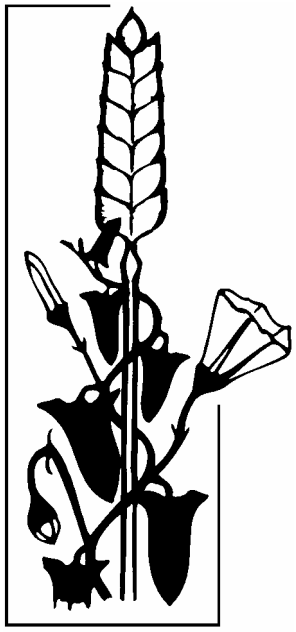

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Terminating ley with mid-summer bare fallow controls *Elymus repens*

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Perennial weeds, especially *Elymus repens* (L.) Gould (common couch), become often a problem in long-term leys. They cause problems also in the succeeding crop, particularly in organic farming, where chemical weed control is not used. The objective of this study was to find such ways for terminating long-term leys, which are more effective in suppressing *E. repens* than traditional autumn or spring ploughing. In addition to controlling perennial weeds our aim was to accelerate the nitrogen release from the ley in order to increase the availability of nitrogen to barley in the early summer.

The field experiment with four replicates was placed in medium fine sand soil field at Juva in eastern Finland. The ley was 3-year old in 2000, consisting of timothy and red clover. The percentage of red clover was about 50%. In the first experimental year, the timothy-clover ley was terminated using various types of cultivation with different timing.

Treatments in terminating ley:

A1 Stubble cultivation (three times during about one month) after harvesting one forage yield, catch crop and autumn ploughing in October ("mid-summer bare fallow" treatment)
A2 Stubble cultivation after second forage yield, no catch crop, autumn ploughing in October
A3 Plain ploughing in September, shortly after second forage harvest
A4 Aftermath was grown, plain ploughing in October, just before winter
A5 Plain ploughing in spring

The effect of different treatments on *E. repens* was assessed in 2001. In spring the whole experimental field was sown with barley. In early July, the number of shoots of perennial weeds was assessed on 2 × 0,25 m² at both ends of each plot. In statistical analyses, the number of *E. repens* shoots and barley yield in different treatments were compared to the "ploughing in October" treatment (A4), which was considered as the standard practice when terminating ley.

The alternative methods reduced *E. repens* infestation when compared to ploughing. After plain ploughing (A3, A4, A5) the density of *E. repens* varied from 147 shoots m^{-2} to 182 shoots m^{-2}, none of the ploughing treatments being superior to the other. The "mid-summer bare fallow" treatment (A1) reduced significantly *E. repens* (having only 27 shoots m^{-2}). Stubble cultivation in Autumn after harvesting second forage yield seemed to reduce *E. repens* (to 94 shoots m^{-2} in barley stand) when compared to plain ploughing, but the difference was not statistically significant.

The grain yield and hectolitre weight of barley were highest, 2390 kg ha^{-1} and 61,6 kg $hectolitre^{-1}$, respectively, after combination of stubble cultivation and a catch crop (A1). The second highest grain yield was harvested after late plain ploughing (A4). However, none of the yields differed significantly from the yield in treatment A4. The availability of nitrogen was affected by the treatments. There was 40 kg ha^{-1} soluble nitrogen on the top soil (0–30 cm) in May, in the year after the mid-summer bare fallow (A4). The lowest content of soluble nitrogen was after springtime ploughing.

The results of this study suggest that mid-summer bare fallow is a relatively effective way to reduce the amount of E. repens when terminating ley. Early started stubble cultivation is also less sensitive to moist weather, leaving more time for exhausting the rhizome reserves of E. repens. Stubble cultivation and catch crop do increase the costs but not as much as bare fallowing for the whole summer would do. Additionally, mid summer bare fallow allows harvesting one forage yield prior to bare fallowing.