Can parasitic gastro-enteritis be used as an indicator of welfare in organic sheep?

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ABSTRACT

Organic livestock standards are designed to deliver good animal welfare but without an objective means of assessing welfare, it is difficult to know if they succeed. Existing assessment systems largely assess environmental requirements, rather than looking at animal behaviour or health. Parasitic gastro-enteritis (PGE) is recognised as being one of the most difficult diseases to prevent in organic livestock production. Monitoring systems for PGE can be used by organic farmers in their decision-making and could be one aspect of assessing animal welfare, particularly in relation to sheep. Results are presented of studies on an experimental organic beef/sheep farm and on commercial organic upland sheep farms. The usefulness of PGE control as an animal welfare indicator is discussed.

Key words: organic sheep production, animal welfare, internal parasites

INTRODUCTION

Positive animal health and welfare are fundamental objectives of organic livestock production and the standards regulating the development and management of such systems incorporate these concepts (UKROFS, 2001). To ensure the success of organic management systems, consumer trust and farmer compliance must be supported by a process of quality control through an independent audit of quality standards (Webster, 2001). However, it has been stated that on-farm welfare assessment methods are in their infancy and in the organic certification schemes, welfare tends to be implicit rather than explicit (FAWC, 2001). Existing assessment systems, such as the ANI 35L (Bartussek, 1999), used in continental Europe concentrate on housing provision, rather than on animal health and behavioural aspects.

Although animal health assessments are only one component of on-farm welfare appraisals they may be useful where other welfare criteria are difficult to quantify, as in extensive ruminant systems. It is generally recognised that parasitic gastro-enteritis (PGE) in sheep is one of the most challenging aspects of organic livestock production, given that control methods rely primarily on management rather than routine use of anthelmintic drugs. Clinical PGE in sheep can result in severe loss of body weight, scouring and death. Where some degree of control is applied, subclinical disease is more common, with production losses associated with poor growth rates and reduced milk and wool yields (Coop & Holmes, 1996). In addition to a centrally-mediated reduction in voluntary feed intake, there are adverse effects on protein and mineral metabolism (Sykes, 1997).

This paper describes epidemiological studies of PGE in sheep on experimental and commercial organic farms and attempts to evaluate PGE assessments as an indicator of welfare on such farms.

MATERIALS AND METHODS

The epidemiology of PGE was studied on an experimental organic upland farm of 66 hectares. Sixty beef cows and 200 breeding ewes are grazed separately on permanent ryegrass/clover swards. Annual rotation between cattle and sheep grazing is practised as one aspect of PGE control. Calves and lambs are born in May and June and graze with their mothers until weaning or housing in the autumn. Standard parasitological techniques (MAFF, 1986) were used to measure numbers of infective parasitic larvae (L3) on pastures, carry out faecal worm egg counts and assess total worm burdens at slaughter. The effect of trace element supplementation of deficient sheep on worm egg output and worm burdens was also studied.

RESULTS

The basic pattern of the life cycle of trichostrongyle parasites in a summer lambing organic sheep flock is shown in Figure 1. Low levels of L3 were present on pastures in early spring but these had further declined by lambing time. The periparturient rise (PPR) in faecal worm egg output by ewes was responsible for contamination of the pastures in May and June. The infective L3 larvae which developed from these eggs were ingested by lambs while grazing and established patent infections. Over the five years of study, peak numbers of L3 on pasture varied between early July and late August. Total numbers of L3 also varied between years and between fields. Worm egg output by untreated lambs increased progressively during the late summer and early autumn, following weaning.

The results of a field trial where pregnant ewes and the lambs subsequently born to them were supplemented with copper, cobalt and selenium are shown in Table 1.

During 2001, monitoring on one case study farm has shown that careful selection of fields and groups of animal to be studied is crucial. Stress at weaning resulted in dramatic increases in worm egg outputs by lambs after weaning, similar to the changes seen on the experimental farm.

DISCUSSION

These results confirm the high variability of parasitological measurements in the field. Potential indicators of PGE status, which could be used by organic farmers and inspectors include faecal worm egg counts, pasture larval numbers, the presence or absence of scouring lambs and lamb growth rates. Unfortunately, faecal worm egg counts are highly variable, being influenced by between and within breed variation, species of parasite, nutrition and level of immunity. The interpretation of faecal worm egg counts can, therefore, be difficult unless they are put into context. However, using available information on the epidemiology of

PGE, a monitoring programme can be designed which will give a reasonable assessment of the current level of PGE control. The programme must be adjusted in the light of experience, to reflect the individual farm situation. This process may take several seasons to achieve and should be further adjusted if changes in management take place.

