

Poisonous Plants on the Range Hold Important Place Among Causes of Stock Fatalities

George H. Hart

Minor losses of livestock are constantly occurring while grazing over the uncultivated lands comprising such a large part of the state total area. These losses are not serious in relation to the financial stability of any one outfit.

While the great infectious plagues were going their way such losses were not even given consideration. When the more serious death losses are brought under control the constant drain of these scattered fatalities are subjected to closer scrutiny. Thereby it soon becomes evident that they are due to a variety of causes in which toxic plants hold an important place.

There are hundreds of thousands of plant species. Animal and plant food relations are flexible depending on degree of stocking and variety of plants present.



Durango root (*Datisca glomerata*), a new toxic species demonstrated to be poisonous to cattle in Mariposa County in 1944. When dry forage is depleted, its green leaves and stems are attractive to the grazing animals.

Selective grazing is important and the existence of an ample supply of very palatable species may result in certain less palatable species not being grazed at all on some ranges. On others with less opportunity for selection they may constitute a considerable part of the total feed supply. Great grazing areas in different parts of the world may have entirely different flora constituting the plant cover.

Types of Toxicity

It has been facetiously remarked that any plant is poisonous to livestock provided they eat enough of it, if not by a true poison then by mechanical disturbances. It is of course recognized that all plants do not cause harm in the same way. Thus we have well known powerful plant poisons termed alkaloids from which drugs are made for use as medicines such as strychnine, morphine, atropine, cocaine, nicotine, and so forth.

In some plants the poisonous substance is all through the plant, but in many cases it is concentrated in very definite parts such as the root, leaf, flower, or seed. Thus it may only be present at certain stages of the plant's growth. The toxic substance may have a deleterious action in one species of animal and be not eaten or relatively harmless to another.

Quite a different form of poisoning is that produced by photosensitizing plants. In these species the plant develops a light sensitive substance which when ingested by the animal gets into the blood stream. No harm is even then caused unless the unpigmented white areas of the skin are exposed to sunlight. This results in the light sensitive substance reacting to the light and setting up great irritation or burning in the skin. This causes large areas of the skin to blister and peel off with great distress and loss of weight to the animal.

Klamath weed (*Hypericum perforatum*) is a plant causing this condition. It is grazed heavier by sheep than cattle and produces swelling of the ears, face and head of white faced sheep. The body is protected

from the sun by wool but if closely clipped the body skin will manifest irritation. The Klamath weed has been extensively studied and the active principle in the plant causing the trouble was isolated by N. Pace at the University of California in 1939 and termed hypericin. Thus this plant widely scattered over the northern half of California is not only a noxious weed usurping the range from more desirable vegetation, but also acts as a toxic plant.

In the area of the Merced Irrigation District, photosensitization of cattle became serious some years back with hundreds of animals becoming affected every year. Careful study of the forage plants in the area has so far failed to show any of them to be the cause.

Treating the white parts of the hide of affected animals with machine oil containing lamp black, moving them from affected areas and better drainage, has greatly reduced the seriousness of the trouble. Recent work in Australia has shown that certain algae in standing water may cause the trouble.

Variations in Seasonal Incidence of Plant Poisoning

Stock with valley or foothill winter quarters may have been driven over a definite route to or from the mountains for years and suddenly losses will occur. Careful search may bring out the presence of a plant listed among the poisonous species. Further evidence will bring out the fact that only the root is poisonous, such being the case with water hemlock.

That particular year the soil was very moist when the animals were passing, resulting in pulling the plant from the soil, root and all, in the grazing process.

On the other hand only the flower or seed may be poisonous. The animal coming along at the same time in a very early season will find the plant further advanced and poisoning result. Thus larkspur is a real source of loss in early spring, particularly the first year following a burn.

When feed is very short and scarce, less palatable, and even poisonous, plants will be eaten that would have been left undisturbed under better feed conditions. Loco weed is somewhat in this class, but when animals get the habit of eating it they will search it out on account of having acquired a craving for the effect it seems to produce.



