

Grower Summary

FV 416

Brassicas: module drenches to
control cabbage root fly

Final 2013

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HDC
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel – 0247 669 2051

HDC is a division of the Agriculture and Horticulture Development Board.

Project Number: FV 416

Project Title: Brassicas: module drenches to control cabbage root fly

Project Leader: Dr Rosemary Collier

Contractor: University of Warwick

Industry Representative: Andy Richardson, Allium and Brassica Centre

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Project Cost: £23,046

Headline

Tracer found to be an acceptable alternative to Dursban WG.

Background

For many years the cabbage root fly (*Delia radicum*) has been controlled on transplanted Brassica crops through the application of an organophosphorus insecticide (chlorpyrifos – Dursban WG) to the modules prior to transplanting. However, the future of this treatment is now uncertain. Within the last decade, an alternative treatment (spinosad – Tracer) has become available to growers, but whilst Dursban has been available, Tracer has not been used widely. One of the reasons for its limited use is the perception that Tracer is not such an effective treatment. Now that future use of Dursban is likely to be time-limited, it is important to establish whether there are limitations in the performance of Tracer.

Tracer drench treatments have been evaluated extensively in HDC projects on control of cabbage root fly and in general, when modules are transplanted immediately after treatment, there is little difference (on average) in the levels of control achieved with Tracer and Dursban. On all transplanted brassica crops, effective control is most critical during a period of several weeks after planting, whilst the plants are small and the root system is establishing. Larger, established plants can withstand a certain amount of cabbage root fly damage. One of the most recent comparisons of these two treatments was undertaken in a LINK project on companion planting for cabbage root fly control (FV 251), where both treatments were used as positive controls in field trials, mainly in commercial crops in Lincolnshire. In a total of 15 trials, and considering root damage:

Tracer performed better than Dursban on 8 occasions,

Dursban was better than Tracer on 2 occasions

There was no statistically significant difference on 5 occasions.

However, the performance of Tracer under sub-optimal conditions has not been evaluated and this is particularly in relation to delays in planting, where the modules have been treated but planting is delayed, often due to adverse weather conditions. There is concern that the effectiveness of the Tracer treatment may diminish while the plants are standing and that this will shorten the period when the treatment is effective once the plants are growing in the soil. The key aim of this project was to undertake a field trial to establish whether this is likely to happen. A second aim was to evaluate the performance of some novel pre-planting

treatments.

Summary

Two types of trial were conducted. The first was a field trial to assess the performance of aged treatments of Tracer and Dursban WG together with some novel treatments. The second was a glasshouse trial and concerned the persistence of Tracer and Dursban WG module drench treatments after heavy watering events.

Field trials

Two field trials were conducted using cauliflower as the test crop. Including an untreated control, there were 13 treatments. Tracer (spinosad) and Dursban WG (chlorpyrifos) were applied pre-planting 2 weeks, 1 week and 1 day before planting and further Tracer treatments applied at 1 week and 1 day before planting were heavily watered. Additional treatments included Mundial (fipronil) seed treatment and two biological treatments (one of which was a plant extract). One trial was timed to coincide with the peak of first generation cabbage root fly egg laying and the other with the peak of second generation egg laying. The cauliflower seed (cv Seoul) was sown on 17 April 2013 (Trial 1a) and 21 May 2013 (Trial 1b), transplanted on 25 May 2013 (Trial 1a) and 10 July 2013 (Trial 1b) and harvested on 28 June (Trial 1a – 5 weeks after planting) and 8 August (Trial 1b – 4 weeks after planting).

The harvested plants were weighed, and the roots and stems were scored for damage by cabbage root fly larvae. There was more damage to untreated plants in Trial 1b than in Trial 1a. Treatments performed similarly in both trials.

Most treatments increased plant weight in one or both trials compared with the untreated control, except HDCI055 which did not increase plant weight in either trial. There was some evidence of treatment timing affecting plant weight in Trial 1a, but there were no differences between Tracer and Dursban WG.

Most treatments decreased root damage in one or both trials compared with the untreated control, except HDCI056 which did not decrease root damage in either trial. In both trials, there were no differences between Dursban WG treatments or Tracer treatments at all treatment times. HDCI055 was more effective applied pre-planting than post-planting but less effective than either Dursban WG or Tracer. The Mundial seed treatment was as effective as Dursban WG and Tracer.

Most of the treated plants had less stem damage than the untreated control, but this was only statistically significant with all of the Dursban WG treatments and in Trial 1a, with HDCI056 and Tracer treatments applied at Day 1 and Week 1 (plus heavy watering). There were no statistically significant differences between Dursban WG treatments but there was a clear reduction in efficacy with ageing residues. Although there were some significant differences between Tracer treatments and the control, there were no significant differences between any of the Tracer treatments and there was a less obvious effect of treatment time. At all treatment times Dursban WG treatments had less damage than Tracer treatments.

Glasshouse trial

In a glasshouse trial to determine the persistence of drench treatments, half the modules (containing calabrese plants) in six 345 Hassy trays were treated with Tracer and the other half were treated with Dursban WG (3 trays of each). Between sampling and watering events, the trays were maintained at maximum moisture-holding capacity on capillary matting. The modules were sampled (10 modules/treatment from each replicate tray) 1, 4, 7, 10, 13 and 16 days after treatment and watered once, heavily from above, between sampling occasions. Insecticide residue analysis was performed by ALS Food & Pharmaceutical.

The concentration of both insecticides declined gradually with time. After 16 days, 70% and 63% of the applied spinosad and chlorpyrifos respectively remained.

Main conclusions

- Module drench treatments of Tracer were as effective as Dursban WG at protecting the root zone of transplanted cauliflowers from attack by cabbage root fly larvae.
- The efficacy of Tracer was only marginally diminished when planting was delayed for 2 weeks following treatment or by heavy watering of the modules pre-planting.
- Residue studies suggested that Tracer was at least as persistent as Dursban WG when treated modules were exposed to a series of heavy watering events and stored at maximum moisture capacity.
- In most circumstances Tracer is likely to be an acceptable alternative to Dursban WG.

Financial Benefits

Without adequate insecticidal control, crop losses due to cabbage root fly damage would be considerable. It is estimated that about 24% of the plants in field brassica crops would be rendered unmarketable by the cabbage root fly without the application of effective control

methods. Tracer appears to be as persistent in the module as Dursban WG and as effective in the field at controlling cabbage root fly in the root zone.

Action Points

- The work has shown that Tracer is as effective as Dursban WG so growers should consider Tracer as an alternative treatment