4th EWRS Workshop on Physical Weed Control
Elspeet, the Netherlands, March 20-22, 2000

Mechanical weed control in transplanted sugar beet

BO MELANDER
Danish Institute of Agricultural Sciences, Department of Crop Protection,
Research Centre Flakkebjerg, DK-4200 Slagelse, Denmark, Bo.Melander[at]agrsci.dk

Introduction

Sugar beet normally require hand-weeding when organically grown. Time consumption for manual weeding may reach more than 150 hours ha^{-1}. Intra-row weeds, i.e. those growing between the crop plants in the rows, are the ones which cause the need for hand-weeding, not those growing between the rows. Several mechanical methods for intra-row weeding in organic sugar beet have been studied in recent years, mainly in Sweden. The work has generally shown that early post-emergence cultivation usually causes severe crop damage using most tools, but later cultivation can be made with a wide range of tools when the sugar beet have developed 4-6 true leaves. However, mechanical methods do not currently form a true solution for an effective removal of manual weeding as it is usually the first flushes of seedlings, emerging within 2-3 weeks after sowing, which are most numerous and thus most time-consuming to remove.

The objective with the present study was to develop a transplantation technique for sugar beet that strengthens the competitive ability of the beet plants and creates favourable conditions for conducting simple and efficient mechanical weeding. The investigations took place on a sandy loam that was under conversion to organic cropping. Two experiments were conducted, one in 1998 and one in 1999. Weed harrowing and torsion weeding were the two mechanical methods under investigation. The sugar beet plants were raised in cylindrical plugs (6 cm long) called *Beekenkamp Bee-Matic* speedlings. They were transplanted in the field in early May when the sugar beet plants had developed 4-5 true leaves.

Results and conclusions

The transplanting technique gave a solid establishment of the beet plants in the soil, which made mechanical weeding possible even 5 days after transplanting. Only torsion weeding at a high intensity (tines 0 cm apart) resulted in severe crop damages at the early treatments. Both weed harrowing and torsion weeding could lower time consumption for hand-weeding to less than 10 hours per hectare without negative yield responses. This was found for weeding strategies consisting of 4-6 passes commenced as early after transplanting as possible and then conducted with short intervals of 5-7 days between each pass. Weeding intensity of each pass was adapted to the prevailing conditions at each time of treatment. Although yield was not affected negatively by mechanical weeding, size and shape of the beets were unacceptable owing to a high degree of forking.

It is concluded that transplanting sugar beet may provide favourable conditions for conducting effective mechanical weeding, however the techniques for raising sugar beet seedlings have to be improved to overcome problems with forking.