A cow in the area of the Merced Irrigation District affected with skin blisters on the muzzle and about the eye as a result of eating photosensitizing plants.

Thus natural conditions may be favorable for manifestation of trouble only once in three, five, or even ten years.

Constant Additions Being Made to the Poisonous Plant List

Investigations from time to time add new species to the poisonous plant group. A recent study by S. J. Van Der Walt and D. G. Steyn reported in the Onderstepoort Journal of Veterinary Science and Animal Husbandry, March 1946, is a case in point. They worked with eighteen plants from different areas in South Africa and four of them for the first time were proved to be toxic.

A similar finding resulted in July 1944 in Mariposa County, when D. Campbell of the Merced County

Irrigated Pastures And Livestock Parasites

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Lambs given daily doses of sulfaguanidine are protected from clinical symptoms. The high cost of sulfaguanidine, usually renders its use prohibitive as a preventive measure.

Stomach Worms. These worms (*Ostertagia*, large; *Trichostrongylus*, small; and *Haemonchus contortus*, twisted wire worm) invade the fourth stomach and small intestine of the animal. The eggs are excreted by the infected animal. They hatch, become infective, and crawl up the plants where they are eaten by the animals.

In acute cases, animals infected with stomach worms, scour, lose weight, and become weak and anemic. The diarrheic feces are typically blackish and of a particularly foul odor.

Prevention of stomach worm infections on irrigated pastures can be accomplished to a large extent by appropriate treatment of all new animals before they are placed on the pasture and, in heavily infected areas, by treating the animals every three weeks from the time they are three weeks old.

Nodular Worms. Symptoms similar to those of the stomach worm are produced by a group of parasites known as "nodular worms" (*Oesophagostomum*), which in acute cases may be more serious.

Generally these worms become a serious problem only in those regions where summer rains occur, but it is possible that moisture conditions in irrigated pastures may increase the problem in California.

Preventive measures against stomach worms are effective against nodular worms.

Liver Flukes. The liver fluke (*Fasciola hepatica*) inhabits the bile ducts of the liver. The adult flukes deposit tremendous numbers of eggs which are carried into the small intestine with the bile, and are voided with the feces of the infected animal.

At one stage of the life cycle of the parasites an appropriate species of water snail acts as an intermediate host. At a later stage of the development the parasites attach themselves as small white cysts on various meadow and swamp grasses and water plants, where they are eaten

Farm Advisor's office was called to investigate the cause of death of five head of cattle near Bridgeport with others showing severe diarrhea. Adjustments of fencing along a highway had enclosed two acres of additional land on which quantities of durango root (*Datisca glomerata*) were growing vigorously along a wet creek bottom.

None of this plant was present within the old fence line. Dry forage within the field was depleted and the green leaves and stems of durango root attracted the animals. This plant was not listed among toxic species. The evidence pointed so strongly to its being the cause of the trouble that investigations were made at the San Joaquin Experimental Range and the University Farm. This work showed the plant not to be very palatable for test cattle and sheep on good diets. This is quite typical and accounts for plant poisoning being more severe when feed shortage exists.

The data collected was published by K. A. Wagon and G. H. Hart in the Journal of the American Veterinary Medical Association, July 1945. It showed the leaves, seed and seed capsules to be definitely toxic. Sublethal amounts in sheep and cattle cause diarrhea, loss of appetite and general depression.

It is doubtful if sheep would consume lethal amounts under natural range conditions. An intake of 250 to 275 grams resulted in death to a 750 pound twenty-one month old heifer and a 400 pound heifer calf.

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Importance of Legumes in dry land rotation and their value in supplying nitrogen for the succeeding crop, is being studied.

Nutritional Deficiencies in Dams Found to be Cause of Deformities of "Acorn Calves"

"Acorn calves" are more common in the oak belt of the Sierra Nevada foothills than elsewhere.

They may be expected in dry years when animals are confined on poor feed in the same areas throughout the year and spend a long time on dry feed. Deformity is more common

Acorn calves somewhat resemble "bulldog calves," found in Dexter cattle. Bulldog calves are always born dead and usually prematurely. The deformities are much more extensive than in acorn calves, which are most often born at term and alive.

