

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

Simon Bilodeau-Gauthier,
David Paré, Christian Messier

COST-ACTION E47
Vejle, Denmark
May 5-7, 2009



Ressources naturelles Canada
Natural Resources Canada



Context

- **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.**



Photos : Louisiana-Pacifique



Photo : Pierre Gagné, RLQ

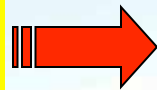
Context

???

Choice of site

Management tools

Objectives



Soil preparation ?



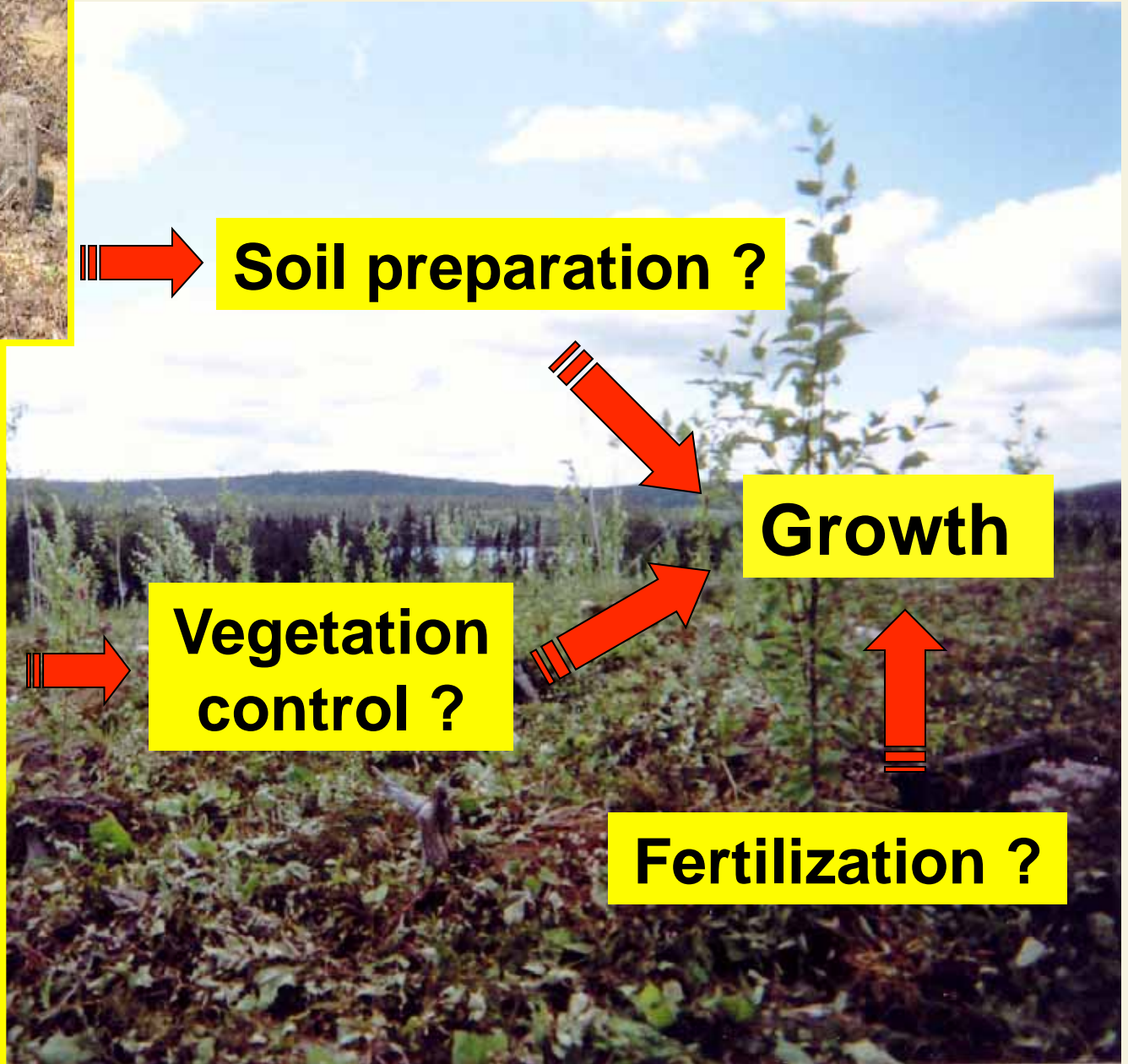
Vegetation control ?



