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Bulletin No. 19 - Squirrel - Tail Grass (Fox-Tail), One of the Stock Pests of Wyoming

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(FOX-TAIL.)
One of the Stock Pests of Wyoming.

BY THE BOTANIST.

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SQUIRREL-TAIL GRASS.
(FOX-TAIL.)

One of the Stock Pests of Wyoming.

AVEN NELSON.

In the winter of 1892, while cleaning some sheep skulls for comparative work in anatomy, the writer's attention was first called to the remarkable malformations and diseased conditions of the jaws of stock to which had been fed, for a time, hay containing even a small quantity of the matured grass elsewhere commonly known as Squirrel-tail or wild barley, but in Wyoming more usually as Fox-tail. Subsequent inquiry and investigation has developed the fact that the prevalence of this grass in the meadows of this state, and of the west generally, is so great and the injury such as to justify calling attention to it in this public way.

SQUIRREL-TAIL. — (Hordeum jubatum L.)

In this genus of grasses (Hordeum) belong the cultivated and wild barleys. The former are among the earliest grains of which we have any historical mention, and the wild barleys have likewise been known for a considerable time. Hordeum jubatum, the species under consideration, was known to Linnaeus and has been frequently mentioned by agricultural writers since that time.

It seems to be sparsely distributed over a large part of North America and over parts of Europe and Asia. Soils
impregnated with alkali and other similar salts are particularly favorable to its luxuriant growth, possibly because other grasses do not thrive so well in such soils and hence do not crowd it out, rather than because such conditions are the most favorable. Wet lake and sea-shore meadows and cold, wet alkaline plains are rarely free from it. This will in part explain its rapid spread in this and our neighboring states, for with the extension of our irrigation systems the above conditions are being multiplied and the means for the rapid distribution of its seed are furnished. The land immediately adjoining irrigation ditches and low places, wet from seepage, as well as land flooded early in the season or on which the water has been allowed to stand throughout the winter and spring are particularly liable to be infested. The seed, distributed by the water of the ditches, by the wind, and carried by animals to which it clings by reason of its barbed awns, finds in such places suitable conditions and but slight competition from other plants.

All the grasses of the genus *Hordeum* are characterized by the presence of numerous awns or beards, which in several of the species are quite long, stiff, sharp and freely and strongly barbed. This quality has always condemned the wild species as forage grasses and relegated them to the noxious weeds, except as they have found a place in collections of ornamental grasses. *Hordeum jubatum*, as well as the closely allied species, *Hordeum pratense*, have by all writers been excluded from the forage grasses because of the injuries inflicted upon stock to which they are fed.

That the fact of such injuries has been for a long time known is shown by the references made to it by agricul-
tural writers both past and present. The following is a quotation from Sowerby's Grasses of Great Britain: "In the days of equestrian travelling, one of the greatest recommendations of an inn, in the Isle of Thanet, where this grass is very common, was that of having hay without any admixture of Squirrel-tail."

**ITS NUTRITIVE VALUE.**

In the various chemical analyses of the grasses which have been made it has been shown that Squirrel-tail is not without nutritive value. In fact it ranks as high as some that are recommended for cultivation, but this signifies nothing when it is remembered that many other grasses are either equally or more nutritious and that their use is attended with no danger to stock. This being so, we must look upon Squirrel-tail as a weed whose eradication should at all times be sought.

**BOTANICAL CHARACTERISTICS.**

This grass is probably well known to most farmers and ranchmen, but if not its recognition will be a matter of no difficulty. With the aid of the following description and the accompanying plates, I and II, it will be an easy matter to distinguish between this and other grasses:

The head is compact but elongated and forms what is know as a spike. This is made up of a number of one-flowered spikelets, three of which are borne at each joint of the central stalk or rachis. Each spikelet has an awl-shaped rudimentary floret at each side, which is short awned. Six empty husks or glumes are borne on short stalks at the base of the perfect floret. These are the long, lateral, divergent awns, and are slightly shorter than the long central awn of the glume covering the perfect floret. The awns are hisped or barbed and so diverg-
ent as to give a very bushy appearance to the spike. At maturity the spike disarticulates and the awned seeds are left free to be carried everywhere by the wind. The grass grows in rather compact bunches eight inches to two feet high. The leaves are short and flat, the spikelets a very light green or yellow and very fragile.

INJURIES INFLECTED.

