

Interdatation des arbres morts dans un contexte de mortalité diffuse: gare aux cernes manquants!

Angers V.A., Bergeron Y., Drapeau, P.

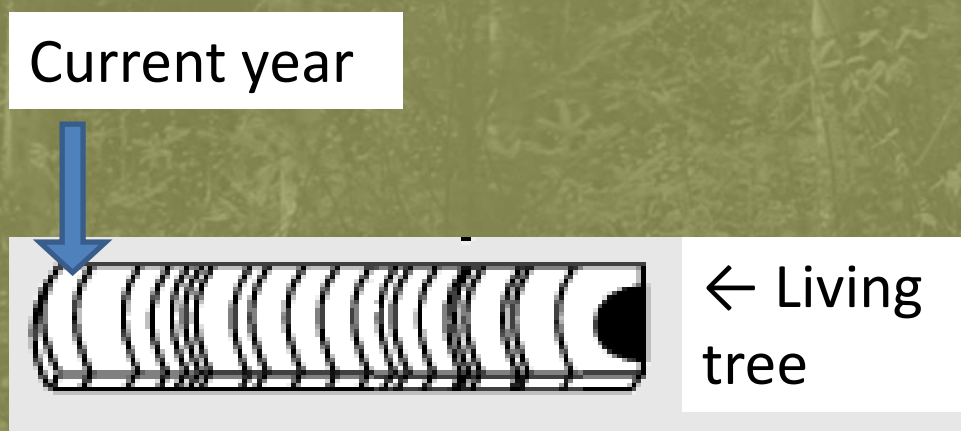
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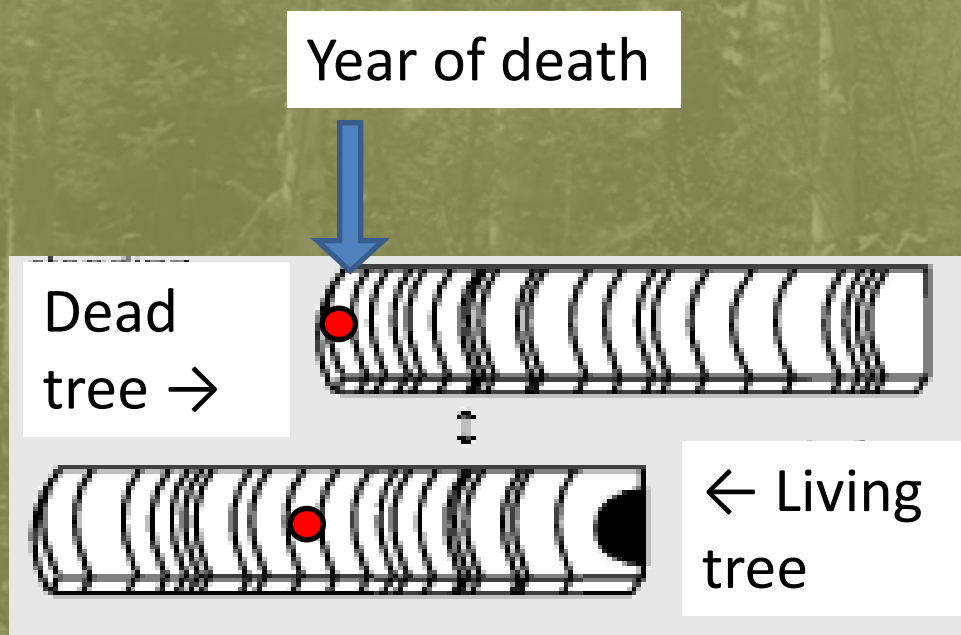
Introduction

