



Transition paths to sustainable legume-based systems in Europe

Using legumes as green manures in protected cropping



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Author(s)

Francis Rayns and Judith Conroy

Centre for Agroecology, Water and Resilience, Coventry University

Contact

Francis Rayns, ab5438@coventry.ac.uk

Country/Region

United Kingdom

Keywords

Green manure, protected cropping

The inclusion of leguminous green manures (also known as fertility building crops or cover crops) can bring many benefits, such as:

- adding nitrogen to the system (as a result of fixation by symbiotic rhizobia bacteria);
- minimising losses of nitrogen by leaching;
- adding soil organic matter (thus improving structure and water holding capacity);
- reducing the risk of erosion; and,
- suppressing weeds and acting as a break crop to reduce the risk of pests and diseases.

They are therefore of value in both conventional and organic systems but remain underutilised. To get the best results the correct species need to be selected and integrated in the rotation with the cash crops.

Protected cropping presents a particular problem due to the high value of the glasshouse or polytunnel infrastructure making it difficult to justify allocating space in the cropping schedule for fertility building crops. Fast growing species that can accumulate biomass rapidly are required, such as true clovers (e.g. crimson, Persian and berseem/Egyptian) or other legumes (e.g. fenugreek, vetch, forage peas and lupins).



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These could be grown either over the winter period (up to six months) or as much shorter break crops in the spring/summer (possibly between salad crops). Lower growing species (e.g. trefoil) may be suitable for intercropping, which could help with weed control. In colder climates, frost hardiness is an issue – under the protected conditions of a polytunnel the peas and lupins may produce ‘softer’ foliage, than those grown outside, which may be more susceptible to cold nights as the winter progresses. However, frost kill can minimise the need for cultivations to incorporate green manures into the soil, if it occurs after significant biomass has accumulated.



Persian clover (*Trifolium resupinatum*) was found to be one of the best legume species for overwintering in an unheated polytunnel. Photo credits ©: Francis Rayns



Vetch (*Vicia sativa*) as green manure grown in a protected cropping system. Photo credits ©: Francis Rayns



About TRUE

The EU funded project "TRansition paths to sUustainable 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.

April 2017 – September 2021



TRansition paths to sUustainable legume-based systems in Europe (TRUE) has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 727973

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