Swede Midge Impact and Management in Spring Canola

Purpose: To determine the impact of swede midge in canola in Ontario and find effective integrated pest management solutions for this newly invasive species. This is one component of a long term canola insect pest project, looking at cultural, biological and chemical strategies for both swede midge and cabbage seedpod weevil.

Methods:

Effect of Planting Date on Susceptibility of Spring Canola

Pheromone traps were established at two field locations (Elora & Arkell) in Ontario in mid-May and will be maintained until the end of September 2006 in order to monitor swede midge populations. Swede midge populations were quite high at the Elora site, but low at Arkell, throughout the season. Therefore, only results from the Elora site are summarized in this report.

Our two spring canola field locations were set up in a split-plot design, with the main plot as planting date, foliar insecticide applications as subplots and seed treatments (Helix Xtra or fungicide alone) as sub-subplots. There were three planting dates (early spring, two weeks after first planting, and two weeks after second planting), which were replicated four times. The first planting was made on May 24. These trials were conducted using Invigor 5030 (Liberty Link; i.e. glufosinate tolerant). Each plot consisted of three seven row subplots and were 5 m long, with assessments made on plants in the middle three rows. Alternating applications of ASSAIL™ (acetamiprid) and MATADOR™ (lambda-cyhalothrin) were made at weekly intervals from early June (June 8 Elora, June 12 Arkell) until browning down of plants in late August.

Swede midge damage assessments were conducted during the vegetative, flowering and pod filling stages for each of the three planting dates. A damage rating on the primary racemes was used where: 1.0 = mild twisting of petioles and crumpling of leaves, but little damage to the raceme or flowers, 2.0 = severe distortion of foliage and distortion of pods and racemes, 3.0 = death of main raceme, clusters of pods and undeveloped buds. A damage rating on the secondary racemes was used where 4.0 = mild twisting of petioles and crumpling of leaves, but little damage to the raceme or flowers, 8.0 = severe distortion of foliage and distortion of pods and racemes, 12.0 = no secondary racemes present, clusters of pods and undeveloped buds on stunted main raceme only. Yield, seed quality and free fatty analysis were also taken for each planting date after harvest in mid-September.

Experiments were also conducted in winter canola, but with only one planting date (September 11, 2006). The same foliar and seed insecticides mentioned above were used in a random complete block design. Damage assessments were done in both the fall and spring. Results from our winter canola trials are briefly summarized below.

Results:

In our 2005-06 winter canola trials, the swede midge caused only minor damage in the fall, with damage restricted to leaves that were lost during subsequent overwintering. During the following spring and summer growing season, winter canola was in an advanced enough plant stage when the overwintering adults emerged in the spring that it experienced little to no damage by swede midge.

In spring canola, damage by the swede midge occurred to some extent during the seedling and early rosette stages, but tended to be more severe during stem elongation and pod formation. Damage was significantly higher at late planting dates than in early and mid-planting dates in trials where all three plant stages were examined [vegetative, flowering and pod-filling] (Figs. 1a and 1b). Earlier-planted spring canola crops were past the vulnerable stages when swede midge populations were at their peak, whereas late plantings were very heavily hit by swede midge and little flowering occurred as a result.