- Crossdating – The basics



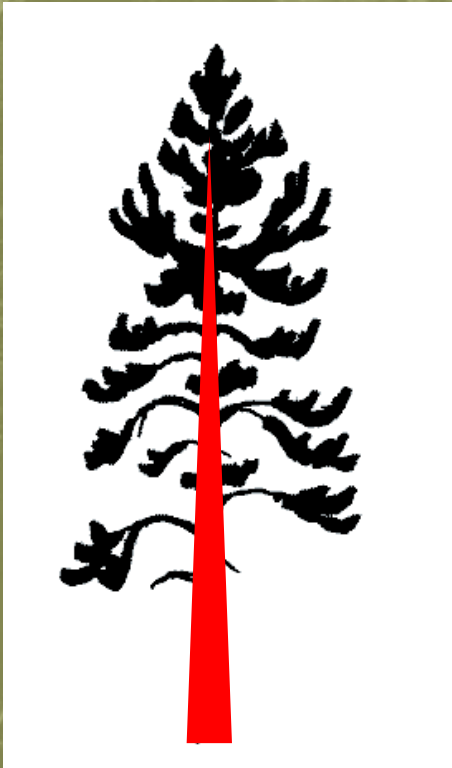
Introduction

- Crossdating – The basics



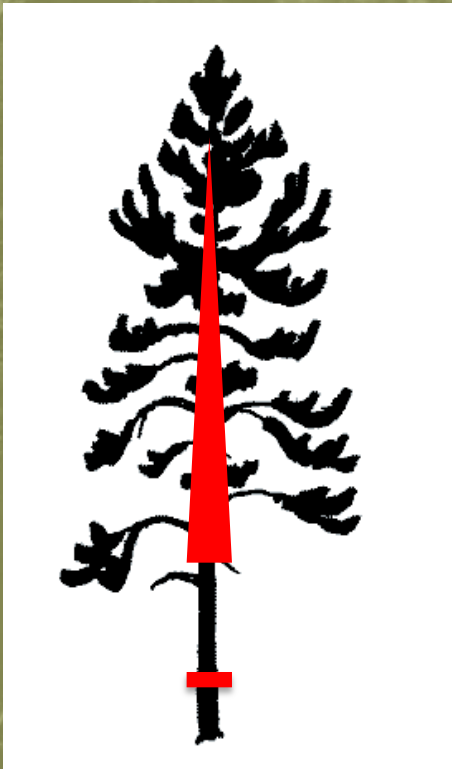
Introduction

- Dendrochronological crossdating used to reconstruct mortality patterns
- Assumes that last ring produced = year of death
- Growth initiated in apical zones



Introduction

- Dendrochronological crossdating used to reconstruct mortality patterns
- Assumes that last ring produced = year of death



- Growth initiated in apical zones
- In stress trees, rings may be formed only in the upper part of the bole
- If crossdated samples are taken at the base, potential underestimation of the year of death

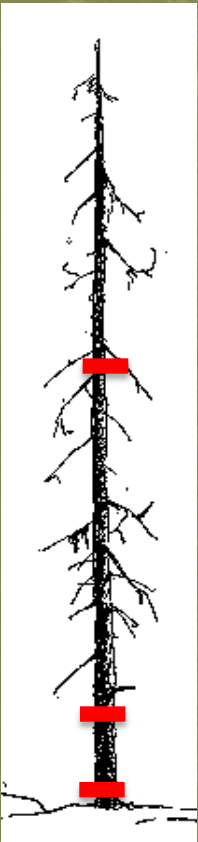
Research questions

- Is there a time lag between last year of growth ring production at different heights in dead trees?
- If so, what is the range of magnitude of these lags?
- How does it vary with causes of death?



Methods

- Is there a time lag between last year of growth ring production at different heights in dead trees?
- If so, what is the range of magnitude of these lags?



- 4 tree species:
 - Jack pine
 - Trembling aspen
 - Balsam fir
 - Black spruce
- 118 trees

Methods

- How does it vary with causes of death?
 - 5 stand types sampled
 - Cover a gradient of causes of death

