

Biodiversité et fonctions des écosystèmes forestiers, de la forêt à la ville



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RESEARCH
PAPER



The effect of biodiversity on tree productivity: from temperate to boreal forests

Alain Paquette* and Christian Messier



NCEAS

National Center for Ecological Analysis and Synthesis



NATIONAL
SOCIO-ENVIRONMENTAL
SYNTHESIS CENTER

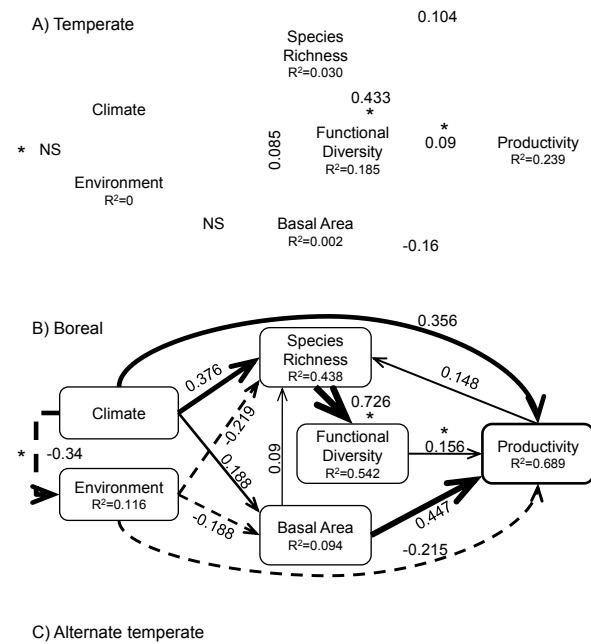


iDiv

German Centre for Integrative
Biodiversity Research (iDiv)
Halle-Jena-Leipzig

ABSTRACT

Aim An important issue regarding biodiversity concerns its influence on ecosystem functioning. Experimental work has led to the proposal of mechanisms such as niche complementarity. However, few attempts have been made to confirm these in natural systems, especially in forests. Furthermore, one of the most interesting unresolved questions is whether the effects of complementarity on ecosystem functioning (EF) decrease in favor of productivity gradient. Using reforestation experiments, we tested the following questions. (1) Is there a difference in the effect of diversity increase on productivity (e.g. functional or phylogenetic) between temperate and boreal forests?





Global Forest Biodiversity Initiative

People, Nature, World, Diversity

GFBI

WE ARE A MULTI-STAKEHOLDER TEAM THAT
SUPPORTS DATA SHARING, POLICY-MAKING,
AND CUTTING-EDGE RESEARCH.

WE ARE A PORTAL TO GLOBAL FOREST
INVENTORY DATA AND SERVICES.

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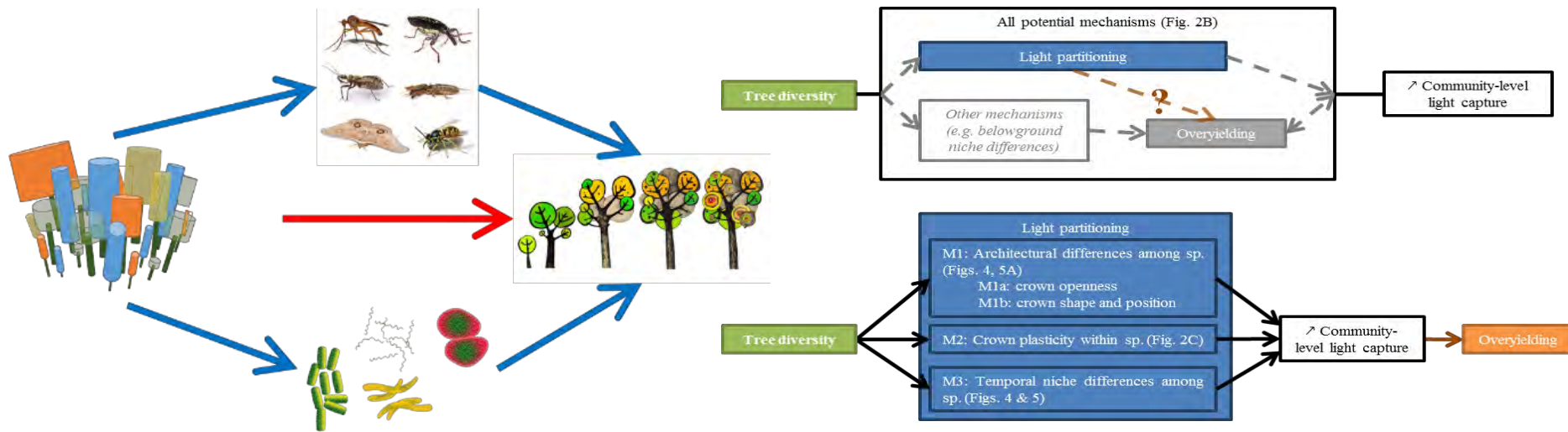


