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Sheep management system markedly affects worm infections in the New England

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Sheep producers claim that intensive rotational grazing (IRG) helps control worms in our cool temperate environment. Three experiments were undertaken to test this, and determine whether the impact of IRG is mediated by effects on the parasitic or free-living phases of the lifecycle.

The experiments were conducted from November 2003 to October 2005 on the Australian Wool Innovation Cicerone Project farmlets located at CSIRO, "Chiswick", 20km south of Armidale, NSW. The three 50ha farmlets comprise an un-replicated test of three different management systems with great care taken to ensure that initial conditions on each farmlet were identical, Farmlet A had high inputs, high stocking rate and few paddock moves, Farmlet B had moderate inputs, moderate stocking rate and few paddock moves while Farmlet C was an intensive rotational grazing system (short graze periods of 3–5 days and long rest periods of 60–150 days) with moderate inputs and a high stocking rate. Experiment 1 was a study of monthly faecal worm egg count (FEC) and larval culture on the farmlets over two years in ewes, lambs and hoggets (n=20/group). Experiment two (artificial challenge) was carried out in spring 2004, summer, autumn and winter 2005. Twenty hoggets from each farmlet were orally dosed with *Haemonchus contortus* (Spring:8,000 L_3; Other seasons:4,000 L_3) and *Trichostrongylus colubriformis* (Spring: 12,000 L_3; Other seasons: 8,000 L_3). Blood samples, FEC, bulked cultures and body weights were taken at days 0, 21, 28 and 35 when the infection was terminated. Experiment 3 (test of pasture contamination) used tracer sheep in the four seasons to determine the level of larval uptake by sheep on the 3 farmlets. Drenched tracer hoggets (n=3–5) were run with each class of sheep on each farmlet, removed at day 14 after introduction and sampled for FEC at days 28 and 35 after introduction.

In Experiment 1 farmlets did not differ in the proportions of worm-infected sheep but they differed significantly (P<0.0001) in FEC amongst infected sheep (Figure 1). Farmlet C had significantly lower proportion of *H. contortus* than A and B (A:71.1%, B:71.7%, C:56.4%, P<0.01). In experiment 2 there were significant differences between farmlets in FEC following fixed challenge in summer and spring and winter (P<0.0001), but not in autumn (Figure 2). In experiment 3 there was a significant effect of farmlet on tracers FEC in winter, spring and summer (P<0.01) but not Autumn (Figure 3).

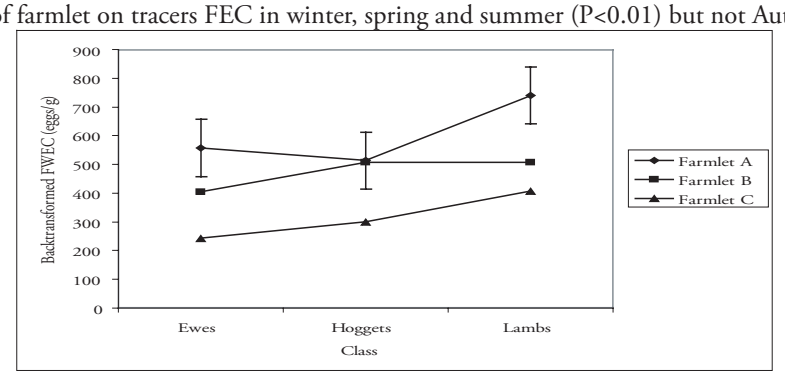

Fig. 1. Faecal worm egg counts by farmlet and class from November 2003 to October 2005

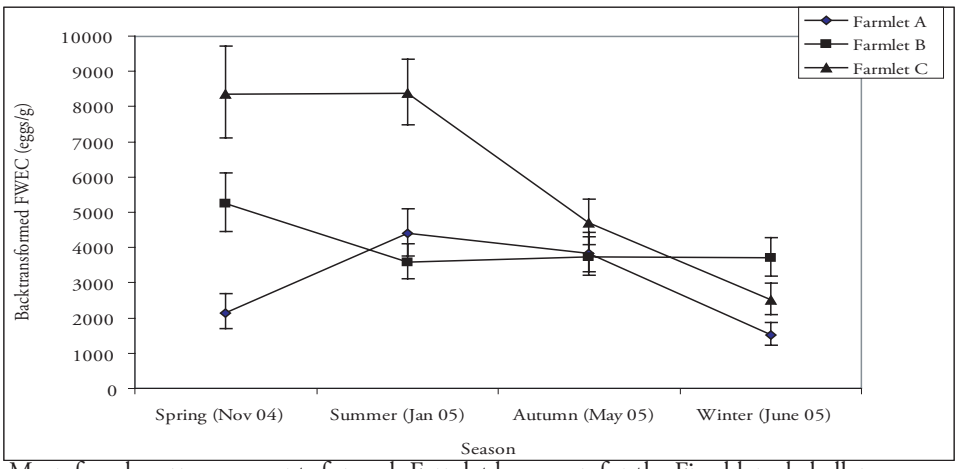

Fig. 2. Mean faecal worm egg counts for each Farmlet by season for the Fixed larval challenge.

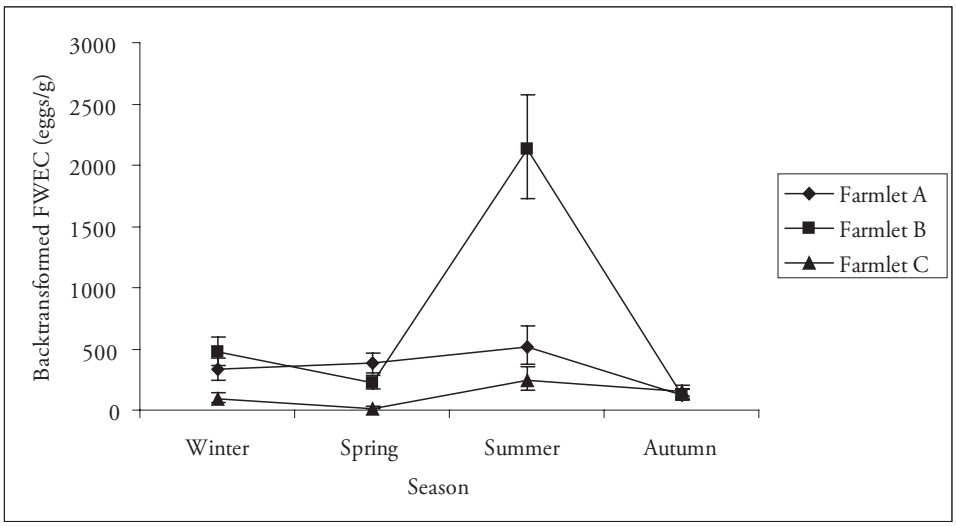

Fig. 3. Mean faecal worm egg counts of Tracer sheep for each Farmlet by season.

These data demonstrate that sheep on Farmlet C have lower FEC than on the other two farmlets with this difference mediated by effects on the free-living stages of the lifecycle, resulting in reduced larval uptake from pasture. Host immunity does not appear to contribute to the effect as sheep on this farmlet displayed lower levels of immunity. It is highly probable that the observed farmlet effects are due to differences in grazing management with the IRG on Farmlet C resulting in low levels of pasture larval intake, lower worm burdens but also reduced host immunity to worms.