Synchronous mortality

Diffuse mortality

Jack pine
Wildfire

Budworm
outbreak

Trembling aspen
tent caterpillar
outbreak

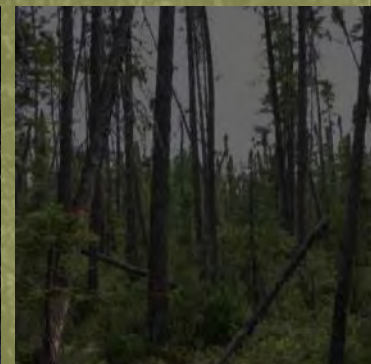
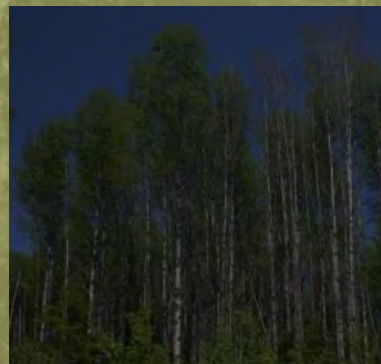
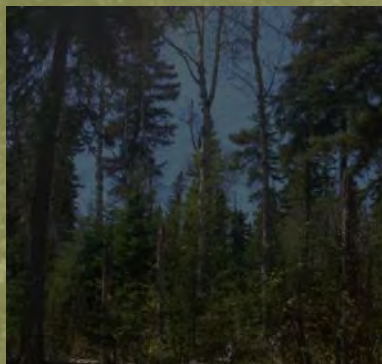
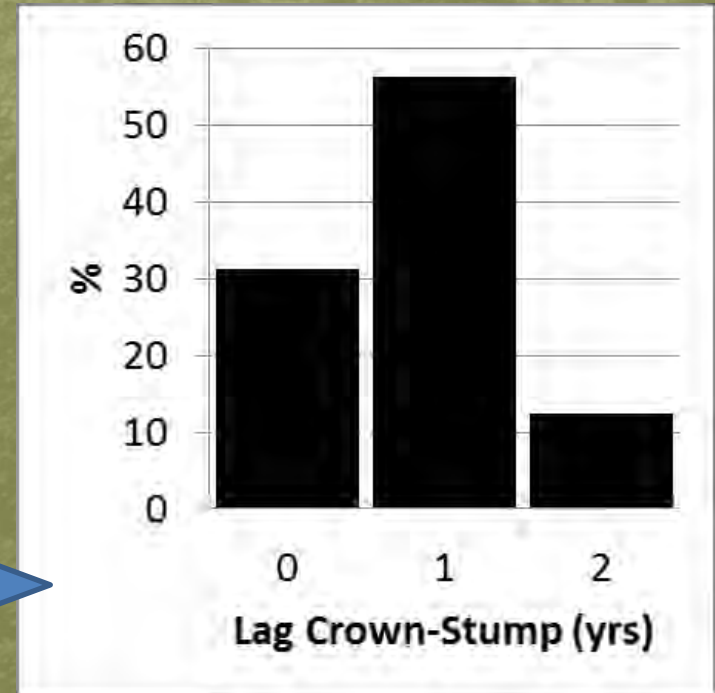
competition
Dieback

Black spruce
Senescence



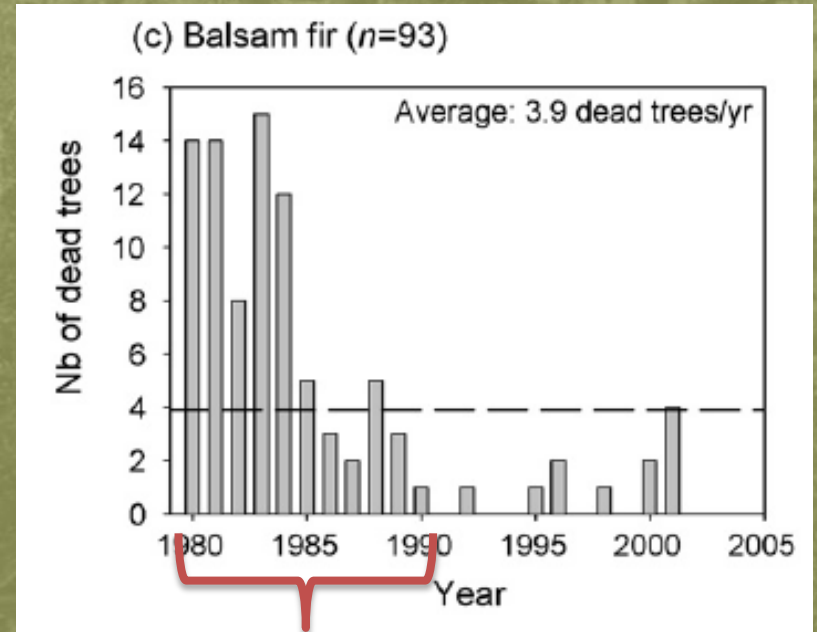
Results

- Jack pine (*Pinus banksiana*, n=17)
- Wildfire in 1996
- 77-100% mortality
- Artefact of spring pre-fire growth



Results

- Balsam fir (*Abies balsamea*, n=26)
- Severe spruce budworm outbreak in late 70's – early 80's