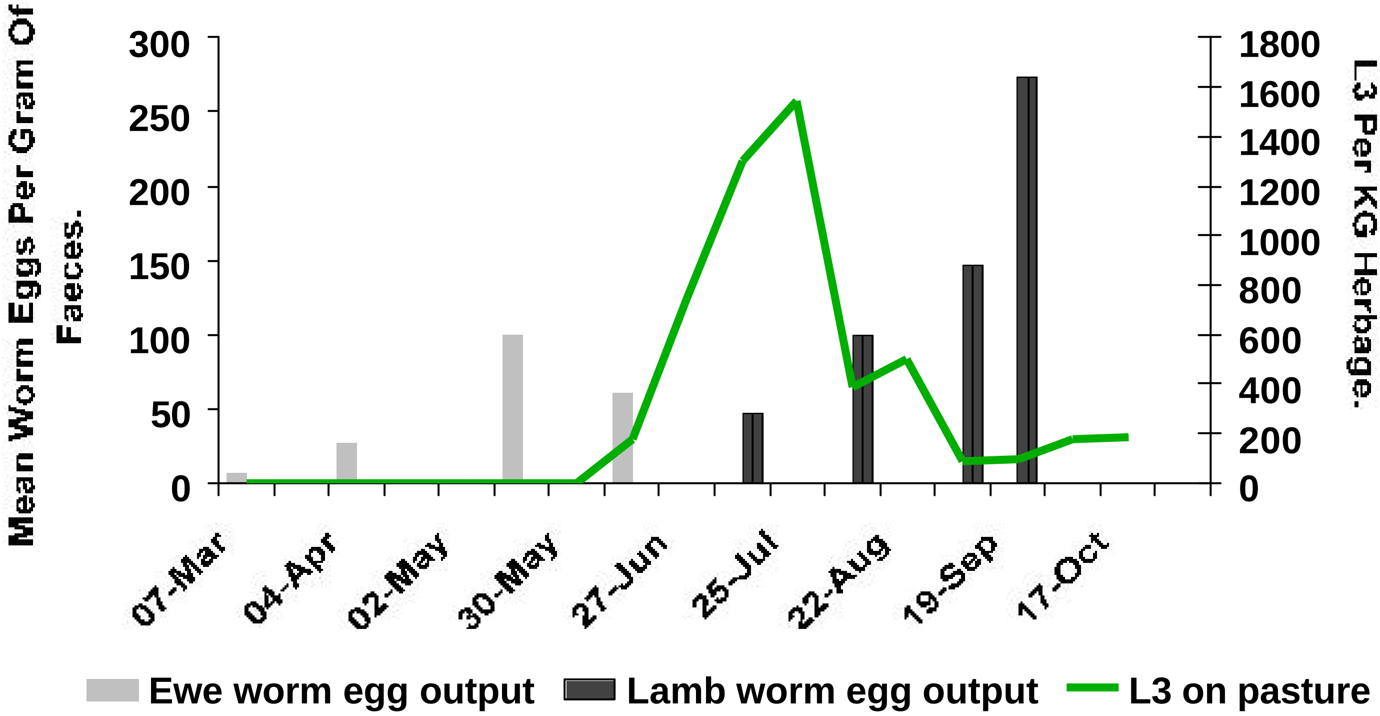

Figure 1. The epidemiology of PGE in a summer lambing flock.

Table 1. Mean total worm burdens in lambs at slaughter.

Ewe Treatment	Lamb Treatment	Abomasum mean (range)	Small Intestine mean (range)
Treated	Treated (n=6)	4,433 (2,200-7,400)	1,733 (900-3,100)
Treated	Control (n=6)	6,700 (900-16,900)	1,700 (700-3,100)
	Group Mean	5,656	1,716
Control	Treated (n=6)	13,433 (5,800-31,800)	2,183 (800-3,600)
Control	Control (n=6)	8,917 (5,100-16,700)	2,033 (1,200-3,600)
	Group Mean	11,175	2,108

In extensive organic sheep enterprises a PGE monitoring programme can be an important part of the assessment of the sustainability of the system. Further research in relation to genetic markers of resistance or resilience to parasitic infection may provide more accurate tools to help in the design and development of efficient worm control programmes and in the assessment of welfare.

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