

Vitamin A Is Essential To Profitable Livestock Production

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Heavy losses of breeding animals and young in spring.

EVERY Spring many breeding cows, ewes and sows become thin, unthrifty, eat little or nothing, become weak, often are unable to stand and may become blind. Many of them die. The young are dead at birth or so weak they soon die. The mothers have little milk or are entirely dry, and often retain the after-birth. These conditions may also develop in females that appear to be in good condition. Mature chickens often show a white film over the third eyelid, a cheesy discharge in the eyes, and a sticky discharge from the nostrils. Chicks fail to grow, show a staggering gait, ruffled feathers and inflamed eyes. Many young animals which are born before pastures become green, develop scours and die of pneumonia. Any of several factors may produce these conditions, but poor quality feed is usually involved and lack of vitamin A commonly is a major factor.

Importance of Vitamin A not Realized

Although vitamin A has been known for a number of years and the effects of its lack on farm animals is well established, livestock producers generally look upon this information as of technical interest but of no practical importance. But considerable evidence is available to show definitely that many serious losses which occur among farm animals, can be explained only by knowing the effects of a shortage of vitamin A, losses which may be prevented by providing sufficient amounts of this vitamin to meet the animals' needs.

Vitamin A needed by all animals

All classes of farm animals including poultry, require vitamin A during growth and after reaching maturity. Symptoms of lack of vitamin A vary with different animals and at different ages. But the most serious economic losses occur in connection with reproduction, egg production, milk production and during the early life of the young. Very little vitamin A is stored in

the bodies of young animals at birth, so that they very soon show the effects of its lack if it is not included in the feeds of the mother and young.

Sources of vitamin A

Animals convert the yellow plant pigment, carotene, into vitamin A. This pigment is found in yellow plants such as carrots and yellow corn and in green leafy plants. Cereal grains, except yellow corn, are low in carotene. Green pasture plants are excellent sources of carotene and during the spring and early summer, when pastures are green, animals on pasture not only obtain sufficient carotene to produce all the vitamin A needed immediately but enough in addition to permit them to store reserves in the liver and fat of the body. In plants which have become brown or bleached because of maturity, or from being killed by drouth or freezing, the carotene is destroyed, and the animals can no longer obtain vitamin A from them. Hay which turns brown when being cured or in the stack, or is made from mature or frozen grass contains little or no

carotene. Bright, well-cured hay which contains an abundance of carotene when first cured, will gradually lose carotene even in dry storage and will retain very little vitamin A value at the end of a year.

Storage and depletion of vitamin A in the animal

Cattle, sheep or hogs which have grazed on green pasture during the spring and early summer will have stored sufficient reserves of vitamin A in their bodies to last them several months on feed which lacks carotene or vitamin A. Frequently, North Dakota pastures become dry in July or August, and produce little or no green feed before freezing weather. During the winter the sheep and cattle either continue to graze on the brown and often bleached grass or they are fed brown or bleached hay, straw or corn stover. During this time the body reserves of carotene and vitamin A are being gradually used up, and in 4 to 7 months, will be practically all gone. Poultry also obtain vitamin A from the carotene of green grass. When the grass becomes dry they too use the vitamin A stored in the body. The pregnant female needs vitamin A to maintain her own body, to provide the vitamin required for normal development of the young before birth and to enable her to produce milk when the young is born. But, having obtained no vitamin A from her feed for several months and having depleted her own reserves, none is left to meet these needs when they are greatest, during the latter part of gestation and at the time of the

birth of the young. Laying hens also use large quantities of vitamin A in egg production, and soon deplete the body stores. During the time when the animal is on feed low in vitamin A, various tissues and organs in the body are being thrown out of order. When definite symptoms of the deficiency appear it is too late to correct the condition by giving vitamin A concentrates.

How may troubles from vitamin A deficiency be prevented?

Green pasture is often available for only 3 or 4 months during the year. Although this pasture is rich in carotene it does not enable the animal to store a sufficient reserve to carry through the other 8 or 9 months. It is entirely possible to cure hay with a bright green color, containing about one third as much carotene as fresh pasture. Green, leafy fine stemmed alfalfa hay is one of the best sources of carotene, but grass hay, cut just before bloom or in early bloom, and cured with a green color is also a good source of carotene. The following amounts of good quality alfalfa and grass hays will provide adequate amounts of carotene for the animals indicated. The figures for brown hay are included to show the differences in vitamin A value of high and low quality grass hays. Green colored alfalfa leaves or leaf meal or yellow corn are the best sources of vitamin A for poultry, when no fresh grass is available. If these feeds are not available, vitamin A concentrate should be mixed in the poultry feed.

Daily Allowance	1000 pound Cow	125 pound Ewe	300 pound Sow
Alfalfa hay, green leafy	1.1 pounds	0.14 pound	0.33 pound
Grass hay, early cut, green	3.3 pounds	0.46 pound	1.00 pound
Grass hay, brown	30.0 pounds	4.25 pounds	10.50 pound

The amounts indicated for the cow and the ewe are considerably less than those animals will ordinarily eat, so that the carotene needs of these animals can be met quite readily when high quality hay is fed.

Sows will eat a surprising amount of good quality hay if it is kept before them in a rack. They will eat the amount of high quality grass hay indicated and considerably more than one third pound of alfalfa hay.

The amounts of brown hay required to supply the needed carotene are higher than the animals will eat.

In addition to the relatively large amount of vitamin A in high quality green colored hay, made from grass cut at the right state, the protein will be two or three times as high as that of hay made from mature or frozen grass. Protein is nearly always relatively expensive when purchased, but a large part of the protein needed by farm animals can be provided in early cut hay. The calcium and phosphorous in hay made from grass cut early are also higher than in hay from mature grass, and protein and mineral deficiencies complicate the low vitamin A troubles among breeding animals and their young. Hence, properly made hay will go a long way in preventing many difficulties in the breeding herd.

Storage is also important in conserving the carotene in the hay. High temperature, mold, water, and exposure to air will destroy caro-

tene. Much hay is left in small cocks or is poorly stacked so that water from rain or snow penetrates and wets it. Wet hay will heat and often mold. Such hay has little or no carotene left.

Weather, time, labor and equipment are limiting factors in hay making. Many livestock men would do far better to properly cure and store a smaller amount of hay, rather than to put up a large quantity of poorly cured, improperly stored wheat grass hay cut at the proper time will contain 376 pounds of protein and 41,000 milligrams of carotene, but a ton cut after the wheat grass has matured will contain only 181 pounds of protein and no appreciable amount of carotene. Hence, one ton of the early cut hay would contain more protein than two tons of the late cut hay and the early cut hay would provide enough carotene to supply the animal's needs while the late cut hay would provide no carotene.

Summary

A large proportion of the losses of young animals, of low milk flow in sows, ewes and cows, of deaths among breeding animals, and of low egg production in poultry, is caused by insufficient vitamin A in the feed during the fall and winter. Cereal grains and most roughages are poor sources of carotene, from which animals make vitamin A. Grasses should be cut for hay during the early bloom stage, to secure high carotene hay. The hay must be cured with a bright green color and stored to protect it against damage from weather.

All methods of weed eradication may fail to reach complete success because of a few plants which are missed. These few, if allowed to continue growth, may produce a large amount of seed or quickly re-establish patches by root-growth.

New methods will not eliminate the need for identification and careful observations on behavior. The reaction of particular weeds to their surroundings may be of more importance than their general habits. Western wheatgrass is essentially similar to quackgrass in general growth habits. It thrives under limited cultivation but is less persistent than quackgrass under intensive cultivation. (O. A. Stevens.)