

# Nutrition for Breeding Herds and Flocks

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Good bluegrass pasture helps insure adequate diet.

Good pasture is the natural feed for livestock. When good both as to quality and quantity it makes a most acceptable ration for breeding animals. Under ordinary circumstances, its cost is relatively low; its supply of food elements is complete and its general effect upon the digestive apparatus of the animal is highly bene-

ficial. The farm equipped with good pastures is in a highly advantageous position so far as caring for a breeding herd or flock is concerned.

The kind of ration consumed is one of the important factors that determine whether an animal will make a satisfactory record in the breeding herd. It is desirable that an animal be well nourished at all times, but the state of nutrition is especially important during the reproductive stage. If females receive an inadequate ration during the stage of gestation the young may be dead at birth or too weak to survive. If they receive an inadequate ration during the stage of lactation the milk may be so deficient in amount that the young cannot attain a normal rate of growth, and are stunted before they are weaned. The milk may also be so deficient in quality that many of the young die before they are weaned, even if the supply of milk is abundant. The nutritional requirements of animals may be divided into four classes: (1) Protein. (2) Energy (Quantity of feed). (3) Minerals. (4) Vitamins.

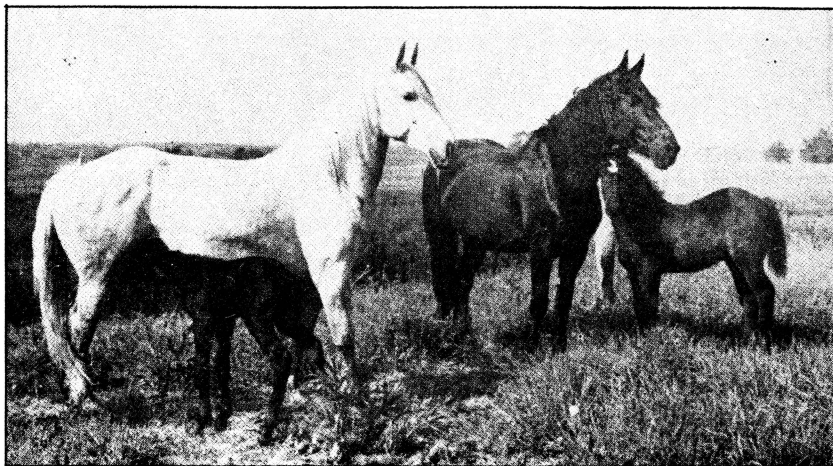
#### **Protein**

Animals should receive enough protein at all times to keep them in a thrifty condition, and the amount required by females rises during pregnancy. The increase is small at first but the requirement is distinctly higher at the end of the period than it was at the beginning. During the stage of lactation, however, the requirement rises steeply. Breeding stock in milk, require approximately twice as much protein a week after delivery as they did the week before. A heavy milking dairy cow may require three times as much protein after calving as she did before. Milk contains a high percentage of protein, and milk protein cannot be manufactured from any raw material except feed protein.

#### **Quantity of Feed**

There is no advantage in keeping breeding stock in extremely high condition, in fact such a practice is objectionable. It is advisable, however, to keep them in a thrifty condition. If females are excessively thin they may not come in heat as regularly as they would otherwise, and they are less likely to conceive. The appearance of the animal is the best guide to the amount of feed that should be supplied. As the stage of gestation advances, however, females should be allowed to accumulate some fat, at least if they are expected to secrete any considerable quantity of milk. A brood sow, a ewe, or a heavily milking cow is unable to consume enough feed to maintain her weight, and at the same time give enough milk

to support a rapid rate of gain in her young. It is advisable therefore to provide her with a reserve of fat to tide her over the period of heavy milking.



A good pasture is a fine place for brood mares and colts.

### Minerals

So far as is known there are only two minerals in addition to common salt that require any special consideration in Missouri. These are calcium and phosphorus. The rations of swine consist chiefly of concentrates, which as a rule are deficient in calcium. If, however, the ration contains a liberal amount of tankage or skimmilk, they will supply enough calcium or lime. Another excellent source of calcium is a liberal supply of a young, vigorously growing pasture. The mineral most likely to be deficient in the ration of ruminants is phosphorus. Few forages contain large amounts of this element, and some do not contain enough.

The standard mineral mixture in this state is equal parts of finely-ground limestone, steam bone meal, and common salt. Because of the difficulty in obtaining steam bone meal, defluorinated rock phosphate is recommended as a substitute. Unfortunately, however, the capacity of the defluorinating plants is insufficient as yet to meet our requirements. Acid phosphate has been used as a source of phosphorus, but it too usually contains some fluorine. Fluorine is decidedly injurious to livestock if consumed for a long period in excessive amounts, and the maximum percentage of fluorine in substitutes should be declared on the label of every package. Authorities in this field advise against using rock phos-

phate that contains over 0.1 per cent of fluorine. Products which contain more than that should not be used for any extended period unless it is necessary.



