International Poplar Commission
Environmental Applications of Poplar and Willow Working Party Workshop
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Willows for environmental applications: new opportunities for regional development in Quebec, Canada

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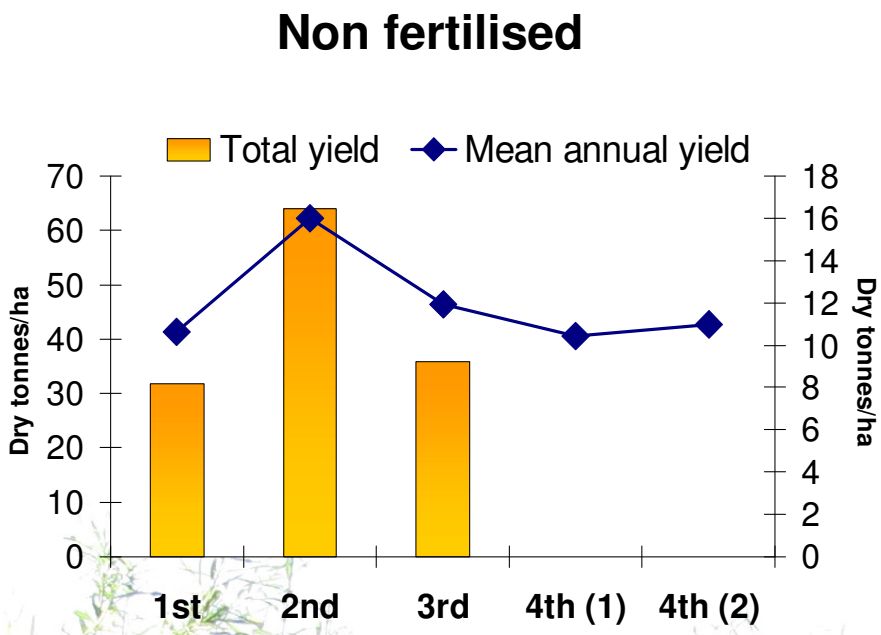
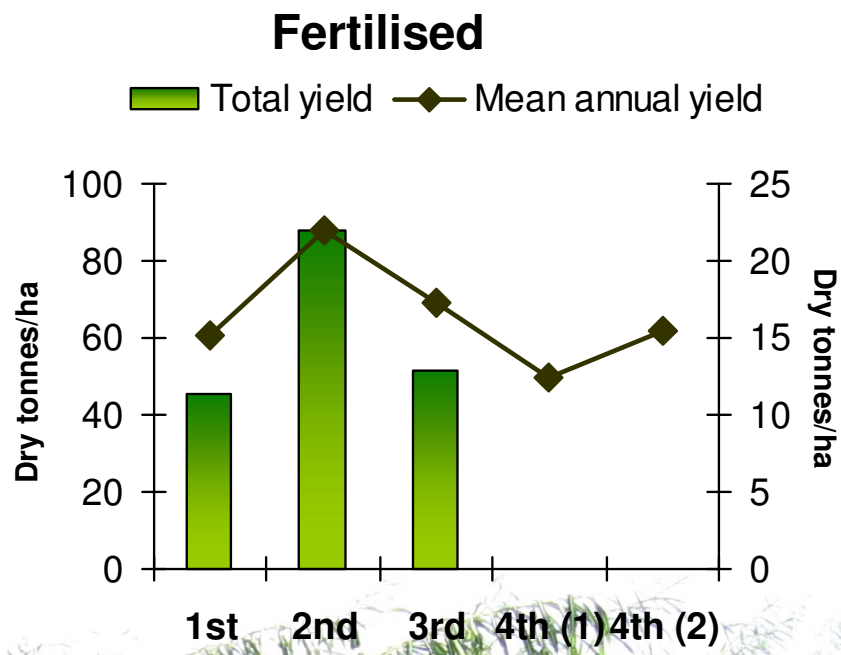
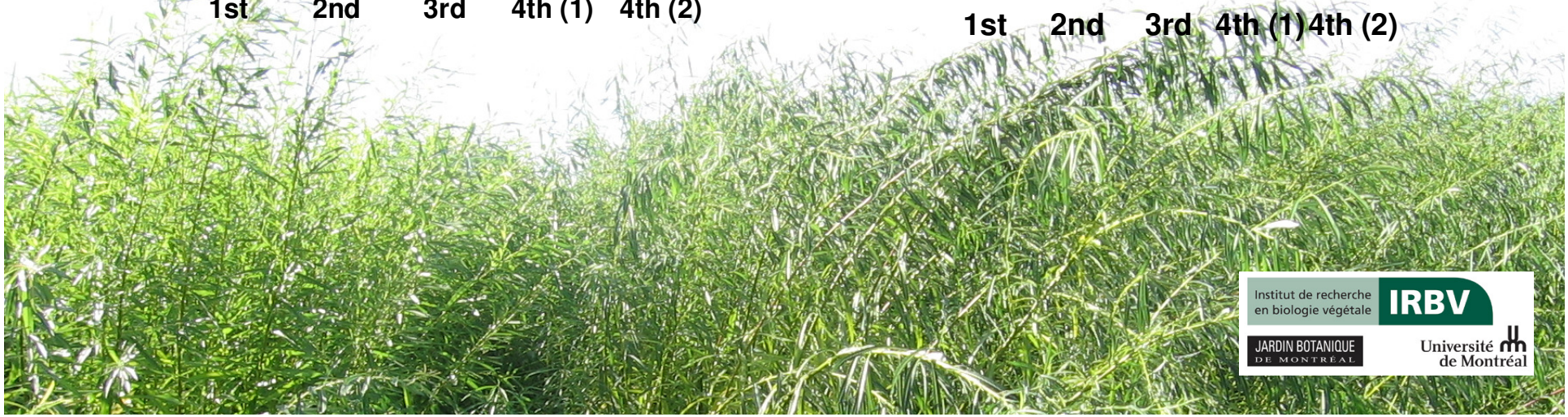
Short rotation woody crop in Quebec, Canada

