, sneezeweed.

Description: Annual or perennial herbs with erect stems. Stem leaves alternate, simple, glandular-dotted, sessile, often numerous. Heads with ray and disc flowers; rays yellow; disc flowers yellow-green. Heads several to many in leafy, rounded, loose to tight corymbs at the top of the plant. The two most common species of *Helenium* in Alabama are described briefly below.

H. amarum (Raf.) H. Rock. Bitterweed, bitter sneezeweed.

Description: Weedy annual with wingless stems; leaves narrow and



FIG. 31. *Helenium amarum*.

numerous; 6-30 inches tall. Bruised leaves with a pungent odor. Figure 31.
H. autumnale L. Sneezeweed, bitterweed.

Description: Fibrous rooted herbaceous perennial, 1-4 feet tall. Stems winged, branched or unbranched near top. Leaves $\frac{1}{2}$ to $1\frac{1}{2}$ inches wide with small teeth along the margins. Heads about 1 inch in diameter, at the ends of branches. Figure 32.



FIG. 32. *Helenium autumnale*.

(Small's groundsel), *S. aureus* L. (golden ragwort), and *S. obovatus* Muhl. ex. Willd. are common species thought to be toxic in Alabama.

Distribution and habitat: Locally abundant in the Coastal Plains and scattered elsewhere throughout the State in meadows, pastures, roadsides, rock outcroppings, open woodlands, and slopes.

Group number: 2.

Poisonous principle: Alkaloids (retrorsine and several others of the pyrrolizidine type).

Toxic parts: Leaves, stems, flowers, and fruits, fresh or dried.

Periodicity: Throughout the year, particularly spring and summer.

Animals affected: Horses, cattle, and sheep.

Specific symptoms: Degenerative changes in the liver, often developing several months after the animal's ingestion of *Senecio* plants over an extended period of time; cumulative action of the toxin causes this type of poisoning to go unrecognized except in chronic cases.

Xanthium strumarium L. Heartleaf cocklebur, burweed.

Description: Coarse, branching annual, 1 to 4 feet high with alternate,

Distribution and habitat: Throughout the State as weeds of moist open places, pastures, roadsides, fields, meadows, and ditches.

Group number: 1.

Poisonous principle: Glucoside (dugaldin) and an unknown phenol; neither evidently responsible for the bitterness.

Toxic parts: Leaves, stems, flowers, and fruit, fresh or dried.

Periodicity: Summer and fall.

Animals affected: Sheep, cattle, and horses.

Senecio spp. Groundsel.

Description: Herbaceous perennials or winter annuals with erect stems. Leaves basal and on the stem, alternate, unlobed, lobed or dissected. Heads in corymbs. Flowers all discoid or discoid and radiate, yellow. Ray flowers 3-5 toothed, pistillate; disc flowers perfect. Fruits (nutlets) cylindrical or ellipsoid, with or without white pappus. *Senecio smallii* Britton

simple leaves. Leaves shallowly 3-5 lobed, long petioled, triangular to weakly heart shaped, up to 6 inches long. Flowers in axillary clusters. Fruit a 2-seeded, broadly cylindrical, ovoid or subglobose bur, covered with stout or slender hooked spines and 2 sharp-pointed terminal spines. Fruits yellowish-green turning brown at maturity. Figure 33.

Distribution and habitat: Throughout the State as an abundant weed of fertile fields, waste places, roadsides, pastures, beaches, and shores.

Group number: 1.

Poisonous principle: Hydroquinone.

Toxic parts: Seedlings and seeds, the latter rarely eaten because of the enclosing bur.

Periodicity: Spring (young plants) or fall (seeds); mature plants are rarely eaten and seem innocuous.

Animals affected: All classes of livestock, especially hogs and chickens, the latter by seeds ground in feed meal.



FIG. 33. *Xanthium strumarium*.