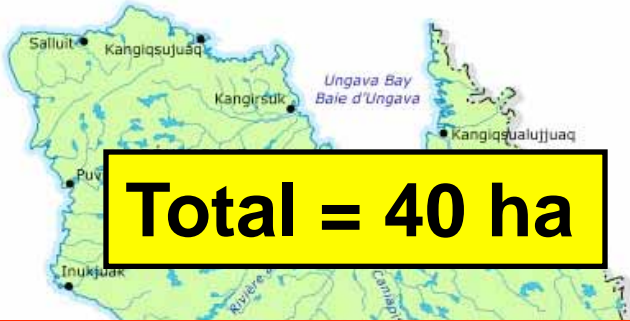
Growth



Fertilization ?



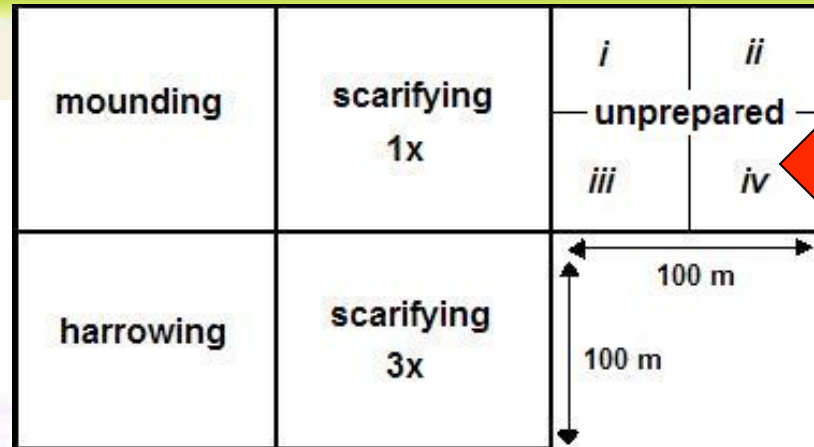
Study Sites



Hybrid poplar clone 915319
(*Populus maximowiczii* x
Populus balsamifera)



Experimental Design



Fertilization



Mechanical Soil Preparation (MSP)

Scarify



Mechanical Soil Preparation (MSP)

Harrow



Mechanical Soil Preparation (MSP)

Mounds



Photo : Louisiana-Pacifique

Mechanical Soil Preparation (MSP)

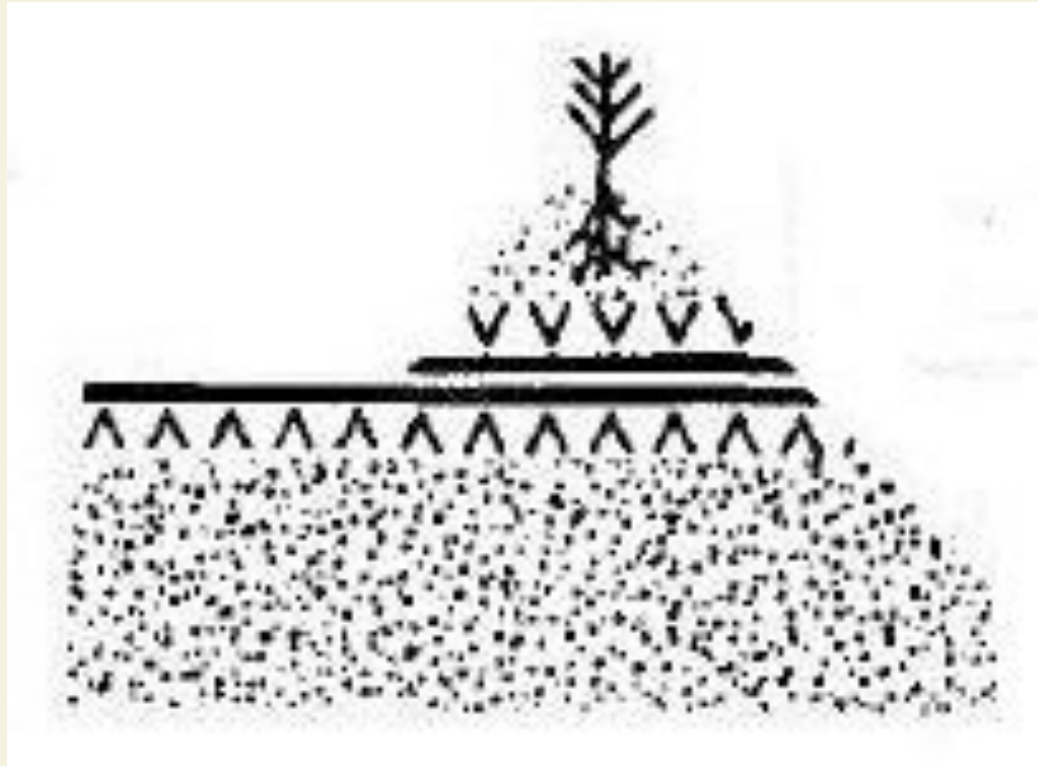
Mounds



Photo : Louisiana-Pacifique

Mechanical Soil Preparation (MSP)

