

Beef fattening on grazed leys: interest of tall fescue

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Abstract

Experiments were conducted at four sites from 2007 to 2009 comparing two grass-clover mixtures (dominant grass: M1 perennial ryegrass; M2 tall fescue) grazed by young cattle. During the first two years, annual DM yield exceeded 12 t y⁻¹. Under dryer conditions, in 2009, M2 grew better than M1. Sward height and organic matter digestibility of both mixtures were similar, resulting in comparable animal performance. Tall fescue was shown to be a promising component for creation of pastures in dry conditions.

Keywords: grass-clover mixtures, grazing, *Festuca arundinacea*, meat production

Introduction

Many holders of small dairy herds seek diversification. Beef fattening on grazed grass-clover mixtures presents advantages, such as utilisation of existing infrastructures, positive effect of leys on soil fertility, enjoyment of having cattle and complementary income. The new Swiss tall fescue (*Festuca arundinacea* Schreb.) variety Belfine, which has soft leaves, should be appropriate for grazing under dry conditions. This assumption justified the following experiment which aimed to assess its use in a grass-clover mixture grazed by young cattle and to compare it with a mixture of perennial ryegrass (*Lolium perenne* L.) and white clover.

Materials and methods

Trials were conducted on four farms: Sugiez (430 m a.s.l.), Chevroux (480 m a.s.l.), Moudon (560 m a.s.l.) and St-Urban (520 m a.s.l.). The first three farms are situated in a relative dry region with less than 1000 mm y⁻¹ rainfall. The experiment was able to be carried out in 2007 on each site; in 2008 on the first three ones, and in 2009 it could be maintained only in Moudon. In summer 2006, two grass-clover mixtures were sown side by side on 1.2 to 1.5 ha paddocks. Their main grass component was perennial ryegrass for M1 and tall fescue cv. Belfine for M2.

Twenty young cattle from diverse breeds were distributed evenly according to their weight on both mixtures. The carrying capacity was then kept to the same level on both paddocks. Continuous grazing was managed by cutting a part of the surface in spring time and removing the heavier animals during summer. N fertilisation was 4 x 30 kg ha⁻¹ y⁻¹. Vegetation was monitored with the following measurements:

- On the whole grazed area: botanical composition (Daget and Poissonet, 1969) and grass height (plate pasture meter Jenquip ®).
- On two fenced plots inside each paddock, alternatively cut every two weeks: grass growth (Corrall and Fenlon, 1977) and organic matter digestibility (Scehovic, 1991).

Results and discussion

At the beginning of the trial in Sugiez, M2 grasses did not establish, but tall fescue could be successfully over-sown in March 2007. With this exception, the botanical composition was well balanced (Fig. 1). White clover proportion ranged between 20% and 40%, considered as

adequate for grazing (Pflimlin, 1993). Tall fescue covered approximately half of the biomass of M2 grasses, in good balance with the ryegrass.

The linear regression with 125 pairs of measurement gives equal sward heights in paddocks M1 and M2 ($R^2 = 0.84$). A classification per period (Table 1) indicates that M2 had a higher grass cover in autumn than M1. Considered as an optimal forage ability (Thomet *et al.*, 2004), 3.5 to 5 cm plate pasture height was generally exceeded, leading to grazing control difficulties and to fodder losses. In Moudon, a high grazing pressure in spring and drought in summer 2009 explain the opposite tendency, with a lack of fodder. These observations on the whole grazed area were confirmed by yield measurement on small fenced plots.

Due to regular rainfall, the annual dry matter (DM) production of both mixtures was high in 2007 and 2008 (Table 2). Pastures exceeding $12 \text{ t ha}^{-1} \text{ y}^{-1}$ of DM are considered as the most productive in Switzerland. Yield decrease during the years was more important for M1 than for M2, indicating that tall fescue fits for long duration leys. The growth dynamic followed the usual tendency with a peak in spring and a depression in summer (Table 2). In summer, growth DM rates higher than $60 \text{ kg ha}^{-1} \text{ d}^{-1}$ confirm the good yielding-capacity of grass-legumes mixtures and correspond to the best pasture production on the Swiss lowland. Results from 2009 in Moudon show that M2 offers promising perspectives in dry conditions.

