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Integrated Management of Leek Moth –
a case of successful partnerships along the research to technology transfer continuum

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Background

Leek moth, *Acrolepiopsis assectella*, an invasive alien species of Allium crops originating from Europe, was first detected attacking Allium crops in the Eastern Ontario in 1993 and Western Quebec in 2001. Since then, it has rapidly expanded its range, and is now found in Southwestern Ontario and New York State.

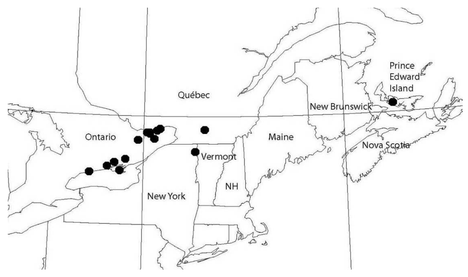

Fig 1. Distribution of Leek Moth in Eastern North America in 2012

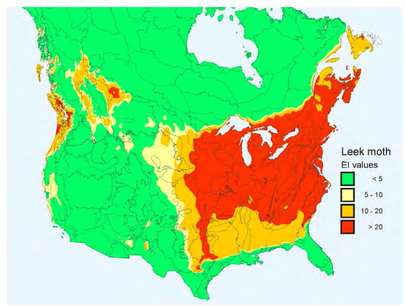

Fig 2. Potential range of leek moth in North America

Sustainable leek moth management today

As a priority emerging pest with few control options for growers, leek moth was among the first pest issues the Pesticide Risk Reduction Program selected to address.

Since 2003, the Pesticide Risk Reduction Program has funded three projects targeting leek moth. These projects addressed research gaps, developed tools and transferred knowledge to growers.

As a result, the leek moth toolbox is currently equipped with innovative and reduced risk management options providing a solid foundation for integrated management of this pest.

Growers are now aware of these tools and how to use them through direct participation in the studies as well as continued dissemination of information through factsheets and workshops.

Partnerships - Key to Success: Collaboration among Agriculture and Agri-Food Canada researchers and provincial experts, University researchers, international cooperators and growers led to the successful development and deployment of sustainable leek moth management practices.

Biological Research

Pest biology

At early stages of the study, research was focused on pest biology and led to development of a life cycle model for leek moth in Canada.

Fig 3. Leek moth larvae cause damage to members of the Allium family (onions, leeks and garlic) by mining into the leaves of the plant

Identification of a Biological Control Agent

The parasitic wasp *Diadromus pulchellus,* was identified in Europe by CABI as an efficient biological control agent. After extensive host range testing release of the parasitoid in Canada was approved in 2010.

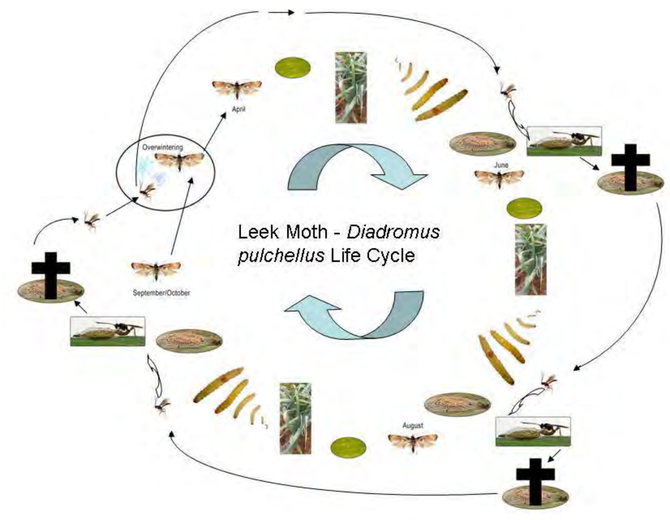

Fig 4. Interaction of *Diadromus pulchellus* and leek moth over one Canadian growing season

Development of Tools and Systems

Monitoring

A monitoring system using pheromone traps , temperature data and life cycle information was created to predict leek moth occurrence and development in the field.

