



Kløvergræs på økologiske kvægbrug. OrgGrass 2007-2010

– reducerede omkostninger og forbedret næringsstofudnyttelse

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Grass-clover in organic dairy farming

OrgGrass 2007-2010



Field experiment in Foulum where strategies for grass rotation design are investigated

Grass-clover in organic dairy farming – how to reduce costs and improve nutrient utilization

On organic dairy farms, grass-clover leys are essential for animal welfare, feed supply and soil fertility building. The proportion of grass-clover in the crop rotations on Danish organic dairy farms is growing and so are farm sizes. This leads to a higher frequency of grass in the near-farm crop rotation to reduce the distance cows have to walk to be milked. However, long-term grazing pastures are often less productive and of poorer quality. It is difficult to utilise the nitrogen accumulated in the field, and there may be problems with the establishment of clover following a conversion.

This research project intends to clarify these issues. A field trial will examine strategies for the design of crop rotations and management of pastures. More precisely, the study includes infield and outfield crop rotations.

Grass-clover pastures on large organic cattle farms

Questions to be answered in the project

- ▶ What is the furthest a cow should walk to pasture?
- ▶ What would be the price of a litre of milk if fresh grass were the main feed ingredient?
- ▶ What is the optimal crop rotation with 240 cows?
- ▶ How do you avoid clover soil fatigue?

Strategies for crop rotation and pasture management

Organic dairy production is increasingly dominated by large farms with many cows. The result is that the distance from the milking parlour to the remotest grazing pasture is too far for the cow to walk. The crop rotation close to the farm therefore includes a large proportion of intensively grazed grass. That is not without consequences – long-term grazing pastures are often less productive and of poorer quality, it is difficult to utilise the nitrogen accumulated in the field, and there may be problems with the establishment of clover following a conversion.

A recently started research project intends to clarify these issues. A field trial at Research Centre Foulum will examine strategies for crop rotation design and pasture management. More precisely, the study includes infield and outfield crop rotations. The infield rotation is close to the farm and consists mainly of grass-clover pastures for grazing. The outfield rotation is further afield and includes maize, lupine, feed grain, and grass for silage.

Productivity and N-leaching

It has turned out to be difficult to combine a high-yield pasture with a low environ-



The project describes the production, quality and environmental impact of pastures at different management scenarios

mental impact. One of the reasons is the high N surplus in the field in the form of dung and urine – and the higher the grass yield, the higher the surplus. The project investigates how to achieve an optimal balance between production and environment. The experiment therefore includes a selection of cattle farms ranging from intensive to very extensive. The first experimental year shows nitrate leaching from pastures to be very management-dependent. In an associated post-doc project, sources and characteristics of leaching of dissolved organic nitrogen in the grass-clover pastures are investigated.

The project also looks at maize in crop rotations with grass. An experiment on a coarse sandy soil in South Jutland focuses on catch crops in maize. The central issue is how a late sowing of a catch crop in maize can be effective in terms of reducing nitrate leaching due to the need for mechanical weed control.

Including herbs in grass mixtures

Another aspect of the project is the development of grass-clover mixtures of high persistence and quality by including herbs such as chicory, plantain, caraway, burnet, lotus, chervil and sainfoin. The interest for including other species in the sward is considerable among organic farmers. In the project the competitiveness of individual species, nutritive value and mineral composition are studied. A Ph.D. study on nitrogen transfer and dynamics in multi-species mixtures is attached to the project. This work also gives an opportunity to study how to produce healthier and tastier organic milk.

In practice, the establishment of white clover following the conversion of a pasture is problematic. Clover soil fatigue is a central issue in the project as the establishment of clover is crucial to the production of grass and the functionality of the crop rotation. The underlying causes of clover soil fatigue are investigated and how the problem can be mitigated on intensively grazed pastures near the farm.



One of the project activities is the development of new grass-clover mixtures containing herbs

Earthworms

Organic pastures are usually associated with a higher abundance of earthworms. Earthworms can by their tunnelling activities significantly increase soil porosity and average pore size. A large number of tunnels, of which some are vertical, promote a faster transport of water through the soil, which may mean that much of the nitrate present in the soil is bypassed. A high earthworm density can thus – in theory – contribute to a reduction in nitrate leaching during the winter months. The project will put this theory to the test and also examine the effect of grazing and age of the sward.

Economic scenarios

The aim of the project is to develop cost-effective and eco-friendly feed production strategies for grass-intensive organic cattle farms. A final evaluation of the different crop rotations and initiatives will therefore be made. To this end representative farm proto types will be optimised in terms of production, self-sufficiency, economy and environmental impact, and scenarios for organic farming using an economic model will be set up. This knowledge will in many cases also be relevant for conventional milk producers, particularly those who have cows on grass.

Grass-clover in organic dairy farming

– options to reduce costs and improve nutrient utilization

(OrgGrass 2007-2010)

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Links

Project homepage: www.orggrass.elr.dk/uk
www.icrofs.org

About ICROFS

The International Centre for Research in Organic Food Systems (ICROFS) is a “centre without walls” where the research is performed in interdisciplinary collaboration between research groups in different institutions. The centre is an expansion of the former research centre DARCOF, which the Danish Government in 2008 decided to give an international mandate and an international board.

The main purpose of ICROFS is to coordinate and monitor international research in organic food and farming systems in order to achieve optimum benefit from the allocated resources. Further, the aim of ICROFS is to initiate research and create impact of the research results through support and dissemination of high quality research of international standard.

More information at www.icrofs.org