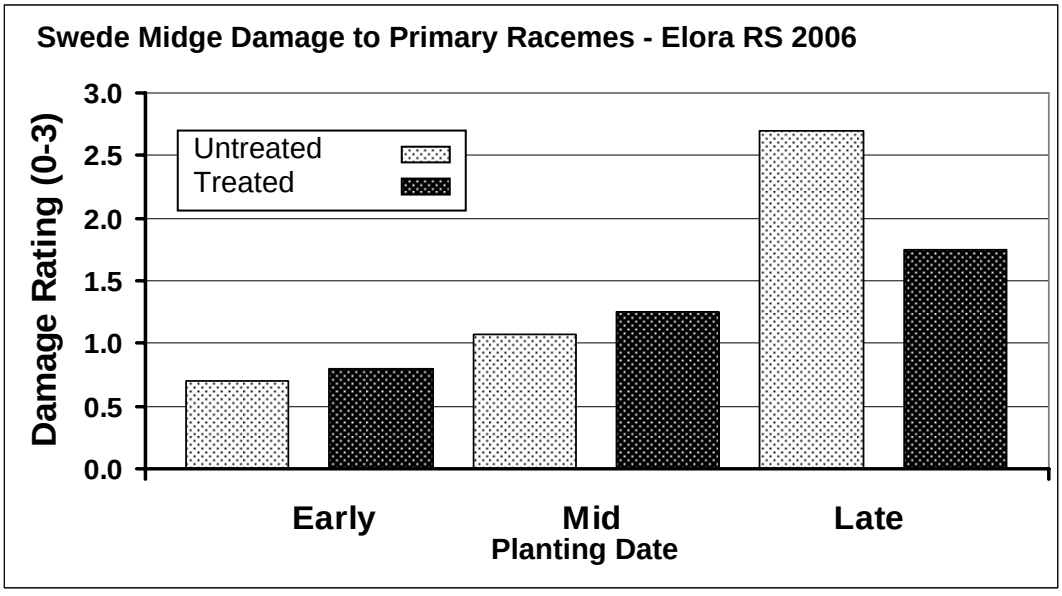

Figure 1a. Damage by swede midge to the primary racemes of spring canola planted at three intervals (May 24, June 7 and June 21 at Elora Res. Stn. Ontario, 2006. A damage rating of 1.0 = mild twisting of petioles and crumpling of leaves, but little damage to the raceme or flowers, 2.0 = severe distortion of foliage and distortion of pods and racemes, 3.0 = death of main raceme, clusters of pods and undeveloped buds.

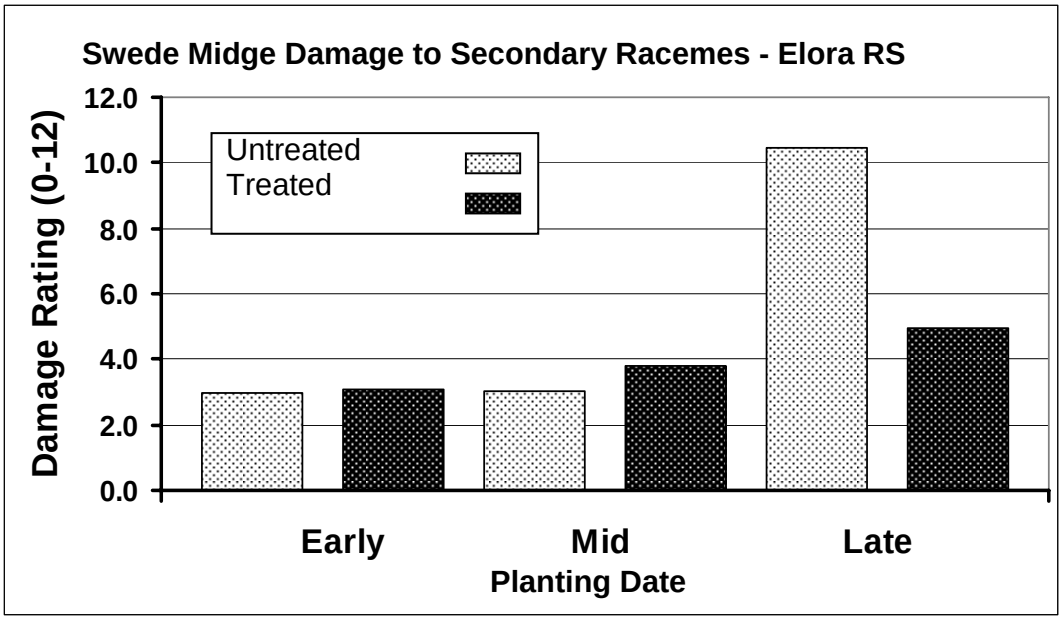

Figure 1b. Damage by swede midge to the secondary racemes of spring canola planted at three intervals (May 24, June 7 and June 21 at Elora Res. Stn. Ontario, 2006. A damage rating of 4.0 = mild twisting of petioles and crumpling of leaves, but little damage to the raceme or flowers, 8.0 = severe distortion of foliage and distortion of pods and racemes, 12.0 = no secondary racemes present, clusters of pods and undeveloped buds on stunted main raceme only.

Summary:

There are two main periods when canola is vulnerable to damage by the swede midge – at bud formation and when secondary and tertiary buds are developing in leaf axils. Once bud formation is complete and plants are in full flower, canola is safe from economic damage by swede midge. Both winter canola and early planted spring canola escape injury from swede midge, as these vulnerable plant stages occur before swede midge populations are at their highest.

To reduce your risk of insect damage, time your planting dates to help avoid the key pests in your area. In spring canola, if swede midge is the main pest of concern, then early plantings are recommended; however if cabbage seedpod weevil is the main pest concern, then later plantings will help to minimize losses to this pest.

For swede midge, foliar insecticide application while plants are still in the rosette stage is recommended. Once registration of Matador™ and Assail™ has been achieved, our study indicates that application of these products should take place prior to stem elongation.

Next Steps:

We will continue the planting date work in 2007. Experimental parameters and design will be re-evaluated by March 2007 to determine crop phenological aspects and planting

dates to be considered in 2007. Variety susceptibility, monitoring strategies and seed and foliar insecticide testing for future registrations is also a component of this long term project. Our final goal is to find a best management practice for both cabbage seedpod weevil and swede midge, two new invasive pests that Ontario canola growers are dealing with. Western Canada is also at risk from the eventual spread of swede midge to other regions and work done in Ontario will provide them with the management tools needed to react quickly when it does arrive.

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Location of Project Final Report: