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CAN WORMS BE CONTROLLED BY CORRECT FEEDING?

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The extensive losses which result from the ravages of internal parasites are a matter of serious concern. Livestock owners realise this all too well and welcome advice concerning control measures which can be adopted. Unfortunately, it is not possible to give clear cut advice on the subject. Much publicity is given to the use of drugs which will expel the worms. Various systems of strategic drenching have been developed. Considerable time and money is being spent on research programmes designed to obtain more efficient drugs, and to learn more about the weak points, if any, in the life cycle of the offending parasites. All this work is building up an effective weapon which can be used by the stockowner to attack the problem of “worms.” It is well to remember, however, that drenching is only one of many methods which can be used to control worm infestation. In this talk attention will be concentrated on experimental evidence which shows that good husbandry in general, and good feeding in particular, may greatly reduce the worm burden carried by livestock.

It is significant that many of our most successful stockmen never use drenches in any form. Fat lamb breeders with excellent records extending over many years can be quoted in support of this statement. Likewise, many champions at the Royal Show come from studs where worm drenches are never used.

Several years ago fat lamb breeders in Victoria sent a representative to New Zealand to see what could be learnt in that country. In his report (Pastoral Review, 16/10/1957, 1187) this representative describes one of his outstanding impressions as follows “I was surprised to find that farmers as a rule do not drench their ewes or lambs at all. I was told that drenching had decreased over the last few years, because experience has shown that unless a sheep has been weakened by some predisposing cause such as malnutrition, or a marginal cobalt deficiency, it will not suffer from a build up of worms at high stocking rates. New Zealand farmers believe that drenching is unnecessary when sheep are fed enough of the right type of feed at the right time.” This ends a quotation characteristic of the statements made by those who believe that good feeding is the main bulwark against infestation with worms. Dr. McMeekan (1957) gives more specific information on this point when discussing the results obtained when pastures were stocked at the rate of four, six, and eight breeding ewes per acre. He states “There was no difference in ewe deaths, in lambing percentages, in lamb losses, while the worm burden carried by the lambs at slaughter was identical under the three stocking rates. No trouble was experienced with worms, and no drenching of either ewes or lambs was found necessary. These points are worth remembering, if only to remove the fears of some sheepmen in respect of possible hazards of heavy stocking with sheep.” It is of particular interest to note that in these New Zealand trials the lambs did not carry any more worms under the conditions of heavy stocking.

Considerable experimental evidence has been accumulated concerning the effect of nutrition in controlling the number of worms carried by infected animals. In the March issue of “Rural Research, 1960,” for example, trials are described in which lambs aged two and a half months were given heavy doses of black scour worm. Half the lambs which were on a poor ration, died as a result but all the well-fed lambs survived. In this publication prepared by the C.S.I.R.O. the clear cut statement is made that “Well fed sheep are better able to withstand and throw off infestations.”

In most flocks of weaner lambs there is a “tail,” that is a percentage of lambs which lack size, and appear to be unthrifty. Generally these unthrifty lambs carry a heavy burden of parasites. Did these lambs become unthrifty because of the worms? Or were the parasites able
to develop because the lambs were un-thrifty? These are basic questions. Experiments have shown that youngsters which receive a plentiful milk supply from their mothers, are much more resistant to infection from worms than are similar animals on the same pasture whose mothers have a poor milk supply. It could well be that the unthrifty "tail" in the weaner flock represents lambs from mothers with a poor milk supply. Dr. J. H. Whitlock (1951) makes this statement in the "Cornell Veterinarian." "It is not unlikely that the diet the ewe is fed, the condition of her udder, her general condition, her genetic constitution, all of which can limit milk production, are at least as important as the pasture contamination she produces." It could well be that if ewes are bred, and fed, to supply plenty of milk, the problem of worms in lambs will no longer be a serious one.

The protective value of the milk supply was shown very clearly in trials with baby pigs exposed to infection with the larvae of round worms (Ascaris). On a diet of rolled oats, the young pigs became infected with as many as 657 of these large worms. The piglets receiving milk also became infected. This particular worm, when first it develops, gets into the blood stream and can cause pulmonary symptoms as it escapes into the lungs. In the piglets receiving milk the young worms reached the lungs where they produced the characteristic reaction but they failed to become established in the bowel. In 1958 a similar type of result was reported with dairy calves which were infected experimentally. Those receiving a full complement of milk had less worms than those receiving hay and grain in addition to the milk. The observation was made that in the milk fed groups the worms did not grow to their full size. There were less worms in the tracts of the unweaned calves than there were in the weaned calves. This evidence is quoted because one so often hears the statement that good feeding will not reduce the actual number of worms in an animal.