By observation and inquiry the following facts in regard to the injury inflicted by its use have been noted:

The awned heads when taken into the mouth break up into numerous sections, scatter about within the mouth and everywhere adhere to the mucus membrane, which soon becomes pierced with the long stiff awns. As the animal continues to feed more awns are added and those already present are pushed deeper into the flesh. Inflammation soon results and leaves the gums of the animal in a condition to be more easily penetrated. The awns are particularly liable to be pushed down alongside of and between the teeth. As the swelling and festering progresses the awns are packed in tighter and pushed deeper and cause suppuration of the gums as well as ulceration of the jaw bones and the teeth. Through the absorption of the ulcerated sockets and roots the teeth become loosened and even drop out, but the animal, impelled by hunger, still endeavors to eat such hay as may be offered. If the cause is continued the disease progresses till the bony tissue of the jaws is disarranged, the ulcers extend to all parts of the jaw bone and it becomes distorted and enlarged, somewhat as in Big-jaw (*Actinomycosis*). The spongy marrow-filled interior of the bone is by the ulceration changed into great cavities, filled with the broken awns (Fig. B.) This condition may continue
till the cavities extend entirely through the jaw and the tightly packed awns protrude till they may be pulled out with forceps or fingers.

On the authority of a number of observant stockmen I learn also that in many instances the awns penetrate in like manner the palate bones and work up into the nasal passages. The throat and probably the stomach suffer similar invasions, and as the awns are heavily cutinized they do not, when they have entered the tissues, decay so as to permit of removal by absorption.

It is probable that all kinds of stock suffer to about the same extent, but as horses are more constantly hay fed it is more often remarked upon them than is the case in cattle and sheep. The latter, however, are subject to a new danger as well, for the awns are caught in the wool about the eyes and work into the tissues surrounding the eye and even into the eye-ball itself, in many instances causing total blindness. I have learned of one case in which this resulted to all of a bunch of calves that were turned in to feed out of a stack of hay containing a considerable quantity of Squirrel-tail.

In the accompanying plates, III, and IV, the effects upon the jaw bone is shown by comparison of the healthy condition with the diseased, and although these figures do not represent extreme cases, yet they reveal enough to completely condemn Squirrel-tail as hay.

The grass before it heads is said by some to form fair pasture, but stock on the range will not touch it after the heads mature and it is only when mixed with other hay that it gives trouble, as it cannot readily be separated.

THE CAUSE.

I have already referred to the cause of its spread and
prevalence in meadow lands. Being indigenous to this region and our soils in many places being better adapted to its growth than for the growth of other grasses, it needs only the requisite moisture for the production of a luxuriant crop.

Professor Cassidy, in his bulletin on Colorado Grasses, speaks of it as a product of over-irrigation, and this seems to represent the general consensus of thought on the question. The better meadow grasses readily compete with it for position under normal conditions but cannot endure constant flooding from ditches, especially during the early spring and summer.

It is also likely to appear on lands from which for any cause the other grasses, native or cultivated, have disappeared. This frequently happens where irrigation has been carried on for a number of years and is then abandoned. Under irrigation the original grasses are gradually replaced by those which thrive best with plenty of water but which soon perish when the supply is cut off and leave the field clear to be occupied by the first hardy invader.

THE REMEDY.

The eradication of this grass ought not to offer a very difficult problem to our ranchmen, and its prevalence is due rather to indifference on their part, owing to a lack of a full comprehension of the injury wrought rather than a lack of ability to cope with it.

The first suggestion is care in irrigation to prevent the occupancy of new territory. Next that steps be taken to get rid of it where it is now found. As it is an annual this should not be difficult, for if it is not allowed to seed it will not appear the next season. In fields where native
grasses are relied upon this may be accomplished by cutting such portions of the fields as show Squirrel-tail before it heads and repeating the operation often enough to prevent seeding for one season. If cut before heading it is fairly nutritious and gives no trouble in the hay. In fields of cultivated grasses that have become foul perhaps the best remedy is plowing and planting to other crops and seeding down new ground with clean seed.

A little care in this matter will fully repay the farmer and ranchman, not only by preventing the loss of stock but by the increased thrift and growth due to the proper nutrition of proper food. Nor is it to be forgotten that the market value of hay depends in part upon its freedom from this pest. No person who values his stock or desires to bestow upon animals under his care even ordinary humane treatment will feed hay in which it is found.

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**Fig. A—Cross section of normal jaw bone:**
- a, fang of tooth; b, marrow.

**Fig. B—Cross section ulcerated and enlarged jaw bone:**
- c, decayed fang of loosened tooth; d, cavity in enlarged jaw, the imbedded awns removed.

**Fig. C—A single seed, awns slightly reduced but barbs exaggerated to show direction.** 
The awns probably penetrate the flesh broken end (seed end) first.
PLATE I. — *Hordeum jubatum* L.—A single plant showing character of leaf and fruit.
PLATE II. — *Hordeum jubatum* L. — A tuft of the grass as it usually grows.

Note. — Plates I and II we are able to present through the courtesy of Professor Crandall of the Colorado Agricultural College. They are from his bulletin on Colorado Weeds.
PLATE III.—Sheep jaws. Fig. 1—Normal condition. Fig. 2—As enlarged and ulcerated by “Squirrel-tail” hay.