



SUPERIOR PERFORMANCE OF SPECIES-RICH MIXES

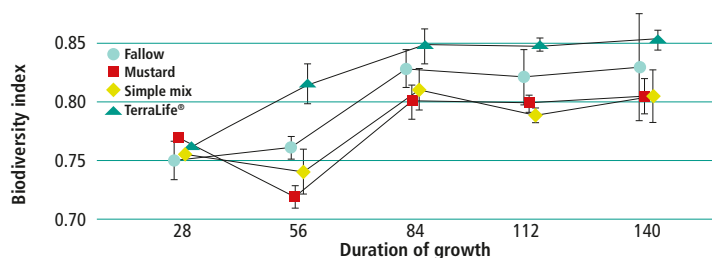
Scientifically proven

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TerraLife® mixes have become an integral part of cover cropping. TerraLife® was launched in 2010 as Germany's first programme of cover crop mixes designed specifically for crop rotations. The programme was developed over 10 years ago to harness the special benefits of mixes containing different species. The aim was to create a simple cover crop tool for farmers which would improve soil fertility and loosen up the soil between crop rotations. Scientific studies have now confirmed the superior performance of species-rich mixes compared with single crop sowings.

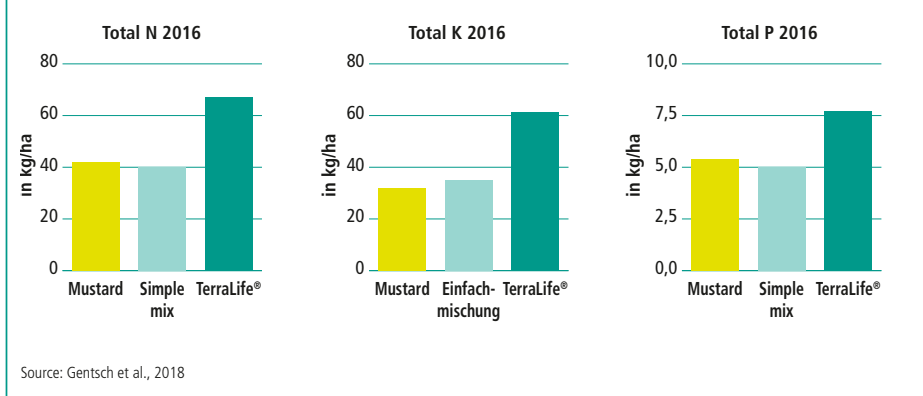
Today the TerraLife® programme offers a range of mixes for specific crop rotations which are designed to tackle problems in arable farming with targeted precision. Farmers who grow TerraLife® can feel the 'subtle' improvement in the soil: it is well-structured, has a fine top tilth and is easier to cultivate. While we have standardised metrics for main crops such as yield and quality, with cover crops it is far more difficult. The CATCHY Project aims to measure the values of cover crops in a crop rotation in an entirely new way. The preliminary findings have now provided some answers.

Abb. 1: Microbial diversity increases in line with the diversity of the cover crop



Source: Gentsch et al., 2018

Abb. 2: TerraLife® MaizePro DT Greening mobilises valuable fertilisers



The project compared four variants; fallow land, mustard, a simple mix (mustard, bristle oat, Egyptian clover and phacelia) and the TerraLife® MaizePro DT mix. Microbial activity is an important indicator of soil fertility. As expected, this was lowest on the fallow land. It increases in line with the level of diversity and is greatest in the species-richest mix (Fig. 1). This can be explained by root penetration and competition at different soil levels and interaction between the plants. Each species has different nutrient requirements and the plants form diverse symbiotic relationships (e.g. with rhizobia or mycorrhizal fungi). Species-specific root exudates are released into the rhizosphere where they activate the microbiology to mobilise nutrients and protect against pathogens. They also have a very positive effect on the development of the secondary soil structure (soil bioengineering). This can be of great benefit to the follow-on crop.

Species-rich mixes provide valuable nutrients

Efficient nutrient management is extremely important in modern arable farming. A cover crop has to not only increase and sustain soil fertility, it must also mobilise nutrients and make them available to the next crop. CATCHY shows that the species-rich mix, in this case MaizePro DT Greening, makes available 20 kg N/ha more than mustard or simple mixes comprising four components (60 kg N/ha in total). The same is true of the key nutrients potassium (+ 27 kg/ha) and phosphorus (+ 2.5 kg P/ha) compared with single crop sowings and simple mixes (Fig. 2). This is especially important in the context of the latest German Fertiliser Ordinance. These nutrients are

already present in the soil and simply have to be mobilised to make them available to plants. Farms in nutrient supply classes D or E rely on these natural nutrient sources.

Readily available nutrients

Dr Norman Gentsch, one of the scientists involved in the CATCHY Project, puts this down to the enormous root biomass produced by a species-rich mix. "These root masses can take up the available nutrients far more effectively than single crop sowings. Nutrients bound in the root biomass, especially in the fine roots, are extremely quickly convertible and are thus readily available to the follow-on crop", says Gentsch.

Benefits for intensive crop rotations

A species-rich cover crop is ideal for loosening up the soil in maize crop rotations. Ideally, cover crop mixes should selectively support mycorrhization, thereby improving the soil structure. This gives the soils better bearing capacity, as well as making them more water-stable and easier to work. TerraLife® MaizePro DT (Greening (30/50)) mixes are ideal for preparing the soil for the subsequent maize crop. These mixes have been continuously improved and adapted to the requirements of the follow-on crop. Farmers can choose between a legume content of max. 30% (MaizePro DT Greening 30) or max. 50% (MaizePro DT Greening 50), depending on the proportion of legumes permitted in the federal states. With 18 components, the mix ensures very good, deep root penetration making it the ideal soil preparation for maize crops.

The CATCHY Project



The CATCHY cover crop project is part of the BonaRes initiative – "Soil as a sustainable resource for the bio-economy" – launched by the German Federal Ministry for Education and Research (BMBF) in 2010. The aim of the project is to investigate how cover crops affect soil and soil biology and thus the main crop yields by studying two different crop rotations with wheat/maize and wheat/field beans over a nine-year period. Alongside the DSV, the project draws on the expertise of experts from various places in Germany – microbiologists from Bremen, soil scientists from Hannover, plant nutritionists from Gatersleben, arable farmers from Triesdorf and socioeconomists from Gießen. DSV brings to the project its extensive experience in the development and use of cover crop mixes.

Diary date: A CATCHY Day for farmers will take place in Triesdorf on 12 October 2018.

The CATCHY Project runs for another five years. The 'black box' of soil microbes will yield many more results over the coming years, providing new insights and valuable information for farmers.



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