



Nitrogen input reduction and optimisation of nitrogen fertilisation in plant teams

Original piece: **Stefano Tavoletti (UNIVPM)**

Intercropping cereals with grain legumes could be a promising strategy to reduce nitrogen inputs in cropping systems because of the lower cereal plant density in cereal-legume intercrops, and the presence of a nitrogen-fixing crop. Optimising fertilisation of cereal-legume plant teams requires knowledge of the requirements for external nutrients, supplied by fertilisers, of each crop in the plant team.

To get initial information that could be useful as a starting point, field trials with different crop combinations (cereal and grain legume) have been carried out within conventional farming systems. Nitrogen fertilisation has been adjusted based on the cereal seed density in the plant team. For example, if wheat as a monocrop usually receives 180 kg of nitrogen (N)/ha, an intercrop where wheat is included at 50% of the monocrop wheat density should receive 90 kg of N/ha. Faba bean or pea did not receive nitrogen fertilisation, high levels of fertilisation can limit the ability of leguminous plants to form nitrogen-fixing nodules. Therefore, the cereal and legume monocrops were fertilised in line with typical farming practice in the trials.

Results on yield, grain protein content and Land Equivalent Ratio (LER) – which assesses the performance of intercrops versus monocrops ($LER = \text{yield in mixed crop} / \text{yield as monocrop}$) – suggested that wheat in a legume intercrop, at 50% N fertilisation of the monocrop, had a grain yield and grain protein content higher than expected when compared with monocrops with standard N fertilisation. Further trials are ongoing where N fertilisation of plant teams will be adjusted based on grain yield and protein content potential of wheat in mixture combinations. Moreover, the use of soil sensors could help detect differences in nitrate leaching levels between monocrops and intercrops.

> Find out more, including references, at: plant-teams.org