

# Canada Thistle Rust (*Puccinia Suaveolens*) Program Development in Edmonton

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# Background

## *Canada thistle (Cirsium arvense)*



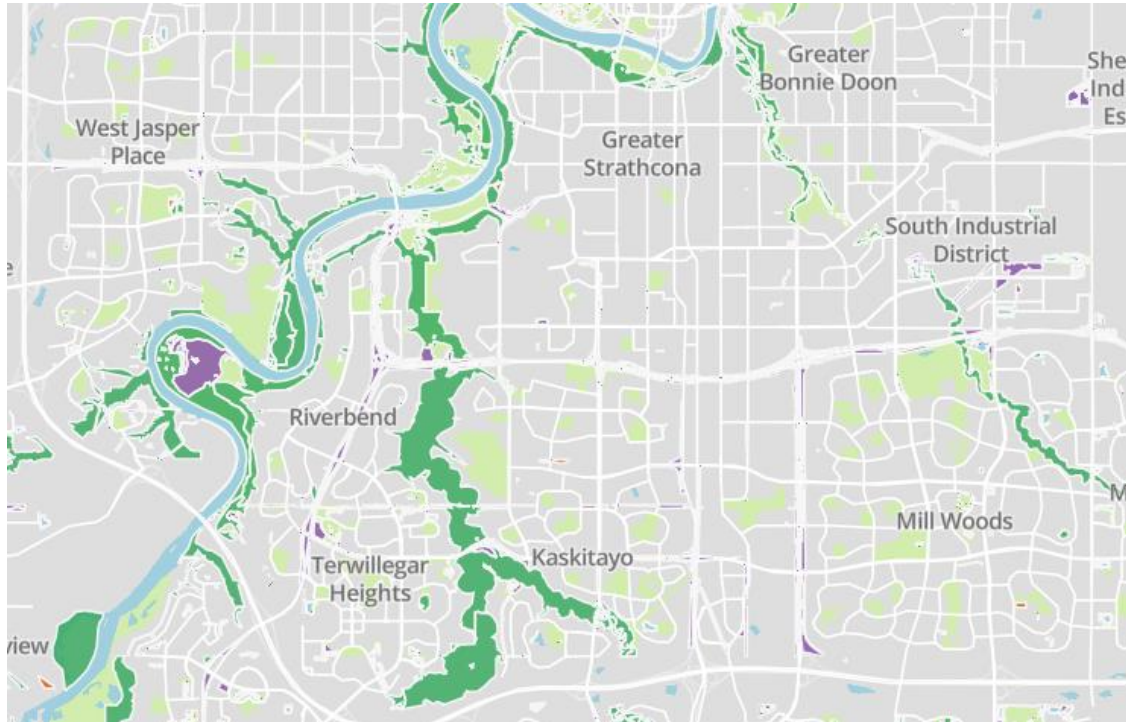
Jan Samanek, Phytosanitary Administration, Bugwood.org  
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Dots represent approximate locations only. Please check with local resources for specific plant locations.

# Background

## Natural and Naturalized Vegetation Areas



# Background

## Previous Biocontrol Releases

- *Larinus planus* (1994)
- *Urophora cardui* (1996)