Acorn calves usually will live if



An "Acorn Calf" with the characteristic short legs and the arched back, resulting from multiple nutritional deficiencies in the dam.

in calves from heifers in their first pregnancy, but may occur in offspring of cows of any age.

Deformities of "Acorn Calves"

Various types of deformity are found in acorn calves. The head may be short, often with undershot jaw, or it may be long and narrow. Usually the long bones of the fore- and hind legs are noticeably short. Other abnormalities include incoordination, inability to stand alone, arched back, and a tendency to chronic bloat. This last difficulty is often fatal in animals past the milk-drinking period.

Much rarer abnormalities are spasticity in one or more groups of muscles, wry neck, turning in circles, falling over backward, and goose-stepping.

by the feeding animals.

Moderately infected sheep fail to gain weight properly, are poor mothers, and are easy prey to certain diseases. In very acute infections which are rare in sheep, the animal dies suddenly with bleeding from the nostrils and anus, suggesting anthrax.

Liver flukes in sheep are involved in the occurrence of the serious bacterial infection, Black Disease.

The clinical picture of liver fluke infection in cattle is somewhat different from that in sheep. Constipation is marked and the feces are hard and brittle. Diarrhea occurs only in the extreme stages. Emaciation occurs rapidly and the animals, especially calves, are soon prostrated.

Heavier infections are necessary to produce clinical symptoms in cattle than in sheep. Many times cattle are infected heavily enough for their livers to be condemned in the slaughter house but not sufficiently heavy to produce obvious symptoms. Liver fluke infections in sheep and cattle may be treated successfully.

Effective snail control is the only practical means of controlling liver fluke infections in irrigated pastures.

Several surveys have been made to determine whether or not liver fluke infections were being acquired on irrigated pastures in California, and in no instance has such been found to be true. These investigations have shown that when cases of fluke infections were present in animals on irrigated pastures they were actually acquired elsewhere.

It has been said that liver fluke infections have been acquired on irrigated pastures in Mendocino County. It is true that appropriate intermediate snail hosts may occur on such pastures and it is possible that liver fluke infections may result.

The chief danger lies in the possibility that a snail-host population may build up in the irrigation ditches and that the immature flukes, leaving the snails, may be transported to the pasture plants during irrigation.

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helped to nurse during the first week. With good care they often reach adult life. Though not economically profitable, they can carry through their normal functions, including reproduction.

Vitamin Deficiency Suspected

The bulldog calf condition is hereditary; the acorn calf condition is not.

Acorn calves are so called because of a rather general impression that they result from the dams eating too many acorns during gestation. This is not true, but if acorns are the main ingredient of the diet they may prevent the formation or utilization of some essential food element and thus aid in producing acorn calves.

Experiments prove that the condition is due to maternal nutritional deficiencies, probably occurring between the third and sixth month of gestation. Once the alterations in the development of the fetus have taken place, they are not changed by good feed conditions during later months of pregnancy.

The specific deficiencies involved have not been found. They are multiple border-land deficiencies, and probably include lack of vitamins A, B complex, and D, as well as protein.

Suggested Means of Control

A consistent, constructive policy of livestock management, with supplemental feeding of cottonseed cake or leafy green alfalfa hay practically will eliminate the occurrence of "acorn calves." Such supplemental feeding will enable breeding cows to produce maximum percentage calf crops and calves of optimum weaning weight.

Growers are referred to pages 92 to 97 inclusive in the California Agricultural Extension Circular, No. 131, "California Beef Production." The circular is available without cost from the Farm Advisor of your county or by addressing the University of California College of Agriculture, Berkeley 4, California.

The Department of Forestry is making case studies of privately owned pine, Douglas fir, and redwood forests, with particular reference to the possibilities of sustained yield management by private owners.

The values of some natural feed-stuffs with respect to growth, reproduction, and viability of chickens are under study.

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