

# Scientific Summary No 139 related to IUFRO News 8/9 2016



## Climate Change Induces Northward Expansion of Forest Pests

Report by Pierre Bernier Coordinator, IUFRO Working Party 8.01.06 (Boreal and alpine forest ecosystems)

<http://www.iufro.org/science/divisions/division-8/80000/80100/80106/>

Climate change is causing northward shifts in species ranges. For mobile species such as insects this will increase their access to forest ecosystems where in the past their presence and impact was limited. Such range expansion and increase in outbreak severity of forest pests are occurring in Europe and North America. Temperature-mediated phenological changes and trophic interactions among host trees, herbivorous insects and their natural enemies are linked to understanding the long-term effects of range expansion on boreal ecosystems. The degree to which northern forest ecosystems are resilient to novel disturbance regimes will have direct consequences on the provisioning of goods and services from these forests and on long-term forest management planning.

The workshop on “Climate induced range shifts in boreal forest pests and their ecological consequences” was organized under the aegis of IUFRO’s unit on boreal and alpine forest ecosystems on 11-15 August 2016 in Sept-Îles, Québec, Canada. It gathered a group of 35 researchers from Canada, the US, Sweden and Finland. The venue was chosen to allow participants to see the spruce budworm in action during field visits, the current severity of the infestation in this part of Canada’s boreal forest being likely related to the warming trend that this area has experienced.

Field visits took participants to sites where on-going measurements were taken on insect dynamics, defoliation patterns in balsam fir, its preferred host, and phenology of the balsam fir buds on which the insects feed preferentially. An interesting talk was also given by a representative of Quebec’s forest insect protection agency (SOPFIM) on a very impressive study to optimize their aerial spraying operations. Several high quality invited presentations also allowed participants to take stock of the issues related to the understanding, control and projection of insect outbreaks in the boreal forest.

### Key issues discussed/latest findings in the field:

- In the boreal forests, the limiting effect of low winter temperature events has been documented for some forest pests.
- Warming trends are currently enabling outbreaks to occur in areas previously spared.
- In Québec, spruce budworm and hemlock looper outbreaks have shifted epicenters over the past few decades, and these shifts appear to be related to documented warming of local climate.
- There are nevertheless very few examples of expansion of forest pest distribution related to climate change.
- There are also very few empirical studies that actually document the causes of insect range expansions.
- In the absence of detailed targeted studies, a lot of interesting information on outbreak dynamics and probabilities can be extracted from repeated insect survey data.
- However, in general, the area of range expansion and outbreak dynamics within the context of climate change has been identified as a major gap in forest dynamics knowledge.



Group photo taken at at Pointe-des-Monts, Québec, Canada.  
By Pierre Bernier, Canadian Forest Service,  
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A special issue of papers based on information presented at the workshop is being organized with the help of the Canadian Journal of Forest Research.

Meeting website: <https://tinyurl.com/IUFROquebec2016>  
or: <http://www.cef-cfr.ca/index.php?n=Colloque.IUFROQuebec2016>

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### Host organizations:

the Canadian Forest Service, Québec’s Ministry of forest, wildlife and parks (Forêts, Faune et Parcs), the Université du Québec à Montréal (UQÀM), the Center for Forest Research

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