Mounds



from Sutton, 1993

Tree planting



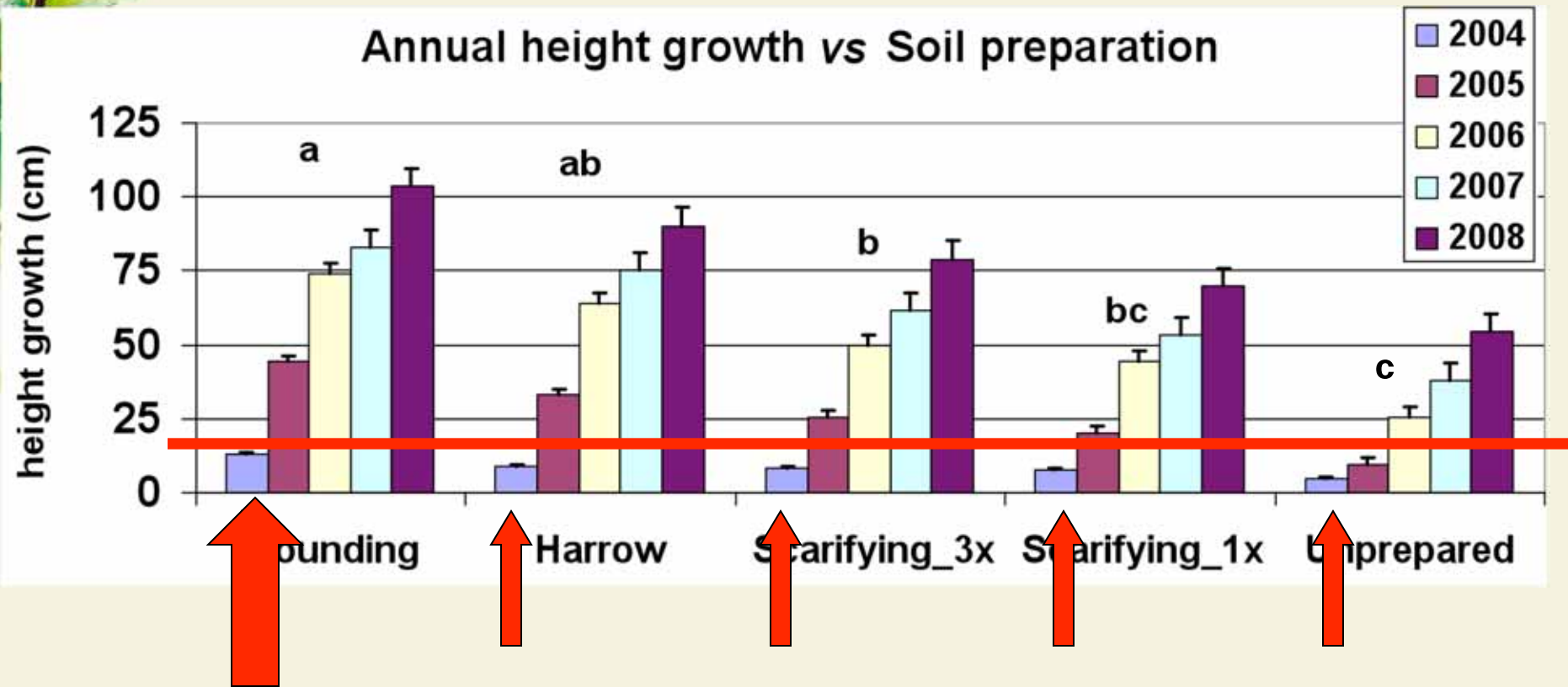
Photos : Louisiana-Pacifique

Vegetation control



Photo : Pierre Gagné, RLQ

What effect of MSP on growth ?



What about soils, then ?