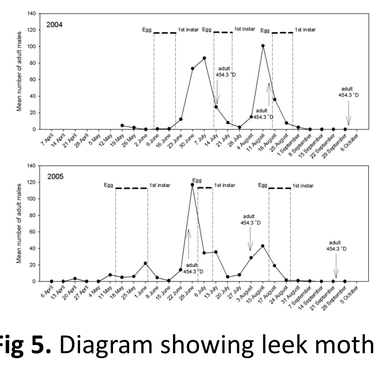

Fig 5. Diagram showing leek moth flight periods

Fig 6. Leek moth pheromone trap in field

Row covers

Row covers, which physically block leek moth adult females from laying eggs on plants, were tested in the field and assessed as comparable to conventional pesticide products.

Fig 7. Row covers in use at grower site

Fig 8. Pesticide applicator tests different biopesticides

Biopesticides

Through laboratory and field studies, spinosad and *Bacillus thuringiensis* subspecies *kurstaki* products were shown to be effective in causing mortality of leek moth. These active ingredients are now registered.

Release of the Biological Control Agent

Over 10,000 *D. pulchellus* adults were released and parasitism levels were monitored in Eastern Ontario between 2010 and 2012. Immediate parasitism levels of up to 50% were achieved in local leek moth populations when sufficient numbers of *D. pulchellus* were released.

Knowledge Transfer

IPM Tools –Detailed guidelines and factsheets to help growers make sound management decisions were developed.

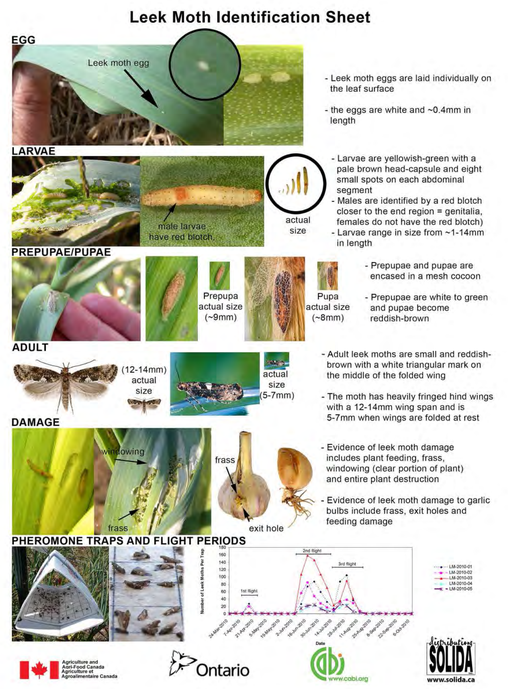

Fig 9. Example of identification sheet handout

Workshops – Information on leek moth and biologically-based management recommendations were shared at grower workshops in Ontario and Quebec. Through presentations, posters and hands-on learning opportunities growers learned more about the biology of the pest, the parasitoid and reduced risk treatments.

Fig 10. Grower training workshops

Farmer Participatory Approach – Working Together to Achieve Results

Fig 11. Individualised grower report

Engaging growers from the early stages of the study and working with them every step of the way was essential to the successful implementation and impact of this work. Field trials, releases and monitoring of the parasitoid were conducted on commercial sites which allowed for regular interaction between the project team and growers. All benefited from opportunities to establish effective dialogue on procedures, issues, solutions and outcomes. Routine dissemination of information to and among growers increased awareness of the emerging leek moth issue and in the use of the new tools and integrated management program available to address it.

Fig 12. A grower collaborator takes part in a parasitoid release

Acknowledgements

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About the Pesticide Risk Reduction Program

Agriculture and Agri-Food Canada's **Pesticide Risk Reduction Program** was established in 2003 and is working with stakeholders to develop and implement reduced risk pest management solutions for growers.

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