## Also Found in Edmonton

- *Rhinocyllus conicus*
- *Cassida rubiginosa*
- *Hadroplontus litura*





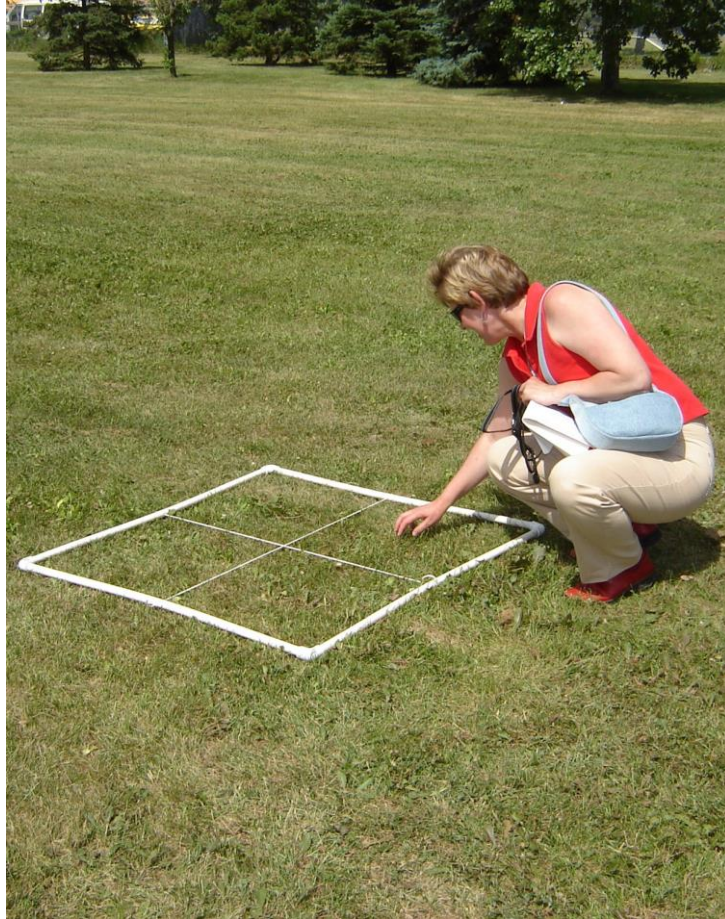
# Background

## Diseases

- *Phoma macrostoma*



Photobleaching of dandelion leaves, indicating successful infection.



Dr. Karen Bailey inspecting Edmonton turf plots 2006.

## Background

### *Puccinia suaveolens*



Systemically infected plant showing chlorosis.

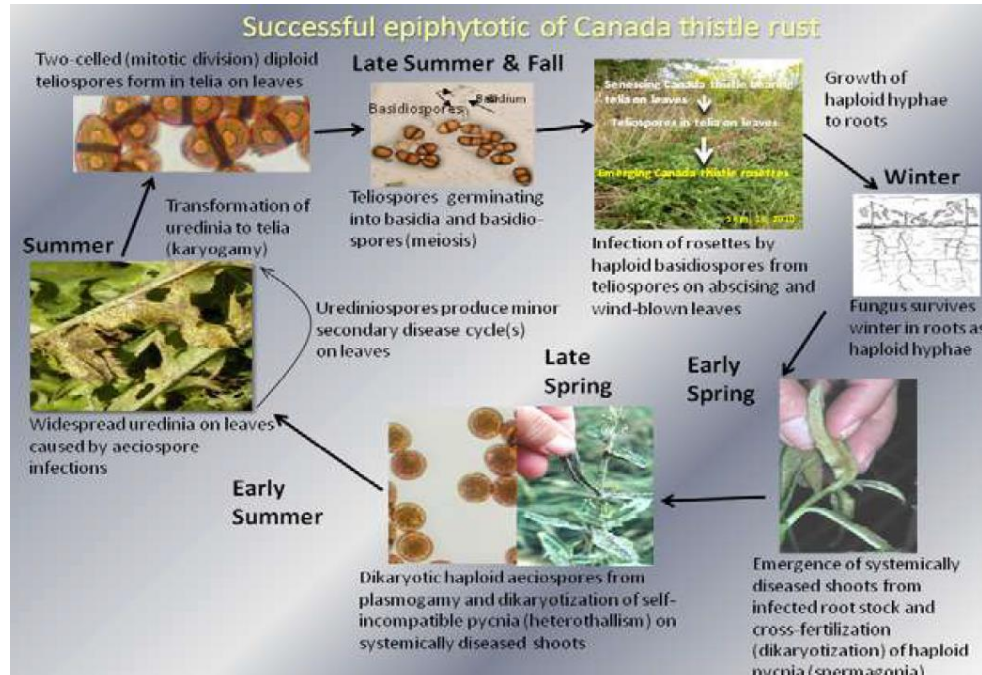


Systemic aeciospore development on the underside of Canada thistle plant in Edmonton.



