Effect of *Elymus repens* on yield of winter wheat, spring barley and faba bean in an organic crop rotation experiment

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***E. repens* shoots were counted and weighed at different densities in cereals and faba bean in two organic crop rotations with three different treatments and compared to biomass and yield of the crop.**

For each rotation, the combinations of treatments with manure and with catch crop (+M+CC), without manure and with catch crop (-M+CC) and with manure and without catch crop (+M-CC) were cultivated. For faba bean, manure was not applied in the +M systems. For potato, catch crops were not cultivated in the +CC systems. For spring barley and grass-clover in O2, all systems had a grass-clover growth in the autumn.

Crop rotations and treatments

O2	Manure	Catch crop	O4	Manure	Catch crop
Spring barley with undersown grass-clover	+/-	n.a.	Spring barley	+/-	+/-
Grass-clover	-	n.a.	Faba bean	-	+/-
Potato	+/-	n.a.	Potato	+/-	n.a.
Winter wheat	+/-	+/-	Winter wheat	+/-	+/-

n.a.: not applicable

There was a good relationship between crop biomass and kernel yield for barley, but a less clear relationship for faba bean.

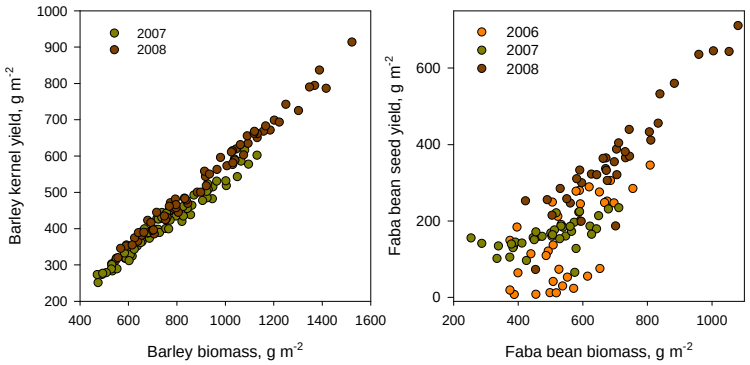

Fig. 1. Relationship between biomass and kernel or seed yield of spring barley and faba bean.

The *E. repens* shoots in the O4 rotation decreased spring barley biomass relatively more than the same number of shoots in the O2 rotation. In treatments without manure, *E. repens* had a smaller effect on biomass than with manure.

In faba bean, *E. repens* in the treatment without manure also decreased the biomass less than in the treatments with manure.

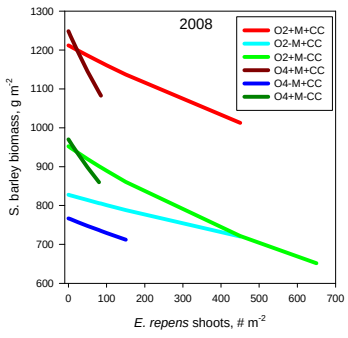

Fig. 3. Predicted barley biomass i 2008 in the two crop rotations and the different treatments.

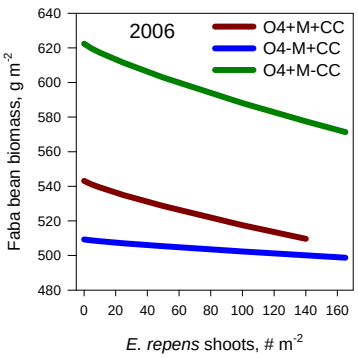

Fig. 4. Predicted faba bean biomass in 2006 in the different treatments.

There were more *E. repens* shoots in spring barley in the O2 crop rotation with grass-clover (mainly in 2008), but in one treatment in the O4 crop rotation (+M+CC) the biomass of the fewer shoots was as high as that in O2.

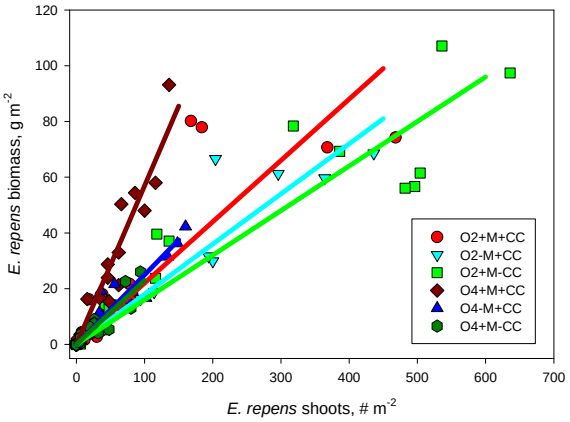

Fig. 2. Relationship between *E. repens* shoots and biomass in the different treatments in spring barley 2007 and 2008.

In winter wheat (where we only have results from one year), up to 80 shoots m^{-2} of E. repens never reached a biomass above 10 g m^{-2} and the winter wheat biomass did not seem to be affected.

The biomass loss was larger in spring barley than in faba bean. In both crops, the loss was smaller in the treatments without manure. For spring barley, the losses were smaller in the system with grass-clover green manure.

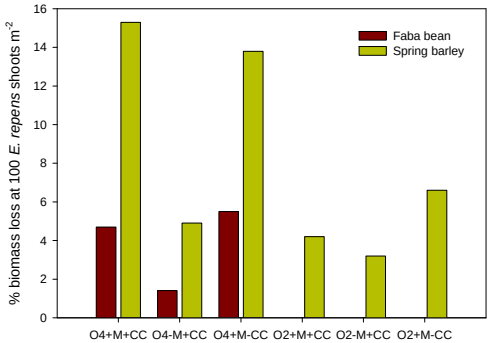

Fig. 5. Predicted biomass loss at 100 shoots m^{-2} of *E. repens*.