About Us



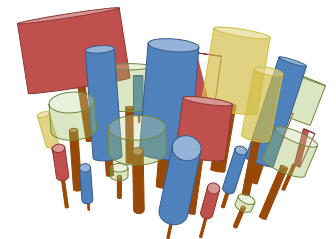
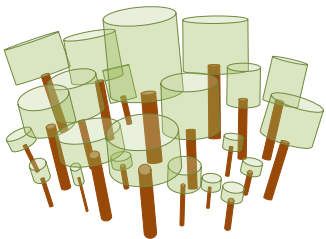
1.2M placettes permanentes, 81 pays, tous les biomes forestiers, >30
millions d'arbres de 9000 espèces ...

Nouveau hub au CEF



La « vraie » science

QUELS SONT LES MÉCANISMES?





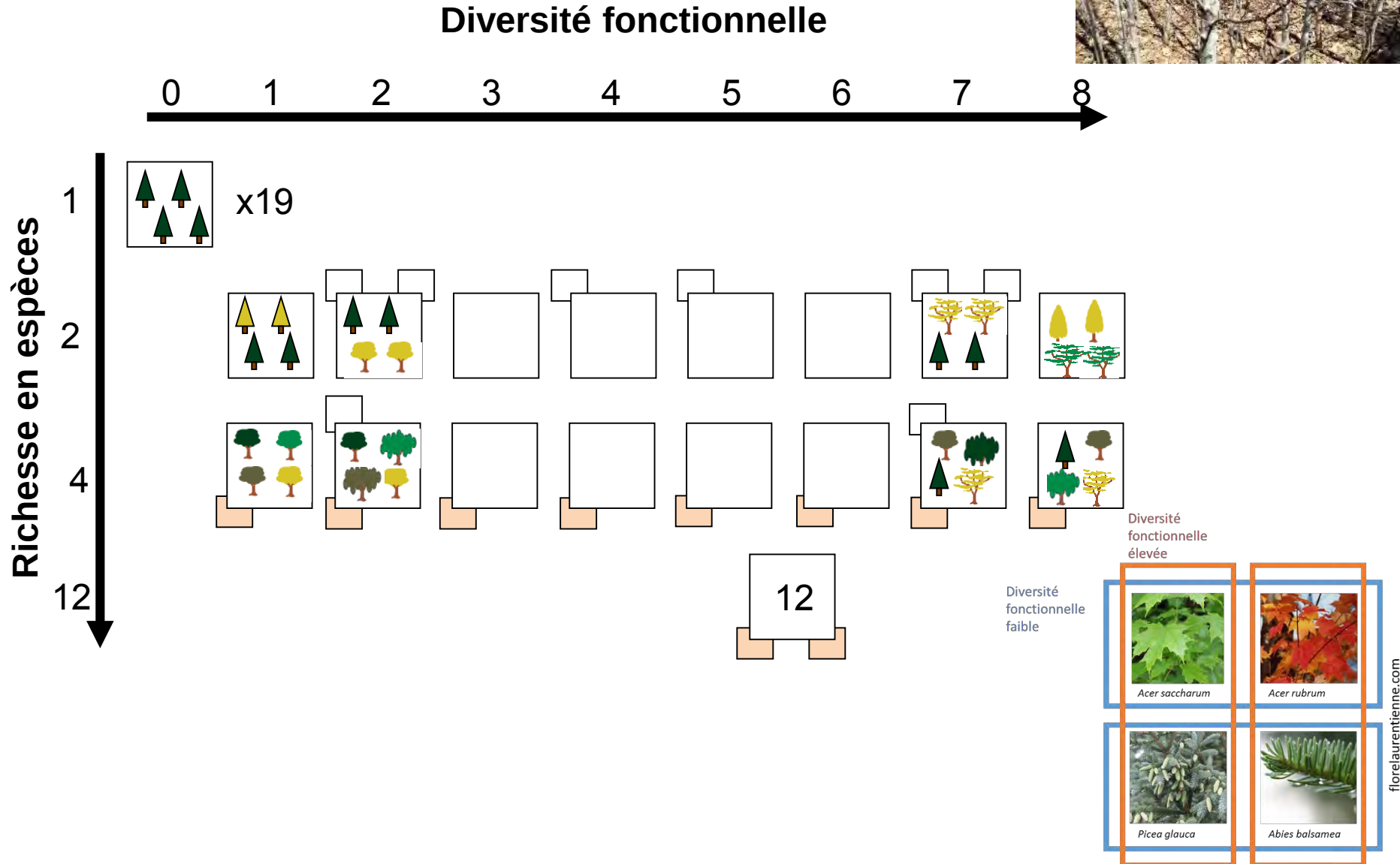
INTERNATIONAL DIVERSITY EXPERIMENT NETWORK *with TREES*