Fall-sown grain supplies green feed for fall and winter.

There is one important method of conserving our supply of feeding phosphates that should not be overlooked. Though some rations do not contain enough of this substance, many rations contain more than enough. It is wasteful to add phosphorus to a ration that already contains enough.

#### Vitamins\*

In practice, a ration is more likely to be deficient in carotene, or in vitamin A, than in any other vitamin. This is largely due to the fact that yellow corn is the only widely used concentrate that contains any considerable amount of carotene. If yellow corn makes up most of the ration it will supply the minimum requirement. It is possible then that if yellow corn is replaced by white corn, wheat, barley, or oats in the ration of swine, the animals will receive insufficient carotene even for growth or maintenance. Good quality green forage usually supplies an abundance of carotene, even during the reproductive stage when the requirement is highest, but the amount in poor quality forage may be greatly reduced. Carotene is readily destroyed by high temperatures, by exposure to strong sunshine, and by exposure to rain. In order to assure an adequate intake of vitamin A then, brood sows should be supplied with a good quality of forage, especially during gesta-

\*For a more detailed discussion see Mo. Agr. Exp. Sta. Bul. 453.

tion and lactation. A good legume hay will supply the sows with sufficient carotene. A good winter pasture, of bluegrass or one of the small grains such as barley, rye, or wheat, will be even better.

Carotene, or vitamin A, is equally important for other breeding females, such as ewes, cows, or mares. A reasonable allowance of high quality forage will supply the vitamin. Low grade roughage is not a dependable source. The color of forage is a fairly reliable index of its quality. If forage still retains its green color it probably contains a sufficient amount of carotene. Forage that is weatherbeaten, and bleached or brown, is probably very low in carotene. The necessity of supplying breeding females with a liberal amount of carotene applies to all species. When the ration is deficient many of the young will be dead at birth or too weak to survive. During the suckling stage there will be trouble from scours and unthriftiness, and the death losses will be high.

#### Other Vitamins

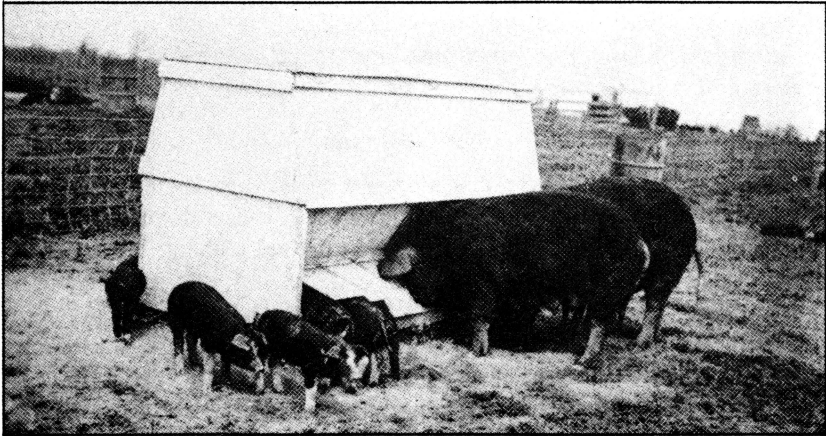
It is possible that livestock may receive an insufficient quantity of some of the other known vitamins, but these deficiencies are less probable. If livestock are out in the sun when the weather permits, they will be protected from a deficiency of vitamin D. It is possible to make up rations for swine that are seriously deficient in riboflavin or in niacin (nicotinic acid) and it may be that some of the rations in common use are mildly deficient in these vitamins. However, the rations that will insure an adequate supply of carotene are almost certain to supply adequate amounts of riboflavin



Sows and pigs find much nutritional value in red clover and do well on it.

and niacin in addition. So far as is known now there is no reason why any precaution should be taken to supply either of these vitamins to sheep, cattle, or horses.

As has been indicated previously it seems fairly certain that there is no great difficulty in supplying swine with all known vitamins. There are excellent reasons though for supposing that their rations are at times deficient in certain unknown, or unrecognized vitamins. For example the Missouri Station has had considerable experience with a ration of yellow corn, tankage, linseed oil meal, alfalfa meal, and a mineral mixture, supplied to sows in dry lots.



Where dry lot feeding is necessary, quantity and quality (required food elements) are necessary for satisfactory results.

