

# 2008 Clubroot Update

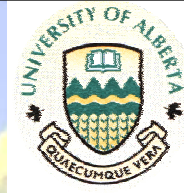
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## Clubroot Survey 2008



- 3 survey groups
- University of Alberta: S.E. Strelkov and V.P. Manolii
  - Annual clubroot surveys initiated in 2004
  - Initially focused on Edmonton region
  - Surveys expanded with increased occurrence of the disease
  - 2008 focus on previously non-surveyed areas
    - Visited total of 374 fields in 15 counties
    - 18 infested fields found, 3 new counties



## Southern Alberta – Ron Howard

- CDC South staff in cooperation with ASB and private sector agronomists
- 95 fields, 13 counties
  - 2 confirmed infestations, 7 suspects pending PCR test results
    - Lethbridge field still a puzzle
  - 5 new counties

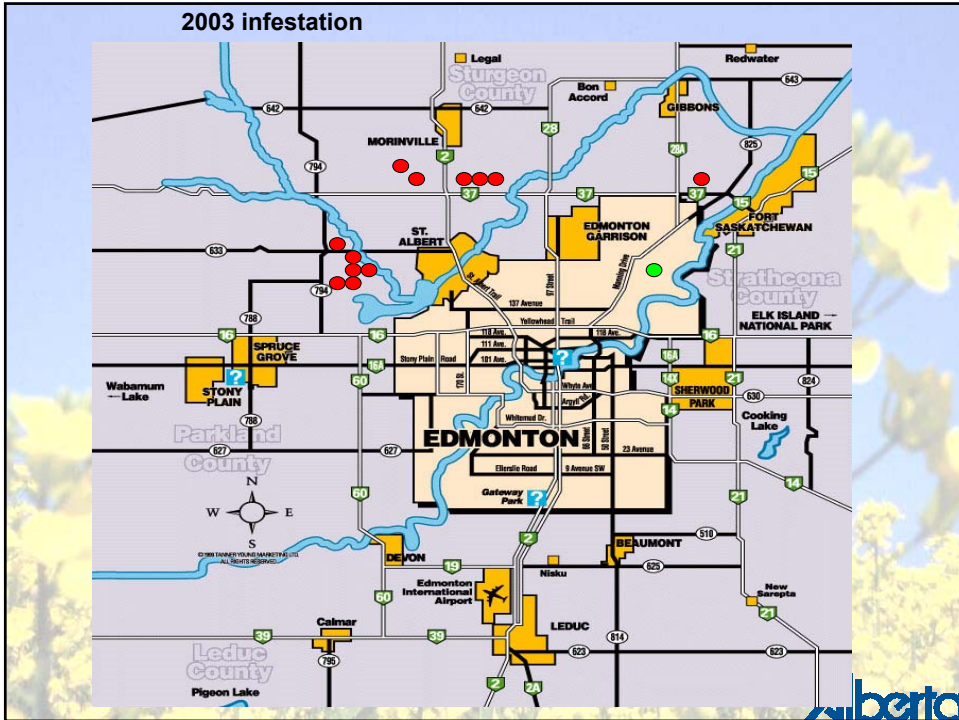
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## Ag Service Boards

- All counties growing canola / mustard were strongly encouraged to survey in 2008
  - Most used a less intense survey method to detect presence
  - A few counties checked every canola field
    - Eg Sturgeon checked 860 fields
  - Around 5000 fields
  - About 210 infested fields reported (some are common with U of A or ARD)

