Nutrition and disease

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IN this article I hope to give readers some ideas concerning the less obvious effects of animal disease, especially in relation to nutritional defects. Disease has been defined as any departure from the normal, so that we are not dealing merely with those specific diseases which are caused by bacterial or virus infections.

The extent to which inadequate nutrition can cause losses of stock by death, or alternatively can pull down the production figures, is seldom fully realised.

In times of drought there are usually heavy stock losses and the production of such items as wool and meat falls dramatically. Drought means starvation—which is an acute form of malnutrition—and the cause is only too obvious.

WORM INFESTATION

Malnutrition in a less acute form is far more common than is generally realised—and because it is not particularly obvious it goes on for year after year causing losses which, in the aggregate, are more extensive than those caused by occasional droughts. Disease and malnutrition go hand in hand, and this is seen particularly in worm infestations of sheep and cattle. Animals that are well fed can carry a fairly heavy worm burden without any apparent ill effects, but those that are badly nourished and running on poor pastures often die, or lose condition to a marked extent.

The parasites to which am I referring are the “hair worms” which cause heavy losses in cattle herds. Calves are most susceptible to worm infestation, while young cattle up to the age of 18 months may also suffer severely. Most infestations occur following autumn rains and the symptoms are usually seen during the late autumn, winter and early spring. Evidence of infestation may be seen at any time of the year however, especially when a falling off in the plane of nutrition has taken place.

In the prevention and control of hair worms in cattle, treatment by means of worm drenches plays only a minor part in the attack on the parasites. This is easily understood since the worm drenches we have at our disposal—2 per cent. bluestone-nicotine, sulphate, and phenothiazine—are not nearly as effective against worms in cattle as they are against worms in sheep.

Because of this it is all the more important to keep young stock on well-drained pastures, practise rotational grazing, avoid overstocking and, most important of all, maintain a good nutritional level. By this, I mean, that at weaning, calves should have a good supplementary ration, the best supplements consisting of whole or crushed cereal grains, oats probably being the most popular, while wheaten bran adds to the palatability of a ration and is much used for this purpose. A suitable lick such as salt and bonemeal, and/or copper and cobalt in the areas where these are deficient should be placed out separately.

Calves should be taught to eat grain as soon as possible and by the third week should be tried with a handful of grain placed in the bottom of the bucket after each animal has drunk its milk. At six weeks ¼ lb.; at two months 1 lb. and at three months 2 lb. of grain daily should be quite sufficient until the calf is six months old. It must be remembered, that well-cured, good quality meadow hay, and good pastures, are necessary components in the ration, and should always be available for young growing stock.

LICE ON CATTLE

Before leaving the topic of parasitic infestation, I wonder how many of you have noticed the effects of lice infestation in cattle. In W.A. the long-nosed sucking louse is frequently found in dense clusters
in young stock. These lice feed by piercing the skin and sucking blood, and infestation as a rule varies with the bodily condition of the animal.

Generally speaking, lowered condition, poor feed, internal parasites, cold weather and lack of adequate exercise lead to very heavy infestations. The lice themselves are taken to be the main culprits, but in actual fact, malnutrition and faulty animal husbandry are really the primary factors. Nowadays of course, arsenical solutions for treatment are out; D.D.T. and gammexane (at double the strength recommended for use in a sheep dip) are more effective and more economical, and can be sprayed on the animal, the treatment being repeated in 14 days to catch the lice which have hatched from eggs in the meantime.

CALF SCOURS

Scours, one of the commonest troubles in calves is a complaint that is well known to dairy farmers. The term is an all-embracing one and may cover a multitude of different disease conditions.

Gross faults in feeding, internal parasites, coccidiosis, some infectious diseases, some poisons such as arsenic and cape tulip, and probably Vitamin A deficiency may all produce scours. But the cause of what we frequently term true "calf scours," despite a good deal of research, has not yet been definitely established. It may occur within a few hours of birth, or possibly within a few days, and the germ involved usually turns out to be Bacterium coli.

This disease is undoubtedly associated with errors in calf husbandry, and exposure to cold and damp, over-feeding (with rapid curd formation in the fourth stomach), and sudden changes of diet seem to be the predisposing factors. The new-born calf should have colostrum (also known as "first milk" or "beastings") as soon as possible after birth, since colostrum has laxative properties, and contains protective substances which assist the calf in resisting disease during its early life.