APPENDIX 1. LIST OF POISONOUS SPECIES REPRESENTING ONLY MINOR PROBLEMS IN ALABAMA (GROUP 3)
DUE TO MILD TOXICITY, RARITY, OR USUAL UNAVAILABILITY TO LIVESTOCK

| Scientific name | Usual common name | Danger season | | | | Toxic principle | Poisonous part | | | | | | |
|-----------------------------------|--------------------------------|---------------|--------|------|--------|-----------------|----------------|-------|--------|---------|--------|-------|-----------|
| | | Spring | Summer | Fall | Winter | | Roots | Stems | Leaves | Flowers | Fruits | Seeds | Seedlings |
| <i>Acalypha virginica</i> | Virginia copperleaf | | X | X | | unknown | | X | X | | | X | |
| <i>Ailanthus altissima</i> | tree-of-heaven | X | X | X | | unknown | | | | X | | | |
| <i>Aletris farinosa</i> | white stargrass | X | X | | | unknown | | X | X | | | | |
| <i>Allium canadense</i> | wild onion | X | X | | | alkaloid | | X | X | | | | |
| <i>Amaranthus retroflexus</i> | redroot pigweed | | X | X | | nitrate | | X | X | | | | |
| <i>Amorpha</i> spp. | false indigo | | X | X | | alkaloids | | | | | | X | |
| <i>Anagallis arvensis</i> | scarlet pimpernel | | X | | | oil | X | X | X | X | | | X |
| <i>Angelica venenosa</i> | angelica | | X | | | unknown | X | | | | | | |
| <i>Anthemis cotula</i> | mayweed dogfennel | | X | | | unknown | | | X | X | | | |
| <i>Aralia spinosa</i> | devils-walkingstick | | X | X | | glucoside | | | X | | | X | |
| <i>Arisaema dracontium</i> | green dragon | X | X | | | oxalate | X | X | X | X | X | | |
| <i>Arisaema triphyllum</i> | jack-in-the-pulpit | X | X | | | oxalate | X | X | X | X | X | | |
| <i>Astragalus</i> spp. | locoweed | X | X | X | | locoine | X | X | X | X | X | X | X |
| <i>Atriplex arenaria</i> | seabeach orach | | X | X | | selenium | | X | X | | | | |
| <i>Baptisia</i> spp. | wild indigo | | X | | | alkaloids | | X | X | X | | X | |
| <i>Batis maritima</i> | beachwort | | X | X | | unknown | | X | X | | | | |
| <i>Beta vulgaris</i> | beet | | X | | | oxalate | | X | X | | | | |
| <i>Buxus sempervirens</i> | boxwood | X | X | X | X | nitrate | | | | | | | |
| <i>Cassia</i> spp. | partridgepea, senna, sicklepod | | X | X | | alkaloid | | X | X | | | | |
| <i>Caulophyllum thalictroides</i> | blue cohosh | | X | | | alkaloid | X | X | X | | | X | |
| <i>Celastrus scandens</i> | climbing bittersweet | X | X | X | | glucosides | | | | | | | |
| <i>Cinnamomum camphora</i> | camphor tree | | X | | | alkaloid | | X | X | | | X | |
| <i>Clematis virginiana</i> | virgin's bower | | X | X | | ketone | | X | X | | | | |
| | | | | | | alkaloids | | | X | | | | |
| <i>Cnidioscolus stimulosus</i> | bullnettle, tread-softly | | X | X | | glucosides | | | | | | X | |
| <i>Convallaria majalis</i> | lily-of-the-valley | X | | | | unknown | | | | | | | |
| | | | | | | glucoside | X | X | | | | | |

Continued

APPENDIX 1 (Continued). LIST OF POISONOUS SPECIES REPRESENTING ONLY MINOR PROBLEMS IN ALABAMA (GROUP 3)
DUE TO MILD TOXICITY, RARITY, OR USUAL UNAVAILABILITY TO LIVESTOCK

