

Finding new cover crops for Estonian conditions

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Implications

Cover crops are essential in fallow periods of cropping systems to protect the soil from erosion and loss of plant nutrients through leaching and runoff. Experiments with potential cover crop species were carried out to evaluate their suitability to the local climate. The biomass production of tested cover crops in the two year experiment depended on the length of the growing seasons.

Background and objectives

Using cover crops in crop rotations is a promising option for sustainable agricultural production in both organic and conventional farming systems. Experiments with new cover crop species were carried out to find varieties that are capable of producing large biomass and binding great amounts of nutrients in the northern climatic conditions. The potential new cover crops for autumn and winter include a brassica species tillage radish (*Raphanus sativus* L.) and leguminous crops berseem clover (*Trifolium alexandrinum* L.) and hairy vetch (*Vicia villosa* Roth).

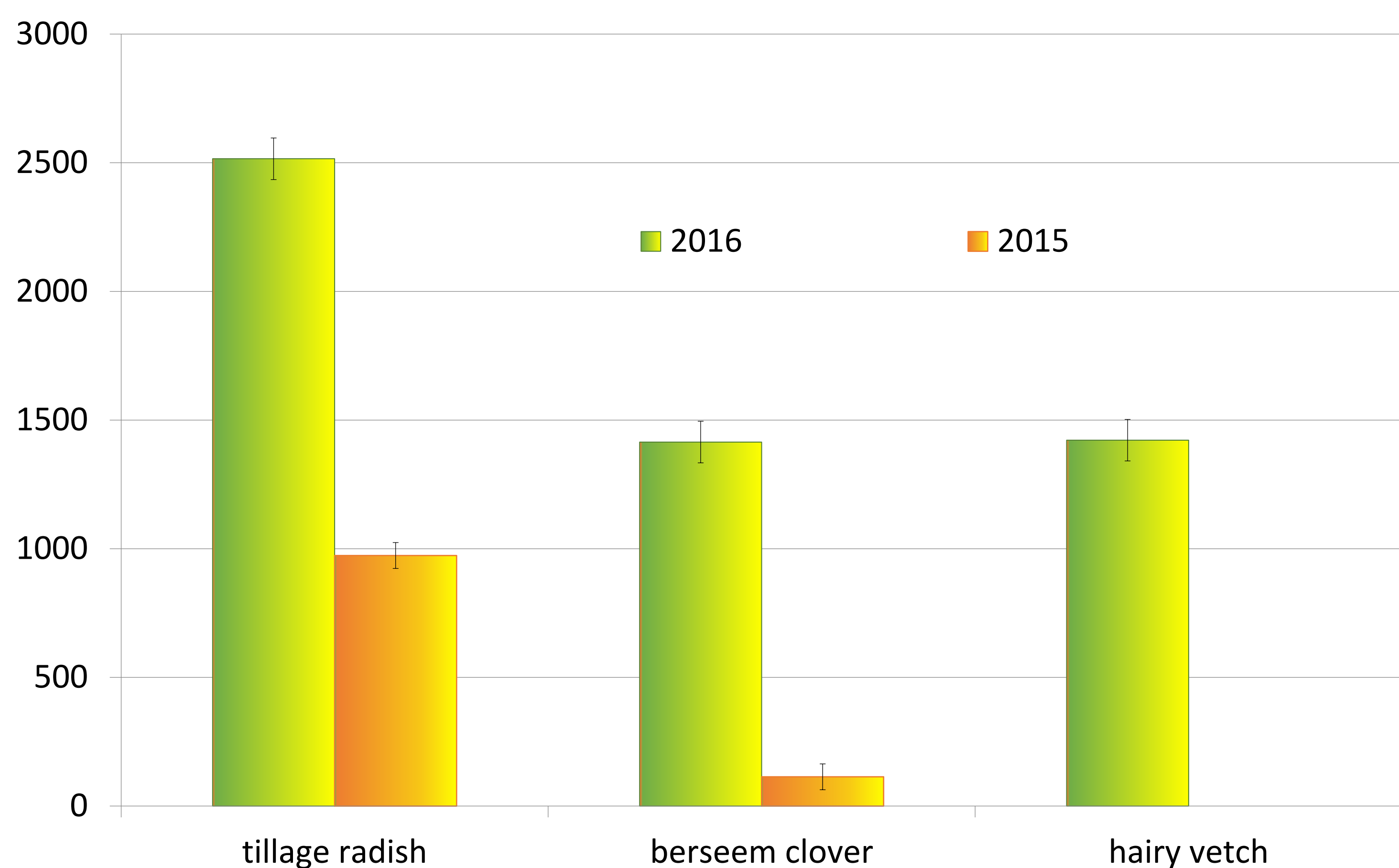


Figure 1. The biomass production of cover crops (dry matter kg ha⁻¹). The vertical bars indicate the LSD_{0,05}