- Approx. 40 hectares under cultivation, with scientific follow-up;
- High annual yield obtained (up to 20 odt /y/ ha);
- Yield could be maintained for years and following repeated coppicing.

Comparison of total biomass yield and mean annual yield for *S. viminalis* on fertilised and non fertilised clay sites







Environmental application of willows: erosion control

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HCX 539

140

Tracé de 1927 du Conseil privé (non définitif)
49°
45°

Osons l'osier

- Two hectares of willows in SRIC to provide willows for regional applications:

- **Wind breaks**
- **Erosion control**
- **Wastewater treatment**
- **Etc.**

OSONS L'OSIER

Regional county of Antoine-Labelle

- 3 hectares of willow in SRIC for:
  - Wood supply for Uniboard Canada (wood panels)

Treatment of aquaculture effluents in Chartierville

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Treatment of aquaculture effluents in Chartierville

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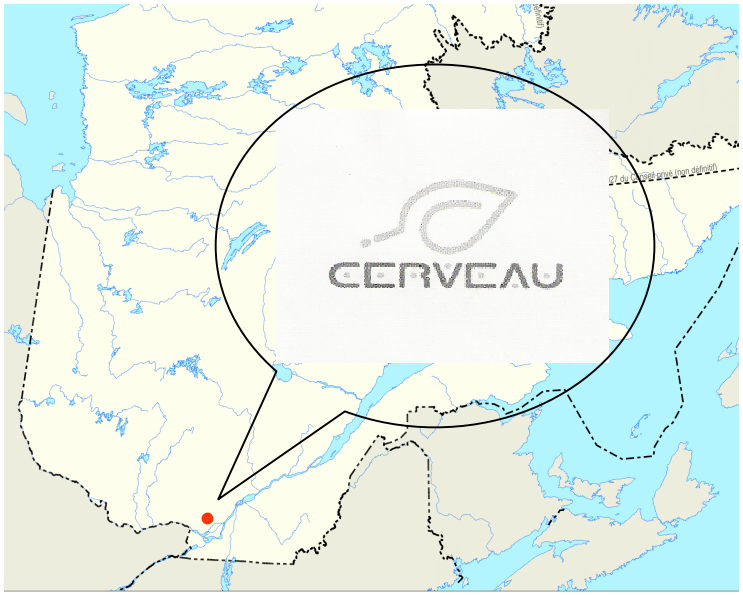
Plant Research Center for Environment and Urban Management in Boisbriand