| Scientific name | Usual common name | Danger season | | | | Toxic principle | Poisonous part | | | | | | | |
|--------------------------------|---------------------|---------------|--------|------|--------|-----------------|----------------|-------|--------|---------|--------|-------|-----------|---|
| | | Spring | Summer | Fall | Winter | | Roots | Stems | Leaves | Flowers | Fruits | Seeds | Seedlings | |
| <i>Convolvulus</i> spp. | bindweed | X | | | | nitrate | X | X | X | | | | | |
| <i>Corydalis</i> spp. | corydalis | X | | | | alkaloids | | | X | | | | | |
| <i>Croton capitatus</i> | woolly croton | | X | X | | oil | | | X | | | | | |
| <i>Cytisus scoparius</i> | scotch broom | X | X | | | alkaloid | | X | X | | | X | | |
| <i>Dicentra cucullaria</i> | dutchman's breeches | X | | | | alkaloid | X | X | X | X | X | X | X | |
| <i>Dirca palustris</i> | leatherwood | X | X | | | unknown | | X | | | | | | |
| <i>Erigeron</i> spp. | fleabanes | X | X | | | unknown | | | X | | | | | |
| <i>Euonymus</i> spp. | burningbush | X | X | X | | alkaloid | | X | X | | X | | | |
| <i>Fagopyrum esculentum</i> | buckwheat | | X | X | | photosensitizer | X | X | X | X | X | | X | |
| <i>Gillenia stipulata</i> | indian physic | | X | X | | glucoside | | X | X | | | | | |
| <i>Gillenia trifoliata</i> | indian physic | | X | X | | glucoside | | X | X | | | | | |
| <i>Hedera helix</i> | english ivy | X | X | X | X | glucoside | X | X | X | X | X | X | X | |
| <i>Hypericum</i> spp. | St. johnswort | | X | | | photosensitizer | | X | X | | | | X | |
| <i>Ilex</i> spp. | holly | | | X | X | unknown | | | X | | X | X | | |
| <i>Iris</i> spp. | irises | X | X | X | X | resinoid | X | X | | | | | | |
| | | | | | | alkaloids | | | | | | | | |
| <i>Lachnanthes caroliniana</i> | redroot | X | X | X | X | unknown | X | X | X | X | | | | |
| <i>Lactuca scariola</i> | wild lettuce | | X | X | | unknown | | X | X | X | | | | X |
| <i>Lathyrus hirsutus</i> | caley peavine | | | | X | alkaloid | | | | | X | X | | |
| <i>Lathyrus latifolius</i> | everlasting peavine | | X | X | | alkaloid | | | | | | X | | |
| <i>Ligustrum</i> spp. | privet | X | X | X | | unknown | | X | X | | X | | | |
| <i>Linum</i> spp. | flax | | X | X | | cyanide | | X | X | | | X | | |
| | | | | | | glycoside | | | | | | | | |
| <i>Lolium temulentum</i> | poison darnel | X | X | | | alkaloid | | X | X | | X | X | | |
| <i>Lophiola americana</i> | goldcrest | X | X | X | X | unknown | X | X | X | | X | | | |
| <i>Lycium halimifolium</i> | matrimonyvine | | X | X | | alkaloids | | X | X | | | | | |
| <i>Narcissus poeticus</i> | narcissus | X | | | X | alkaloids | | X | X | X | X | | | |
| <i>Nolina georgiana</i> | bunchgrass | | X | X | | unknown | | | | | X | X | | |

Continued

APPENDIX 1 (Continued). LIST OF POISONOUS SPECIES REPRESENTING ONLY MINOR PROBLEMS IN ALABAMA (GROUP 3)
DUE TO MILD TOXICITY, RARITY, OR USUAL UNAVAILABILITY TO LIVESTOCK