Mounds :

- warm
- uncompacted
- dry
- poor

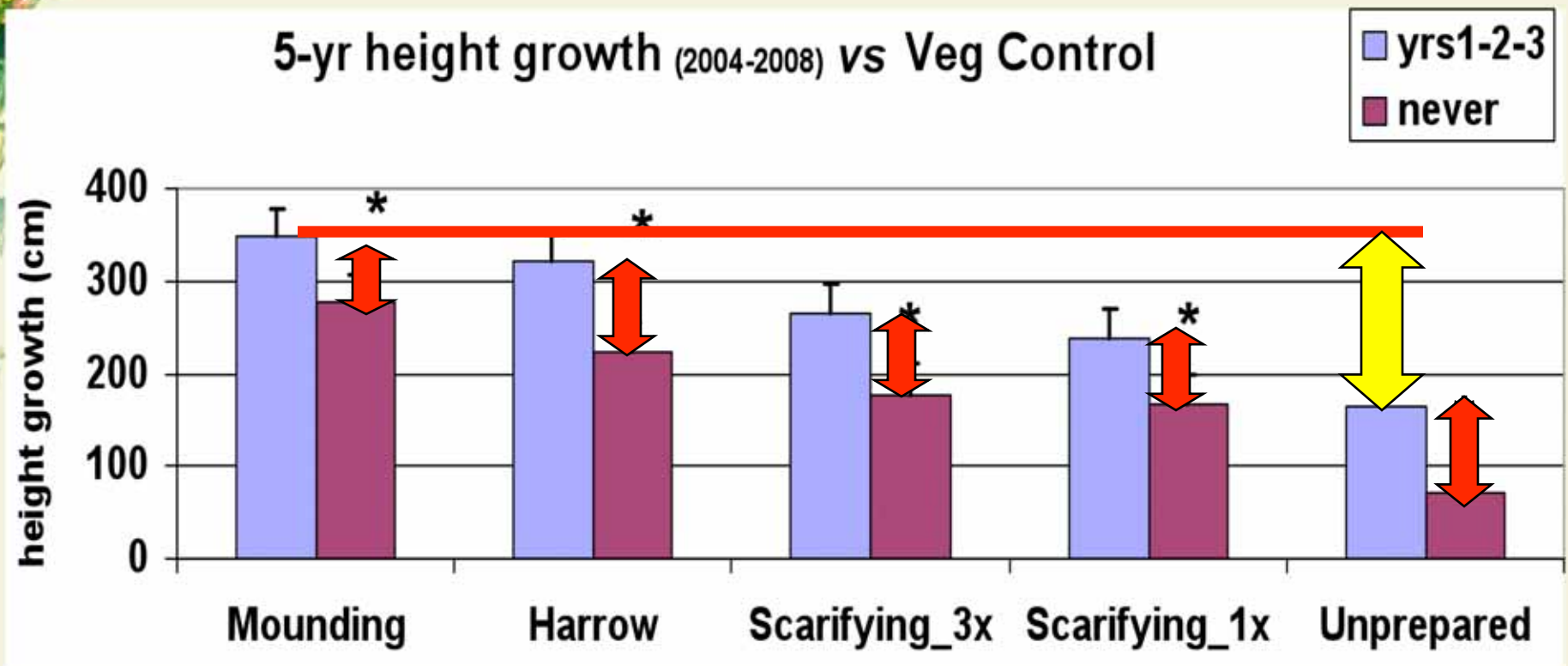


Photo : Western Ag Inc.



Photo :
Spectrum
Technologies
Inc.

What effect of vegetation control ?



