

The importance of crop competition in physical and cultural weed control strategies

Bo Melander

Danish Institute of Agricultural Sciences, Department of Crop Protection, Research Centre
Flakkebjerg, DK-4200 Slagelse, Denmark

E-mail: [bo.melander\[at\]agrsci.dk](mailto:bo.melander[at]agrsci.dk)

Most physical and cultural weed control methods for arable crops do not provide complete weed control. Some weeds will escape the treatments and the numbers depend strongly on the successfulness of conducting the treatments. Moreover, current mechanical weed control methods, that work the intra-row area of the crop, generally operate with low selectivity whether it is cereals grown at narrow row spacing or typical row crops (e.g. maize, sugar beets, and many vegetables) at wider row spacing. Low selectivity means that a high weed control level might be associated with severe crop damages, particularly if large weeds are to be controlled satisfactorily.

Thus, seeking for complete weed control can be very risky or more likely impossible. Since realising that, a number of investigations have then focussed on the tactical use of mechanical intra-row methods, particularly how they can be combined with cultural methods that mainly improve crop competitiveness and crop tolerance to withstand mechanical impact (uprooting and soil covering) from the weeding tools. Some promising weed control strategies in e.g. spring barley, onion, and pulse have been achieved from this work (e.g. Rasmussen & Rasmussen, 1995; Melander, 1998; Melander & Rasmussen, 2001; Rasmussen, 2002). Examples will be given here including results from very recent studies with mechanical and cultural weed control strategies in winter cereals. In these investigations, the prospects of cultural factors, such as crop species, row spacing, crop seed rate, and fertiliser placement, to improve the suppression of escaping weeds were studied.

Crop competition also seems to play an important role in the development of new technologies for intra-row weed control in row crops. Timing of laser cutting, or other cutting devices, and the duration of the effect of soil steaming are both methods, where information on crop/weed interaction appears to be essential for practical implementation of these techniques (Heisel, 2001; Melander et al., 2002). Such aspects will be discussed as well.

References

- Heisel T. (2001). Weeds in sugar beet rows. I. Influence of neighbour plant on the beet yield. II. Investigation of a CO₂ laser for in-row weed control. PhD thesis, Danish Institute of Agricultural Sciences, Research Centre Flakkebjerg, Denmark.
- Melander B. (1998). Interactions between soil cultivation in darkness, flaming, and brush weeding when used for in-row weed control in vegetables. *Biological Agriculture and Horticulture* 16, 1-14.
- Melander B. & Rasmussen G. (2001). Effects of cultural methods and physical weed control on intrarow weed numbers, manual weeding and marketable yield in direct-sown leek and bulb onion. *Weed Research* 41, 491-508.
- Melander B., Heisel T. & Joergensen M.H. (2002). Band-steaming for intra-row weed control. 5th EWRS Workshop on Physical Weed Control. Pisa, Italy, 11-13 March, 4 pp. (available on CD).
- Rasmussen K. (2002). Influence of liquid manure application method on weed control in spring cereals. *Weed Research* 42, 287-298.
- Rasmussen J. & Rasmussen K. (1995). A strategy for mechanical weed control in spring barley. 9th EWRS Symposium. "Challenges for Weed Science in a Changing Europe". Budapest 1995, 557-564.