

Cover crops and Horticultural systems at Elveden Farm



Andrew Francis, Senior Farms Manager at LEAF Demonstration Farm, Elveden Farms Ltd introduces how they are trialling and monitoring cover crops to find out how they can be used to best effect in Elveden's horticultural rotation.

Summary

- Research into cover crops in arable systems has been extensive, however the effects in horticultural systems are less known.
- In Horticulture, a cover crop will likely need to replace a commercial crop in the rotation. The benefits of a cover crop needs to therefore outweigh the cost of losing the commercial crop.
- When choosing a cover crop in a horticulture rotation, it is important to consider the growth stage of a cover crop as well as how to deal with residual cover crop as well as the effect to the following crops.

Introduction

Cover crops have gained significant attention in the past two to three years, partly due to more farms adopting low tillage farming systems and slot drilling. The potential benefits of cover crops range from improved soil health and fertility to pest suppression and improved yields. Cover crops can act as a ground cover for otherwise bare land to stop soil erosion and help to lower the weed burden of the land. The majority of research and trials have focused on arable crops with little knowledge generated for the effects of cover crops in horticulture.

At Elveden, root crops are grown for three years out of their six-year rotation. As root vegetables need to be sown at depth these crops disturb the soil during sowing. In the past, Elveden have used grasses and commercial rye as cover crops after potatoes and before onions to help absorb the nutrients of the green tops and to lock up nutrient to prevent leaching.

Horticulture and Cover Crops

Elveden has tested several cover crop mixes including Biofum crops and mixed crops of Rye, Radish, Clover and Black Oats, to identify which is the most efficient and effective in a root vegetable rotation. The trials have been adapted from HDA cover crop trials where clover and mustard cover crops were used to build fertility in the soil to establish whether the financial costs of a cover crop were outweighed by the benefits to the cash crop.



Cover crop in use at Elveden farm

Elveden's cover crop trials were planted last year and have now been killed off. The nutritional quality of the soil was then tested by monitoring the following onion rotation by recording onion biomass, shape and overall quality. The onion characteristics are expected to improve with increase nutrient availability. Soil moisture of the field has also been monitored to establish whether areas with cover crop retained moisture in the soil over winter compared to areas without cover crops. All cover crop mixes were similar in price therefore cost has not been factored into the effectiveness of each cover crop mix.

Nutrient Availability

The rate of nutrient mineralisation from these cover crops is high. A cover crop grown for twelve months provides a large increase in nutrient availability to the following crop, a marginal gain in nutrient availability to the next crop and no benefit to nutrient availability to the third crop lay. To assess the impact of different cover crop mixes on various root crops, each cover crop mix was trialled in four slots of the six year rotation.

In root vegetable systems, such as the one at Elveden, it is likely that a commercial species will have to be taken out of the rotation to include a cover crop. This means the benefits of the cover crop need to outweigh the financial losses of losing a commercial crop. In order to get the most out of a cover crop, it is important to know where in the rotation is it best placed, this will depend on how the crop will grow, how to deal with the crop residue and what the effect will be to the following commercial crop. The family of the cover crop also needs to be considered in relation to the

commercial crop either side. Cover crops can reduce disease prevalence by providing a bridge between root veg crops. An example would be the suppression of potato cyst nematodes

Removal of Cover Crops

In Arable farming, cover crops can be difficult to sow and get established due to the lack of moisture in the soil left from cereals. This means rain or irrigation is needed to establish a cover crop, leading to an increased cost to an arable farm. In horticulture, this is less of a problem. After the harvesting of Potato crops, for example, soils generally have a high moisture content and so a cover crop is easier to establish in these systems. Historically, both horticulture and arable systems, have used glyphosate to kill off cover crops. However, in the face of the uncertainty of EU renewal of glyphosate, farms are increasingly looking for alternative ways to remove cover crops. Elveden have used grazing to reduce the bulk of the cover crops before then, allowing the cover crop to recover slightly and then applying glyphosate as a final stage to remove the cover crop. This process has helped to reduce the amount of glyphosate used on farm.

Inversion techniques are another method Elveden uses to remove cover crops. This process involves ploughing the cover crop into the ground, allowing the crop to mulch down and then plough residue under again. Elveden has noted instances where the cover crop continues to grow after inversion where glyphosate had to be sprayed to remove the residue cover crop. Elveden has also tried to use frost to remove black oat cover crops but this is a risky approach because the British climate is very unpredictable so the prevalence of frosts from one year to next can change drastically.