CAMPAGNE ANNUELLE 2016-2017
Vous avez jusqu'au 30 avril
pour démontrer votre soutien
envers l'UQAM

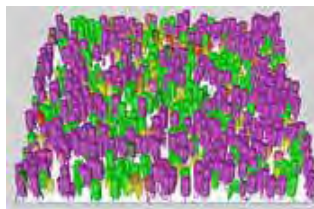
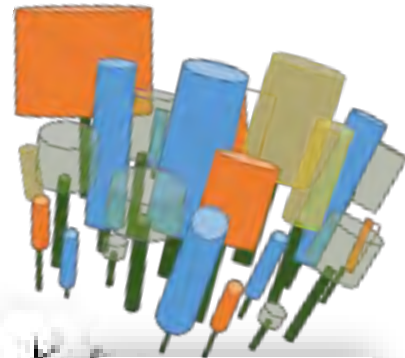
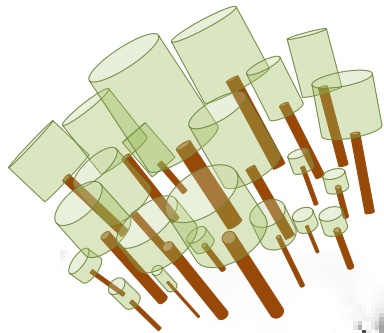
33 chercheurs (plusieurs du CEF), 5 postdocs, 17 étudiants,
et 11 anciens!

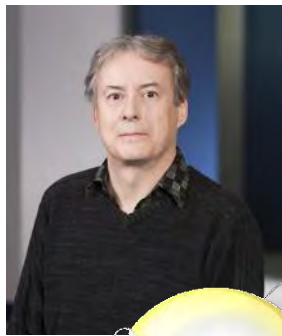
Gradients de diversité
Interactions rapides (15,000 arbres)
Design adaptatif



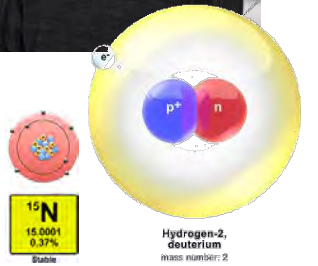
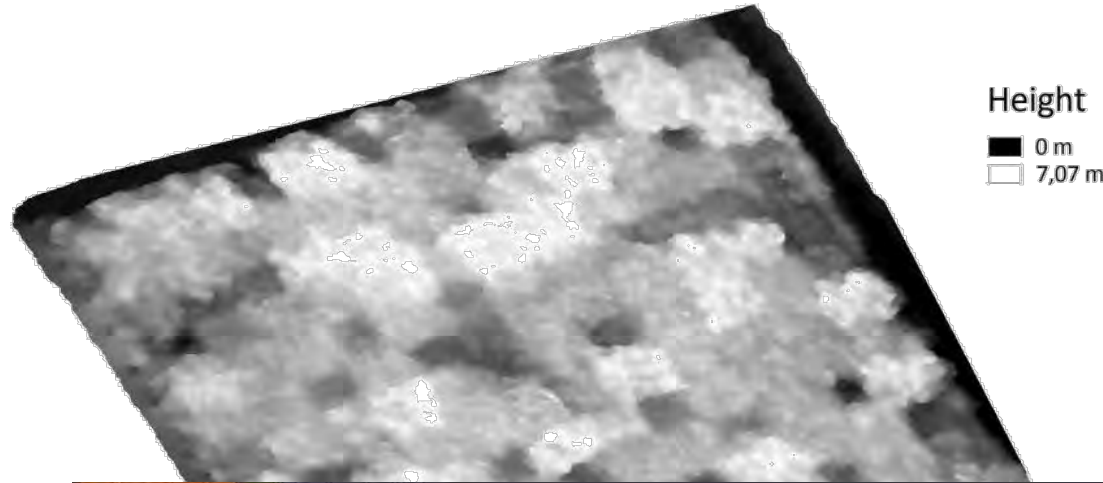
Montréal 2009



