Nutritional notes

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CONSIDERABLE publicity has been given recently to the stock losses which occurred on a farm in Victoria where superphosphate which contained zinc sulphate was used to make a stock lick. As a result the Victorian Department of Agriculture has warned farmers not to add fertilisers of any type to stock licks or to drinking waters.

For some years I have advocated the addition of superphosphate to drinking water, as I consider this to be a cheap and easy way of supplying additional phosphorus to stock. For similar reasons, the preparation of concentrated phosphatic solutions for damping down feed has been recommended. It is not surprising, therefore, that the Victorian recommendations have prompted enquiries concerning the safety of continuing with the West Australian practice.

Careful tests were carried out in this State before the suggestion was made public that farmers should use superphosphate as a source of phosphorus for direct feeding to stock. Five years' experience so far confirms my considered opinion that no harm can result from the use of superphosphate in the ways I have recommended. The addition of superphosphate to stock drinking waters has become a common practice in the dairying areas of West Australia and no reports have been received of any deleterious effects.

About half the bulk of commercial superphosphate consists of insoluble inert material of little or no value to the farmer. When superphosphate is added to stock water, the valuable water-soluble phosphate goes into solution and is consumed along with the water. The insoluble material sinks to the bottom of the container and can be discarded. If, in contrast, the ordinary super is mixed with feed or with salt to make a stock lick then the animals willy-nilly have to eat the dross along with the useful phosphate.

As far as is known, plain superphosphate contains only one substance which is considered to be toxic and that is fluorine. Many tests were made, therefore, to determine how much fluorine was present in solutions prepared in various ways. It was found that drinking water treated as directed with up to 5 lb. of superphosphate per 100 gallons did not supply enough fluorine to be dangerous, even if consumed throughout the year. However, animals are being kept under observation to determine if any long-term disabilities appear with the passage of the years. There is no reason to expect evil consequences as the daily intake of fluorine is well within the calculated safety limits.

It is of interest to note that concentrated phosphate solutions prepared by mixing superphosphate with water at the rate of 5 lb. per gallon are almost free of fluorine. Where such solutions are prepared for use on feed or in drinking water, the fluorine hazard is completely eliminated.

It was never expected that farmers when preparing phosphatic supplements for stock would use superphosphate containing copper or zinc. Plain super is much cheaper, and special lines of fertilizer should only be purchased for use on land deficient in specific plant nutrients. However, the Victorian example indicates that there is a need to warn farmers of the potential danger to stock of added zinc or copper. Perhaps farmers may misleadingly believe that extra "trace elements" may be beneficial to stock and for this reason may be tempted to use compound fertilisers in stock licks or in the drinking water. It should be remembered that our stock do not suffer from lack of zinc even on zinc-deficient country and that the best way to supply copper is through top-dressed pasture. It is the phosphate, which is needed by productive dairy cows. At the Bramley Research Station, experimental cows have each been receiving daily one pint of concentrated superphosphate solution over the last two years. In 1952-53 these supplemented cows produced an average of 259 lb. butterfat for the lactation compared with 222 lb. from the control cows in the same herd (as heifers the control cows were somewhat more productive than the group to be supplemented).

To summarise. In this State no deleterious effects have been reported following the consumption by stock of solutions prepared from superphosphate. These solutions have been in use for periods up to five years. There seems no reason to anticipate any evil effects so long as farmers use only plain superphosphate and use it as directed in Leaflet No. 1069, Department of Agriculture, Perth.

The quantities recommended are:

For Addition to Drinking Water.
3-5 lb superphosphate per 100 gallons of water.

For Preparation of Concentrated Solution.
Thoroughly mix 5 lb. superphosphate on one gallon of water and leave to settle. Use one half-pint of the clear supernatant fluid per cow daily.

741

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WILL EXTRA LIME PREVENT MILK FEVER?

It is now a recognised practice to give injections of calcium boro-gluconate to restore cows which have gone down with milk fever or to sheep which have collapsed because of “transit tetany” or “hypocalcaemia”. Because these conditions are due to lack of calcium in the bloodstream and the response to injections of a calcium salt are often so dramatic, farmers sometimes assume that the cause is a lack of calcium in the diet. Such is not the case, however, and there is no evidence to suggest that the troubles can be prevented by feeding limestone licks or giving calcium drenches.