MSP as a form of vegetation control

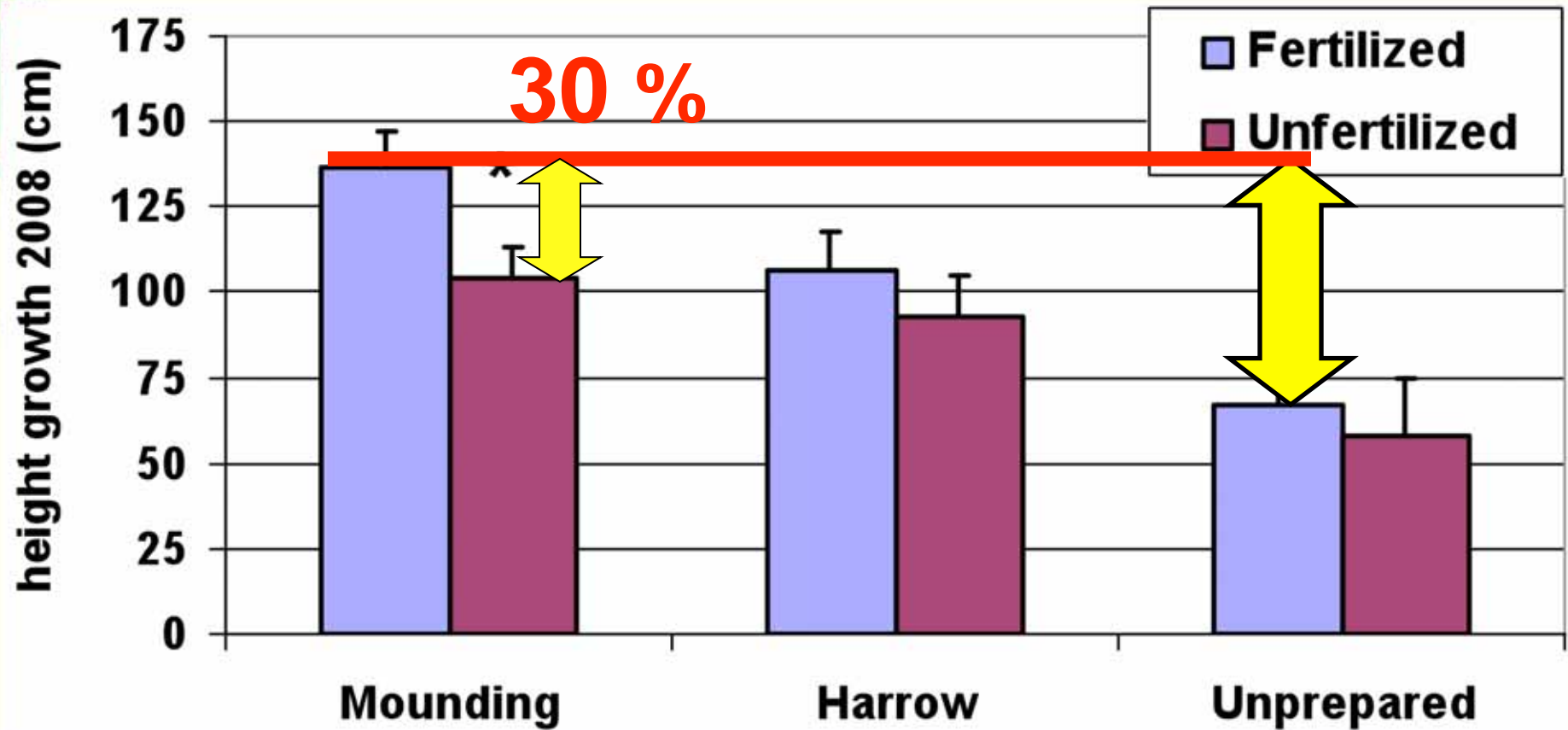
e.g., mounds



Photo : Pierre Gagné

Fertilization and growth

N & N+P



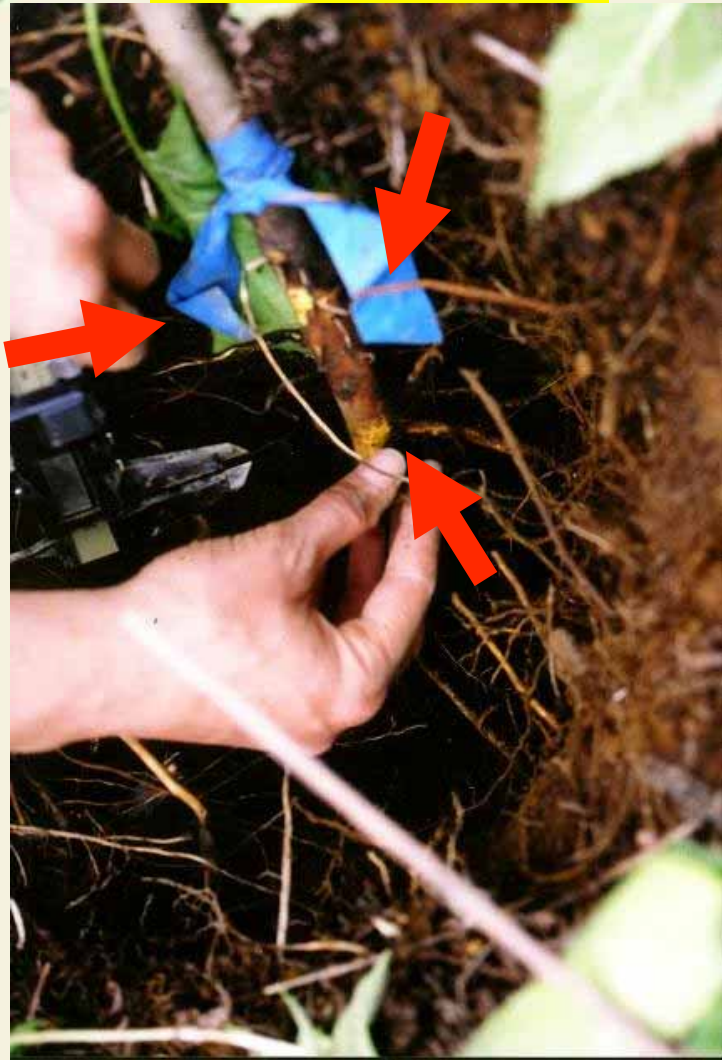
Do mounds favour root growth ?



