

22. Poisonous Weeds

THE MAJOR IMPACT of weeds on agriculture is their effect on crop production. However, certain weed (and crop) species are, in addition, capable of causing discomfort, injury, or death to animals. Man also may be unpleasantly affected by plants; he is subject to hay fever and the irritations or illnesses resulting from contact with dermatitis-causing plants, among which poison ivy is pre-eminent. Domestic animals usually suffer ill effects as a consequence of eating the leaves, stems, or roots of harmful plants, but some weed species may cause mechanical injury. The plants involved are termed poisonous plants.

Herbivorous animals (cows, sheep, horses, pigs) are those most apt to be subject to plant poisoning. Human beings likewise are capable of being poisoned; their chief protection is a difference in eating habits.

Poisonous plants are not a major problem in the production of livestock in most of the central states area. They do constitute a significant economic consideration on the western ranges. This is because: (1) there is a greater prevalence of poisonous species in this part of the country, (2) extensive rather than intensive management practices are the rule; in other words, weed control procedures which are practical on land with a high return per acre may not be economically feasible on the lower value (per acre) ranges, and (3) mismanagement of the ranges. Continued overstocking for decades has resulted in the reduction or destruction of native grassland. This has made possible the invasion of poisonous weeds which would be unable to compete with a vigorous, perennial grass cover.

In general, if food is ample, animals will not eat most poisonous plants, although there are some exceptions. In many areas poisoning has been on the increase because of the increasing shortage of desirable forages; the animals then turn to plants they would not otherwise touch. The increasing prevalence of poisonous weeds following destruction of grasses likewise favors greater frequency of poisoning.

In some instances losses of cattle and sheep have been suffered while they were moved from one location to another. Under such circumstances the animals, having no opportunity to browse, are apt to grab a mouthful of any available plant. Plant poisoning may also be experienced if the stock, after having been on the move all day, are held in

a relatively limited area for the night. Being hungry, they can rapidly consume all acceptable forage, and then proceed to any other accessible plants.

The effects of plant poisoning are diverse. Sometimes the symptoms are scarcely discernible, being evidenced only by failure to gain or by unthriftiness. In other instances, stock are affected by chronic or prolonged disorders which may or may not result in death. Poisoning from some plants can lead to death within a few minutes' or hours' time. The same species may cause a chronic involvement or, on the other hand, rapid death, depending upon the amount ingested at one time and the conditions under which it was eaten.

Poisoning symptoms are often generalized, and a definitive diagnosis may not be possible on the basis of symptomatology alone. Diagnosis is then frequently dependent upon identification of the plant material involved. If death of the animal has ensued, a post-mortem examination of stomach contents may be made. Otherwise, the pasture or range should be examined for poisonous plants which show signs of having been browsed and whose known injurious effects are consistent with the symptoms observed.

SOME PRINCIPAL TYPES OF PLANT POISONS

Alkaloids

These are basic, nitrogenous organic compounds which are physiologically active. Caffeine, the active ingredient in coffee, is an example. Some have slight effects; some are valuable in medicine but can also be extremely poisonous. Alkaloids are especially prevalent in certain plant families, among them, the Legume (*Leguminosae*), Lily (*Liliaceae*), Potato (*Solanaceae*), and Buttercup (*Ranunculaceae*) families.

Glucosides

These are compounds which, on hydrolysis, break down into glucose plus other substances. They may be toxic in themselves and/or their hydrolytic products may be toxic. If it is the end products which are toxic, poisoning will not necessarily result from the eating of materials containing these substances. Poisoning will, instead, depend upon whether conditions in the animal's stomach favors break-down of the glucosides. Cyanogenetic glucosides (e.g. dhurrin in sorghum, amygdalin in wild cherry) yield the very poisonous HCN on hydrolysis.

Resinoids

This is a general term for alcohol-soluble substances of unknown

chemical composition. They are the toxic materials characteristic of various members of the Heath (*Ericaceae*) and Carrot (*Umbelliferae*) families. Presumably the poison hemlock drunk by Socrates was of this type.

Proteinaceous Materials

Also called phytotoxins. Black locust (*Robinia*) and castor bean (*Ricinus*).

Oxalic Acid and Soluble Oxalates

These cause precipitation of body calcium. They are present in a few members of the Goosefoot (*Chenopodiaceae*) and Smartweed (*Polygonaceae*) families.

Nitrates

Excess nitrates may accumulate in plant tissues under conditions of rich soil and deficient rainfall. Such poisoning has been reported from miscellaneous weeds and oat straw. Cornstalk disease or "green corn" poisoning may be a nitrate effect.