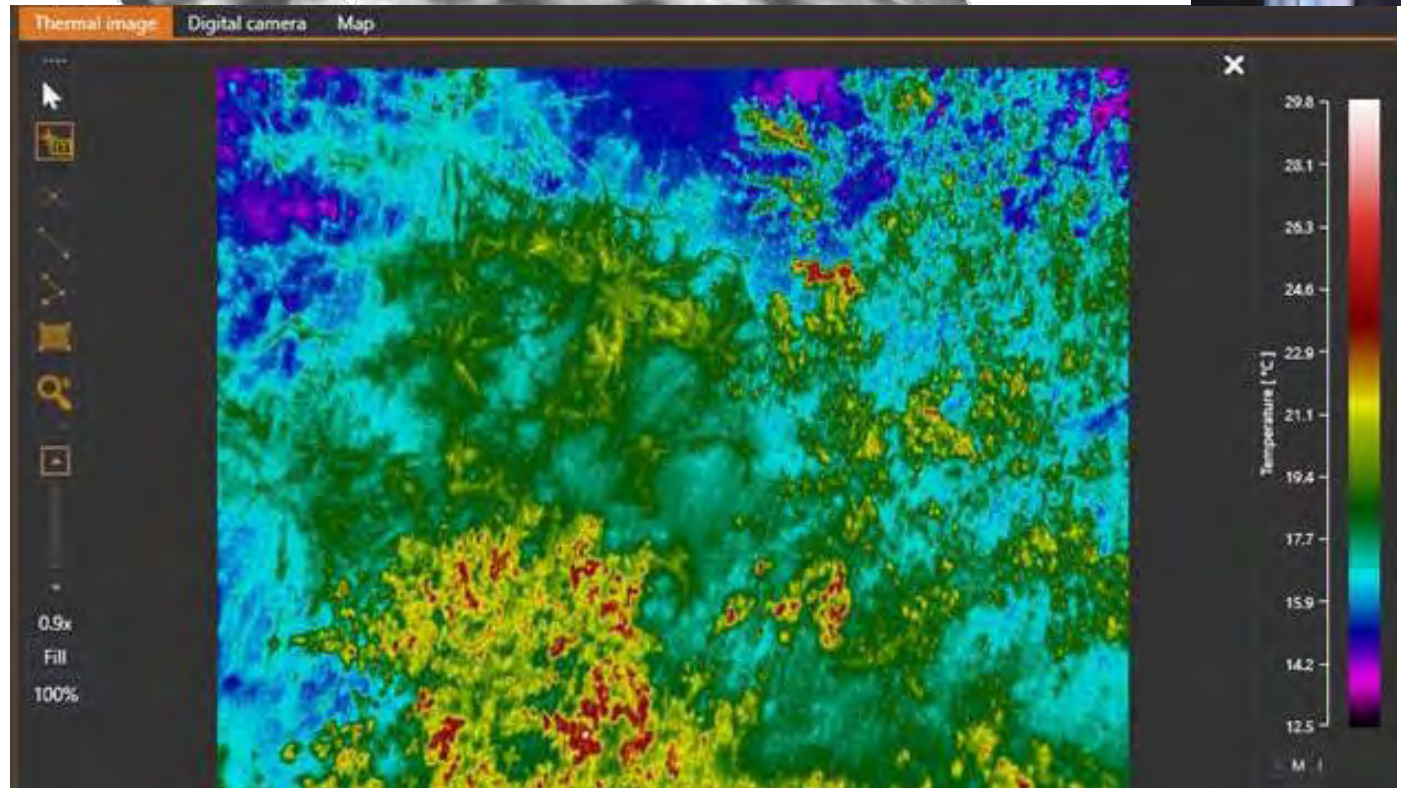




Utilisation de la lumière et de l'eau

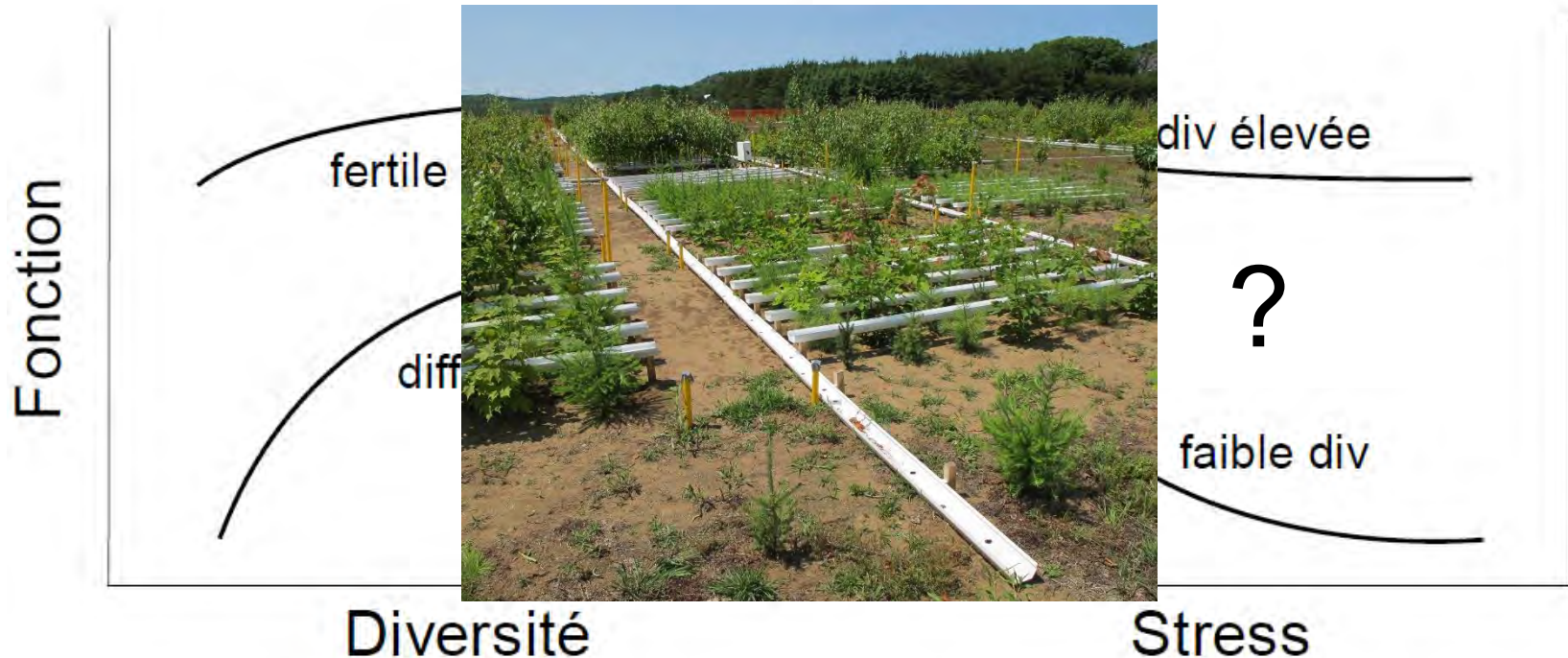
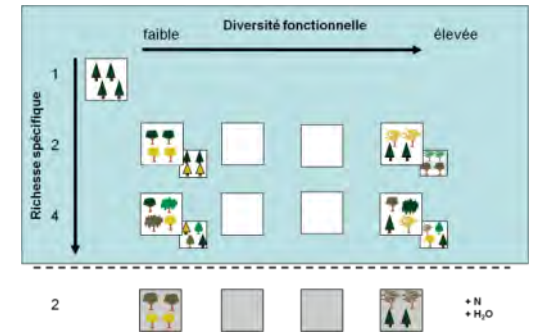


EXO Tactik



Next generation IDENT

Changements globaux et stress environnementaux



Stress hydrique: Sault-Ste-Marie, Sardaigne, Freiburg
Désertification et usages: Éthiopie

Projets de réseau (IDENT / TreeDivNet)

Chewers (Ch) – Fig.1

Chewers are insects that can eat most of the leaf material (succulent tissues, veins, midrib). They include the defoliators that destroy the *entire leaf blade* (only tougher mid-vein remains) and those that eat *distinct portions of leaf* such as distinct notches or circular holes cut from leaf margin, or small randomly scattered holes.