- 7 hectares of willows in SRIC including three clones of *S. viminalis* and *S. miyabeana*
- Willow branches used for the construction of living walls and other environmental applications in and around the municipality
- Projects based on sustainable development concept

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The largest plantation in Quebec
Owner: Agro Énergie in St-Roch-l'Achigan

Use of willows in urban areas for brownfield restoration and decontamination

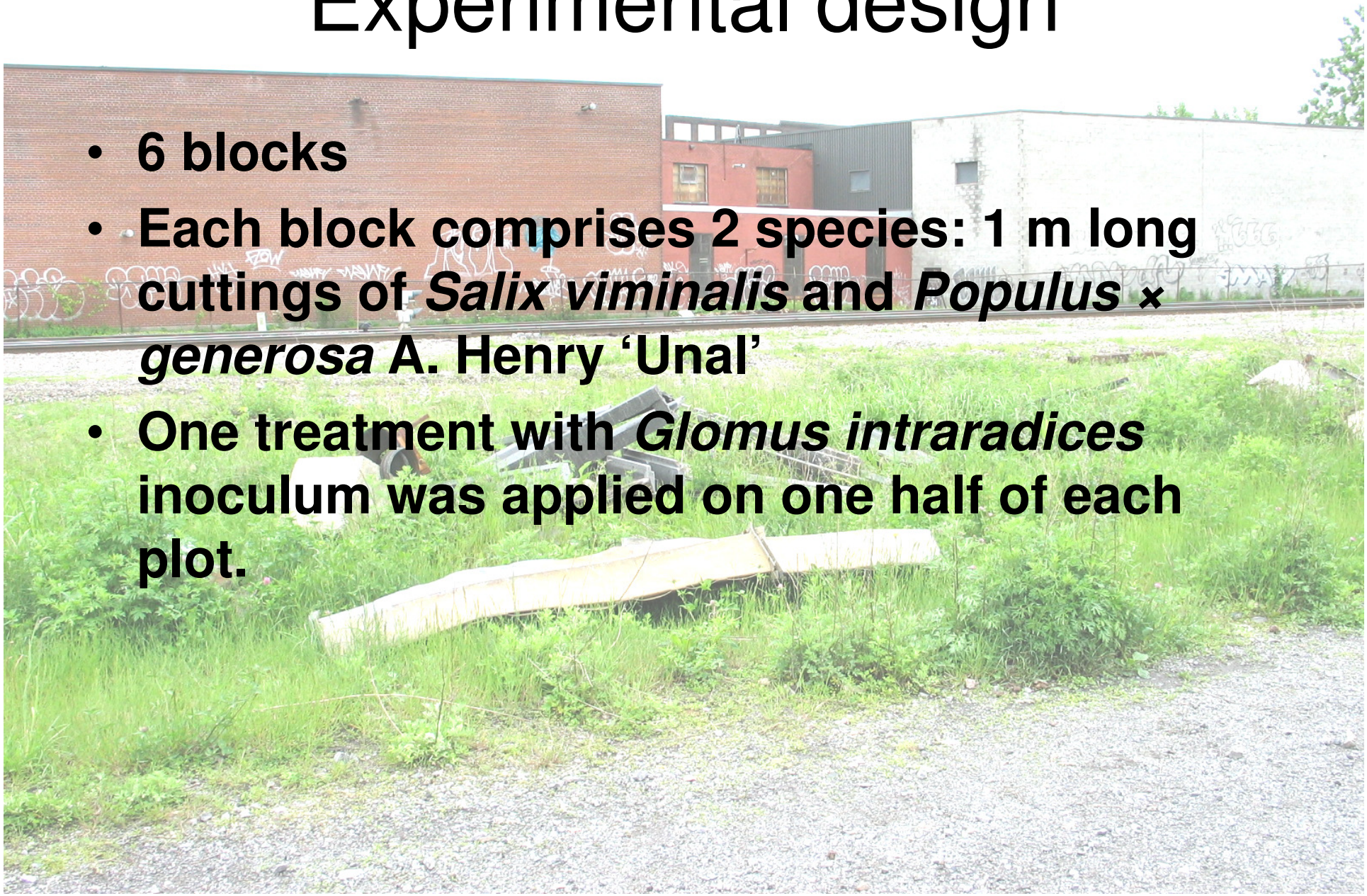
- Verification of field establishment of willows and poplars cuttings (with and without arbuscular mycorrhizal fungi) in contaminated brownfields;
- Comparison of both growth and capacity to accumulate heavy metals in their tissues.

