Optimising Subsidiary Crop Applications in Rotations (OSCAR)
On-farm Testing of Cover Crop Species Mixes

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The Challenge

One challenge farmers face in planning cover crop systems is the dependence of cover crops on biophysical conditions such as soil type, rainfall, and climate. The performance of different cover crop species therefore varies according to geographic location and on-farm growing conditions. Farmers need a quick and effective way of identifying suitable species for their farm.

On-farm Trials

On-farm trials were designed to test how far knowledge of cover crop species can be obtained by farmers directly on their farms. Together with researchers, two farmers in the south west of England have been trialling different methods of assessing species performance to identify realistic and cost-effective methods for farmers to use whilst providing useful results. Based on the trial results a general protocol will be developed to aid farmers in implementing on-farm trials to identify the most promising species mixes for their farms. On-farm testing is also being carried out in Germany and Italy as part of the OSCAR project.

The Trial Mixture

A trial mixture (Table 1) was selected based on findings from the LegLink project (Döring et al., 2013) and discussions with the two participating farmers. On both farms the mix was undersown into a 0.25 ha block of spring cereal in 2013 and 2014.

Common name	Scientific name	Variety	Seed rate (kg/ha)
Red clover	*Trifolium pratense*	Merviot	5.25
Lucerne	*Medicago sativa*	Hunter River	7
Black medic	*Medicago lupilina*	Virgo Pajberg	4.65
White clover	*Trifolium repens*	Alice	1.45
Alsike clover	*Trifolium hybridum*	Aurora	2.05
Birdsfoot trefoil	*Lotus corniculatus*	Leo	3.5

Table 1. *Species composition of custom mixture used in 2013 and 2014 at both farms*

Farmer-led Assessments

The methods tested by the farmers included assessment of species presence/absence and cover using the Braun-Blanquet scale and quadrats at three intervals throughout the growing season (post-establishment, post-harvest and post-winter) and more general whole field visual assessments involving walking across the whole plot, and for each species, estimating abundance and performance using the Braun-Blanquet scale or a more general visual growth category (vigorous, OK, or poor). Supporting photography was also used.

Plate 1. *Together with researchers, farmers are trialling methods of assessing cover crop species performance*

Initial Results

Feedback from the farmers on the assessment methods tested raised the following points:

. Whole field visual assessments of individual species do not work well at early growth stages — the distinction between the mix species being too hard to quantify. Equally, the Braun-Blanquet scale categories are too broad to pick up differences between the individual species

. A quadrat is good for focusing attention but time consuming

. The importance of post-harvest and post-winter assessments depends on the objectives and goals of the individual farmer

. Farmers may lack the skills needed to identify individual species resulting in the under-estimation of certain species

. The least time-intensive assessment method – the whole field visual assessments – is favoured by the farmers

Conclusion

Although the assessment methods may not produce robust, quantifiable data, they do encourage farmers to actively engage in selecting species mixes adapted to on-farm conditions and to assess species performance with an increased level of detail and scrutiny than might otherwise be used.

Where next

In 2015, the third and final year of the trial, a customised mix will be chosen by the farmers based on the results of the previous two years. This mix will be sown against a commercially available mix and more detailed analysis carried out to ascertain whether the methods outlined above give a good indication of suitable species.

Acknowledgements

References

Döring et al. 2013. Project Report No. 513 Using legume-based mixtures to enhance the nitrogen use efficiency and economic viability of cropping systems. HGCA.