

COMPANION CROPS IN OILSEED RAPE

What are the benefits of this new approach?

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Drilling a companion crop or seed mixture alongside arable crops is nothing new. As yet however, this approach has not been widely used in traditional cropping and especially not in oilseed rape. Companion planting in OSR has two main objectives. The primary objective is to reduce nitrogen fertiliser inputs by using legumes to fix atmospheric nitrogen. The secondary objective focuses on repelling or distracting insect OSR pests.

These planting practices were developed in France, where they have been studied in great detail. Studies have increasingly been undertaken in this field in the UK and Germany too in recent years. However, companion planting in oilseed rape has established itself only to a very limited extent in these countries. This is mainly

because conventional solutions are still available, cheaper and easier to use. For one thing has emerged from all the trials: Companion planting in oilseed rape is not at all comparable with crop spraying. In fact, it has significant effects on various aspects of cropping.

Nitrogen fixation

The primary aim of companion planting in oilseed rape is to fix atmospheric nitrogen by using legumes, and so reduce nitrogen fertiliser inputs. Various clover species such as fenugreek and Egyptian clover have proved effective, while field beans (on heavy soils) or lentils have been very successful in some areas. On the other hand, peas and vetches have proved unsuitable because if they are not killed off in winter or controlled with herbicides, they tend to dominate the oilseed rape crop, leading to significant problems during harvest. Under good conditions, companion plantings can fix up to 30 kg N/ha before winter. However, the supply of nitrogen does not become available to the oilseed rape until the following spring when the legumes have died off. And this will only happen if the companion plants have enough time for their nodules to fully develop before winter sets in. For this reason, the oilseed rape and legumes must be sown around ten days before the actual local sowing time. In Germany, this in turn increases the risk of overgrowing and winter kill. In addition to nitrogen fixation, a reduction in pest damage has also been reported in oilseed rape surrounded by companion crops. Weed control and a positive effect on soil health have also been cited as further benefits. If the legumes do not die off over winter, they can be controlled in the spring with a herbicide application



Companion planting of field beans, fenugreek and lentils in oilseed rape

(e.g. Lontrel). However, it is imperative to follow the safety indications on the herbicide.

Pest control

The second approach is to use non-legume companion plants to prevent insect damage in autumn. Species which reliably die off in winter or can easily be controlled with herbicides make suitable companion plants for this purpose. Yellow mustard has proved successful in trials, where it was grown alongside Clearfield oilseed rape. If the mustard survives the winter, a herbicide application in spring will clear it from the crop. Yet the mechanism that is actually responsible for reducing OSR pests is not yet fully understood. One possible explanation could be that the smell of mustard masks the oilseed rape, making it harder for insects to find and attack. Another explanation could be that the pests (mainly flea beetle) prefer the mustard and therefore avoid the oilseed rape. Buckwheat, on the other hand, was found to be a poor companion plant because it is too vigorous in autumn and tends to outcompete the young oilseed rape plants. Regardless of the specific species used as companion plant, this approach bears the risk that competition from the companion plant will cause the oilseed rape to bolt and so lose its winter hardiness. Furthermore, all non-legume companion plants will invariably compete with rapeseed for light and nutrients.

When to sow?

Companion plants are sown with the oilseed rape, either simultaneously in the same row or separately in a second pass between the rows of rapeseed. This planting technique has been developed by farmers in France. Non-legume companion plants such as mustard can also be broadcast after drilling the oilseed rape. In terms of variety choice, it is important to choose an oilseed rape variety which is sufficiently vigorous in autumn, but at the same time less prone to extending its stem. Weed control is relatively straightforward in both systems described above. Previous trials have shown that a pre-emergence treatment with a herbicide containing metazachlor has no adverse effect on the companion crop. Graminicides can also be applied in the usual way. In France the weed control effect provided by companion plants enabled herbicide application rates to be reduced by as much as 50% of the permitted dose.



Mixes of oilseed rape and yellow mustard – close-up view



Mixes of oilseed rape and yellow mustard (high proportion of mustard)

How cost-effective is it?

A further important point is the cost-effectiveness of companion planting in oilseed rape. The savings afforded by reducing fertiliser and agrochemical inputs are countered by the additional cost of the seed. Companion seed can cost up to €70 per hectare, depending on the species. Furthermore, the cost-effectiveness of the companion plant seed may be reduced by the possible need to apply herbicide in the spring. There are still many unanswered questions regarding companion planting in oilseed rape and little experience of this new technique has been gained on the ground. For this reason, we can make no general recommendations about its use at present.

Conclusion

The main benefits of companion planting in oilseed rape are to fix atmospheric nitrogen for use by the oilseed rape in the spring and to repel insects and thus reduce insecticide use in autumn. Even though undersowing in oilseed rape has long been studied and has to a limited extent

become established farming practice, the big breakthrough has failed to materialise as yet. The main reasons for this are the possible detrimental effects on the main crop and the complexity of the system compared with conventional solutions. Furthermore, the cost-effectiveness of companion planting is not guaranteed every year since savings on nitrogen and agrochemicals are offset by the additional cost of the seed. Further research is needed to give growers the greatest possible reassurance before these approaches can become mainstream.



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