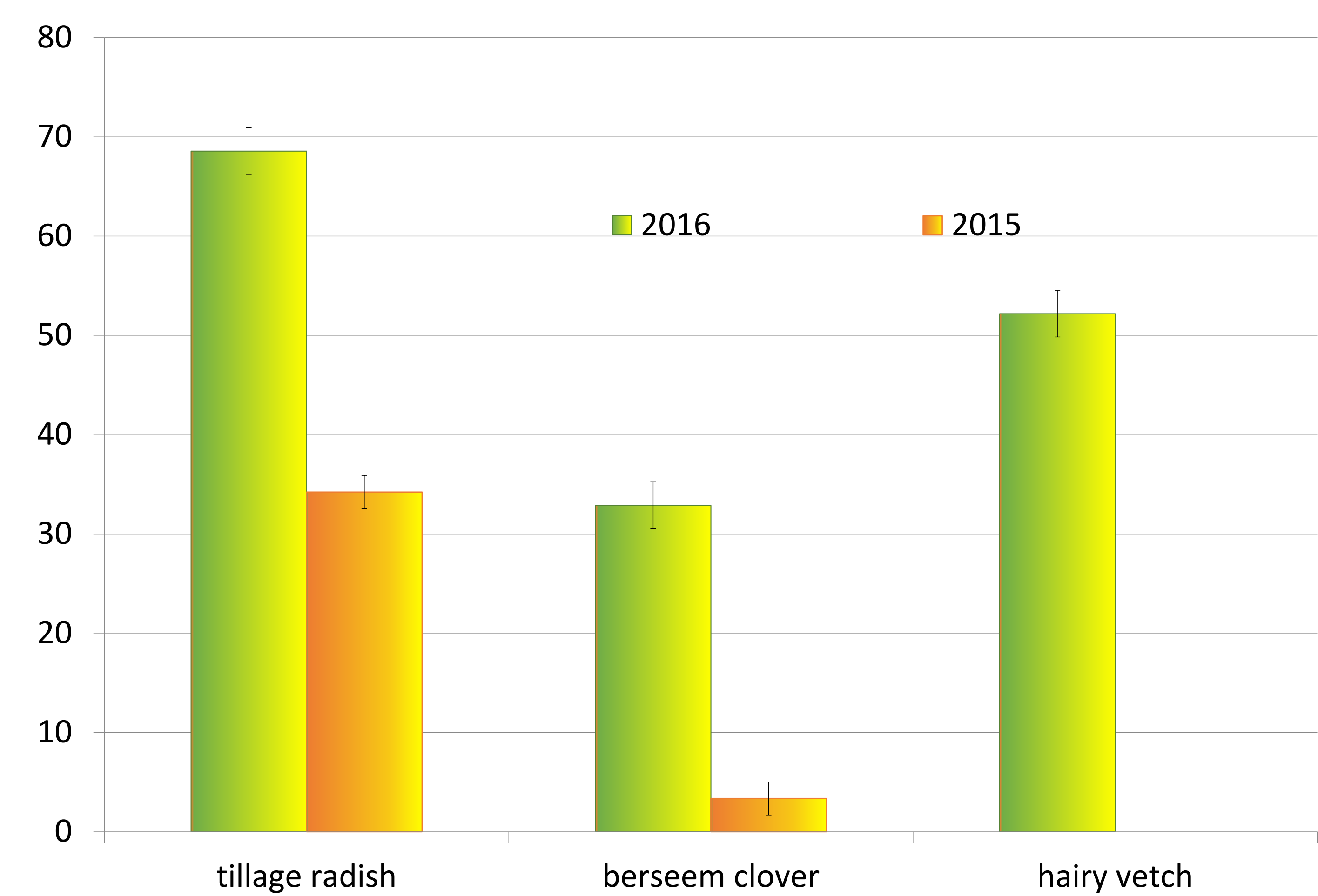


Figure 2. The nitrogen content of cover crops (dry matter kg ha⁻¹). The vertical bars indicate the LSD_{0,05}



Figure 3. Hairy vetch in spring



Figure 4. Berseem clover in 2016 and 2015



Figure 5. Tillage radish in autumn and winter



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Key results and discussion

The weather conditions in 2015 caused a late harvest of cash crop and the cover crops tillage radish and berseem clover were drilled at the end of August. Biggest biomass was produced by tillage radish - about 950 kg dry matter (DM) ha⁻¹ (Fig.1) and it bound 35 kg of nitrogen (N) ha⁻¹ (Fig. 2). The biomass DM yield of berseem clover was only 100 kg ha⁻¹.

Earlier sowing and more favourable weather conditions in 2016 resulted in considerably higher biomass yields compared with 2015. The total biomass DM yields varied from 2500 kg ha⁻¹ for tillage radish to 1400 kg ha⁻¹ for hairy vetch and berseem clover. Tillage radish bound 70 kg N ha⁻¹. Hairy vetch has potential for surviving the winter (Fig. 3) and therefore gives an opportunity to scavenge more N. Tillage radish does not survive the winter in our climate, but when established early it produces quite large taproot and therefore is capable of scavenging the nutrients from deeper soil layers (Fig. 5). Berseem clover needs early establishment (Fig. 4).