# Background

From Berner, D. et al. 2013 Successful establishment of epiphytotics of *Puccinia punctiformis* for Biological Control 67: 350-360



# Field Trials 2021-2023



Site 1

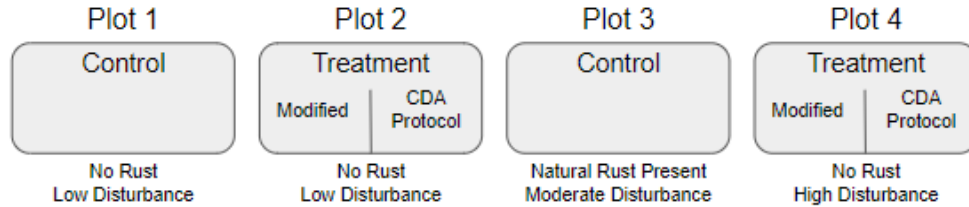
*Hermitage Biocontrol Study Site Map. Plots 1 - 4 are ordered South to North. Plot 3 is a Harvest Location.*

Prepared by [Julie Coventry](#)

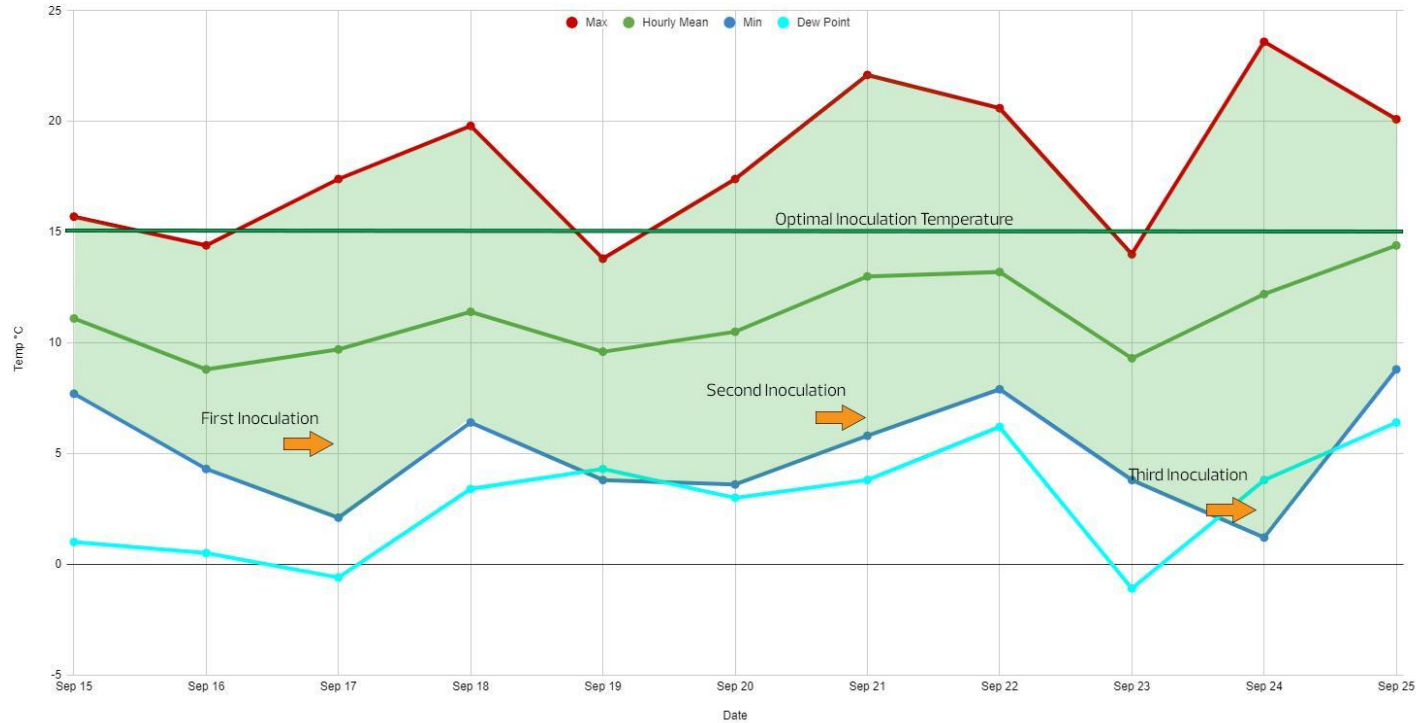


