EVALUATION OF TRITICALE AND WHEAT AS WHOLE GRAIN DROUGHT RATIONS FOR SHEEP

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SUMMARY

Merino ewes with a mean live weight of 39 kg were fed triticale or wheat at the rate of 470 g of dry matter (DM) per day for 84 days. The mean live weights of ewes fed triticale were consistently lower than those fed wheat. However, such differences were relatively small there being only 0.9 kg difference in live weight between treatments after 84 days feeding. Mean digestibilities of the rations were similar, as were carcass weights, when both grains were fed. No significant pathological disorders were observed that could be related to the feeding of either grain.

Triticale as a drought ration for sheep (at 470 g DM/day) is capable of sustaining live and carcass weights at levels similar to those obtained when feeding equivalent amounts of wheat.

INTRODUCTION

Triticale is a hybrid cereal achieved by crossing wheat (*Triticum* spp.) and rye (*Secale cereale*). It has a high lysine content which has stimulated extensive research work on feeding of triticale to pigs (King 1980) and poultry (Karunajeewah 1978).

Little work has been conducted on the nutritive value of triticale for ruminants. McElroy (1968) compared triticale and barley in feedlot rations for cattle and reported better growth from triticale diets, but the incidence of liver cysts and damage to ruminal epithelium increased when steers were fed rations containing more than 50% triticale. Jordan and Manke (1972) compared rations based on triticale or barley for fattening lambs with a mean live weight of 37 kg. Triticale fed lambs grew at 92% of the growth rate achieved by lambs' fed barley over a 56 day period. Their results indicated that triticale or barley could be efficient feeds as grain components of rations to finish lambs No work has been reported on the value of whole triticale grain fed as a drought ration for maintenance of sheep live weight.

Whole cereal grains are successfully fed to sheep in times of drought in Australia. The work described in this paper was designed to compare the nutritive value of triticale and wheat when fed as drought rations to sheep and to determine the significance of associated pathological problems.

MATERIAL AND METHODS

Twenty South Australian Merino ewes were selected at random from a flock at the Mallee Research Station, Walpeup. These ewes were one and a half years old, non-pregnant, with an initial mean live weight of 42 kg. They weredivided at random into two equal groups. Both groups were drenched with a broad spectrum anthelmintic. Ten were fed triticale (cv. Tyalla), the remaining ten being fed wheat (cv. Condor). The sheep were fed whole grain in two groups in bare earthen pens at a rate of 0.5 kg air-dry grain daily (470 g DM/sheep/day). The ration was based on feeding recommendations to maintain live weight of dry sheep of 42 kg (Hyland 1.965).

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Increasing amounts of grain were fed daily with roughage during a two week period to gradually introduce the ewes to their specified rations. No further roughage was fed after this period.

The full grain ration was fed twice weekly for a further two weeks before the start of the experiment, during which time mean live weight of the ewes decreased to 39 kg. The ewes were then fed for $4 days on diets offered twice weekly (at 3 and 4 day intervals) in open, steel troughs, 6 m long; 1.5% ground limestone was added to the rations. Food residues were collected. Live weights were recorded at 7-21 day intervals, immediately before the 4 day ration was offered. Chemical composition and DM digestibility were determined on both diets (Table 1).

TABLE 1 Chemical composition;? and DM digestibilities of triticale and wheat

Diet	DM (%)	Crude protein (%)	Crude fibre (%)	Ether extract (%)	Ash (%)	Mean DM digestibility (%)	SE
Triticale	93.8	15.0	4.4	2.3	1.6	87.2	1.8
Wheat	94.0	15.1	3.5	2.4	1.3	87.1	2.1

*Analyses as described by AOAC (1975)

The digestibility of the diets fed at 470 g DM/sheep/day was determined with four wethers fed triticale and three fed wheat in metabolism cages. After a three week preliminary feeding period faeces were collected daily for seven days for calculation of digestibility. Feed and faecal samples were dried for 24 hours at 80° C for DM determination. The ewes were slaughtered 113 days after introduction to both grains. Carcass weights were obtained immediately after slaughter and fat depth was measured over the eye muscle between the 12th and 13th ribs. The entire liver and a section of rumen wall (c. 300 mm x 300 mm) were collected from each sheep at slaughter. These were kept on ice for approximately 6 hours until examined for evidence of pathological change.

A stepwise regression analysis was used to relate live weight means to days of feeding. The model fitted was of the form:

$$L = a + bD + c(D + 1) + dXD$$

where L = the observed live weight in kg
X = pseudovariable, where + 1 = triticale and − 1 = wheat
D = days of feeding

The variable D +1 was forced in, significant or not, the other variables entered only if significant at the 5% level. The pseudovariable was present in this model only as an interaction term, since the treatments were identical at day 0.