Feeding should be regular and not at frequent intervals. The milk should be fed at blood heat. The change to separated milk should be gradual and at this time 1 oz. cod liver oil daily is useful. In addition, it must be remembered that scrupulous cleaning and sterilisation of utensils, and the provision of a good dry bed are essential to the well being of the calf.

I have not mentioned specific treatment for calf scours, but sulphamezathine and sulphaguanidine are both useful. Milder cases may respond merely to boiled water and glucose or to 2 oz. castor oil followed by lime-water and milk.

It has been reported in America that regulated nipple feeding may be an aid in the control of scours, and recent work in N.S.W. has tended to confirm that idea. In one experiment, a pair of identical twins were put on nipple feeding, one with a regulating jet so that the calf was compelled to suck for 20 minutes to get its allowance of milk. The other was fed without a regulating jet, so that it was able to drink the same amount in three minutes. Within 24 hours this calf developed scours.

After the scouring had cleared up, the experiment was reversed and the other calf then developed scours. Further experiments with other twins have produced the same results.

MINERAL DEFICIENCIES

All animal foodstuffs or fodders contain minerals, but when the mineral content of fodders is low, or when exceptional circumstances force a demand for minerals that is greater than can be supplied through the normal food intake, mineral supplements are necessary; and this is particularly applicable with high-producing cows.

Mineral supplements are usually provided in the form of licks containing calcium and phosphorus, either as bonemeal, bone flour or di-calcium phosphate; molasses, which has a relatively high content of both calcium or magnesium, is also used as an adjunct to the usual mineral lick.

Most of the minerals essential for health are stored within the animal body and can be used as required, being carried to the organs and tissues by the blood serum —the clear straw-coloured fluid portion of the blood. In normal health, the concentrations of the various minerals in the blood serum remain fixed and constant,
within certain defined limits. Variations in these concentrations however, brought about by abnormal conditions, may give rise to sickness and even death.

Three conditions commonly occurring early in the lactation period are those known as milk fever, grass tetany and acetonaemia, and are especially common in the winter and spring months when green feed is abundant.

Milk fever is associated with a lowering of the calcium and phosphorus content of the blood; in grass tetany the magnesium and calcium blood levels may be lowered; while in acetonaemia there occurs a fall in the level of the blood sugar, together with the appearance in the blood serum of toxic substances known as ketones or acetones, which give the disease its name.

The actual cause of these conditions has not yet been fully worked out, but there is little doubt they are in part at least of nutritional origin, and recent research has shown them to be due to a temporary failure of the elaborate bodily mechanisms which involve the parathyroid glands, the pituitary (or so called master gland) and the adrenal cortex (which is part of the adrenal glands that lie near the kidneys). These are endocrine (or internal secreting) glands and the hormones which they secrete help to keep the animal body running in a normal manner. Thus with a better understanding of these metabolic diseases, new treatments have come into being, notably with regard to acetonaemia, where it has been shown that injections of cortisone coupled with glucose have proved remarkably successful. Unfortunately, this drug is not yet on the free list as it is for human patients, and the cost at present may deter all but the owner of a valuable pedigree animal.

As you know, “milk fever” can recur in spite of a superabundance of calcium and phosphorus in the food, and can be treated without a change of diet, by an injection of calcium alone—a trivial quantity when compared with that already stored up in the bony skeleton of the cow. In this regard, an interesting development has recently come from America. In the dairy herd in which milk fever was very prevalent, half the cows were given a mineral supplement rich in phosphorus during the six weeks prior to calving, while the rest of the cows were left as controls. The idea behind this unusual approach to the problem (i.e. competition of excess phosphorus with calcium) was to try to stimulate the parathyroid glands which control the level of calcium in the blood—and thus to raise the calcium blood levels and reduce the incidence of milk fever at calving time. In the small trial carried out, successful results were achieved, so we have perhaps some new food for thought in our approach to this disease.

Among susceptible herds and notably for pregnant and parturient cattle the use of supplementary feeds rich in calcium, phosphorus and magnesium may be indicated, although the degree of utilisation of these minerals is an unknown factor unless actually checked by laboratory methods.

Grass tetany and “bloat” or tympany of the rumen or paunch, may be controlled in part at least by a good animal husbandry approach.