Willows for environmental application in urban areas

Soil characteristics of urban brownfields

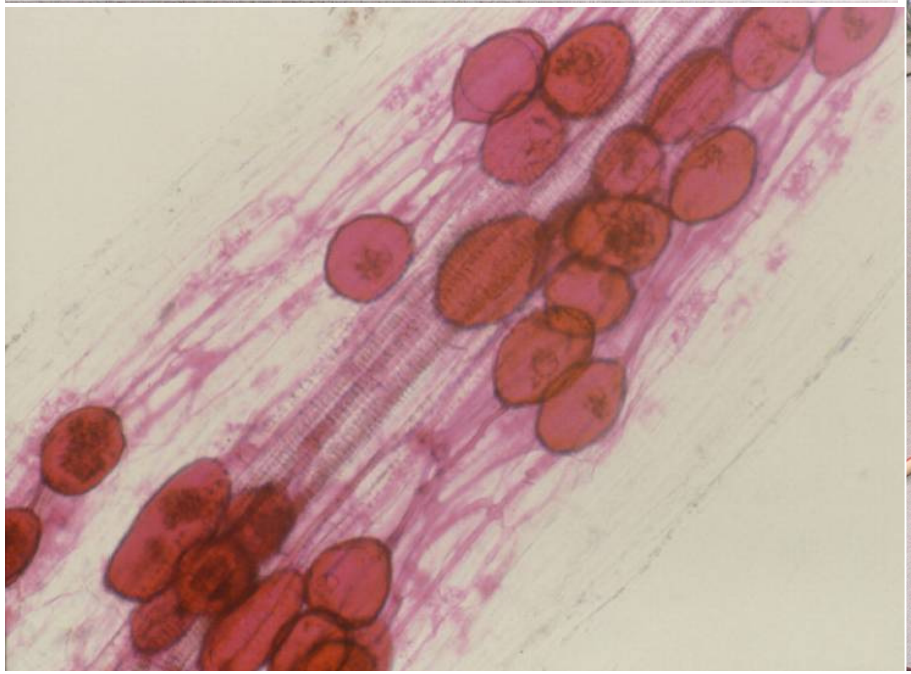
- Low level of organic matter content;
- Heavy and compacted soils;
- High pH;
- Poor drainage;
- Contamination of various origins (organic and inorganic);
- Very heterogeneous.

