

Anne SCHNEIDER
Francis Flénet

TERRES INOVIA,
THIVERVAL-GRIGNON,
France

In the current French arable cropping systems mainly based on cereals and oilseed rape (OSR), grain legume crops provide both a botanic diversification and nitrogen supply, thanks to their ability to fix atmospheric N₂. However, ecosystem services provided by legumes are not well characterised according to the given context, preventing them to be fully valued for a large number of farmers (Jeuffroy et al. 2015). In order to complement previous studies and on-going INRA analysis of a series of detailed traits in one location, Terres Inovia carries out trials to address the comparative characterisation of some services provided by grain legume crop to the following rape (or wheat).

The services of pea, faba bean, lentil crops, compared with non-legume crop (wheat, rape), are measured with rape and wheat as the following crops in two locations (« Berry » in the Indre area since 2015, and « Grignon » in the Yvelines area since 2016) in different couple of years.

Several variables are analyzed: yield (quantity and quality), N fixed (%Ndfa, following 15N enrichment in the case of analytical trials), residual mineral soil nitrogen (at 3 dates), crop and grain nitrogen content, soil biological activity indicator (soil nematofauna), and, in one location, N₂O emissions. Preceding crops on year n include non-legume crops (wheat and OSR in both locations), and legume species (winter pea and pea-wheat intercrop in both locations, winter faba bean and spring lentil only in Berry, spring faba bean and spring pea only in Grignon). The following crops on year n+1 include wheat and OSR without N fertilisation (0N) or with a suboptimal N fertilisation (N1).

The first results of this on-going experiment, in combination with previous results, outline that OSR which follows pea absorbs a higher proportion of nitrogen compared with the OSR after wheat, i.e. more than 40% in the case of non fertilised OSR. The different legume-related ecosystem services are variable according species and contexts and the investigation of the factors explaining their quantification is targeted to better use them for more robust OSR grown with less inputs in cropping systems.

- Jeuffroy M.-H. et al. 2015. Performances agronomiques et gestion des légumineuses dans les systèmes de productions végétales, In : Les légumineuses pour des systèmes agricoles et alimentaires durables (Ed Quae), pp.139-224.