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a special emphasis on the role of
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The effect of cover crops and mowing on the abundance and biomass of *Elymus repens*

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Couch grass (*Elymus repens* L.) is a problematic weed on northern latitudes. It propagates mainly through rhizomes and once established it can quickly spread throughout a field. Currently, the two main control methods are herbicides and extensive repeated tillage. Cover crops are mainly used to prevent nitrogen leaching during fallow periods. Cover crops may also provide other beneficial effects to the cropping system, such as competing with weeds, supply nitrogen to the subsequent crop, and provide food and shelter to beneficial insects. The main aim of the study was to investigate if two cover crops with different functional traits, alone or in combination, could be used to control couch grass during autumn, after harvest of a cereal crop. The cover crop treatment was combined with mowing (cutting of aboveground biomass). If successful, the control method would avoid the negative impacts of herbicides and extensive tillage, while adding services of e.g. nutrient conservation and nitrogen fixation.

The cover crop-mowing experiment was conducted in three locations in southern and eastern Sweden in 2011-2012, and repeated in 2012-2013. The design was a split-plot with randomized complete blocks. Main plots were mowed zero, one or two times. In the subplots, cover crops were under-sown in conjunction with the sowing of main crop spring cereals. The cover crop treatments were: none, red clover (*Trifolium pratense*), perennial ryegrass (*Lolium perenne*) and red clover/perennial ryegrass. The ryegrass is an efficient nitrogen scavenger and the clover has horizontal leaves that more efficiently prevents light from reaching the soil surface than grasses with more erect leaves. Measurements taken were abundance of couch grass shoots, aboveground biomass (cover crops and couch grass), rhizome biomass and soil mineral nitrogen.

The couch grass shoot abundance did not differ depending on cover crop, but the rhizome biomass increased (about 20%) with red clover compared with the control (2013; $p=0.0006$, 2012; $p=0.15$). There was no significant difference in soil mineral nitrogen amounts between the different cover crop treatments. This indicates that the competition for nitrogen was not severe in the experiment. In the first trial, but not in the repetition, mowing twice in the autumn resulted in significantly lower shoot abundance ($p=0.05$) and 34% less rhizome biomass than in the control ($p=0.03$) (though this not reduce it below the starting biomass). Mowing also increased the crop yield in the subsequent year by 15%. For cover crops to be effective against couch grass it might be necessary to test other species and/or cultivars, and to increase the plant density. Mowing twice did suppress the couch grass growth (rhizome weight and shoot abundance) significantly one year, but it did not reduce it below the starting biomass. More frequent mowings, better timing and a more optimal combination with cover crops might make the method more suitable for couch grass control.