

## Does mechanical weed control take effect on *Sonchus arvensis*?

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Perennial weeds can be quite easily controlled with herbicides. In Finland perennial weeds are an increasing problem in organic farming (Salonen et al. 2001). Mechanical methods, like weed harrowing and inter-row hoeing, control annual weeds satisfactorily but perennial weeds poorly. *Sonchus arvensis* is one of the most difficult weeds to control without herbicides.

The main aims of this research were to study the biology of perennial weeds and to find out the best non-chemical control methods for *S. arvensis*. For this purpose a three-year field experiment was set up in 2001 at Vihti, southern Finland. The experiment was conducted in a clay soil (containing 6–12% organic matter) field under organic production. The main weed was *S. arvensis*, which had spread fairly evenly over the whole field. The experimental design was randomised blocks with five replicates. The treatments included fibre hemp, spring cereal (barley in 2001, oats in 2002) with or without inter-row hoeing, bare fallow (cultivation when *S. arvensis* reached 5–7 leaves) and ley (timothy + red clover) with mowing. For more details see Vanhala et al. (2003) in this Proceedings.

The most effective control method seemed to be bare fallowing. One year after bare fallow there were only 1% *S. arvensis* left in oats. Two years of ley with mowing also reduced *S. arvensis* effectively. There was 9–15% dry mass of *S. arvensis* left compared to barley-oats without hoeing. The final effect of this method cannot be assessed until autumn 2003, because to timing of the mowing greatly affected the measured dry mass in 2002.

Inter-row hoeing left 43% of *S. arvensis* alive. However, inter-row hoeing kept the dry mass of *S. arvensis* on an equal level during 2001–2002, while barley-oats without hoeing seemed to increase *S. arvensis*. Fibre hemp did not grow properly in this experiment and so it did not prevent the growth of *S. arvensis* as expected.

How could we intensify the weed control effect of non-chemical methods? Bare fallow was fairly effective against *S. arvensis*, but several cultivations were done during the summer (6–8 times). This means high total fuel and labour consumption and the risk of damaging the soil structure. This method should therefore be optimised. The S-tine cultivator used here had narrow tines, hence it could not overturn all weeds per one pass and extra passes were needed. One solution could be to use a cultivator with wide ducksfoot blades.

Inter-row hoeing (3 times in 2001 and 2 times in 2002) killed *S. arvensis* quite well between the cereal rows, but not at all within the rows. In this experiment 18 cm row spacing and 11 cm wide ducksfoot blades in the hoe were used. Hence, the unhoed strip of row was 7 cm. One solution to intensify the effect of the hoe could be to extend the row spacing. For instance, if we assume that the unhoed strip is 7 cm and the row spacing is 12.5 cm, 18 cm, 25 cm or 30 cm, we can hoe 44%, 61%, 72% or 77% of the field surface, respectively. The negative effect in this approach is that the yield and crop competition decrease to some extent due to wide row spacing.

### References

Salonen, J., Hyvönen, T., Jalli, H. 2001. Weed flora in organically grown spring cereals in Finland. *Agricultural and food science in Finland* 10, 3: 231-242.