How best should we manage hybrid poplar plantations?
Interactions of site preparation, vegetation control and fertilization

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• Silviculture of hybrid poplars is a promising solution to reduce the pressure on natural forests while maintaining the wood supply to industries.

• Hybrid poplars are sensitive to competing vegetation and to inadequate soil conditions and fertility.
Context

Choice of site

Management tools
Objectives

- Soil preparation?
- Growth
- Vegetation control?
- Fertilization?
Hybrid poplar clone 915319
(Populus maximowiczii x Populus balsamifera)

Total = 40 ha

Study Sites

Saguenay-Lac-St-Jean
### Experimental Design

<table>
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<tr>
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<th>mounding</th>
<th>scarifying 1x</th>
<th>scarifying 3x</th>
<th>unprepared</th>
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<td>harrowing</td>
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Fertilization
Mechanical Soil Preparation (MSP)

Scarify

Photos: Pierre Gagné, RLQ
Mechanical Soil Preparation (MSP)

Harrow

Photos: Pierre Gagné, RLQ
Mechanical Soil Preparation (MSP)

Mounds

Photo : Louisiana-Pacifique
Mechanical Soil Preparation (MSP)

Mounds

Photo: Louisiana-Pacifique
Mechanical Soil Preparation (MSP)

Mounds

from Sutton, 1993
Tree planting

Photos : Louisiana-Pacifique
Vegetation control

Photo: Pierre Gagné, RLQ
What effect of MSP on growth?
What about soils, then?

Mounds:
- warm
- uncompacted
- dry
- poor
What effect of vegetation control?
MSP as a form of vegetation control

e.g., mounds

Photo: Pierre Gagné
Fertilization and growth

N & N+P

30 %
Do mounds favour root growth?
Do mounds favour root growth?

Unprepared

Mounds

Photos: Simon Bilodeau Gauthier
Distribution of roots in soil

Roots: mineral > organic
Distribution of roots in soil

Mounds

organic

mineral

mineral
Distribution of roots in soil

Mounds

Fine roots: mineral = organic

organic

mineral
Future Management Strategies

• Globally, mounding is the best MSP

• Veg Control has more effect in less intense MSP

• Fertilization, when done after a few years, is optimal for well-developed trees.

• Prioritize management techniques thus:
  MSP >> VC > Fertilization.
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