# Field Trials 2021-23

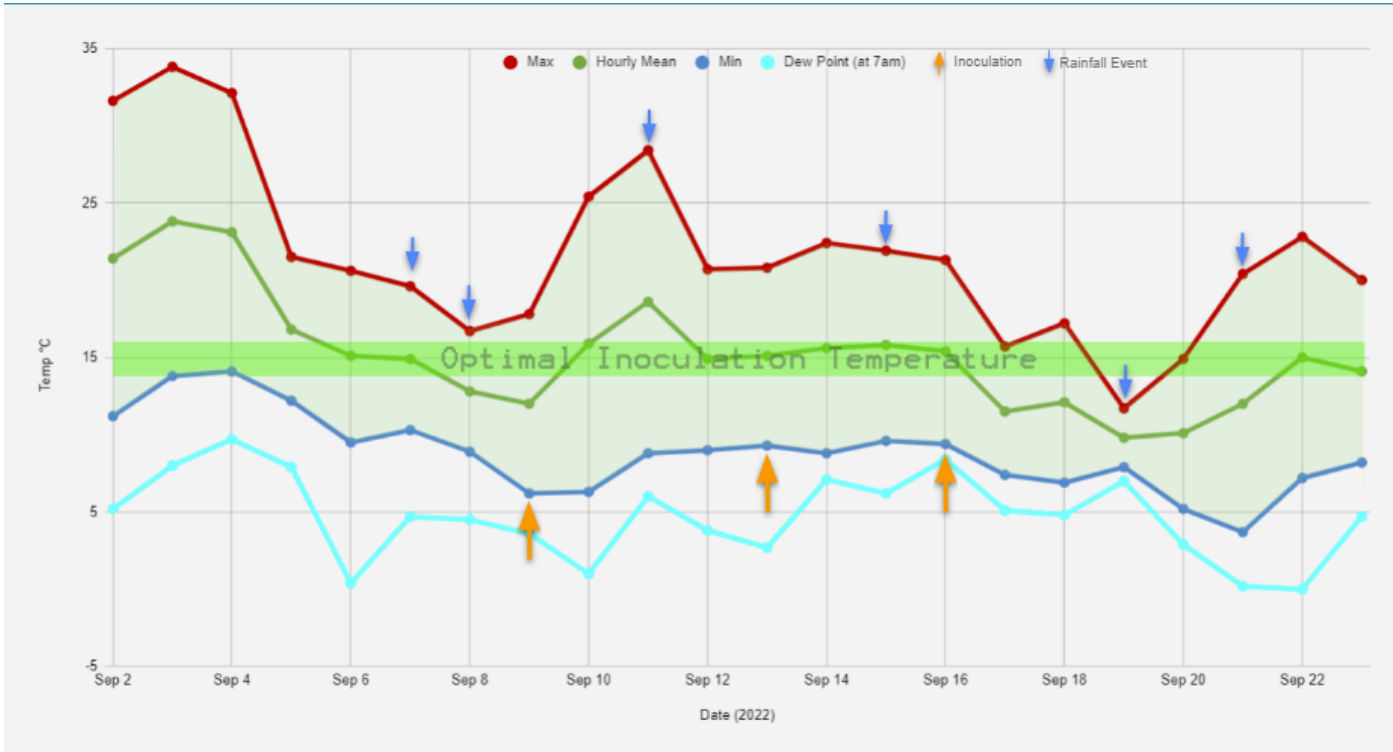
South → North



# Inoculation Timing 2021



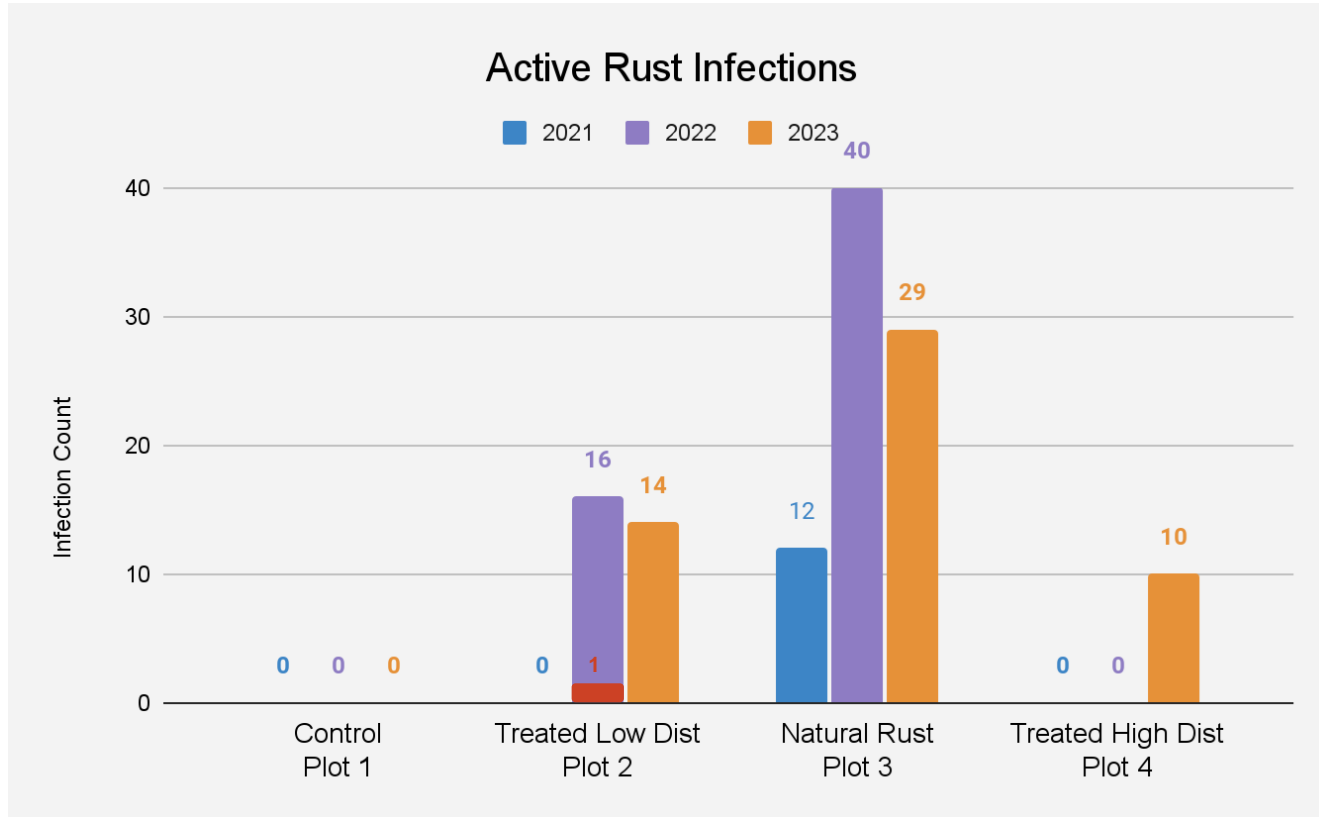
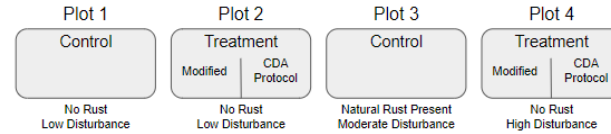
# Inoculation Timing 2022





