

Title:

Knowledge transfer for integrated management of European Corn Borer

Subject

- The core subject of the case:

In the Quebec province of Canada there are grown about 450 000 hectares of corn annually. One of the most important pests of this crop is the European Corn Borer (*Ostrinia nubilalis* (Hübner)) (ECB). Corn is just one of many hosts of cultivated plants in the region and this pest can cause serious damage especially at high infestation levels.

- The scope of the case being studied:

To control this pest, producers have relied mainly on the use of chemical pesticides applying up to 4 sprays per season. Without proper control, yield losses from ECB can reach from 30 to 70%. Establishing an integrated system for sustainable management of ECB has been a priority for Quebec producers and researchers especially in the last 15 years. Proven integrated approaches are now commercially available to corn producers in this region.

- The stated goal (s) of the case being studied:

To present a case study that demonstrates the successful results from the transfer of new knowledge and technologies on the integrated ECB management in corn production.

Specific elements assessed in the case study

Targeted integrated pest management approaches:

- **Monitoring** for the ECB is important primarily for the proper identification of the pest, especially because ECB resembles several other moths which may cause confusion resulting in unnecessary sprays. Also, this practice allows evaluating actual infestation levels in the field against established thresholds which is required to determine whether pest control measures are economically justified.

Results to-date:

A number of technical factsheets were developed as part of extension activities providing producers with necessary information on the ECB such as practical criteria for discriminating them from other moth species, its biology, damage it causes as well as management practices that could be used. The following are a few examples of factsheets available*:

- [La pyrale du maïs](#) ;
- [La pyrale du maïs, un ravageur à deux races](#) ;
- [Pyrale dans le maïs sucré : Intervenir au stade optimal](#)

- **Biological control:** research of alternative management strategies aiming to reduce pesticide use has led to the discovery and adoption of biological control methods to suppress populations of ECB, such as the use of parasitoids (*Trichogramma* spp.) and other natural enemies.

Results to-date:

Several factsheets and a video were developed and disseminated to producers to guide them on how to use these biocontrol tools as part of their integrated management of ECB, e.g.*:

- [Lutte biologique contre la pyrale du maïs à l'aide de trichogrammes dans la culture du maïs sucré](#)¹
- [La lutte intégrée contre la pyrale du maïs dans le maïs sucré](#)²
- [Portrait économique de l'utilisation des Trichogrammes](#)³
- [Les trichogrammes, une solution biologique à la pyrale du maïs](#) (vidéo)⁴

Assessments used in case study

Cost-benefit analyses /economic viability:

- A cost-benefit analysis of multiple releases of *Trichogramma* spp. in yellow corn crops was conducted by a local producer³. Used at a rate of 75 Tricho Cards/ha the cost of only using *Trichogramma* spp. for ECB control was 227% higher than the cost of 4 treatments with the insecticide Coragen. But, the producer sold his corn at a farm gate price of \$0.50 more for the dozen. According to the producer, this biocontrol approach provided him with much more benefits than just the financial gain at retail. These included protection of human and environment health, better biodiversity (more natural predators present in the fields) and favorable image for his operation at the marketplace and neighbouring community. Another independent economic study found that for a field of 5-9 ha, the costs related to the release of *Trichogramma* spp. ranged from 90% to 241% of the cost of chemical control of ECB².

Crop protection or prevention outcomes (efficacy):

- It is proven that *Trichogramma* spp. can be as effective as insecticides, and in fact it can replace the use of insecticides, in achieving significant reduction in ECB population and damage². Eliminating pesticide sprays for this pest would allow the increase in the population of natural predators, which in turn can reduce occurrence of other crop pests such as aphids, thus resulting in more reductions in pesticide use^{2,3}.

Success rate of approach used to promote IPM adoption:

- In Quebec, about 15% of producers use *Trichogramma* to control ECB and many of them practice this approach for the past 7 or 8 years⁴.

Change in grower understanding or practices (uptake):

- A better understanding of non-chemical pest management approaches available, has led to a higher adoption rate of these alternative practices by producers over the years. This success can be attributed to the continuous and extensive research, demonstration and outreach activities undertaken locally, and in collaboration with the corn producers in the region. The new information was effectively disseminated

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| <p>allowing producers to make informed decisions for best practices in ECB management.</p> | |
| <p>Summary of case study findings</p> <ul style="list-style-type: none"> - This case study demonstrates the importance of viable networks sharing pertinent agriculture information such as Agri-Réseau⁵ and Pôle d'excellence en lutte intégrée⁶, which ensure an effective and rapid transfer of IPM related knowledge and technologies to producers. <p>As consumers become more and more conscientious about the origin of their food and how it has been produced, as well as about potential health concerns with some pesticides, they seem willing to pay the difference in the higher price for the corn produced with less pesticides.</p> | |
| <p>Name of the responsible and funding organization*</p> | <ul style="list-style-type: none"> - Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (Stratégie phytosanitaire québécoise en agriculture) - L'Institut de recherche et de développement en agroenvironnement - Clubs-Conseils en agroenvironnement - Agri-Réseau (Le Centre de référence en agriculture et agroalimentaire du Québec) - Pôle d'excellence en lutte intégrée - Anatis Bioprotection |
| <p>Website/ URL *</p> | <ul style="list-style-type: none"> - Agri-Réseau⁵ (http://www.agrireseau.qc.ca/navigation.aspx?r=pyrale du mais) - Pôle d'excellence en lutte intégrée⁶ (http://www.lutteintegree.com/spip.php?page=recherche&recherche=pyrale) |
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* web-published content available in French only