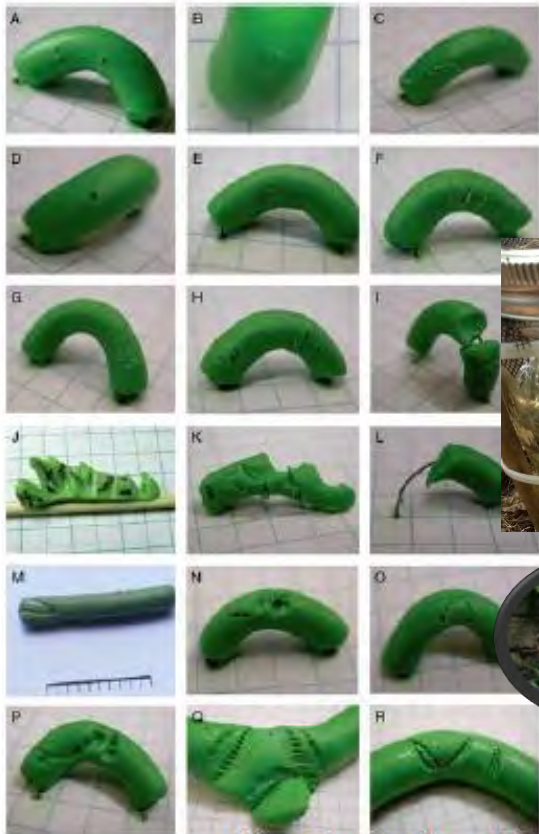


Fig. 1: Leaf chewers: left entire leaf blade destroyed; right distinct portions eaten

Hervé Jactel et al

Evalyne Muiruri et al



Figure taken from Low et al.¹⁴



Ika Djukic et al



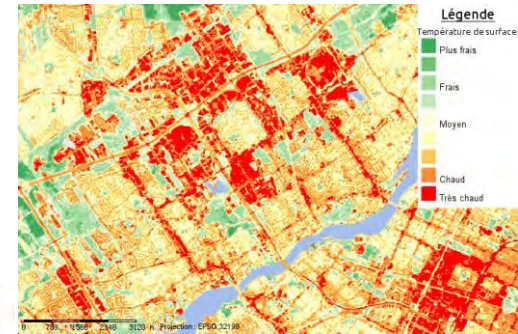
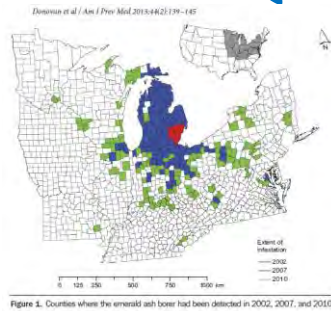
Biodiversité et Services écosystémiques

FORÊT URBAINE



Îlots de chaleur, pollution, santé...

Quand les arbres meurent, les gens aussi



The Relationship Between Trees and Human Health

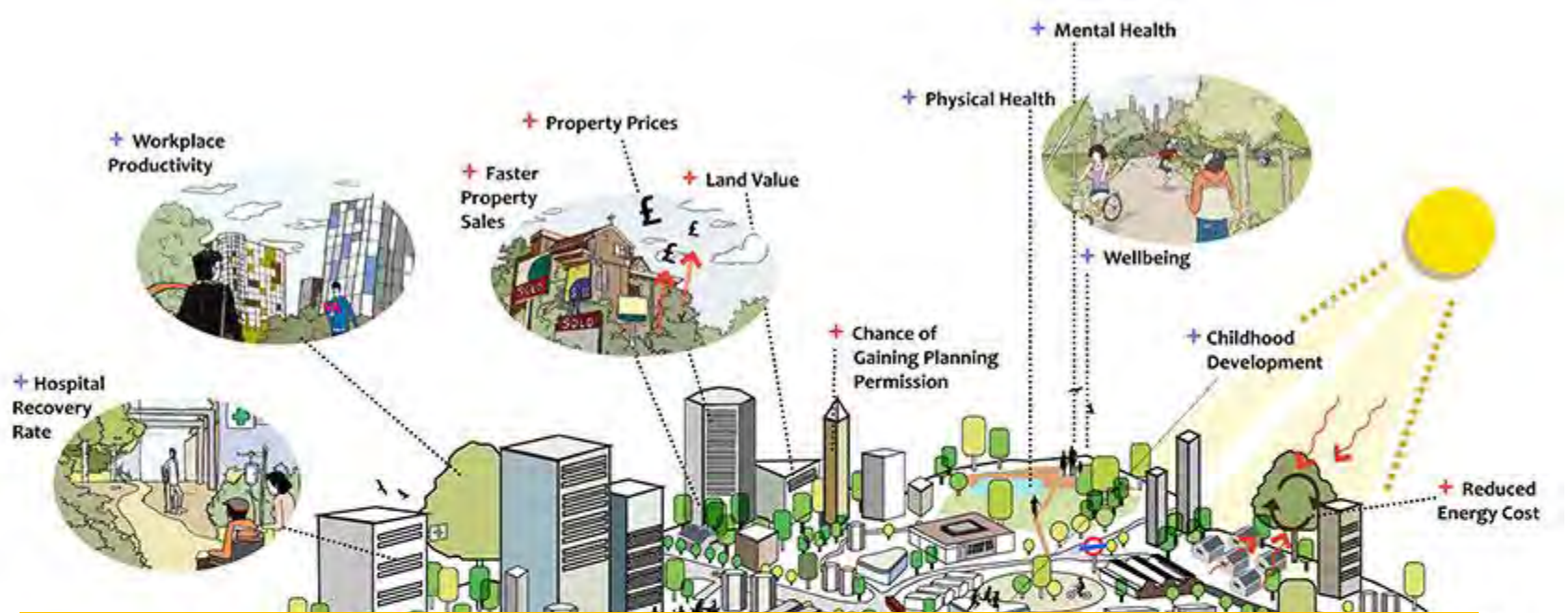
Evidence from the Spread of the Emerald Ash Borer

