Preliminary evaluation of plantain (*Plantago lanceolata*) cultivar Tonic as a feed for ewe lactation

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Abstract. *A pilot study was undertaken to determine the benefits of using plantain cultivar Tonic as a feed source for ewes during lactation. Thirty nine ewes were set stocked on either plantain, perennial or Italian ryegrass a week prior to lambing (August) and lamb live-weight gain recorded until weaning in November. Lambs from the Tonic treatment appeared heavier and had elevated copper and selenium liver concentrations relative to other treatments. Faecal egg output of ewes from the plantain treatment appeared lower. These results suggest further investigation into the benefits of plantain is warranted.*

Introduction

Pasture type and quality can have a significant impact on growth of lambs. In the first six weeks after birth, lamb growth (particularly for twin lambs) is largely determined by daily milk intake (Geenty and Dyson 1986). Ewe milk production is influenced by a number of factors including nutrition in late pregnancy and during lactation (Rattray *et al.* 1987). From week six on, pasture becomes an increasing component of the diet for the lamb and therefore has an increasing effect on lamb growth rate.

Grazing plantain (*Plantago lanceolata*) cv. Tonic during lactation could benefit sheep production systems due to its ability to increase metabolisable protein supply (Fulkerson *et al.* 2008), its potential for greater daily dry matter (DM) intake (through its rapid fractional degradation rate) (Burke *et al.* 2000), its ease of harvesting and its strong growth during the critical early spring period.

The aim of this preliminary experiment was to evaluate the benefits of grazing cv. Tonic plantain for lamb growth-rate during lactation.

Methods

A non-replicated pilot field experiment was set up at Ceres Research Centre, Canterbury, New Zealand. Pregnant ewes (n=37) were randomly allocated to one of three treatment groups and set-stocked on either plantain (cv. Tonic) pasture; perennial ryegrass (*Lolium perenne* breeding line) pasture infected with an AR1 endophyte; or, Italian ryegrass (*Lolium multiflorum* cv. Crusader) pasture. Grazing these pastures commenced from one week prior to lambing (8 August), continued through lactation until weaning in late-November. Stocking rate in each treatment was reviewed weekly and grazing areas adjusted in an attempt to maintain pasture availability between 1,000 and 1,500 kg DM/ha. Pasture mass was estimated weekly using a capacitance probe calibrated with quadrat cuts. All treatments lambed with 165–170% lambing rate.

For each ewe, lambing date, sex and birth weight of lambs were recorded at birth. Lamb live-weight change was determined by regular weighing. Faecal egg concentrations (FEC) were determined in lambs using a modification of the McMaster method (MAFF 1979). Livers from lambs in each treatment were recovered at

Table 1. Pasture mass, stocking rate, lamb live-weight change (LWG) and weaning weight, faecal egg concentration (FEC), and liver selenium (Se) and copper (Cu) concentration at weaning on three pastures

	Italian ryegrass	Perennial ryegrass	Tonic plantain
Pasture mass (kg DM/ha)	1,600	1,500	1,000
Stocking rate (ewes/ha)	13	8	8
Lamb LWG (g/day)	332	270	370
Weaning weight (kg)	38.8	32.0	42.8
Lamb FEC (eggs/g)	-	666	14
Liver Se (umol/kg)	-	756	1457
Liver Cu (nmol/kg)	-	630	1450

slaughter and analysed for selenium (Se) and copper (Cu) concentration.

Results and discussion

Lamb live-weight at weaning was higher for lambs on Tonic plantain than on either Italian ryegrass or more particularly perennial ryegrass (Table 1).

The apparent increase in lamb weaning-weight on Tonic plantain was achieved at a lower average level of pasture availability. Average pasture mass (kg DM/ha) in this study was probably not low enough to constrain intake. Sward height guidelines have not been established for plantain, but the present data are evidence that fewer constraints to intake may occur at lower pasture masses on plantain relative to ryegrass. It is possible that the apparently heavier weaning-weight on Tonic was a result of better milk production through better ewe nutrition, and greater DM intake of Tonic by lambs.

There was some evidence that faecal egg count was lower on the Tonic plantain treatment relative to the ryegrass treatments. This may simply reflect differences in larval challenge due to grazing history or the different plant structure, but the effect of improved metabolisable protein supply on the immune response should not be discounted. The effect of grazing plantain on faecal egg output needs further investigation.

Lambs grazing Tonic plantain appeared to have elevated liver concentrations of Cu and Se at slaughter relative to ryegrass fed lambs. Similar effects have been reported previously (Moorhead *et al.* 2002).

This study suggests there may be significant benefits from using a winter active plantain such as Tonic as forage during lactation in sheep breeding systems. Increased weaning-weight, reduced faecal egg output and higher Cu and Se liver concentrations could provide significant benefits to sheep production systems. More detailed investigations are required.

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