If the quality of the various constituents is satisfactory this ration should supply an adequate amount of all known vitamins. Occasionally the results have been excellent. As a rule though the ration was unsatisfactory. Many of the pigs died before they were old enough to wean. At some time or other before weaning the pigs were unthrifty, and developed scours. The weaning weights were low and a considerable number of the pigs could be classed as runts. It is believed now that these unsatisfactory performances are due to a deficiency in the ration of some unrecognized vitamin. High levels of alfalfa meal in the ration, fifteen or twenty per cent, improve it, but do not make it satisfactory. Experience shows that the most practical way to make the ration entirely satisfactory, is to include green pasture. If winter pasture of suitable quality is available, it should be provided. Brood sows, and their litters,

should be on pasture as soon as the weather permits. This pasture is important during the last third of gestation. It is essential during lactation, for a high degree of success in raising pigs.

A strenuous effort is now being made to increase pork production. There will be more sows to farrow in 1943 than in 1942. At the same time the supply of high grade feed is curtailed. There is reason to expect that our attempts to increase pork production will be partly nullified by higher pig losses. These losses can be partly prevented, by providing pasture for the sows. Unless unusual precautions are taken, sows in dry lot or bare pastures cannot wean satisfactory litters. The provision of high quality pasture will help solve many difficult problems in livestock production.

The nutritional requirements of male breeding animals are less exacting than those of females, but the ration must be adequate if males are to maintain the highest level of fertility. Information on this point is incomplete, but it is believed that an unsatisfactory ration may reduce the number of spermatozoa, or reduce their activity, or may cause other abnormalities. Breeding males should be kept in medium condition, and should have ample exercise. They should be supplied with forage of high quality, and whenever it is practicable to do so they should be supplied with fresh green feed. There are reasons for believing that fresh green forage is superior to the dried product for both male and female breeding stock.

### **Poultry**

In some respects poultry production is in a more critical position than the production of other classes of livestock. Laying hens are seldom on the range during the season when hatching eggs are produced, and likewise chicks or poults seldom have access to the range until they are fairly well grown. The diet then is composed almost entirely of grain, and of concentrates which are purchased for their protein and vitamin content. The vitamins that are most likely to be deficient in poultry rations are A, D, and riboflavin.

If either vitamin A or D is deficient in the ration of laying hens the hatchability of the eggs is low, and the chicks or poults that do hatch are weak and suffer a high mortality. If the rations of baby chicks or poults are deficient in vitamin A they become weak and die without any very characteristic symptoms. A deficiency of vitamin D causes soft beaks, also soft and deformed bones, and if severe the mortality is exceedingly high. Normally

vitamin A is provided in the ration of laying hens by including yellow corn and alfalfa meal in the ration. In this climate it is usually possible to keep laying hens out in the sunshine long enough even in winter months to protect them from a deficiency of vitamin D. In order to obtain superior hatching eggs though, it is advisable to include this vitamin in the ration. Both vitamins A and D are readily available at present, as fish liver oils, or satisfactory substitutes. The activity is quite variable, and the amount supplied should be governed by the declared potency.

A deficiency of riboflavin likewise reduces the hatchability of the eggs, and the chicks that do hatch are of low vitality. In addition many of the newly hatched chicks are deformed. The toes are tightly curled, and the legs stick out at grotesque angles from the body. If the diet after hatching is deficient in riboflavin the curled-toe condition, or curled-toe paralysis, will develop. The death rate is very high if the deficiency is severe. The riboflavin content of the diet is usually reinforced by including alfalfa meal, dried skim-milk, or dried whey. Some of the newer riboflavin concentrates are known as whey solubles and distiller's solubles. In normal times these riboflavin carriers are readily available, but under war conditions they are scarce and at times unobtainable. The uncertainty of obtaining these supplies is exceedingly serious. The season for producing hatching eggs, and of growing the baby chicks or poults, is comparatively short. If proper feeds are not available at this critical time all types of poultry production will be inevitably curtailed. An adequate supply of vitamins is a pressing necessity in the poultry business.

As long as the feed shortage persists, it will be necessary to make the fullest possible use of substitutes that may be available locally. If skimmilk, buttermilk, or whey can be obtained they should be supplied to the laying stock and to the baby chicks or poults. One half to one pound of the liquid to each pound of dry feed should be a liberal allowance. If a small quantity of green feed could be cut and carried to the flock, all vitamin requirements would probably be met. Green bluegrass, barley, wheat, or rye are excellent sources of vitamins. During the winter and early spring 1 pound of grass to 6 pounds of dry feed should provide the required vitamins. After rapid growth starts up in the spring, and the grass becomes more watery, the proportion should be increased. One pound of very tender grass to each 3 pounds of dry feed would not be excessive.



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