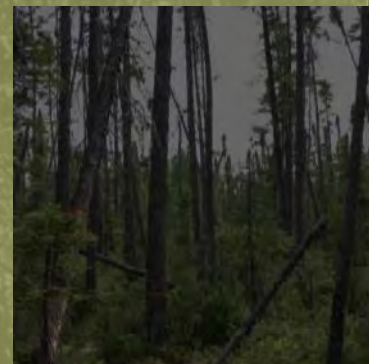
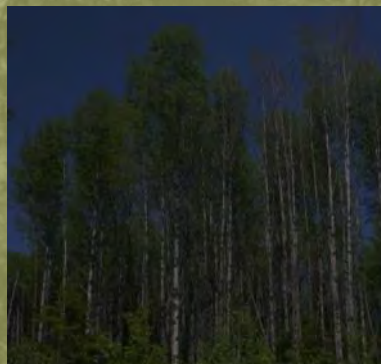
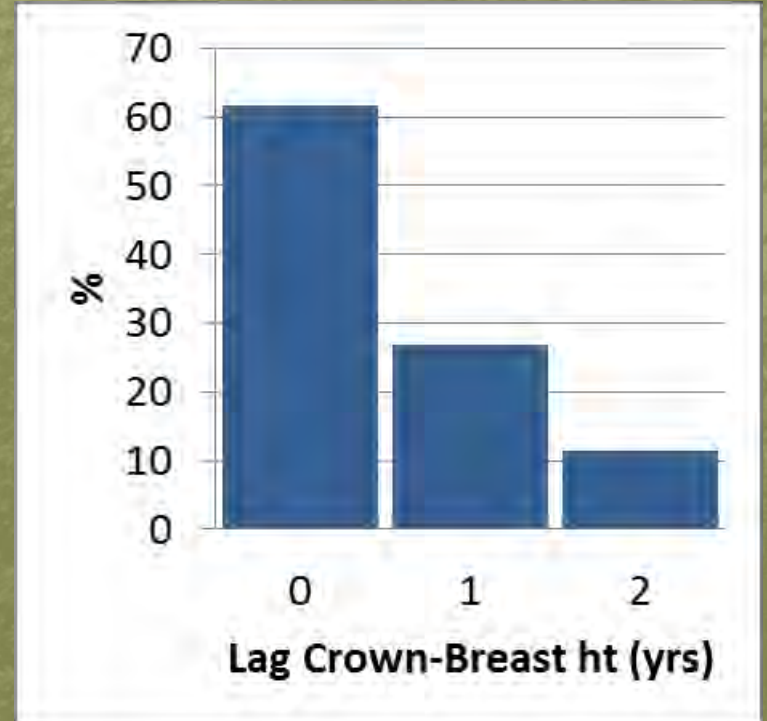


Angers et al. 2010, For. Ecol. Manage.



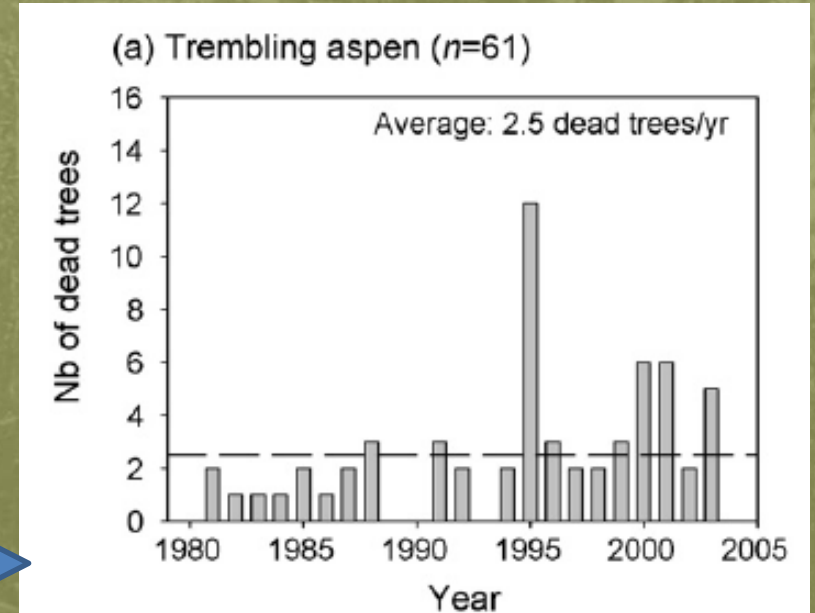
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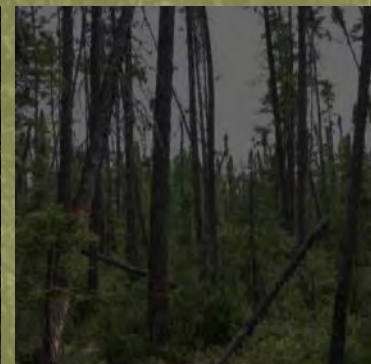
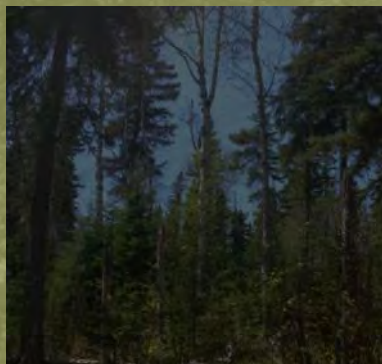


