

## POISONOUS WEEDS IN ALFALFA HAY

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The presence of weeds in alfalfa hay detracts from the quality of the hay, lowers the potential selling price and may be hazardous to the animal consuming the hay. In a pasture an animal may find a plant unpalatable and refuse to eat it. Poisonous plants may grow in an alfalfa field and be harvested and fed. An animal may have little choice about whether or not to consume the poisonous plant particularly with today's methods of processing hay (pelleting, cubing etc.).

A producer's goal is to harvest a quality hay and market it at a fair price. Much time, effort and expense is directed toward quality control. The present paper will describe some of the weed problems found in alfalfa hay, particularly weeds that are also poisonous plants.

Mechanically Injurious Plants. One usually thinks of mechanically injurious plants as causing problems by being caught in the hair, causing superficial injuries. Many of these plants may be found in hay and can cause problems in the mouth or in rare instances further along in the digestive tract.

The prime problems with mechanically injurious plants are grass awns that penetrate the surfaces of the mouth. The classical plant is the foxtail (Hordeum spp) problem as seen in dogs' ears but in cattle and horses the awns of this plant may become impacted in various areas in the mouth. The awns may cause ulcers with subsequent invasion of deeper tissue. The awns have retrograde barbs on the shafts which aid in the penetration and progression of the awn through the tissue.

Another grass awn that causes a unique lesion in cattle and horses is yellow bristle grass, Setaria lutescens. This is a common weed of moist areas. I've seen cases in dairy herds and in beef cattle that have been fed on poor quality hay.

The clinical syndrome of yellow bristle grass disease is that of an ulcerative stomatitis. The lesion may be anywhere from 3 mm to 2 cm in diameter. Characteristically the surface of the ulcer contains many sharp broken off awns of grass. The lesions may be found on the margins of the lips, on the tongue, on the cheek and gums.

Milkweed Poisoning. There are numerous species of plants which exude a milky juice when the stem is cut. Not all of these are poisonous. However, members of the genus Asclepias do contain toxic resins and glycosides.

There are thirteen different species in California. Only 3 are of any consequence: woolly-pod - milkweed, Asclepias eriocarpa, the most toxic; Mexican whorled milkweed, A. fascicularis, having moderate toxicity; and showy milkweed, A. speciosa, which is the least toxic but most common.

These plants may be found in alfalfa hay and are toxic in the dry state. The clinical syndrome associated with milkweed poisoning may take either a gastroenteric or a nervous form. The nervous form is characterized by depression and poor appetite, the animal is apathetic, there is usually weakness with loss of muscular control as evidenced by knuckling at the fetlock, and falling. There may also be dilatation of the pupil and respiratory paralysis. In certain instances the animal may show convulsions. This is difficult to differentiate from anoxic struggling that may occur in the terminal stages of other conditions.

The gastroenteric form consists of initial constipation. There may be a foul breath. The animals will ultimately develop a fetid diarrhea. Bloat will develop along with salivation. The animal may succumb within one hour or die several hours later.

There are no specific lesions of milkweed poisoning. So this disease must be differentiated from all the other infectious diseases that might cause similar gastroenteritis. As in all cases of poisoning the most important factor is to get a proper history for the inclusion of the poisonous plant in the hay. One must be very meticulous in evaluating a hay sample or a grain sample. You must recognize that poisonous plants may only be present in certain bales or certain portions of the bale and that you may or may not actually get the proper history.

Pyrrolizidine Alkaloid Containing Plants. Pyrrolizidine alkaloids are produced by 5 or 6 plant species but only 2 species are important for our consideration in alfalfa hay: fiddleneck or fireweed (Amsinckia intermedia) and common groundsel (Senecio vulgaris). Both of these plants occur as weeds in hay fields in California. New plantings of alfalfa may be overgrown with the weeds. Both fiddleneck and groundsel prefer moist cool weather for optimum growth. The first cutting could be 10-50% weeds. Stands of alfalfa that are heavily infested with weevil may allow weeds to take over. Only rarely are the weeds a problem in second and later cuttings. Oat hay may be contaminated with these weeds also.

There may be a marked variation in the alkaloid content of plants from season to season and during different growth stages. Pyrrolizidine alkaloids damage liver cells by preventing normal cell division. With the failure of mitosis, the cell continues to grow up to 4-10 times its normal size. Once the cell is affected it continues to grow until it outgrows its nutrition and ultimately dies. Most of the cells in the liver may be affected by one exposure to the alkaloid. When sufficient cells are necrosed, the liver ceases to function and a typical liver disease will develop.

Clinical Signs. The clinical signs manifested in pyrrolizidine alkaloid poisoning cannot be differentiated from infectious hepatitis or other hepatopathies caused by other plants. Horses and cattle become incoordinated and may fall when attempting to walk. Animals may stand with their heads in a corner or up against a solid wall. Other signs less commonly seen include straining and coma. The animal may become more bright and alert and may even stand again after this coma has passed. Icterus is common, but needn't be present. The key to diagnosis is the enlarged liver cell which may be observed from a liver biopsy or on a postmortem specimen.

There are some important facts that must be borne in mind when considering pyrrolizidine alkaloid poisoning.

1. Pyrrolizidine alkaloid poisoning is one of California's most important plant problem especially in hay.
2. The clinical effects are not usually seen until 2 to 8 months following an exposure. This makes it extremely difficult to obtain a proper history and piece the puzzle together
3. Young rapidly developing animals are more susceptible to the effects of pyrrolizidine alkaloids than more mature animals.
4. Pyrrolizidine alkaloids cross the placental barrier and can affect the developing fetus
5. Pyrrolizidine alkaloids are secreted in the milk of lactating females that are actively consuming plant material containing the alkaloids.

This then makes it possible for human involvement in the case of dairy cattle.

Lathyrism. Ornamental sweet peas, caley pea, and rough pea, Lathyrus spp. are legumes, closely related to vetch (Vicia spp.) and are easily confused with vetch in baled hay. Neurolathyrism is produced by chemicals in the plant that cause damage to the spinal cord.

We experienced an outbreak of poisoning involving a field planted with what was thought to be vetch and alfalfa and harvested as hay. Instead of vetch, it turned out to be caley pea. Clinical syndromes developed in both cattle and horses when fed this hay. I could describe the condition as approximating the "tying-up" syndrome in horses. Animals had a stilted gait. The center of gravity was pushed forward over the front legs giving the appearance of the horse balancing on the front legs and using the hind legs to move forward in short mincing steps.

This outbreak of lathyrism reminded me that new problems can and do show up. Agriculture is still trying to improve production with new plant species. Different cultural practices may cause the development of new plant problems. Continued diligence must be exercised to keep weeds out of hay.