Project #8748

Comprehensive pest management program for Allium Crops

Researcher: Prof. Mary Ruth McDonald
Institution: University of Guelph
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I. Brief Project Description

Field and laboratory research will be conducted to address the major issues in insect and disease management on bulb onions and green onions, using an integrated approach and involving researchers from different regions and disciplines. Control of onion downy mildew is one of the main challenges facing onion growers. This disease is becoming more prevalent in Ontario, and has been a problem in 3 of the past 4 years. To achieve control, growers must use an effective fungicide and apply it before infection takes place. Thus, the combination of effective fungicide and correct timing of the spray is critical.

Onion maggot remains a major insect pest of onions. If onions are not treated with insecticide, stand losses average 50%, and in high pressure years such as 2005, we have recorded losses of over 80%. High rates of granular insecticide are used to control onion smut, but there are new seed treatments available, including the reduced risk materials, spinosad (Success) and novaluron (Rimon). Previous work has shown that improving the control of onion smut, reduces onion maggot damage, so onion smut must also be controlled to prevent yield loss, and must be assessed when evaluating products for onion maggot control. There are some new fungicides that show promise as seed treatments for onion smut control.

One of the most economical and environmentally friendly methods to control diseases is host resistance. Research and breeding of onions for onion smut resistance is being conducted at the University of Wisconsin, by Dr. Mike Harvey. In 2004 we received funding from the USDA for a collaborative project with Dr. Harvey to screen the U.S. collection of the onion germplasm for resistance. Now there is an opportunity to do further work with this material to breed for resistance in onions that will be suitable for Ontario growing conditions.

II. Project Objectives

1. Downy Mildew:

a) Registration of new fungicides for the control of downy mildew on bulb onions and green onions. New fungicides include Gavel, BAS 516, and Acrobat and the fertilizer, Alexin, which is reported to stimulate host plant resistance.

b) Evaluate a new forecasting system for onion downy mildew (Millioncast) in comparison with the system currently used, Downcast and a modified version of Downcast developed in Holland. Fungicides will evaluate in conjunction with disease forecasting to determine if the current forecasting system works with the new materials, in the same way as it does with Dithane, Ridomil and Aliette

c) Evaluate green onions for susceptibility to downy mildew, and as well as selected cultivars of cooking onions. Growers have observed differences in susceptibility in their fields. Test fungicides for downy mildew control on green onions in addition to dry bulb onions.

2. Onion maggot control:

a) New insecticide seed treatments for onion maggot, including spinosad (Success), novaluron (Diamond) and a new material from Dow XDS 175, plus continued work to obtain registration of fipronil (Regent). These new materials are "reduced – risk" insecticides.

b) Evaluation and listing of relative susceptibility of common onion varieties to onion maggot, determination of the best products for combined control of onion maggot and onion smut.

c) Testing of onion maggot populations from Ontario for resistance to Lorsban (chlorpyrifos)

3. Onion smut control:

a) Evaluation of new fungicide seed treatments for the control of onion smut, including (trifloxysdtrobin) Trialex and Quadris (azoxystrobin) and data to support the registration of tebuconazole (Raxil) in combination with Apron and Maxim. Seed treatments will also be evaluated for control of damping-off.

b) Evaluation of onion lines for resistance to onion smut, including collaboration with plant breeder Mike Harvey to breed onions with increased resistance.