The organic matter digestibility analysed in 2007-2008 was similar for both mixtures (Table 2). Considering these values and the grass height results, it can be concluded that palatability of M2, i.e. tall fescue, was comparable with that of M1.

Results of the monthly weighing of the animals confirmed that the mixture type did not influence their performance. In spite of low weight gains (760 g d^{-1} on average), a productivity of 1200 kg of meat per hectare was reached, generating gross margins higher than those of wheat.

Table 1. Grass height measured with a plate pasture meter in three sites (cm)

Grazing Period	Sugiez		Chevroux				Moudon							
	2007		2008		2007		2008		2007		2008		2009	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Turnout	*	*	7.3	6.4	5.9	6.8	6.1	5.6	8.6	7.4	4.8	5.7	4.0	5.0
Spring	6.7	6.6	7.0	6.9	7.9	8.0	8.0	8.1	9.9	8.6	8.6	8.5	4.3	4.9
Summer	5.2	5.5	4.1	4.7	5.0	5.1	4.6	4.2	8.5	7.8	5.5	5.0	4.5	4.8
Autumn	3.1	3.4	2.6	3.3	4.0	3.9	3.4	3.6	5.7	6.2	3.9	3.9	2.8	3.1

* no measurement

Table 2. Fodder production of grass-clover mixtures M1 and M2 at four sites

Site	Sugiez		Chevroux		Moudon		St-Urban		
	M1	M2	M1	M2	M1	M2	M1	M2	
Annual dry matter yield ($\text{t ha}^{-1} \text{ y}^{-1}$)	2007	13.4	11.7	13.7	13.5	14.5	14.4	15.9	15.7
	2008	10.2	12.2	12.9	13.3	13.4	14.3	*	*
	2009	*	*	*	*	9.2	10.7	*	*
Daily dry matter grass growth ($\text{kg ha}^{-1} \text{ d}^{-1}$)	Spring 2007	97	82	81	69	82	72	87	91
	Summer 2007	65	66	73	79	68	72	66	67
	Spring 2008	97	110	97	104	90	98	*	*
	Summer 2008	35	51	73	64	59	68	*	*
	Spring 2009	*	*	*	*	67	85	*	*
	Summer 2009	*	*	*	*	37	44	*	*
Organic matter digestibility (%)	Spring 2007	82	83	81	82	81	80	77	78
	Summer 2007	77	79	77	77	74	75	78	78
	Spring 2008	80	79	82	79	80	80	*	*
	Summer 2008	79	78	79	76	79	81	*	*

* no measurement

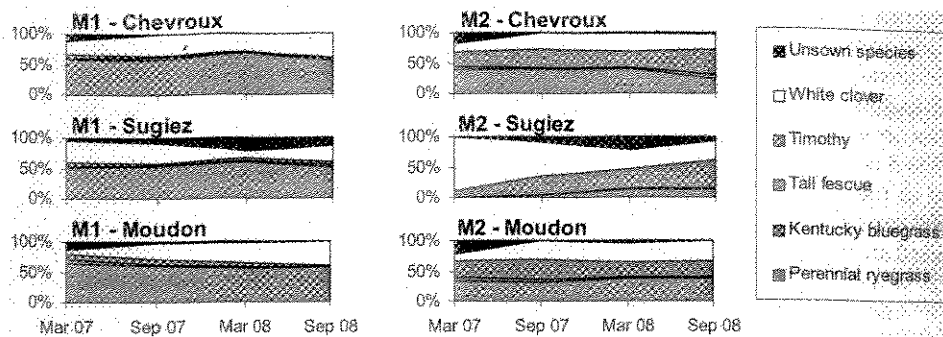


Figure 1. Botanical composition (%) of mixtures M1 and M2 in three sites in 2007 and 2008

Conclusion

Tall fescue cv. Belfine is appropriate as a component in grass-clover mixtures for grazing. In comparison with perennial ryegrass, it has the following advantages: higher yielding capacity in summer, and better persistence over three years. No differences in terms of the digestibility of organic matter and the cattle intake could be observed.

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