| Scientific name | Usual common name | Danger season | | | | Toxic principle | Poisonous part | | | | | | | |
|-----------------------------------|---------------------|---------------|--------|------|--------|-----------------|----------------|-------|--------|---------|--------|-------|-----------|---|
| | | Spring | Summer | Fall | Winter | | Roots | Stems | Leaves | Flowers | Fruits | Seeds | Seedlings | |
| <i>Ornithogalum umbellatum</i> | star-of-Bethlehem | X | X | X | X | alkaloid | X | X | X | | | | | |
| <i>Oxalis</i> spp. | woodsorrels | X | X | | | oxalates | | X | X | | | | | |
| <i>Oxypolis filiformis</i> | leafless cowbane | | X | X | | unknown | X | X | X | X | | | | X |
| <i>Papaver somniferum</i> | common poppy | | X | | | alkaloids | | X | X | | X | X | | |
| <i>Parthenocissus cinquefolia</i> | Virginia creeper | | X | | | unknown | | | | | X | X | | |
| <i>Phaseolus lunatus</i> | lima bean | | X | | | cyanide | | | | | X | X | | |
| <i>Phoradendron serotinum</i> | mistletoe | | | X | X | amines | | | | | X | | | |
| <i>Polygonum</i> spp. | smartweeds | | X | X | | photosensitizer | | X | X | X | | | | |
| <i>Punica granatum</i> | pomegranate | | X | X | | alkaloid | | X | X | | | | | |
| <i>Rhamnus</i> spp. | buckthorn | X | X | X | | glycosides | | X | X | | X | | | |
| <i>Rheum rhaponticum</i> | rhubarb | | X | | | oxalate | | | X | | | | | |
| <i>Rudbeckia hirta</i> | blackeyesusan | | X | | | unknown | | X | X | | | | | |
| <i>Rudbeckia laciniata</i> | cutleaf coneflower | | X | | | unknown | | X | X | | | | | |
| <i>Rumex</i> spp. | sorrel, dock | X | X | | | oxalates | | X | X | X | | | | |
| <i>Salsola kaki</i> | Russian thistle | | X | X | | nitrate | | X | X | | | | | |
| <i>Sassafras albidum</i> | sassafras | | X | | | oils | | X | X | | X | | | |
| <i>Scirpus americanus</i> | American bulrush | | X | X | | unknown | | X | X | | | | | |
| <i>Spigelia marilandica</i> | indian pink | | X | | | unknown | | X | X | X | | | | |
| <i>Suaeda linearis</i> | seepweed | | | X | | unknown | | X | X | | | | | |
| <i>Tephrosia virginiana</i> | goatsrue | X | X | | | unknown | X | X | X | | | | | |
| <i>Trifolium hybridum</i> | alsike clover | X | X | X | | phytotoxin | | X | X | | | | | |
| | | | | | | photosensitizer | | | | | | | | |
| <i>Triglochin striata</i> | ridged podgrass | X | X | | | cyanide | | | X | | | | | |
| <i>Trillium</i> spp. | wakeroin, toadshade | X | X | X | X | unknown | X | X | | | | | | |
| <i>Vinca</i> spp. | periwinkle | X | X | X | X | unknown | | X | X | X | X | | | |
| <i>Veratrum viride</i> | false hellebore | X | | | | alkaloids | X | X | X | X | X | X | X | |
| <i>Wisteria</i> spp. | wisteria | | X | | | unknown | | | | | X | X | | |

APPENDIX 2. LIST OF POISON CONTROL CENTERS IN ALABAMA AND NEARBY AREAS

| City where located, name and address | Telephone | Director and assistant director |
|---|----------------------------|--|
| Alabama | | |
| Anniston Poison Control Center Anniston Mem. Hosp. Pharmacy Dept. 400 E. 10th St., P.O. Box 370 36201 | (205) 237-5421 Ext. 382 | Bill Stephenson Wendell Turner |
| Auburn Poison Control Center School of Pharmacy Auburn University 36830 | 826-4740 | Byron B. Williams Joseph E. Manno |
| Birmingham Poison Control Center Children's Hospital 1601 6th Ave. South 35233 | 323-8901 | S. D. Palmer P. A. Palmisano |
| Dothan Poison Control Center Southeast Alabama General Hospital 36301 | 794-3131 Ext. 521 | Dean H. Byrd, Sr. Dorothy West |
| Florence Poison Control Center Eliza Coffee Memorial Hospital 600 W. Alabama St. 35630 | 764-8321 Ext. 206 | Jesse H. Thornton |
| Gadsden Poison Control Center Baptist Memorial Hospital 1007 Goodyear Ave. 35903 | 492-1240 Ext. 206 | J. Richard Anderson J. Barry Jacobs |
| Mobile Poison Control Center Mobile General Hospital St. Anthony & Broad Sts. 36603 | 473-0341 Ext. 243 | Mrs. Barakeh |
| Florida | | |
| Ft. Walton Beach Poison Control Center Ft. Walton Beach Hospital 207 Hospital Dr. N.E. 32548 | (904) 243-7611 Ext. 223 | William W. Thompson Robert J. Saxer |
| Panama City Poison Control Center Memorial Hospital of Bay County 600 N. MacArthur Ave. 32401 | 785-7411 Ext. 652 | M. M. Traxler Bill Lowther |
| Pensacola Poison Control Center Baptist Hospital 1000 W. Moreno St. 32501 | 434-4811 Ext. 518 | John C. Lipsey Vivian Whitehead |
| Georgia | | |
| Albany Poison Information Center Phoebe Purney Memorial Hospital 417 3rd Ave., P.O. Box 1151 31705 | (912) 436-5741 Ext. 155 | Mack Sutton John Perry |
| Rome Poison Control Center Floyd Hospital Turner & McCall Blvd. 30161 | (404) 235-0451 | James H. Williams William Fricks |

