

Danish research on physical weed control in bulb onion (*Allium cepa* L.) and leek (*Allium porrum* L.)

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Abstract

Experimental work with physical weed control in direct-sown onion has been going on at the Danish Institute of Agricultural Sciences since 1993. (Direct-sown means that the crop is sown directly into a normal seedbed in the field but has nothing to do with reduced tillage). Most of the methods investigated for onion have also been introduced to direct-sown leek.

The research has mainly focused on the control of intra-row weeds, i.e. those growing between the crop plants in the rows, in order to lower time consumption for hand weeding. Both onion and leek normally require hand weeding of intra-row weeds, when grown organically or when effective herbicides are not available. Danish organic growers may spend 300-500 hours ha⁻¹ to hand-weed these crops, where leek is usually the most demanding one. Inter-row weeds are normally easily controlled mechanically with no demand for supplementary manual weeding.

Both physical pre-emergence and post-emergence methods have been studied in multi-factorial field experiments with particular emphasis on their effects on intra-row weeds and marketable yield parameters. The pre-emergence methods considered were: flaming, weed harrowing, nighttime soil cultivation, and false seedbed. Post-emergence methods were: hoeing close to the row, flaming, vertical brush weeding, and weed harrowing. The investigations have clearly shown that mechanical and thermal methods can lower intra-row weed numbers considerably provided that they are combined with one another. Pre-emergence flaming followed by post-emergence brush weeding has been particularly promising, resulting in intra-row weed control levels at 70-90%. Time consumption for hand-weeding following the different treatments has generally shown to be linearly related to the remaining numbers of intra-row weeds, with no significant influences of cultural factors on this general relationship.

Some results have indicated that the much cheaper and environmentally more friendly method of pre-emergence harrowing may replace flaming. Similarly, hoeing close to the row may also be as good as brush weeding. Both aspects are worth considering as part of a weed control strategy for direct-sown onion and leek grown organically.

Also investigations with post-emergence weed harrowing in transplanted bulb onion and leek have been conducted. High intra-row weed control with little requirement for subsequent hand weeding can be achieved in both crops but some crop damage might occur in leek.

Selected references

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