Photo : Pierre Gagné

Do mounds favour root growth ?

Unprepared



Mounds



Photos : Simon Bilodeau Gauthier

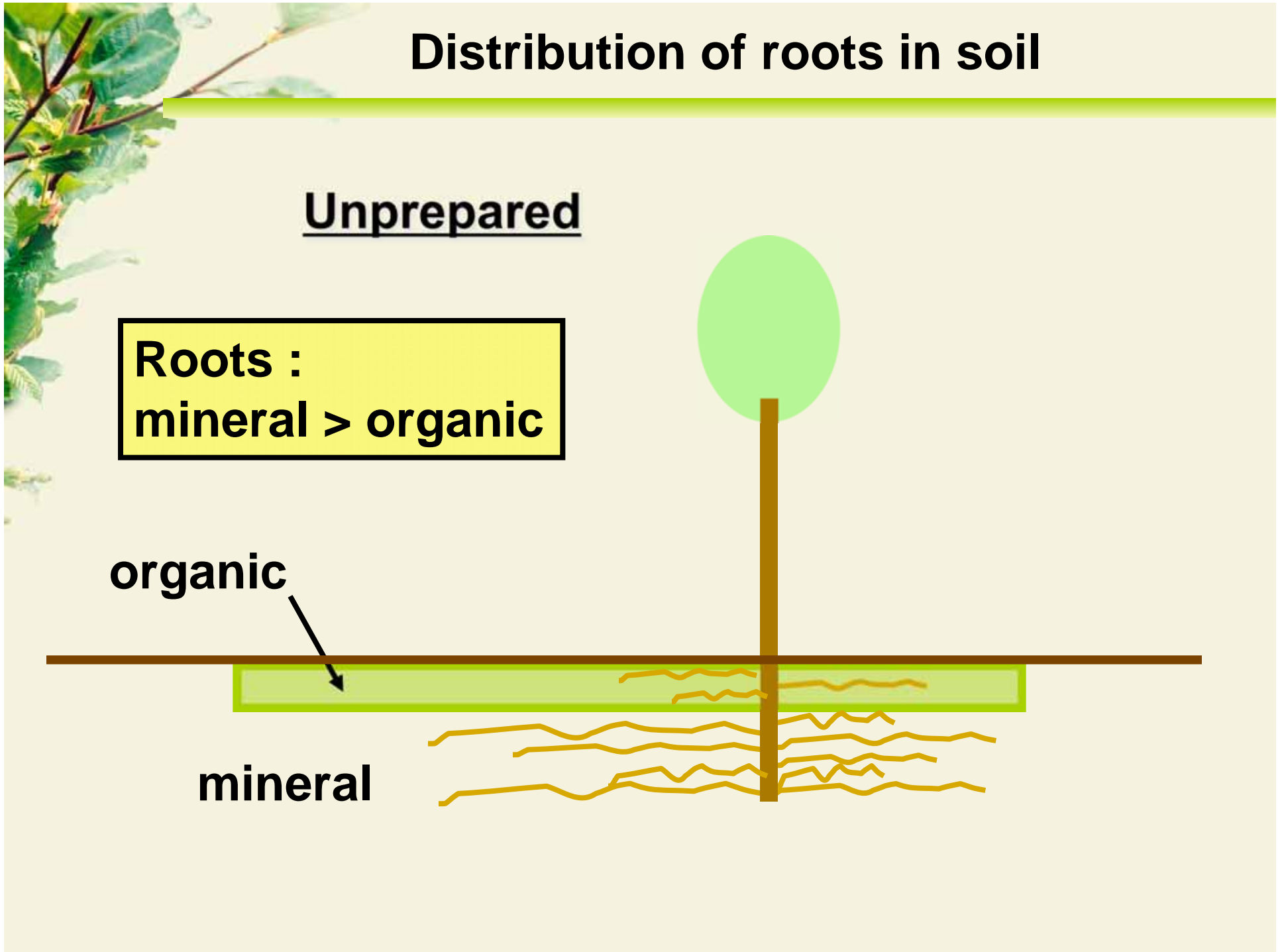
Distribution of roots in soil

Unprepared

**Roots :
mineral > organic**

organic

mineral



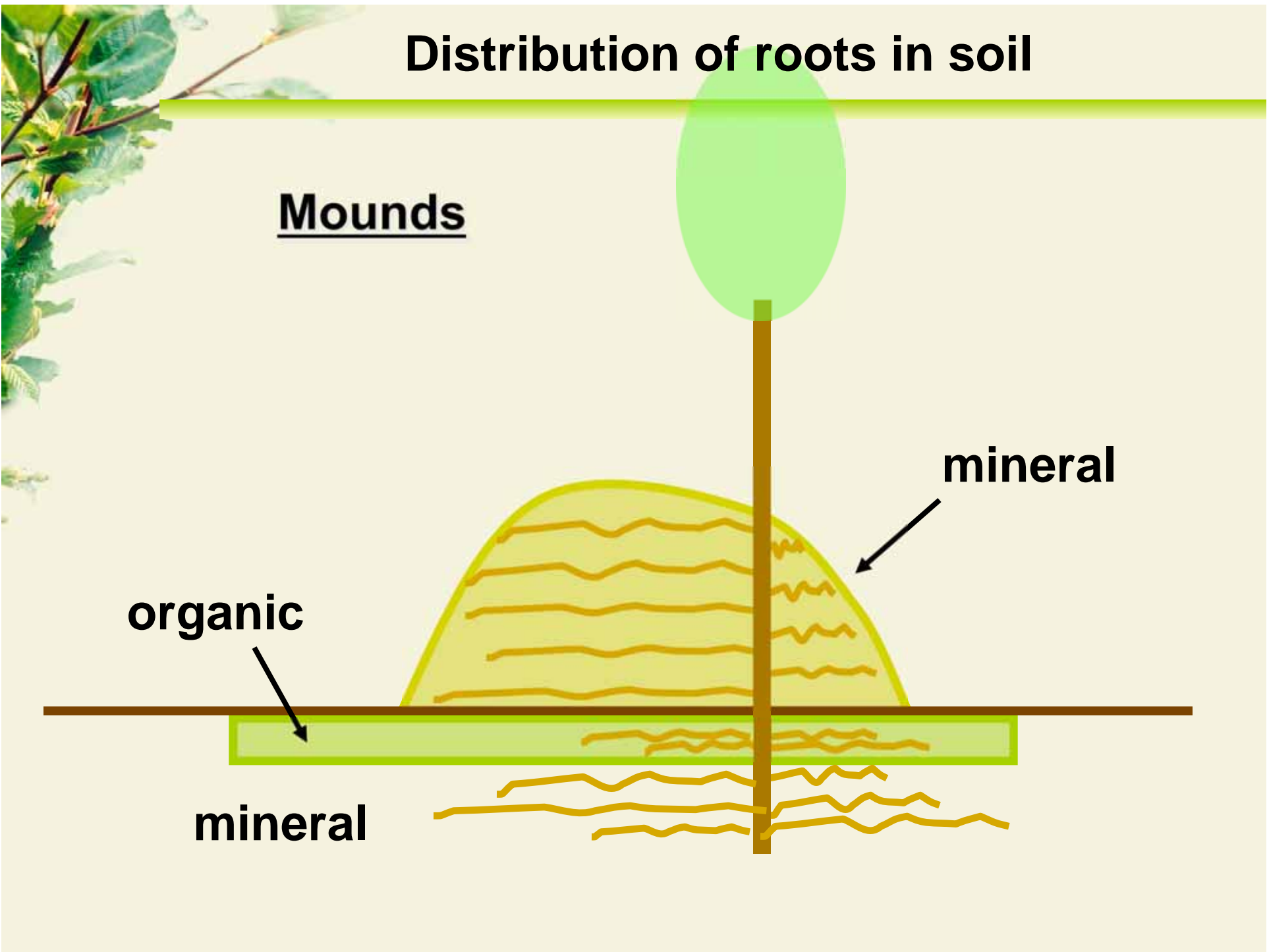
Distribution of roots in soil