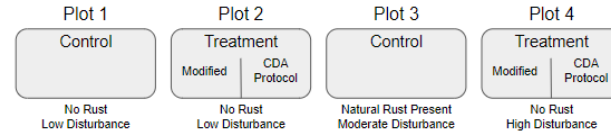
# Results

South → North

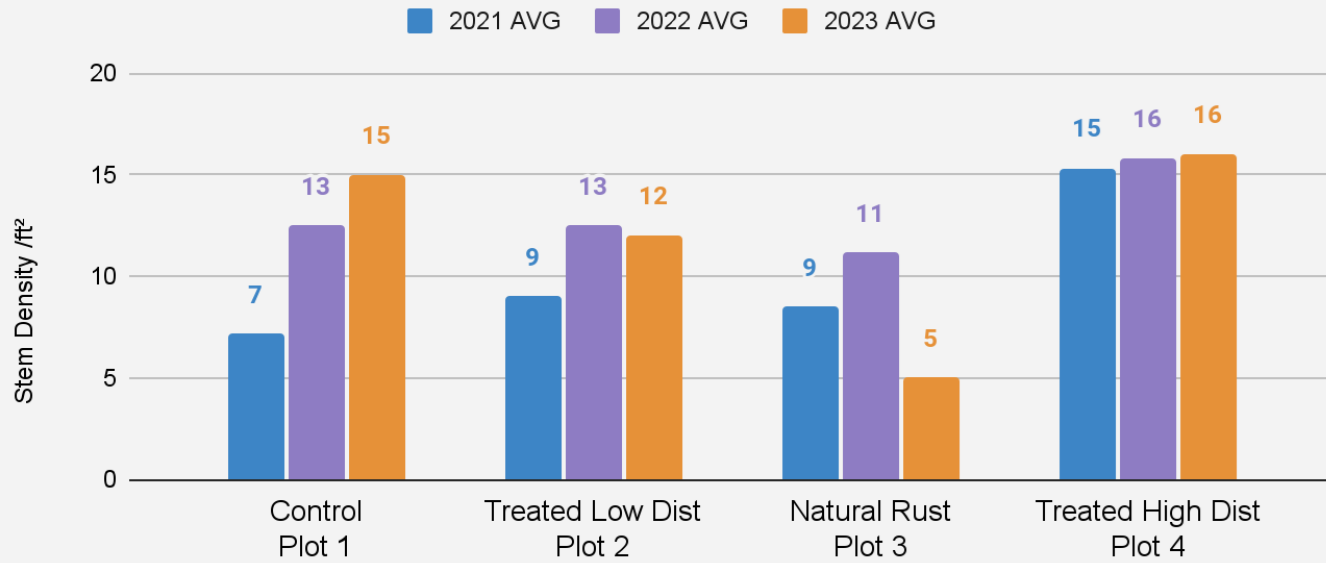


# Results

South → North



## Thistle Stem Count Averages



# *Treatment Program*

- *Inoculum  
Production*
- *Field Application*



# Inoculum Production

- **Collecting**
  - **Timed for optimal teliospore ratios, ~mid to late fall**
  - **Two strategies: bulk aeciospores and secondarily infected teliospores**
- **Drying**
  - **Done immediately to avoid mold growth**
- **Refining**
  - **Grinding**
  - **Hand sieving is hard work!**