Results

- Trembling aspen (*Populus tremuloides*, n=19)
- Competition - Dieback + Forest tent caterpillar outbreak

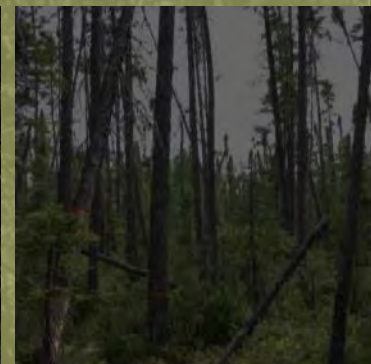
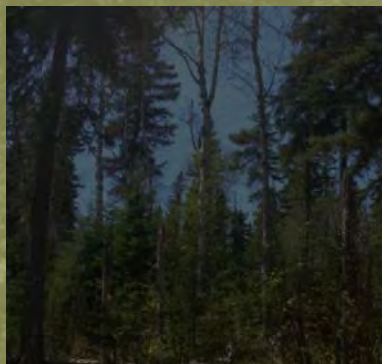


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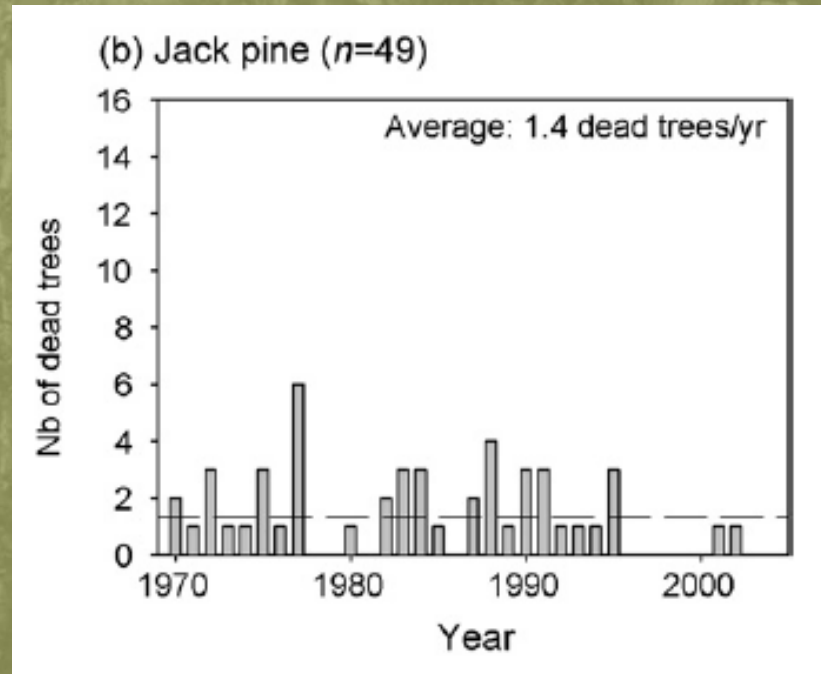
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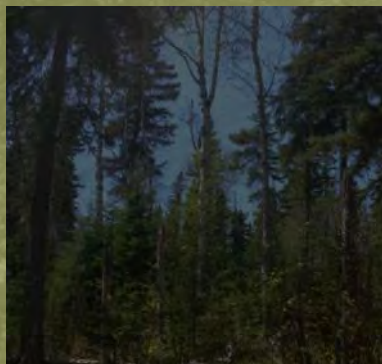