Higher Alcohols

Tremetol from white snakeroot (*Eupatorium*).

Dicoumarol

An anticoagulant, sometimes formed in spoiled sweet clover.

Selenium

Certain species of locoweed (*Astragalus*) and *Stanleya* have the ability to take inorganic selenium from the soil. Apparently these plants, adapted to regions of the West having seleniferous soils, require selenium in protein synthesis in the place of sulphur. Other plants are not capable of taking up inorganic selenium. However, they (plants in general) are capable of incorporating selenium in the organic form, i.e. from the decomposed remains of selenium-requiring plants. Hence, under such circumstances, a wide variety of plant kinds may be potentially poisonous.

Photosensitization

This effect will result only if (1) animals eat the plants involved, and (2) their skin is subsequently exposed to sunlight. If the skin is protected by a thick coat of hair or is dark-pigmented, symptoms will not develop. Plants which may be responsible include St. Johnswort (*Hypericum*), buckwheat (*Fagopyrum*), and rape (*Brassica*).

Mechanical Injury

The awns of certain grasses can puncture or cause wounds around the face, ears, or in the mouth. If these subsequently become infected, the animal may be in serious condition. Some causative agents: squirrel-tail grass (*Hordeum*), three-awn grass (*Aristida*), sandbur (*Cenchrus*).

SOME POISONOUS PLANTS

Sudan Grass (*Sorghum*)

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The principal danger from this forage crop is in summer or fall (forage), or in the winter from hay or silage. The active substance, a cyanogenetic glucoside, dhurrin, is found only in unhealthy plants. Forage injured by frost, drought, or disease is most apt to be dangerous. The availability of enzymes fostering hydrolysis of the glucoside, condition of the animal, and the nature of other material which it has eaten all affect the possibility of HCN being released.

If hay is suspected, it is sometimes suggested that a concentrate be fed first or that maltose or dextrose should be added to the feed. An excess of simple sugars in the stomach will tend to prevent the breakdown of the glucoside.

If active poisoning takes place, death often quickly intervenes and antidotes (oxidizing substances or monosaccharide sugars) are too late.

Wild Cherries (*Prunus*)

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Wild cherries are small trees with ovate to elliptic, serrate leaflets, usually with glands on the petiole. The flowers are in conspicuous, white racemes. The fruits are cherry-like, but smaller than cultivated forms.

These plants may, under certain conditions, develop a cyanogenetic glucoside (amygdalin). Wilted leaves are especially dangerous. If trees are cut in a pasture or along a fence row, branches should not be left available to stock. The conditions affecting poisoning are the same as discussed for sudan grass above.

Corncockle (*Agrostemma*)

p67

The seeds contain glucosides (or their hydrolytic products) which are poisonous. The seeds may occur in screenings employed in chicken feeds and other mixed feeds. All domestic stock (and humans) may be affected. Pigs are said to be most sensitive but chickens are most frequently poisoned.

Rape (*Brassica*)

p305

Rape is a cultivated plant similar in general appearance to the weedy mustards previously described. It is frequently planted for "hog pasture" but may cause photosensitization (blistering and loss of hair) of light-colored hogs.

Sweet Clover (*Melilotus*)

p97

In spoiled hay, coumarin may be changed to dicoumarol which slows blood clotting and produces other cumulative effects. Cattle and sheep are more susceptible than horses.

Water Hemlock (*Cicuta*)

p128

This plant contains a resinous substance in its cluster of perennial roots. Occasional loss of stock is almost entirely in the spring. At this time of year, when other forage is limited, animals may be attracted to the rosettes of leaves growing in wet soil. The roots are apt to be pulled up and ingested with the leaves.

Black Nightshade (*Solanum*)

p158

The leaves, stems, and green fruits contain an alkaloid which may be hydrolyzed to a glucoside. If a sufficient quantity of the weed is eaten, death can ensue in a few hours.

White Snakeroot (*Eupatorium*)

p306

White snakeroot is a weed of wooded pastures, thickets, and fence rows. It is much less common than in the past, owing in large part to destruction of its natural habitat. The active ingredient, tremetol, an unsaturated higher alcohol, may be passed to human beings in milk. It causes "trembles" in animals and "milk sickness" in humans. The effects are, in some instances, chronic, or death can take place within a few days after symptoms appear.

Cocklebur (*Xanthium*)

p307

The seedlings in the cotyledon stage are poisonous, especially to pigs.

