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.

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.

**SUPERIOR PERFORMANCE OF SPECIES-RICH MIXES**

Scientifically proven

Carmen Fiedler · Lippstadt

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

![Graph showing microbial diversity over duration of growth for different cover crops](Source: Gentsch et al., 2018)
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 mycorrhiza, 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 diverse crop rotations (e.g. with rhizobia or mycorrhizal fungi). 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.

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