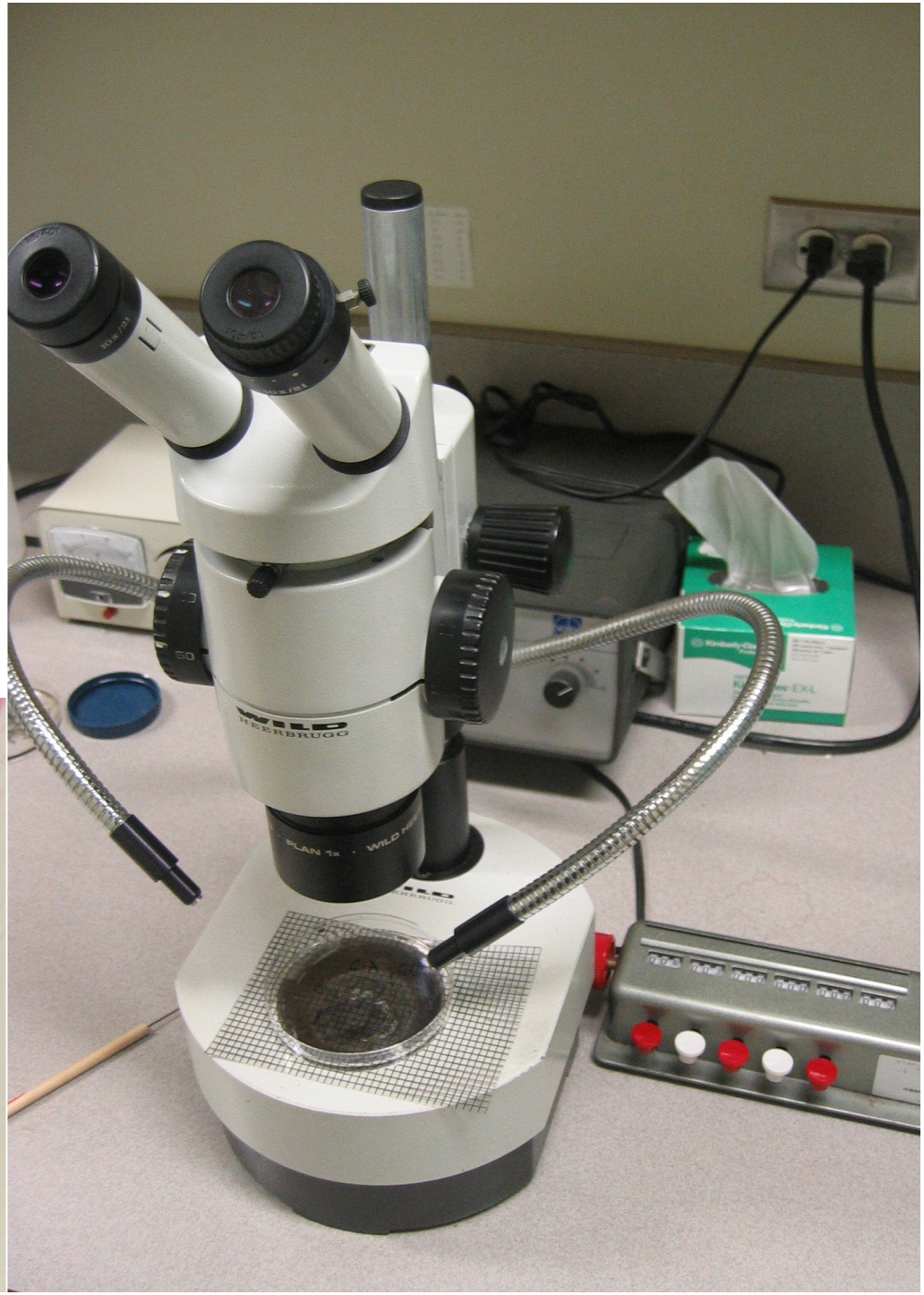
Experimental design



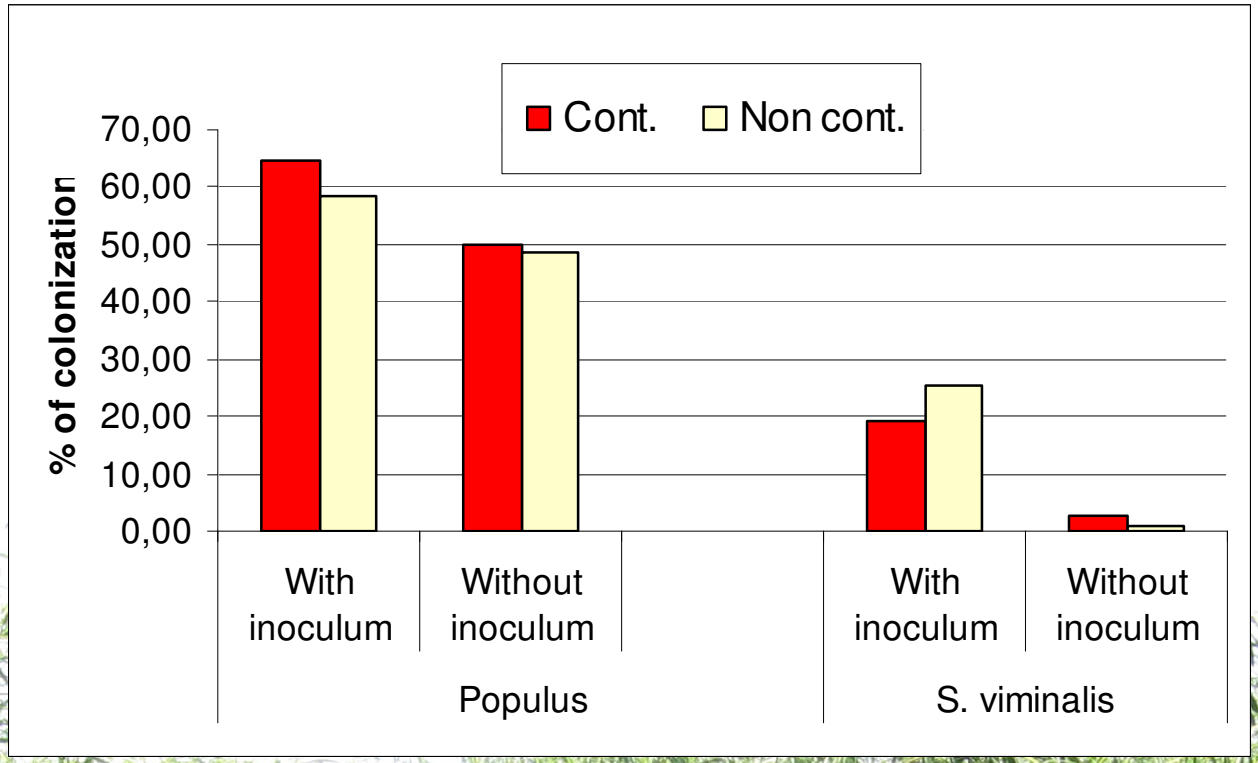
- **6 blocks**
- **Each block comprises 2 species: 1 m long cuttings of *Salix viminalis* and *Populus × generosa* A. Henry 'Unal'**
- **One treatment with *Glomus intraradices* inoculum was applied on one half of each plot.**