With this in mind, the feeding of a balanced ration, including roughage sufficient to ensure correct bowel functioning, is essential especially where milking cows are being grazed on, or are first turned out on soft, lush or young pastures.

Vitamin deficiencies with all their different manifestations are examples of true nutritional disease, as of course are the ill effects produced when such minerals as calcium, phosphorus and the trace elements copper and cobalt are deficient in the diet.

A true calcium deficiency is very rare in pastured animals, but phosphorus deficiency is common in severe forms in many phosphorus deficient areas in the world, notably South Africa. While no longer of common recurrence in W.A. it may be seen particularly in long-settled areas, where for many years minerals have been taken from the soil and not replaced by top dressing. It may occur where rabbits have destroyed valuable pasture species such as clovers and other legumes. Typical symptoms include a failure to thrive, poor development and sometimes a temporary sterility, while another obvious feature is a craze for bones (known as osteophagia). This mineral hunger is important in that such
bones are commonly contaminated by the micro-organism Clostridium botulinum, and the toxin or poison formed by this germ results in botulism or “toxic paralysis,” a more often than not fatal disease of cattle, which, however can fortunately be prevented by vaccination. The top dressing of soils with superphosphate, and the provision of ground rock phosphate during the summer months are clearly indicated in such instances.

Large tracts of W.A. are known to be copper-deficient and cattle appear to be most severely affected in that proportion of the jarrah-redgum belt extending from just north of Busselton to several miles south of Margaret River, and within 15 miles of the coast. The Northcliffe district is similarly affected, as are also the Gingin and Dandaragan districts to the north. Other areas, notably the semi-coastal country in the region of Perth and Bunbury, are suspected, but have not been investigated completely.

Signs of deficiency are most marked between August and October, and more evident in good seasons with abundance of green feed, than in drier years. Young stock are particularly affected, showing unthriftiness, retarded growth, joint abnormalities and diarrhoea. Adult stock show depraved appetite, eating the soil around the roots and butts of upturned trees, and may scour freely, while in severely deficient areas “falling disease” may be encountered. In this acute form of the disease, death occurs close to calving or just after, and an apparently normal cow, may suddenly bellow, throw up its head and fall dead, when being turned out to pasture after milking.

Copper supplements in the form of Denmark lick are in common use throughout the affected areas, but topdressing of the pastures generally at the rate of 5 to 10 lb. of copper sulphate per acre mixed with superphosphate is also useful, and the benefit persists for a number of years.

Cobalt deficiency, which is also known as “wasting disease,” was at one time believed to affect only young cattle, and to be confined to some of the karri slopes in the Denmark district and also to the Nornalup and Walpole districts, but it is probably present in other parts of the South-West.

Young cattle between 6-18 months are more susceptible than adult stock, and there is a progressive loss of condition, anaemia and scouring. In adult cattle, there is depressed milk secretion, abortion and sterility. Finally, with progressive weakness, death occurs from three months to two years from the onset of the first symptoms.

The disease may occur at any time of the year but is most common during the spring and early summer when green feed is abundant.

Extremely small quantities of cobalt (5-10 mill. grams. of cobalt chloride) will cure and prevent Wasting Disease in cattle. Denmark Lick No. 1 incorporates cobalt in the necessary quantities, while it is also possible to treat hay with cobalt solution and thus eliminate the necessity of hand feeding dry cattle.

Finally I would like to close with a brief word on rye grass staggers, a disease which has not yet been recorded in this State, but which may make its appearance here some day.

Recent outbreaks of rye grass staggers in cattle have been reported from Southern Victoria, these outbreaks following light rains which brought on new growth in paddocks in which rye grass was predominant.

Calves are much more commonly affected than adult cattle and symptoms include an inability to move rapidly, a tendency to fall, staring eyes and laboured breathing. When the animals are not disturbed, symptoms may not be noticeable and grazing takes place quite naturally. Often, affected calves have great difficulty in regaining their feet after falling over.

Rye grass staggers in cattle is rarely fatal, but deaths may occur as a result of an accident such as an affected animal falling into a water hole or creek.

To control outbreaks, stock should be moved to a paddock containing little or no rye grass. Recovery will then take place within a few days. Alternatively, the animals can be confined on a relatively small paddock and hand-fed with oaten or lucerne hay until the rye grass matures. The animals can then be returned to it quite safely.
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