

Quinoa as an alternative forage crop in organic dairy farming

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Introduction

Experience with quinoa (*Chenopodium quinoa*) in 2000 on Aver Heino, Centre for organic dairy farming, showed that it was an easy crop to grow and conserve, with high production in a relatively short growing period. When used in a feeding experiment the quinoa whole crop silage (WCS) showed a high dry matter (DM) intake but disappointing fodder qualities. In 2001 an experiment was conducted to establish the effects of cultivar, N application level and harvest date on the fodder quality of WCS.



Materials and Methods

Two varieties of quinoa (Ras1 and Atlas) were compared at three nitrogen (N) application levels: 40 m³ cattle slurry, with 0 (N1), 50 (N2) and 100 (N3) kg fertilizer N ha⁻¹; i.e. 67, 117 and 167 kg available N ha⁻¹, and four harvest moments: after a growing period of 70, 84, 98 and 112 days). Variety and N level were randomised within three replicates. The quinoa was grown on a ploughed grass/clover field on a sandy soil.



Results

Atlas yielded more than Ras1 ($p < 0.001$, Fig. 1). N level had no effect on the DM yield.

The DM content increased with increasing growing period, for Atlas more than for Ras1 (interaction $p < 0.01$, Fig. 2).

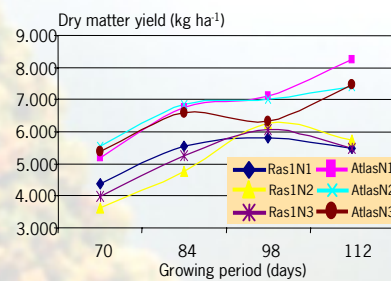


Fig 1. Effect of variety, N level and growing period on DM yield

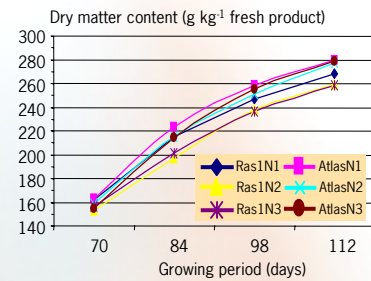


Fig 2. Effect of variety, N level and growing period on DM content

On average the crude protein (CP) content of Ras1 was about 18 g kg⁻¹ DM higher than of Atlas (Fig. 3). For N2 and N3 CP content decreased from 70 to 98 days growing period. The OMD of Ras1 was on average about 3% higher than that of Atlas (Fig. 4). A longer growing period led to a higher OMD.

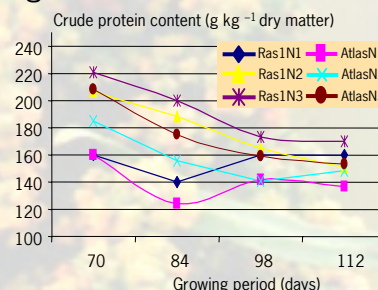


Fig 3. Effect of variety, N level and growing period on CP content

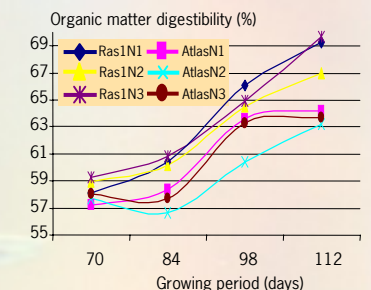


Fig 4. Effect of variety, N level and growing period on OMD content

Conclusions

The new cultivar Ras1 had a lower DM yield than Atlas but a better fodder quality.

It is possible to increase the CP content by earlier harvesting, but this is accompanied by a lower DM yield, DM content and OMD. Thus quinoa is not a viable alternative to grass or grass/clover for protein production.