Results

- Jack pine (n=24)
- 80 years old stands
- Competition - Dieback

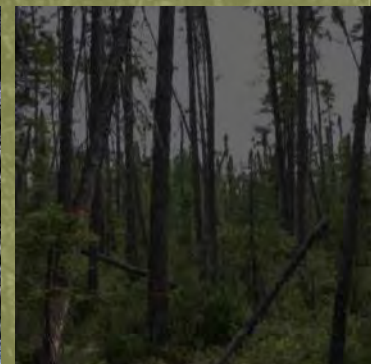
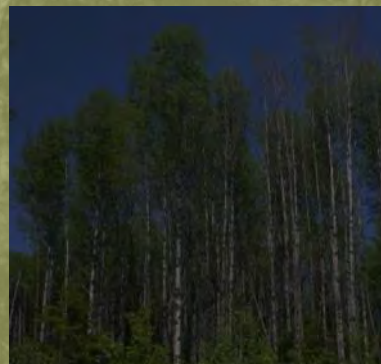
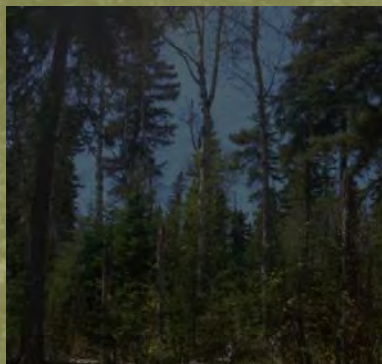
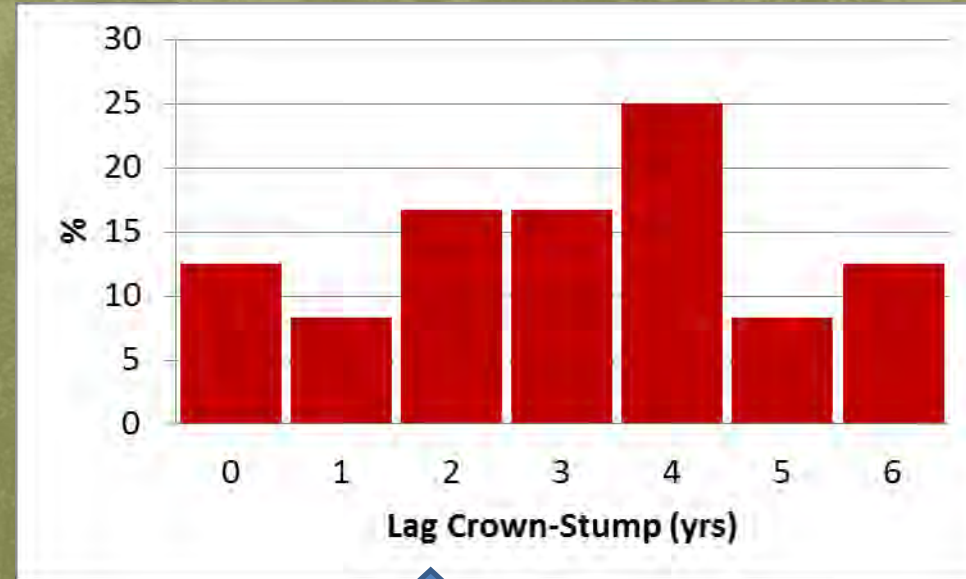


