

Weed control strategies in organically grown carrots

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ABSTRACT

This paper outlines a study to integrate elements of cultural, thermal and mechanical control methods in the production of late maincrop drilled organic carrots. Agronomic and economic findings are discussed.

Keywords: weed control strategy; carrots; organic systems

INTRODUCTION

Weed control for organic carrot production poses particular difficulties. The crop is sensitive to poor seedbed conditions, slow to germinate and only reaches canopy closure towards the end of the season (Tamet *et al.*, 1996; Peacock, 1991). Therefore, optimisation of all controllable weeding factors is critical in this crop to produce a comprehensive organic weed control strategy.

MATERIALS AND METHODS

A field experiment was carried out at HRI Wellesbourne on registered organic land. Factors under investigation included pre-emergence flaming, timing and method of weed control. Weed and crop parameters were assessed on a number of occasions throughout the season. An economic analysis was also completed.

RESULTS

The dominant weed species over the trial area were *Viola arvensis*, *Matricaria* spp., *Senecio vulgaris*, *Stellaria media* and *Papaver* spp. In this season, weed emergence and ground coverage was generally low across the trial site.

Pre-emergence flaming

Plots which had been pre-emergence flamed had significantly lower weed cover up to harvest, however, there was no significant effect on carrot yield.

Timing and method of post-emergence weed control

Weed control was significantly more effective at the earlier weeding dates, 3 or 5 weeks after 50% emergence. There was a significant ($P < 0.01$) effect of weed removal timing on the yield of carrots; the 3-week (38.8 t/ha) and 5-week (39.3

t/ha) weeded plots having a significantly greater yield than the 7-week treatment (34.5 t/ha). There was also a tendency towards a higher marketable percentage the earlier the weeding date (data not shown).

There was no significant effect of weed control implement on carrot yield, although there was a trend for steerage hoeing to give the highest marketable yield (31.4 t/ha) compared with hand (27.7 t/ha) and brush weeding (27.6 t/ha).

Economics of different strategies from HRI-Wellesbourne

The highest gross margin (£10228 ha⁻¹) was obtained from the steerage hoed plots at 5 weeks which had been pre-emergence flamed. The lowest gross margin resulted from plots that had not been pre-emergence flamed and not weeded until 7 weeks after 50% emergence with the steerage hoe (£4996 ha⁻¹).

DISCUSSION

The overriding factor from this first year of field trials was the impact of weather. The crop was drilled 9 June into a moist seedbed giving the crop an excellent start. The weather then became very dry so that the carrots had established well but there was little weed growth.

The pre-emergence flaming did reduce weed coverage and/or slow weed development, allowing flexibility with the first post-emergence weeding date. Due to the low weed population, the final yield in this trial was unaffected by the thermal control. However, in higher weed pressure situations, this could be a useful and relatively cheap tool to use in a weed management programme.

The results from the method of weed control were inconclusive. Hand weeding showed no yield benefit compared with mechanical weeding, even though in-row weed would have been removed. The steerage hoed plots tended to have the highest yields, which could have been due to greater levels of available N that might have resulted from mineralisation of soil-bound nitrogen induced through mechanical disturbance of the soil.

The economic returns were mainly dependent on the plot yields since the costs of mechanical weeding are relatively small compared with the crop wholesale value.

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