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2003 infestation



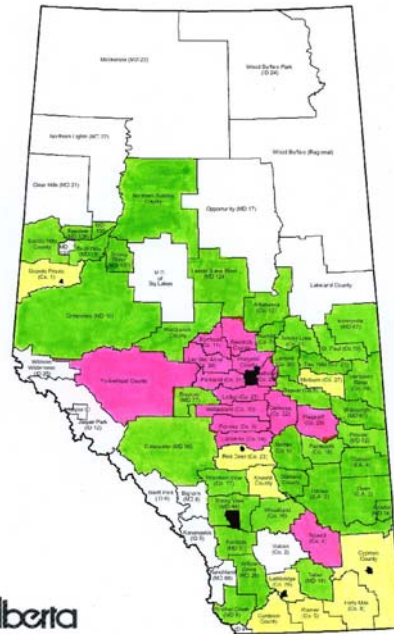
Preliminary Nov 2008

Pink- surveyed and found positive  
 Green - surveyed and found negative

Yellow - suspect and still under investigation or results inconclusive

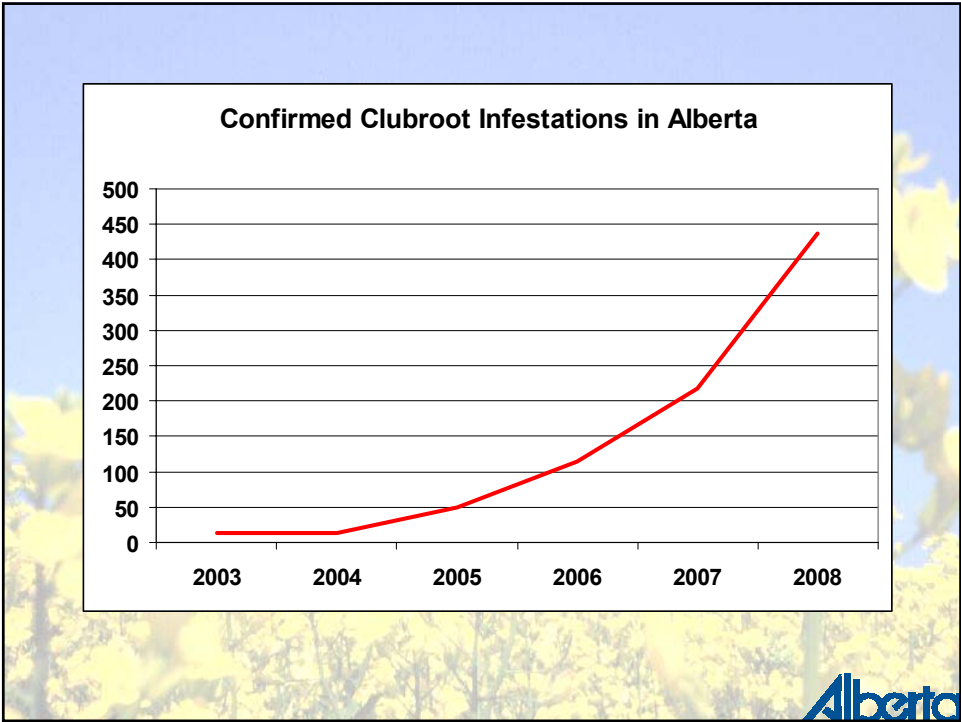
White - not surveyed and status unknown

Positive near Medicine Hat is a cole crop market garden



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# Control Measures in the future?

- research (U of A: Strelkov, Rahman  
ARD: Hwang, Howard)
  - Effectiveness of liming with wood ash or lime, soil applied fungicide, calcium cyanamide
  - Bait crops
  - biofungicides
  - Seed transmission
  - Resistance breeding
    - Probably 2 years away from varieties with short term resistance
  - Equipment sanitation products / methods
    - Partially funded by energy companies

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Swift Environmental Ltd.

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## Clubroot Disease of Canola and Mustard

Clubroot is a serious soil borne disease of canola and crops in the cabbage family (cruciferous crops). The disease occurs worldwide and was first identified in Europe in the thirteenth century.

This disease is a major problem in cole crops (cruciferous vegetables like cabbage) in some areas of British Columbia, Quebec and Ontario, and there have been two previous reports of clubroot in cole crops in Alberta.

Clubroot is not a new disease in Canada or Alberta. However in 2003, clubroot was confirmed in several canola fields near Edmonton, Alberta, which was the first report on canola in western Canada.

Clubroot can affect broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kale, kohlrabi, radish, rutabaga and turnip. Canola, rapeseed and mustard are also susceptible to this disease. There are several other cruciferous hosts, but their contribution to disease development and carryover is not well known.

This fact sheet contains current knowledge about clubroot in canola and describes options for Canadian canola growers to prevent this disease from becoming well established.

### Disease cycle

The causal agent of clubroot is *Plasmodiophora brassicae* Watsman. In the past, this agent has been classified as a slow moving fungus (oomycete), but more recently it is regarded as a protist (an organism with plant, animal and fungal characteristics).

Normally, several different races or strains are present in established infestations. *P. brassicae* is an obligate parasite, which means the clubroot pathogen cannot grow and multiply without a living host. The life cycle of *P. brassicae* is shown in Figure 1.

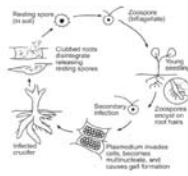


Figure 1. Life cycle of *Plasmodiophora brassicae*, the pathogen that causes clubroot (source: Oles Sauer, University).

Resting spores germinate in the spring, producing zoospores that swim in soil water to root hairs. These resting spores are extremely long lived and can survive in soil for up to 20 years. For example, Swedish research in infested spring sown fields found that 17 years were needed before clubroot subsided to non-detectable levels.

The longevity of the resting spores is a key factor contributing to the seriousness of the disease. Resting spore germination is stimulated by compounds exuding from the roots of host plants.

After the initial infection of the host plant through root hairs or wounds, the pathogen forms an amoeba-like cell. This amoeba like cell multiplies and then joins with others to form a plasmodium, which is a naked mass of protoplasm with many nuclei. The plasmodium eventually divides to form many secondary zoospores that are released into the soil.



Alberta Clubroot Management Plan

Developed by:  
 Alberta Clubroot Management Committee  
 June 2007



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