CA-66




WILD
HEERBRUGG
PLAN 1x

Comparison of % of colonization



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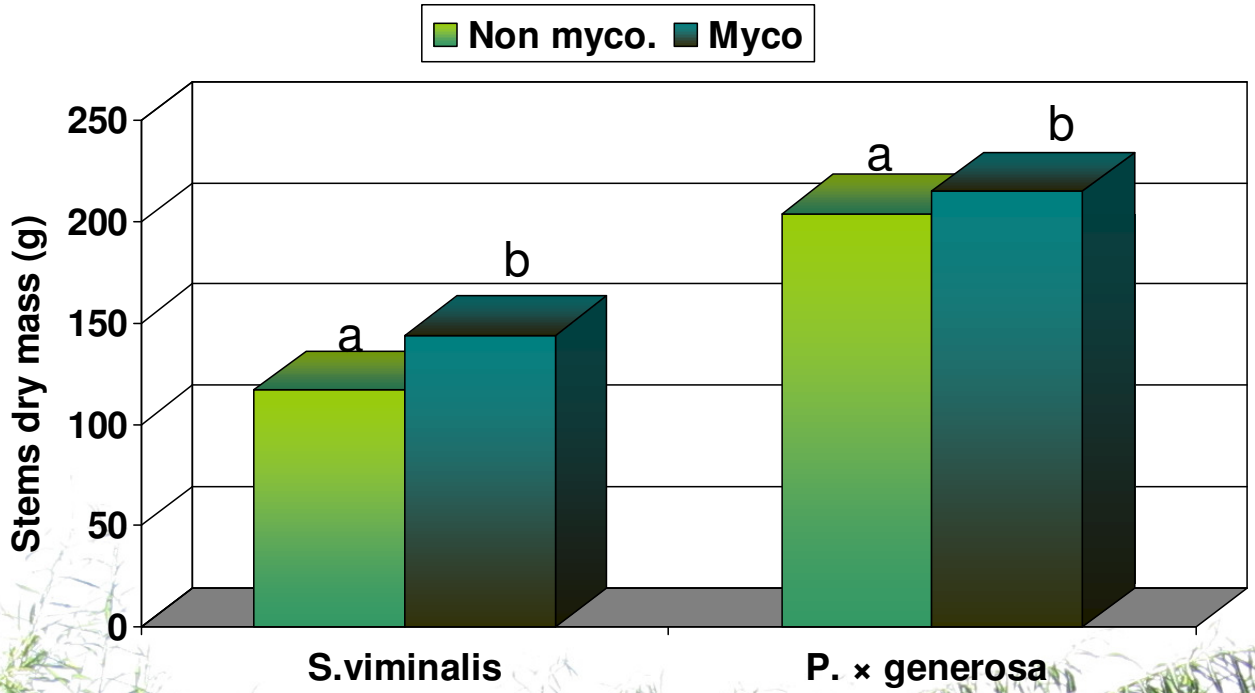
Comparison of stem biomass