Mounds

mineral

organic

mineral



Distribution of roots in soil

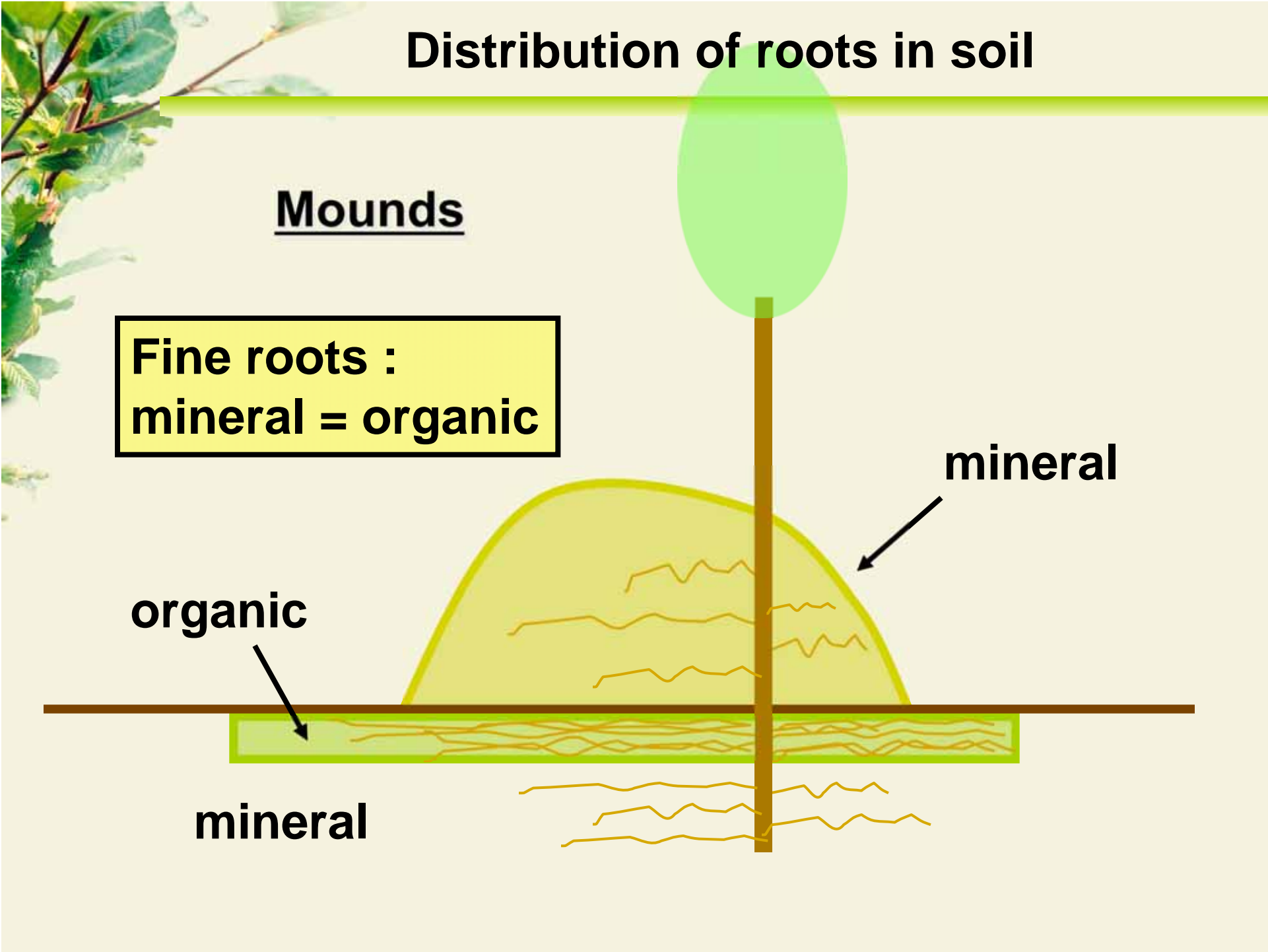
Mounds

**Fine roots :
mineral = organic**

mineral

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.



Acknowledgements

David Paré (RNCAN)

Nicolas Bélanger (TÉLUQ)

Pierre Gagné (RLQ)

André Beaumont

Annie Turgeon

Catherine Malo

Pierre Périnet (MRNFQ)

Alain Courcelles (RNCAN)

Christian Messier (CEF, UQAM)

Annie Desrochers (UQAT)

Caroline Lavoie (LP-Chambord)

Luc St-Antoine (RNCAN)

Karl Gommier

Éric Pelletier

Alain Fauchon (MRNFQ)

Jean-Pierre Girard (MRNFQ)

