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Athenry

Winter grazing forage crops are being successfully grown on organic farms throughout Ireland, from Cork to Donegal. In this article we will discuss the overall role, establishment and management of forage crops in organic livestock production.

Introduction

The provision of winter feed is often the biggest variable cost in organic livestock production. Organic concentrates are more expensive to purchase, and with the aims of improving profitability and producing all feed for livestock on the farm— it is important to explore all the available options. One strategy to reduce the cost of winter feeding is to use feeds which can be grazed *in-situ* (in the field), thereby reducing variable costs of purchasing organic concentrates or harvesting. While grass/clover silage will provide the bulk of winter fodder, forage crops can provide a viable alternative to cereal and grain-based concentrates.

What are forage crops?

Forage crops are annual or biennial crops, grown for grazing or harvesting as whole crops. This is a very broad term that can cover whole crop cereals, legumes such as peas, maize, beets and a number of brassicas. This article will focus on fodder beet and brassicas such as kale, fodder rape and turnips, which can be used as winter grazing forage crops. Forage brassicas were grown widely throughout Ireland up to the 1960s, but their use began to decline with the mechanisation of grass conservation. In other countries with grass based dairy and beef industries, such as Britain and New Zealand, forage brassicas such as swedes, kale, turnips and rape have consistently been used as a source of cheap, high quality, out of season feed that can be utilised *in situ*.

The benefits of winter grazing forage crops

Winter grazing forage crops are cold-hardy plants that can grow at lower soil temperatures ($\leq 6^{\circ}\text{C}$) than perennial ryegrass and can produce a thick, palatable crop. Along with good yields of dry matter ($>8\text{ t DM/ha}$), these crops maintain a feeding value similar to that of spring grass ($>80\text{ DMD}$). Quick growing times of 12-13 weeks for turnips and 14-15 weeks for forage rape are also an advantage.

They can be used to feed from October to February as part of an outdoor wintering system. Although the economic benefit is dependent on individual farm circumstances, Teagasc research has shown that when housing costs are included, the benefit of an outdoor wintering system may be reduced by one third in wintering costs.

Selecting crops and fields

Deciding which forage crop to grow, and where and when to sow, will depend on a number of factors.

1. Consider your stock feeding requirements over the winter period, including the type of animal to be fed, and the number of animals: Weanlings or growing animals require high protein supplementation to fulfil growth requirements. Consult with your seed supplier to determine which variety of your chosen crop is most suitable for your enterprise, as some will be more suitable for autumn grazing, and others are more suitable for late winter grazing.
2. Consider how much of the stock feeding requirements will not be met with silage or other pasture-based feed.
3. Consider when the land for growing forage crops will become vacant. Forage crops should be used as part of a rotation. Where a particular field has been targeted for reseeded, the forage crop may be undersown with grass. Forage rape and stubble turnips can be sown after harvesting cereals such as oats.
4. In accordance with cross-compliance, fields chosen for out-wintering should be free-draining, should not be near water-courses and should not have steep slopes.

Soil test 7-8 weeks before sowing, to allow time to correct nutrient and lime deficiencies. As acid soils increase the risk of clubroot disease, a target pH of 6.0-7.0 is advised. This can be achieved by applying lime according to the soil test results. Slurry, organic chicken manure or FYM pre-tillage will normally provide enough Boron.

Swedes and kale are full season biennial crops usually sown from mid-May to mid-July. The earlier they are sown the higher the utilizable yield. These crops can be grazed from November through to March. Rape and stubble turnips are annual crops that should be sown later than swedes and kale for use during the November to March period. They have a lower yield than either swedes or kale. Rape or stubble turnips offer the advantage of being sown after harvesting cereals in August and therefore provide a low cost winter feed from tillage ground.

Growing mixtures

Forage crop mixtures are becoming increasingly popular amongst organic farmers as a way of combining the benefits of two or more different crop types. The most common method is to blend a high protein crop such as forage rape or kale with a high energy crop such as stubble turnips. Mixing forage rape with stubble turnips increases the protein content and winter hardiness, compared to stubble turnips alone, but also extends the utilisation period.

It is also worthwhile using two or more different varieties of forage crop, as some varieties may prove more suited to the specific farm conditions than others, thus minimising loss.