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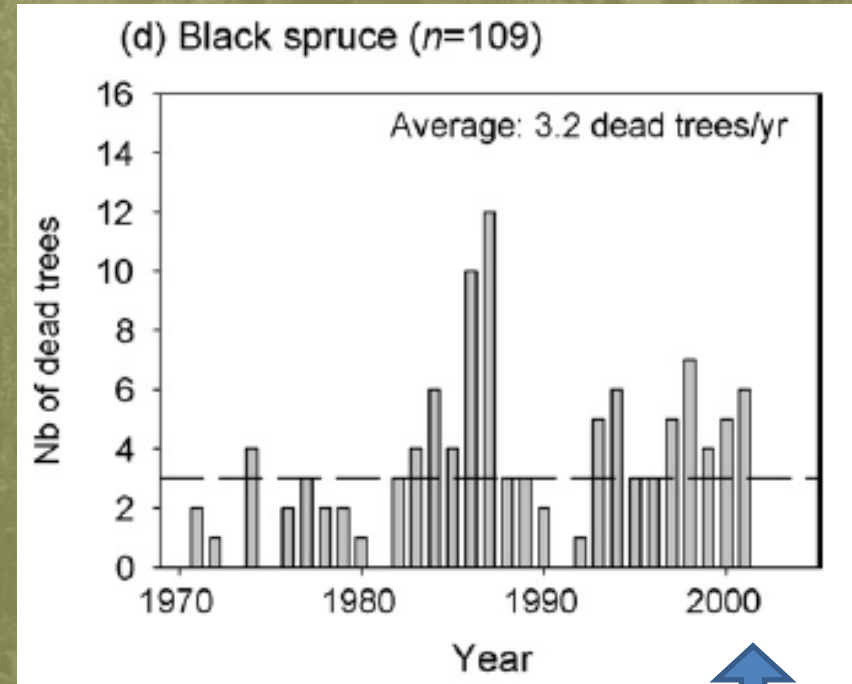
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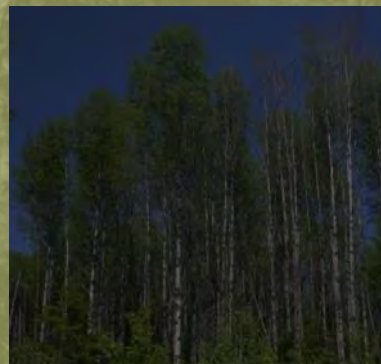
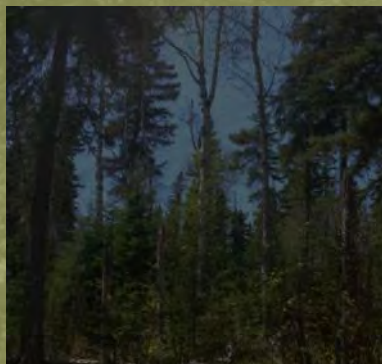


Results

- Black spruce (*Picea mariana*, n=32)
- Stands 169-1585 years old
- Senescence

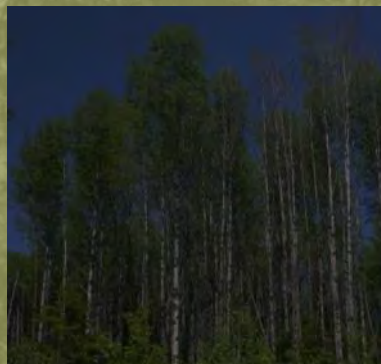
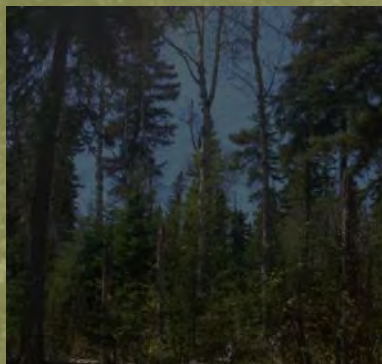
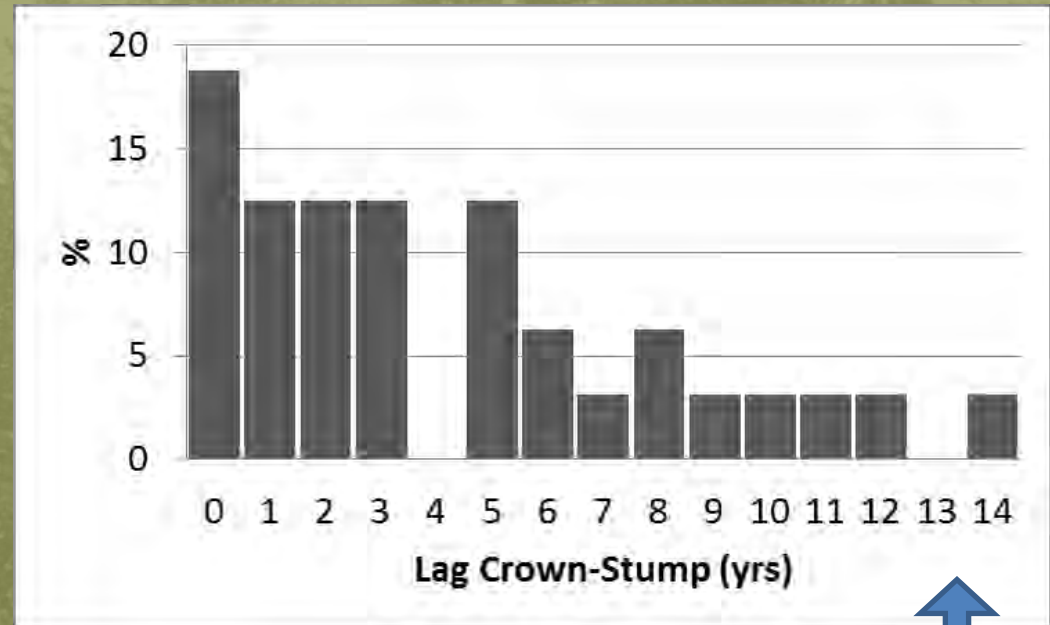