Continued

APPENDIX 2 (Continued). LIST OF POISON CONTROL CENTERS
IN ALABAMA AND NEARBY AREAS

| City where located, name and address | Telephone | Director and assistant director |
|--|---------------------------------|------------------------------------|
| Mississippi | | |
| Laurel Poison Control Center Jones County Community Hospital Jefferson St. at 13th Ave. 39440 | (601) 425-1441 Ext. 20 or 48 | Joel H. McKinley Robert C. Boyd |
| Pascagoula Poison Control Center Singing River Hospital Highway 90 East 39567 | 762-6121 Ext. 761 | Sarah Fornea |
| Tennessee | | |
| Chattanooga Poison Control Center T. C. Thompson Children's Hospital 1001 Glenwood Dr. 37406 | (615) 624-5020 | Ronald Eith Marilyn Mann |
| Columbia Poison Control Center Maury County Hospital Mt. Pleasant Pike 38401 | 388-2320 Ext. 49 | Kenneth A. Flowers |

GLOSSARY

- ACHENE. Dry, indehiscent, one-seeded fruit.
- ACRID. Strongly bitter.
- ALTERNATE. Leaf arrangement with only one leaf per node.
- ANTHELMINTIC. Chemical that kills intestinal worms.
- ANNUAL. Plant that completes its life cycle from seed to seed in one growing season.
- ASPHEXATION. Death due to insufficient oxygen in blood.
- ASTRINGENT. Chemical that shrinks tissues.
- ATAXIA. Lack of muscular coordination.
- AXIL. The upper or inner angle formed by juncture of leaf or branch and stem.
- BERRY. Fruit type that usually is homogenously fleshy.
- BLADE. Usually flat, expanded portion of a leaf.
- BLOAT. Abnormally high volume of gas in the paunch of ruminants, especially cattle.
- BRACT. Reduced or modified leaf usually associated with flowering and/or fruiting portions of a plant.
- CALYX. Collective term for sepals of a flower.
- CAPSULE. Fruit type that is dry, several to many seeded, and usually splits along two or more longitudinal lines.
- CARDIAC. Pertaining to the heart, or area near the heart.
- CATHARTIC. Purging medicine more vigorous in action than a laxative but less so than a purgative.
- COMA. State of prolonged unconsciousness and insensibility.
- CONVULSION. Violent involuntary muscular contraction.
- COROLLA. Collective term for petals of a flower.
- CORYMB. Short and broad, more or less flat-topped inflorescence in which the outer flowers open first.
- DELIRIUM. Temporary state of frenzied excitement.
- DEMULCENT. Ointment or medicine that soothes irritated or inflamed membranes.
- DIARRHEA. Frequent and excessive discharge of loose material from the bowels.
- DIURETIC. Chemical that increases the secretion and flow of urine.
- DRUPE. Fruit type with a fleshy outer layer and a stony inner layer forming a pit next to the seed.
- DYSYPNEA. Difficult or painful breathing.
- EDEMA (Oedema). Abnormal accumulation of fluids in tissues of the body causing swelling.
- EMETIC. Medicine or other substance that causes vomiting.
- ENTERITIS. Inflammation of the intestine, especially the small intestine.
- ENTIRE. Leaf margin type that is smooth, not toothed or divided.
- EXFOLIATE. To peel off in shreds, thin layers, or plates.
- FASCICLE. Condensed or close cluster, as of flowers or most pine leaves.

FLORET. Individual flower in a grass spikelet or composite head.

FOLLICLE. Dry fruit type that opens along only one longitudinal line.

FORB. Broad-leaved herbaceous plant.

GASTRITIS. Inflammation of the stomach.

GLABROUS. Lacking pubescence, including hairs, scales, or other forms.

GOITROGENIC. Goiter-causing, usually by prevention of normal inorganic iodide accumulation by the thyroid.

HEMORRHAGE. Discharge of blood from the vessels, either internally or externally; especially heavy bleeding.

HERB. Plant that is non-woody above ground and dies back to the ground each year.

INFLORESCENCE. Pattern of branching within flowering portion of a plant, particularly the floral axis; flower cluster.

INVOLUCRE. Series of bracts usually closely subtending a flower or an inflorescence.

LAXATIVE. Medicine or other substance that causes mild intestinal discharge.

LEAFLET. Blade segment of a compound leaf.

NARCOTIC. Drug or substance that induces deep sleep, lethargy, and relief of pain; in large doses may cause stupor, convulsions, and death.

NAUSEA. Stomach sickness causing the impulse or desire to vomit.

NODE. The point on a stem where one or more leaves are, or were at one time, attached.