Hypocalcaemia (low blood calcium) results from what appears to be only a temporary upset in the mechanism which controls the level of calcium in the bloodstream. This upset can be produced in a productive cow about calving time by the strains associated with imminent lactation. It can be produced in sheep, particularly pregnant ewes near term, by unaccustomed movement or temporary upsets (hence the term “transit tetany”). Without treatment the animals sink into a comatose state and generally die. With treatment recovery is generally spectacular and permanent.

Affected stock are generally in good condition and are receiving rations containing plenty of lime. Thus milk fever is often seen in dairy cows on clover pastures which are particularly rich in calcium. This being so one would hardly expect limestone licks or limewater drenches to be of preventive value. Just what causes the temporary lack of calcium in the blood is not properly understood but it is not lack of lime in the system as a whole. A piece of grit in a carburettor will stop an engine for lack of petrol although the tank may be full. Likewise some temporary metabolic upset may so reduce the calcium in the blood that the animal dies from hypocalcaemia despite a system rich in lime. The injection of calcium boro-gluconate will generally set the mechanism in motion again and an uneventful recovery to normal follows. As regards prevention, little more can be recommended than to do everything possible to ensure that breeding stock can complete their pregnancies in good forward condition free from any upsets or disturbances likely to throw the system out of gear.

THE BEST WAY TO FEED HAY

It is commonly assumed that hay, particularly before being fed to stock. This assumption is farmers who are putting hay through a hammer mill do any good?

When long hay is fed to stock there appears to be considerable waste. According to the quality of the hay and the hunger of the stock a proportion of the fodder remains uneaten. But it does not follow that the stock would be any better off if they ate the lot. Even good hay contains a proportion of material which is of no nutritional value. Coarse mature herbage will often require more energy to digest than it can yield to the animal eating it.

When long hay is made available, the stock select the most nutritious fraction and discard that which is useless. If the hay is chaffed then the bad is mixed with the good and it all has to be eaten. The farmer may consider that by doing this, waste has been eliminated. This is not necessarily the case; it may merely mean that the stock are forced to eat fibrous roughage which is of negative value.

The same result may apply when molasses or condiments are added to poor quality hay or cocky chaff to entice stock to eat it. Indigestible roughages do not gain any value by being camouflaged so that stock consume them under false pretences.

Nor do fibrous foods become any more digestible when they are reduced to a fine powder in a hammer mill. It is not unnatural to expect that hay would be more easily attacked by the digestive juices if it is first reduced to a fine powder. Such is not the case. Sawdust is no more easily digested than the original log of wood. Likewise, the robust cell walls of mature pasture plants are resistant to digestion even when the material is finely ground.

This was demonstrated very clearly in experimental work recently carried out in the U.S.A. *(Swanson and Herman, 1952). Lucerne hay was fed to dairy cows in three forms, namely, coarsely chopped, ground, and finely ground. A hammer mill was used to grind the hay, a one inch and a five-sixteenth inch screen being used for the respective grades of fineness. The results showed that the finely ground hay was no more digestible than the hay chopped into 1½-3in. lengths. This confirms reports by previous workers who found that there was no significant improvement in the digestibility of hay following grinding.

The American workers report an interesting practical point. When the cows were fed on finely-ground hay they stopped chewing their cuds. This may or may not be a disadvantage but it indicates that grinding up the hay could upset normal digestive processes which work very efficiently. The inference is that ruminants are well equipped to deal with coarse roughage and that it may be beneficial to give stock the opportunity to discard material which is of little or no value. Certainly it should not be assumed that roughage can be made more digestible by grinding it finely.

Hammer mills may serve a useful purpose where fodder contains fine seeds such as linseed or wild turnip. Many of these seeds have a high feed value but have such hard coats that they normally escape digestion. If the seeds can be broken in a hammer mill well and good but checks on the efficiency of the machines should be made. Weed seeds could possibly be spread in the manure, even though the fodder had been put through a mill.

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