A forage rape/kale/stubble turnip mixture growing on Sean Condon's organic farm, Crecora, Co. Limerick. This rape/kale/stubble turnip mixture was sown on 1st August on 2.4ha. Prior to sowing the field was grazed down very tight, shallow ploughed, power harrowed and sowed along with a liming agent using a fertiliser spreader. No other nutrients were applied. The seedbed was then rolled using a Cambridge roller. This forage crop gave very palatable high protein winter grazing for 20 yearling heifers.

Seeding rate: 10kg/ha

Composition: 40% Akela (organic) Forage Rape
30% Dynamo (organic) Stubble Turnip
30% Interval (non-organic) Forage Rape/Kale Hybrid.

Sowing

Three factors must be considered when sowing: timing; seeding rate and; sowing technique.

The sowing date has a huge influence on the success of growing these crops, both in yield and maturity. A delay in sowing can result in an average 60% reduction in optimum DM yield. Plan to sow kale and swedes by early June. The optimal sowing date for forage rape and stubble turnips is early August. In Teagasc research trials, a delay in sowing from the 1st August to 31st August led to a 48% to 77% decrease in forage rape and stubble turnip DM yield.

As a general rule of thumb, crops that can be broadcast are more robust and require less maintenance. The three sowing options are precision drilling, direct drilling and broadcasting, with precision drilling requiring

the lowest seeding rate, and broadcasting the highest. Kale, for example, may be precision drilled at 3kg/ha or direct drilled at 4kg/ha or broadcast at 5-6kg/ha.

If broadcasting seed, cross broadcasting tracks i.e. North to South, East to West. It is important to roll the field after sowing, to ensure soil-seed contact and moisture retention.

Weed management

If permanent pasture has been ploughed, then weeds should not be an issue and no weeding is required. Weeds may be a problem when surface tillage is used for cultivation, especially on land that has been used for crops in the past three years. In those scenarios, some form of weed management should be used. Using a false seedbed is most effective. This is where weeds are allowed to sprout and given a 'false sense of security' for a couple of weeks, and then cultivated. Hoes can also be used to weed the crop, and will have to be used in precision-drilled crops.

Using a higher sowing rate should also help the crop to outcompete weeds. Weed seeds are more likely to germinate in May than June, so sowing kale or swedes early (May) increases weed pressure. June sowing of swedes and kale should reduce if not eliminate the need for weed control. Teagasc research has shown that no weed control should be needed for forage rape.



Forage rape/stubble turnip mixture growing on Mark Duffy's organic farm, Ballybay, Co. Monaghan, used for fattening cattle during the winter, prior to slaughter.

Pests and Disease

Club root is the main disease threat for brassicas, but kale is not as prone as other brassicas. Varieties with increased resistance to disease are available, and in organic farming natural resistance is a very important factor for consideration when choosing varieties. A one in five year rotation for brassicas is recommended to keep club root levels low.

Birds can be problematic, and it is important to intervene early to frighten them away. The damage caused by flea beetles and caterpillars is mostly cosmetic and should not be a concern, as beneficial insects are usually enough of a control. If plants are showing significant damage it may be necessary to intervene with pyrethrum for insects or *bacillus thuringiensis* (BT) for caterpillars. Always check with the Certification Body to get permission before using any pesticide.

How to use forage crops



Mark Duffy's cattle are fed forage rape/turnips in the field along with silage and 2-3 kg organic concentrates per day for approximately 100 days prior to slaughter.

There are a number of different options available for using forage crops, depending on the type of crop grown and the individual farm. Strip grazing of the forage crops *in situ* optimises crop utilisation and results in high feed intakes. Crop 'breaks' should be long and narrow rather than short and wide, so that all animals have access to the fresh break, and trampling and damage of the crop is kept to a minimum. Stock should be removed to hard standing once each day's ration has been eaten. To prevent damage to soil structure, stock should be kept off fields in very wet conditions

Although strip-grazing is recommended, some other options for feeding are available. Zero grazing, where the crop is mechanically harvested every few days and fed, reduces the need to move stock around. Clamping or making silage at the end of the growing season is also possible with some of the crops, and simplifies the feeding process. However, all of these options increase harvesting and winter housing costs.