

SOME POSSIBILITIES OF POST-DRILLING MECHANICAL WEED CONTROL

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1. Introduction

Up until half a century ago, inter-row weed control was carried out by hand and animal drawn implements. In motorized agriculture mechanical inter-row weed control was largely replaced by chemical weed control.

Herbicides contribute 20% to the total use of active matter in biocides, and 40% of the total costs of biocides in The Netherlands. Nowadays there is a widespread consensus, that the use of herbicides should be reduced to a minimum, as stated in the "Long-range Plan on Crop Protection".

- Reduction of the structural dependence on chemicals;
- Systematic reduction of the use of chemicals to 50% (in the year 2000) and a reduction of nematicides to 10-20% of the amount used in 1988.

2. Planting system and (intra-row) mechanical weed control

The amount of weeds after a weed control operation is inversely proportional to the treated area (Kouwenhoven, Wevers and Post, 1991). During crop growth inter-row weed control in motorized agriculture is rather succesful under dry weather conditions. Generally 2-3 operations will suffice. With **inter-row** weed control 60-70% of the surface is treated. This area might be increased by laser- or mechanical guidance with a slit in the soil to about 80%.

Intra-row weed control is more difficult and control of weeds closely surrounding crop plants practically impossible. Intra-row weed control in motorized agriculture can be carried out by ridging, by brushing machines with horizontal or vertical axes, by the distinguishing of crop plants and weeds by means of, for example, photo cells or TV camera's, combined with effectors like thinners etc.: 80-85% of the surface can be treated.

Inter-row weed control becomes **intra-row** weed control when plants are planted or drilled in **squares**. In this case the treated surface varies from 85->90%. Planting or drilling in squares will cause junction problems with the next trip over the field. Therefore drilling in rectangles (per pass over the field) and weed control with a thinner + electronic device might be a better option for application in practice.

Weeds close to crop plants can be controlled mechanically by brushes, hoe-ridging (Terpstra and Kouwenhoven, 1981), or chemically. To save the cropping plants they should be strong enough to be brushing resistant.

Application of **paper pots** might improve resistance to brushing.

Full width mechanical weed control before emergence and after harvest, for instance

by harrowing, can increase the treated area to about 100%. Farmers in the surroundings of Wageningen were reported to be successful in keeping their crops free of weeds this way with only one low-dose/low-volume herbicide treatment during the dry spring of 1990.

3. Conclusions

- The use of herbicides during the growing season can be reduced to 10-50% of the amount used in 1988 by mechanical weed control;
- More attention should be given to the control of weeds closely surrounding crop plants;
- Most of the present options for intra-row weed control are not yet ready for application in practice;
- The profit of research on no-chemical weed control methods will increase with the number of banned herbicides.

References

- Kouwenhoven, J.K. Wevers, J.D.A. and Post, B., 1991. Possibilities of mechanical post-emergence weed control in sugar beet. *Soil Tillage Res.* 21: 85-95.
- Terpstra, R. and Kouwenhoven, J.K., 1981. Inter-row and intra-row weed control with a hoe-ridger. *Agric. Engng Res.* 26: 127-131.