It is not only milk which will help an animal to cast off a parasitic infection. In some interesting trials carried out in the U.S.A., at the New Georgia Experimental Station, it was found that calves grazing on a fescue grass pasture carried more worms, and showed ill-effects, in comparison to similar calves which were placed on red clover, or good mixed pasture. By adding maize to the diet of the calves on the fescue the number of worms was reduced by two thirds and the weight gains of the calves showed a significant increase. There was here no need to drench the affected animals to remove the worms. All that was required was to correct the deficiency in the diet. In many cases, unfortunately, we do not know just what is the weakness in the diet which has to be corrected. In the absence of this knowledge drenching necessarily remains an important bulwark of defence. But while the drenching is being carried out an attempt should be made to determine the weakness in the system which enables the worms to thrive. The importance of this approach is illustrated very well in Information Circular No. 16, published by the C.S.I.R.O. concerning a problem with weaners in the Northern Tablelands of N.S.W. Worms were numerous in these young sheep and in some years a third of the flock would die with heavy infestations of nodules worms. A series of supplements were tried without any beneficial effect. It was then found that if the weaners were placed on green oat crops the infestation would be thrown off in a matter of several months. Of more importance, losses no longer occurred and the animals gained considerable weight. In contrast the controls lost weight. Obviously a change in livestock husbandry which will effect these improvements is to be preferred to a drenching programme which, at the best, can only reduce the worm burden.

It would appear that if any essential nutrient is lacking in the diet this can increase the susceptibility to worm infestation. Mineral deficiencies can be particularly serious. As an extreme example one can quote an experiment carried out in America (Emerick et al, 1957) in an area where as many as 28 per cent. of the lambs died despite a supplement of salt plus trace elements. Phenothiazine drenches were effective in reducing these losses and in promoting good growth rates. But supplements of calcium phosphate were equally effective and were much less trouble to the farmer.
The importance of mineral supplements has been demonstrated in many experiments carried out in South Africa, under climatic conditions similar to our own. In a number of scientific journals the opinion is expressed that even where stock receiving mineral supplements still carry worms, these animals do much better than their fellows which have been drenched to remove the worms but which still suffer from the mineral deficiency. If too much faith is placed in a drenching programme, it is probable that the urgent necessity to correct a dietary deficiency will be overlooked.

When a productive pasture is heavily grazed it is estimated (Taylor, 1944) that a sheep may ingest as many as 8,000 parasites in one day. Obviously the grazing animal must necessarily be endowed with defensive mechanisms or it would be overwhelmed by this massive infection. Every opportunity should be taken to make use of these natural defence mechanisms. That these can be effective has been demonstrated very effectively in long term trials carried out at the C.S.I.R.O. Regional Laboratory near Armidale in N.S.W. Here the improved pastures, which are heavily stocked, seemed an ideal environment for the development of a serious worm problem. But the Research Officers have shown that weaners on these pastures do not show any benefit from regular monthly dosing with phenothiazine. In contrast sheep on unimproved native pastures at a low stocking rate can be severely infested with worms unless regularly drenched. Here we have an object lesson for the many farmers in Western Australia who have a worm problem in flocks running on partially improved country. It seems more logical to determine, and correct, the probable deficiencies in the diet of these animals, rather than to continue to depend on drenches to eliminate the worms. It is significant, for example, that in the many areas where cobalt deficiency is known or suspected, internal parasites are also a serious problem. Likewise, it is no mere coincidence that lupinosis is associated with heavy infestations of worms. Perhaps if one could correct the deficiencies in the diet, so that the animals can develop their normal resistance to parasitic infection, simultaneously there may be an alleviation of the lupinosis problem. The deficiencies in question are not necessarily simple ones—maybe there is a shortage of several essential nutrients. The deficiency hypothesis could even be a false one, but it appears worthy of study.

In this talk attention has been restricted to the importance of good feeding in the control of "worms." Any nutritional deficiency, be it energy, protein, minerals or vitamins, will leave stock more vulnerable to attack. Of course, every aspect of the production programme can have some significant effect on the well-being of the livestock. If, despite all efforts, worms remain a problem, it is wellnigh certain that there is a nutritional or managerial weakness somewhere. So if drenching remains a necessity, set out to discover the weakness which exposes your animals to attack. In no aspect of rural production is it more true to say that "Prevention is better than cure."

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