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Timing of stubble cultivations is important for the control 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.

Both control methods has a number of negative side-effects. For example, stubble cultivations, especially if repeated, are time and fuel demanding and could cause increased nitrogen leaching. However, previous experiments and theory indicate that a single cultivation will cause massive reshooting of the couch grass, which could exacerbate the problem. Thus repeated tillage is recommended. The main aim of the study was to investigate how the timing of the stubble cultivation affects the control of couch grass. The hypothesis was that with good timing, i.e. at harvest, one stubble cultivation would reduce couch grass biomass more compared with less optimal timing (three weeks later). Repeated cultivations were expected to further improve the control, even if the primary cultivation was delayed a few days.

The experiment was conducted in three locations in southern and eastern Sweden in 2011-2012, and repeated in 2012-2013 in two of the locations. The design was randomized complete blocks with five treatments of stubble cultivation: (a) none, (b) twenty days after harvest, (c) at harvest, (d) at harvest and repeated twenty days after harvest, and (e) five days after harvest repeated twenty days after harvest. Measurements taken were abundance of couch grass shoots, and aboveground and rhizome biomass.

Preliminary results show that treatments (c), (d) and (e) consistently had significantly lower couch grass shoot abundance ($p<0.0001$) and about a quarter as much rhizome biomass ($p<0.0001$) as the control, in both 2012 and 2013. In 2013, the couch grass shoot biomass in treatments c-d was about one third of the biomass in the control ($p<0.0001$) (no data from 2012). The crop yield was approximately 26% higher ($p=0.0002$) in treatments c-d than in the control. The effect of treatment (b) was much more variable compared to the control than the effect of c-e, but was on average an intermediate between the control and the other treatments.

The results show two interesting things. Firstly, timing is very important for single cultivations, as shown by the more consistently positive results of (c) compared to (b), but perhaps not for two cultivations, (d) vs. (e). Secondly, the single early cultivation could not be distinguished from the treatments with two cultivations in the effect on couch grass. This seemingly contradicts earlier experiments and theory and could potentially lead to reduced tillage and new control combinations e.g. an early stubble cultivation followed by a cover crop.