OPPOSITE. Leaf arrangement with two leaves, one on either side of the stem, at each node.

PALMATE. Compound leaf type or venation type with the leaflets or veins, respectively, radiating out from a central point of attachment or origin.

PANICLE. Inflorescence type usually more or less conical and with the lowermost branches often much branched.

PEDICEL. Supporting stalk of an individual flower in an inflorescence.

PEDUNCLE. Supporting stalk of an entire inflorescence or a solitary flower.

PERENNIAL. Plant that continues to live year after year.

PERIANTH. Collective term for sepals (calyx) and petals (corolla) of a flower.

PETAL. One of the inner, usually colored and showy parts of a flower, which collectively function to attract pollinators.

PETIOLE. Stalk supporting leaf blade and attaching it to stem.

PINNATE. Compound leaf type or venation type with the leaflets or veins, respectively, arranged in rows on each side of a common axis (the rachis or midrib).

PISTIL. Innermost part of a flower, developing into the fruit after pollination and fertilization.

PUBESCENT. Hairy.

PURGATIVE. Medicine or chemical that causes strong intestinal evacuation.

RACEME. Elongated inflorescence type, usually more or less cylindrical and with pedicels attached to an unbranched main axis.

RHIZOME. More or less elongated, horizontal underground stem, or rootstock.

ROOTSTOCK. Underground stem that produces green shoots at the nodes and roots along its length; perennial structure of many herbaceous perennials, usually upright in position.

RUMEN. First and largest compartment of the stomach in cud-chewing animals.

SALIVATION. Excessive discharge of saliva from the mouth.

SCLEROTIUM. Hard structure often formed by fungi parasitizing the grains of certain grasses.

SEDATIVE. Medicine or chemical that lessens excitement, irritation, or pain.

SEED. Ripened ovule containing an embryonic plant and its stored food within a protective coat.

SEPAL. One of the outer, usually green (but sometimes colored) parts of a flower that encloses floral buds before they open.

SESSILE. Lacking a supporting stalk; without petiole if a leaf, without pedicel or peduncle if a flower or inflorescence.

SILICLE. Capsular fruit characteristic of certain members of the mustard family, usually about as wide as long.

SILIQUE. Capsular fruit characteristic of certain members of the mustard family, usually much longer than wide.

SPASM. Convulsion.

SPIKELET. Basic unit of grass inflorescence, containing one or more florets and arranged in various patterns on the plant.

SPORE. Minute reproductive cell formed in the sexual life cycle of vascular plants; main reproductive body in many primitive plants lacking seed production.

STAMENS. Pollen-producing organs of a flower, located just inside the perianth.

STELLATE. Star-like, referring usually to the hairs of certain plants.

STIMULANT. Medicine or chemical that temporarily increases activity.

STIPULES. Two small appendages attached to the base of a petiole or to the node; basal leaf parts with various forms and functions.

STUPOR. State of dulled sensibility, or partial or complete loss of sensibility.

TREMOR. Involuntary quivering, trembling, shaking.

VERTIGO. Sensation of dizziness or giddiness, often causing staggering.

WHORLED. Leaf arrangement with three or more leaves per node; also the common arrangement of similar parts within flowers.

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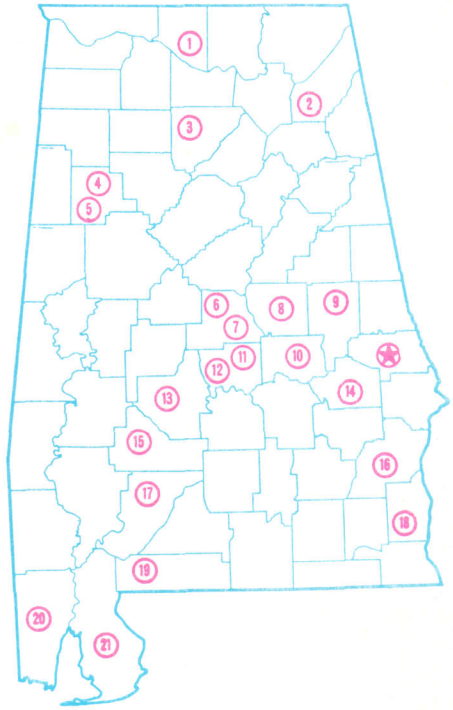
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Alabama's Agricultural Experiment Station System

AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, live-stock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.