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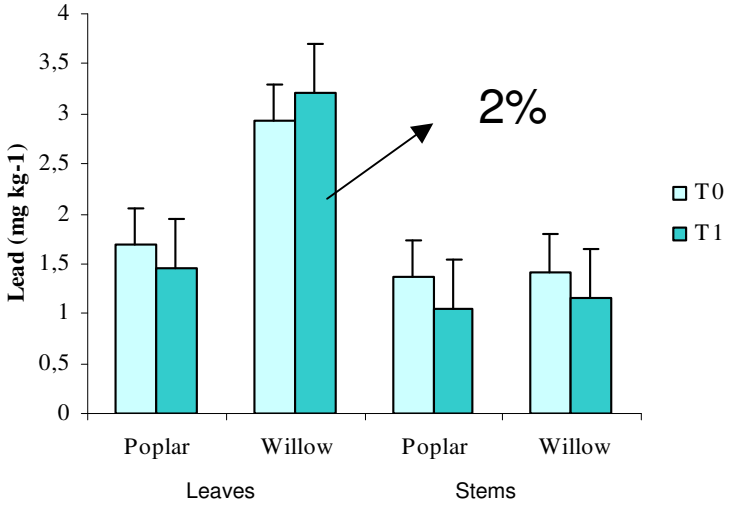
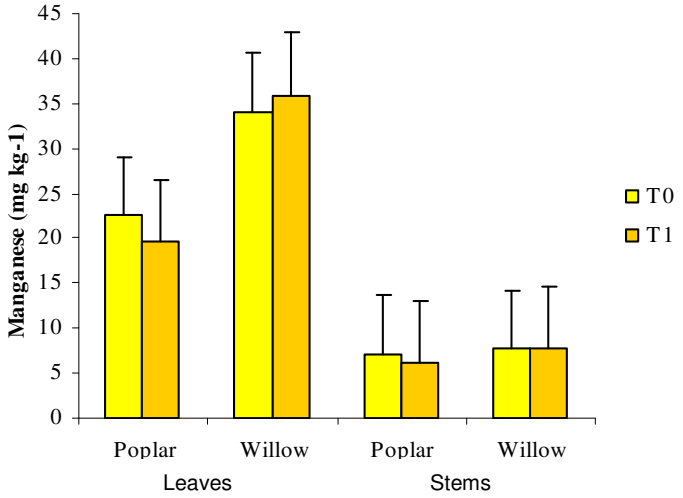
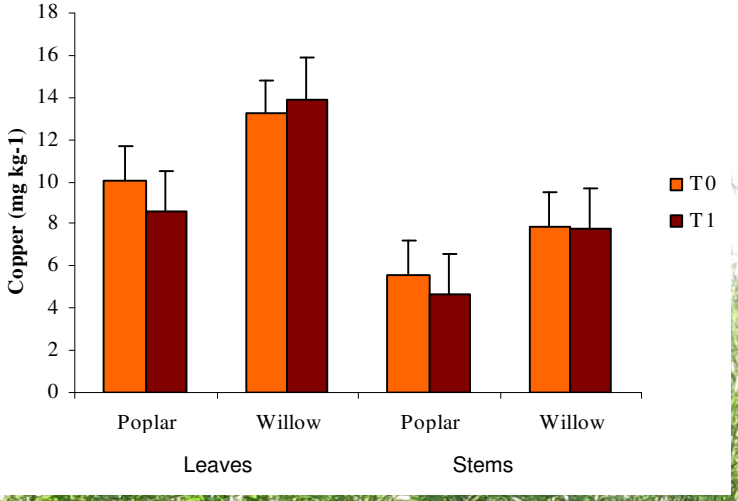
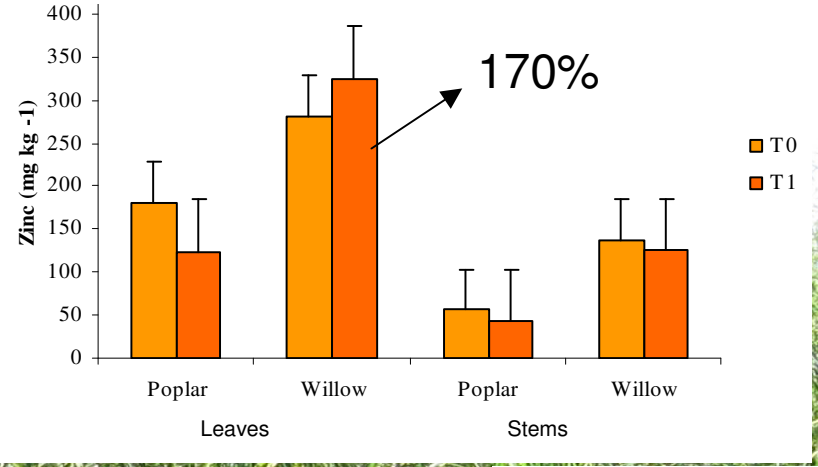
Comparison of metal concentration in leaves and stems









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Preliminary conclusions

- **Establishment of willows and poplars from long cuttings on brownfields seems to be an efficient method to quickly reclaim brownfields in urban area;**
- **In general willows showed higher metal concentrations in their tissues;**
- **Willows seem to be more susceptible to root colonisation by *Glomus intraradices* inoculum**
- **Treatment with *Glomus intraradices* inoculum significantly increases stem biomass in poplar and willow, but had no effect on metal content.**

New research trends: identification of indigenous clones for environmental uses

- Find and collect clones of diverse indigenous species such as *Salix amygdaloides*, *S. nigra*, *S. interior*, *S. eriocephala*, and *S. discolor*;
- Establish field trials and select for biomass production potential, pest resistance, wood quality, and chemical constituents;
- Indigenous material will meet greater acceptance among the general public and ecologists for restoration and diverse environmental applications in urban and rural areas.

Aknowledgments

Canadian Federal Interdepartmental Program on Energy Research and Development (PERD)

Municipality of Boisbriand

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Montreal Botanical Garden

Montreal Centre of Excellence in Brownfield Rehabilitation

Osons l'Osier

Regional county of Antoine-Labelle

Southwest Borough of the City of Montreal

Technology and Innovation (T&I) program of the Canadian Biomass Innovation Network

The Green Municipal Funds program

Uniboard Canada

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