Barley Scab (*Gibberella*)

Barley scab is a fungus disease usually attacking grains of barley or wheat. Pigs are usually affected; they are intoxicated or narcotized, but usually recover in a few hours. Scab is particularly prevalent on barley in the more humid production areas, and has largely resulted in the restriction of barley production for feed grain purposes to the more arid high plains.

Waterbloom

Waterbloom is a foamy, greenish scum which may develop around the shores of lakes in hot summer. The plants involved are various blue-green algae. Reports of poisoning are sporadic, usually from lake regions, and following periods when the wind has been blowing towards the shore for a considerable length of time. All domestic stock drinking the water may be affected, and may be quickly killed.

Locoweeds (*Astragalus*)

p307

Astragalus, a genus of native wild legumes includes well over 100 species in the United States, the preponderance of them from the plains states west. The plants possess pinnately compound leaves, usually blue to white papilionaceous flowers in spikes or racemes. The fruits are diverse.

Certain species are alkaloid-containing. Others are selenium-indicator plants which, as previously indicated, are not only poisonous in themselves but can release selenium in a form susceptible to being taken up by other plants. Acute selenium poisoning is caused by eating highly seleniferous vegetation and often results in death in a few hours. Blind staggers and alkali disease are chronic forms of selenium poisoning resulting from the more moderate ingestion of mildly seleniferous plants over a period of time.

Larkspur, Poisonweed (*Delphinium*)

p308

The poisonous larkspurs are similar in appearance to the larkspurs and delphiniums of gardens. Their leaves are usually palmately dissected. The flowers are irregular, attractive, and conspicuous. The

larkspurs are alkaloid-containing plants and cause losses principally to cattle. They are abundant, Great Plains and West.

Lupines (*Lupinus*)

p309

Lupines are attractive legumes with palmately compound leaves and usually racemes of blue flowers. They are common in the western plains and mountains. The poisoning agents are alkaloids which are especially abundant in the seeds. Sheep are primarily affected.

Halogeton (*Halogeton*)

p308

This weed apparently does not as yet occur in the North Central States. It has, however, become so notorious that it deserves mention.

A member of the Goosefoot family (Chenopodiaceae), it is related to Kochia (*Kochia*) and Russian thistle (*Salsola*). First reported in the United States about 1935, it is now common in several western states, denuded ranges, waste areas, and roadsides. It is one of the annual weeds which has become prevalent as a consequence of overgrazing of range land.

The plants contain large quantities of soluble oxalates. Sheep are most easily injured. Losses up to several hundred head in a single night have been reported. The use of considerable areas of range has been rendered dangerous because of the presence of this weed.



PLATE 154

Prunus serotina Fruiting branch x2/3.

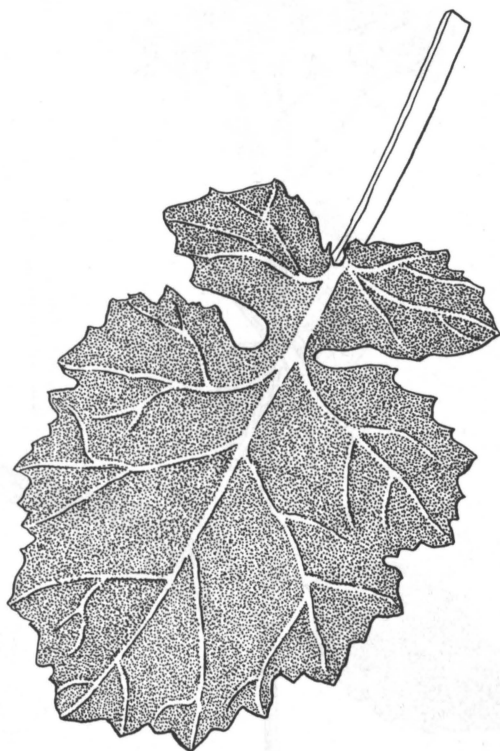


PLATE 155

Brassica napus Leaf x2/3.



PLATE 156

Eupatorium rugosum Flowering stem x2/3.



PLATE 157

Xanthium strumosum 1. Seedling: first leaves stage x2/3. 2. Seedling: cotyledon stage x2/3.

Astragalus mollissimus 3. Leaf and fruiting raceme x2/3.



PLATE 158

Delphinium sp. 1. Leaves and inflorescence $\times 2/3$.
Halogeton glomeratus 2. Habit $\times 1/3$.



PLATE 159

Lupinus sp. Habit x2/3.

Weed Control

