Monitoring and controlling carrot weevil in the Holland Marsh, Ontario

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Introduction

Carrot weevil (CW), *Listronotus oregonensis* (LeConte), is a major pest of carrots in the Holland Marsh, Ontario, Canada. Adult CW become active in the early spring and deposit eggs in leaf bases and young carrot roots (Fig. 1). Weevil larvae feeding on young carrots can kill seedlings outright. Larval feeding damage to larger roots is concentrated on the top third of the root and renders the carrot unmarketable. Carrot weevil damage increased continuously from 1.7 to 6.9% between 2010 to 2016 in the Holland Marsh. Insecticide efficacy and monitoring/seeding date trials were conducted at the Ontario Crops Research Centre – Bradford between 2015 to 2019.

Figure 1. a) Adult CW feeding and depositing eggs, b) larva in a carrot root, c) young carrot killed by weevil feeding and d) weevil feeding damage,.

Efficacy Trials

- CW had become resistant to the commonly used insecticide phosmet (Imidan), but foliar applications of novaluron (Rimon) and cyantraniliprole (Exirel) resulted in reduced CW damage.
- These products were most effective in high pressure fields when applied at both the 2nd and 4th leaf stage.
- The adoption of novaluron helped reduce the amount of CW damage in commercial fields to 0.2% by 2021 (Fig. 2).

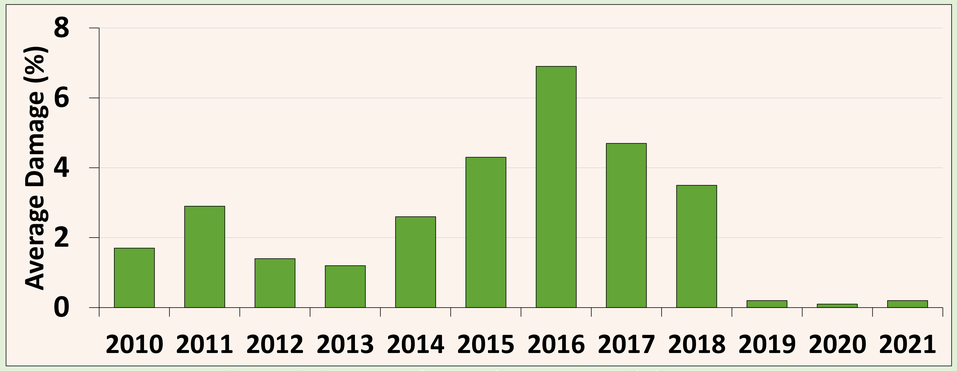

Figure 2. Percent of annual carrot weevil damage.

Monitoring & Seeding Date Trials

- Monitoring and carrot seeding date trials were conducted to determine if CW damage could be avoided (Fig. 3).
- The studies found that carrots seeded in late May to early June had lower CW damage compared to carrots seeded earlier in May (Fig. 4).
- Seeding carrots later in the season may be an effective cultural practice to minimize carrot weevil damage.

Figure 3. Boivin carrot weevil trap.

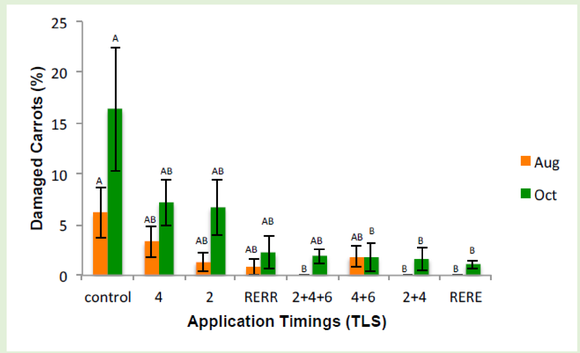

Figure 4. Application timings of Rimon at different carrot leaf stages 2, 4 and 6 true leaves (R = Rimon, E = Exirel).

Conclusions

- The use of novaluron and cyantraniliprole continues to minimize CW damage and provides products with different modes of action to be used in rotation.
- The seeding date results show that monitoring and applying insecticide is very important for the management of CW in early seeded carrots.
- Monitoring is still useful for late seeded carrots, to determine if insecticides are needed or not.
- Monitoring of CW feeding throughout the season has also observed a probable second generation of CW.
- Managing CW in the Holland Marsh has been successful through combining optimum timing of these effective insecticides and, in some cases later seeding, to reduce the majority of CW damage.