Practice Abstract #25

TRansition paths to sUstainable legume-based systems in Europe

# Developing elite-rhizobia inoculants to enhance legume crop performance and yield

Legumes are characterised by their capacity for Biological Nitrogen (N) Fixation (BNF), which is the ability to fix atmospheric di-N gas (N2) into biologically useful forms. BNF is a function of a symbiotic relationship of the legume with a particular class of soil microbes, collectively referred to as rhizobia. Rhizobia that are compatible with the host infect its roots, and form outgrowths termed 'root nodules' within which they carry out BNF. Due to this unique ability legumes do not need synthetic N fertilisers to be productive, since BNF fulfils their N requirements.

The rhizobia normally reside as free-living soil microbes and present a wide variety of types which vary in ecologically important characteristics, such as their persistence in the soil, their ability to compete with other legume-compatible rhizobia to form root nodules, and their BNF capacity. In addition, legumes are often characterised as having unstable yields, and the sub-optimal nature of their rhizobia-legume symbiosis has been implicated as a factor in such instability.

Consequently, specific rhizobia strains have been isolated which allow more consistent and enhanced yields, and these are sold as commercial inoculants. The inoculants are applied to legume seeds just before sowing and comprise very high concentrations of rhizobia due to low on-seed survival.


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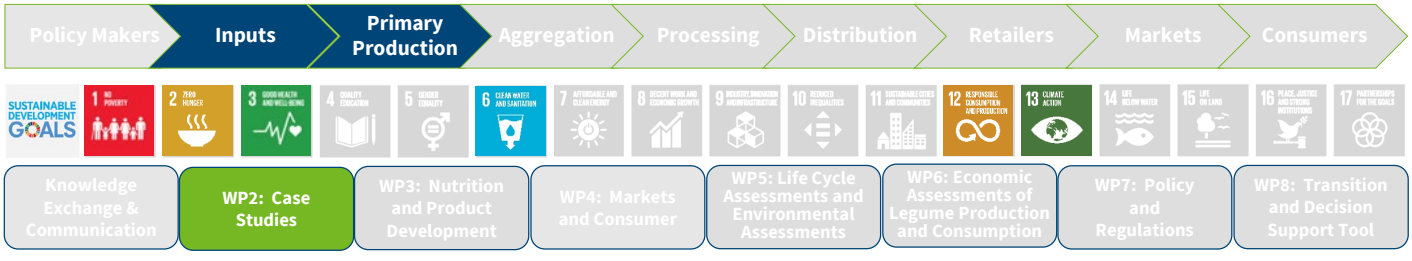
www.legumetechnology.co.uk


The James Hutton Institute





All Pratice Abstracts prepared by the TRUE Project in the EIP-Agri common format can be found here: https://ec.europa.eu/eip/agriculture/en/find-connect/projects/transition-paths-sustainable-legume-based-systems

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# Developing elite-rhizobia inoculants to enhance legume crop performance and yield

To optimise the potential of commercial inoculants, TRUE partners have isolated 'elite' rhizobia from peas and beans which have both high BNF potential and high on-seed survival. This provision of elite rhizobia inoculants is allied to the availability of molecular tests for rhizobia population densities in soils, and identification of the genetic determinants underpinning their elite potential. This research and innovation activity is being carried out with support from www.legumetechnology.co.uk.

**Figure 1.** Various legumes and pulses . *Photo credits ©: Mariana Duarte*

## About TRUE

The EU funded project "TRansition paths to sUstainable legume based systems in Europe" (TRUE) is a balanced practice-research partnership of 24 institutions, which aims to identify the best routes, or "transition paths" to **increase sustainable legume cultivation and consumption across Europe** and includes the entire legume feed and food value chains.

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