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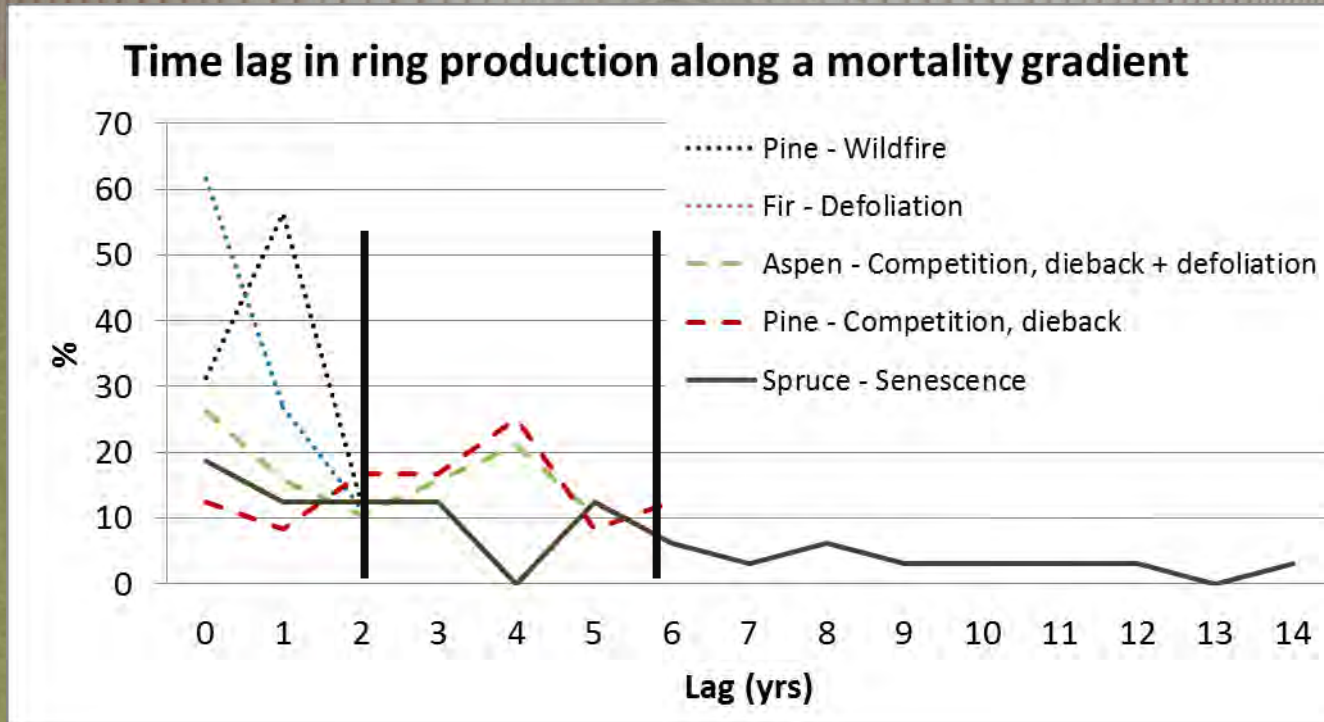


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Conclusions - Implications



- Probably sp specific patterns but clear trend.
- The more diffuse the mortality, the larger the window of lag between years of last ring production.
- When reconstructing fine diffuse mortality patterns, consider collecting a disc in the upper part.



Thanks!

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Alexandre Roby