RESULTS

The regression aquation for ewes fed either wheat or triciale can be written as one equation. The equation is:

$$L = 38.6 - 0.035D + 0.238\,(D + 1) - 0.005XD \quad (R^2 = 82.8\%\ P<0.01)$$
$$(\pm 0.009)\ (\pm 0.03)\ \ (\pm 0.001)$$

Ewes weighing 38.8 kg lost 1.4 kg during the 84 day feeding period when fed triticale, whereas ewes fed wheat lost 0.5 kg, a difference-of 0.9 kg (Fig. 1.).

The wheat ration for both three and four day feeding periods was usually consumed in a few hours. whereas ewes took two to three davs to consume the triticale rations. Intake of both grains was similar, as feed residues were insignificant. One ewe in each treatment was replaced because of acute laminitis.

Mean carcass weights of ewes fed wheat were 17.7 ± 1.5. kg compared to 17.6 ± 1.3 kg for ewes fed triticale. Three ewes fed triticale and four ewes fed wheat had 1–2 mm of fat over the eye muscle between the 12th and 13th ribs. Less than 1 mm of fat could be measured at this point on the remaining sheep eating both diets.

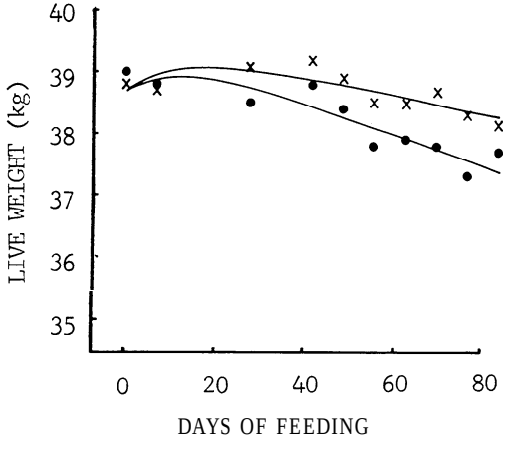

Fig. 1. Changes in ewe live weight with time for sheep fed either wheat (✕—✕) or triticale (●—●).

Several minor pathological changes were found in the liver and rumen samples examined. The most common finding was emphysema in the submucosa of the rumen, producing dilation of the submucosal lymphatic vessels. Eight sheep (six fed triticale, two fed wheat) had evidence of this change in the rumen. Seven sheep (five fed triticale, two fed wheat) had evidence of focal granulomatous inflammation in the liver. This was almost certainly due to the migration of in-mature parasites, probably *Cysticercus tenuicollis*, through the liver.

DISCUSSION

The similar chemical composition and DM digestibilities of the wheat and triticale suggest that there should be little difference in live weight response of sheep fed drought rations of the two grains. In fact the difference observed in mean live weight after 84 days of feeding (0.9 kg), although statistically significant, represents only 2% of initial live weight and is likely to be of little importance to animal production.

The difference in the rate of consumption of the two grains could have

important effects on animal production. It would be reasonable to assume that the triticale ration which was consumed in 2-3 days would be distributed more equitably within a large flock of sheep, than the wheat ration which was consumed in a few hours. The assumption could also be made that loss of grain could occur e.g. through competition with local fauna. Furthermore wool growth may be retarded due to the length of time taken to consume the triticale ration. This has been shown to occur when sheep were fed wheat daily compared to weekly (Franklin and Sutton 1952; Hill et *al* 1968).

The occurrence of emphysema observed in submucosal lymphatic vessels of the rumen could not be explained. The lesions noted were not of an inflammatory nature as would be expected were the condition due to changes in rumenal pH. It was possible that emphysema in the sub mucosa could have occurred as an agonal or post-mortem change. Lesions found in the livers of both groups were calcified and regarded as being most likely parasitic in origin. They may have been present before either triticale or wheat was fed to the ewes. Neither the lesions nor the changes in the rumen wall could be related to the feeding of either triticale or wheat. These findings contrast with those of McElroy (1968) who reported damage to ruminal epithelium and increased incidence of cystic livers after feeding triticale to cattle as the major cereal grain in a fattening ration. The lack of damage found in this trial may be related to the level of grain fed, the rate of introduction of grain to the sheep or that sheep respond differently to cattle when fed triticale.

In conclusion, triticale seems to cause no major pathological problems when fed to sheep as a maintenance ration, and is capable of sustaining similar live and carcass weights to that obtained when feeding equivalent amounts of wheat.

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