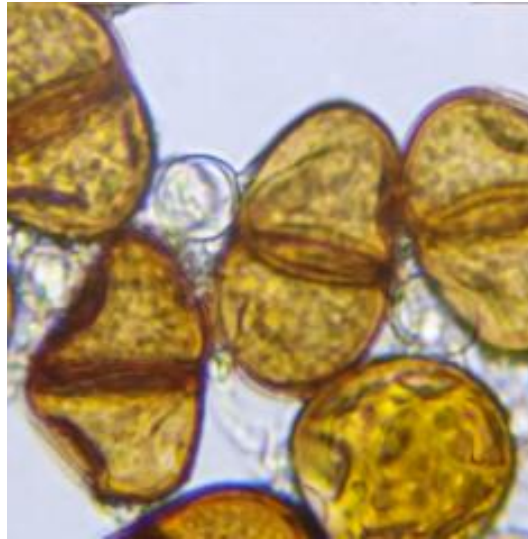


# Refining the Inoculum

## Grinding + Sieving



Sieve Size	No. 18	No. 50	No. 200	No. 400
Particle Size	1000µm	300µm	75µm	38µm
Quality Description	Coarse / Unusable	Refined / Dry Spreadable	Fine / Sprayable	Pure

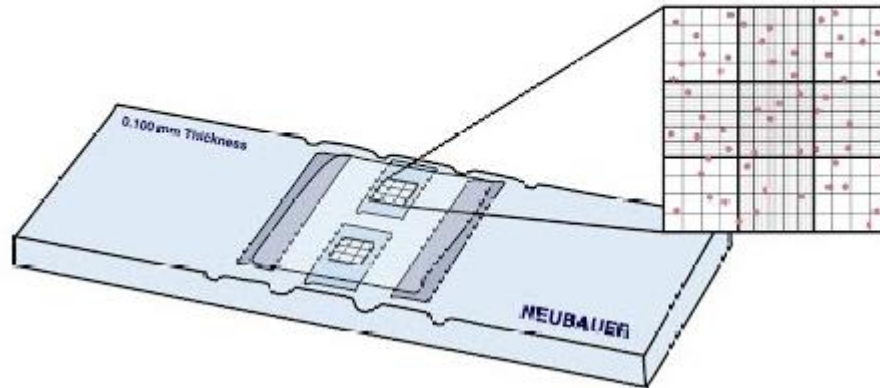


# Application Process





# Application Process



# Field Application Process

- **Site Selection**
  - Natural/Naturalized areas
  - Ideally cool and humid
- **Mechanical Preparation**
  - Timed for the last week of July or first week of August
- **Inoculant Application**
  - Prepare the equipment
  - Mix powder at specified ratio
  - Apply ~10ml per rosette x 3



# Future Plans

- Survey for natural infection sites
- Spore concentration optimization trials
- Timely mechanical control
- Use of adjuvants
- Operational deployment
- Offer refining services to others



# Acknowledgements

**Chris Saunders**, ret. Senior Biological Technologist for the City of Edmonton - for providing guidance on the *Puccinia suaveolens* biocontrol program

**Karen Rosen**, Biocontrol Specialist and Project Leader for the Canada thistle rust fungus program at the Colorado Dept of Agriculture's Palisade Insectary - for developing monitoring and application procedures for *Puccinia suaveolens*

**Karen Bailey**, for her work on Phoma macrostoma and bio-pesticides

**Natural Areas, City of Edmonton** - for surveying weed locations and producing maps for the *Puccinia suaveolens* biocontrol program

**Pest Management Lab, City of Edmonton** - for allowing the time to develop this program

**Cody Pelletier**, Technologist for the City of Edmonton - doing the field work and making the presentation

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Pg 2: Jan Samanek, Phytosanitary Administration, Bugwood.org Canada Thistle field

Pg 3: Nash Turly 2013 (*Urophora cardui*), Mike Quinn, TexasEnto.net (*Rhinocyllus conicus*), [B. Schoenmakers](#) at [Waarneming.nl](#) (*Hardoplonthus litura*), Udo Schmidt (*Cassida rubiginosa*)

Pg 6/14: [Joel Price, Oregon Department of Agriculture, Bugwood.org](#) Canada Thistle Plant and teliospores