Geoffrey H. Donovan, PhD, David T. Butry, PhD, Yvonne L. Michael, ScD,
Jeffrey P. Prestemon, PhD, Andrew M. Liebhold, PhD,
Demetrios Gatzliolis, PhD, Megan Y. Mao

Results: There was an increase in mortality related to cardiovascular and lower-respiratory-tract illness in counties infested with the emerald ash borer. The magnitude of this effect was greater as infestation progressed and in counties with above-average median household income. Across the 15 states in the study area, the borer was associated with an additional 6113 deaths related to illness of the lower respiratory system, and 15,080 cardiovascular-related deaths.

Conclusions: Results suggest that loss of trees to the emerald ash borer increased mortality related to cardiovascular and lower-respiratory-tract illness. This finding adds to the growing evidence that the natural environment provides major public health benefits.

(Am J Prev Med 2013;44(2):139-145) Published by Elsevier Inc. on behalf of American Journal of Preventive Medicine



Comment est-ce affecté par la diversité?

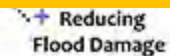
- + Economic Benefits
- + Social and Environmental Benefits



+ Social Cohesion



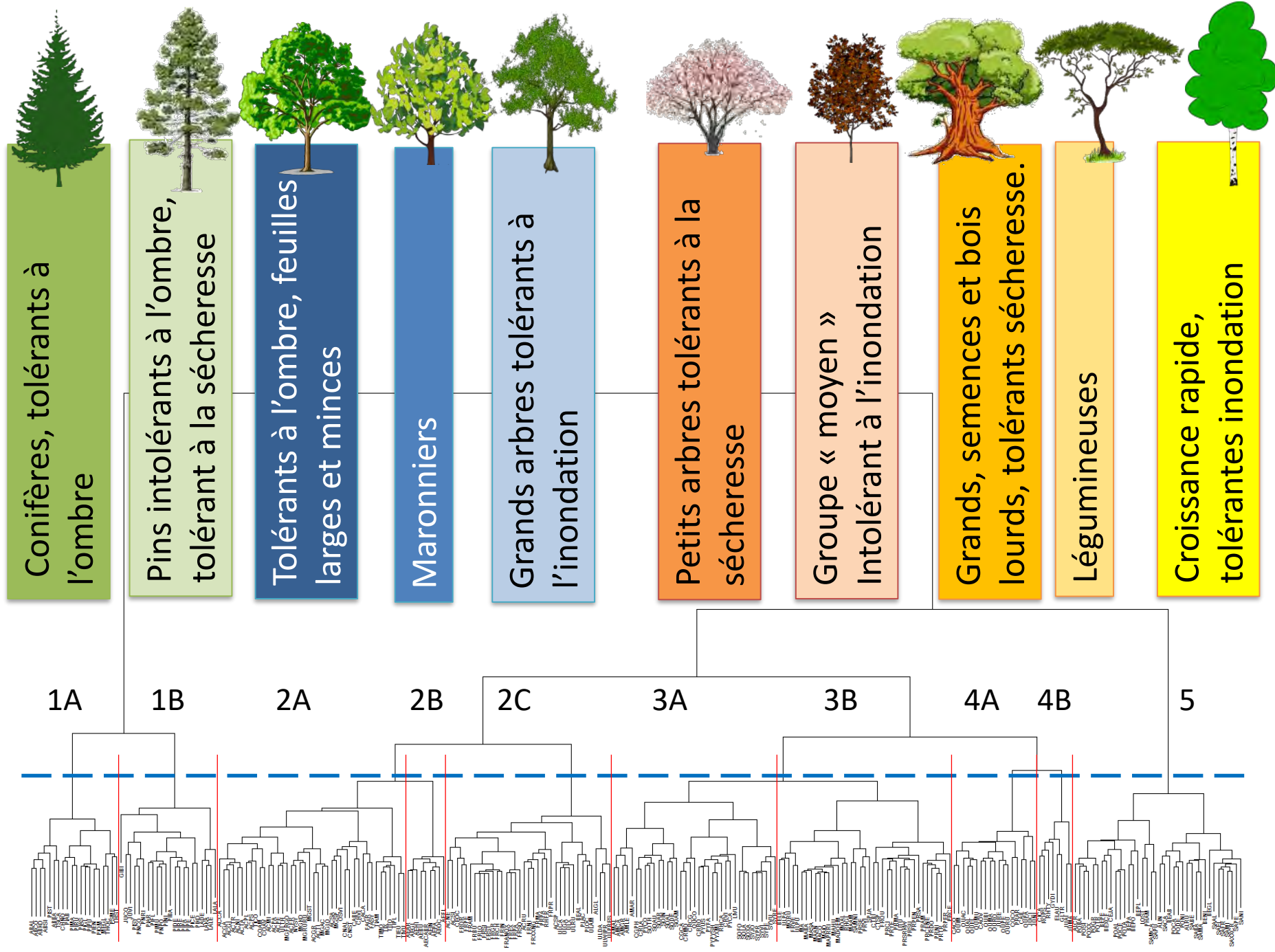
+ Cleaner Water



+ Reducing Flood Damage



La forêt urbaine aujourd'hui, et demain
Diversité et résilience





REPENSER LE REBOISEMENT

GUIDE STRATÉGIQUE POUR L'AUGMENTATION DE
LA CANOPÉE ET DE LA RÉSILIENCE DE LA FORÊT
URBAINE DE LA RÉGION MÉTROPOLITAINE DE
MONTRÉAL

- OCTOBRE 2016 -

Sous la direction du

**JOUR
DE LA
TERRE**
• QUEBEC

En collaboration avec le comité
reboisement de la Communauté
métropolitaine de Montréal

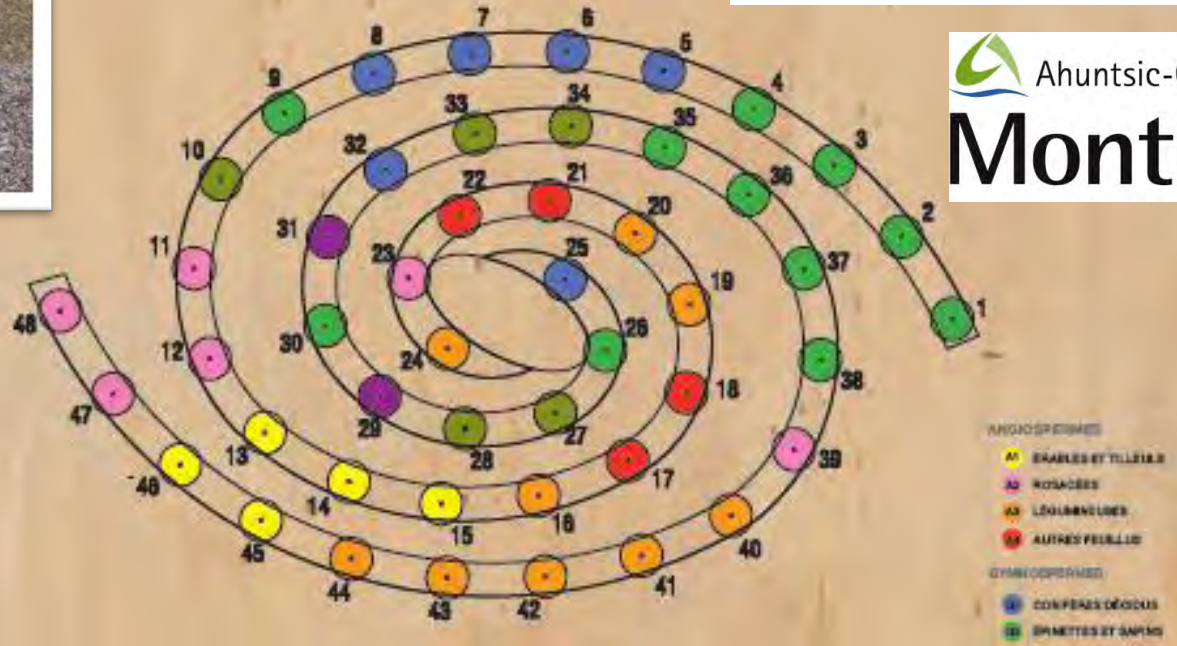




IDENT-Gallileo



INTERNATIONAL DIVERSITY EXPERIMENT NETWORK with TREES



- 14: Acer rubrum x freemanii 'Autumn Blaze'
- 15: Yucca filamentosa 'Stirling'
- 16: Quercus x laurifolia 'Crimson Spire'

- 17: Gleditsia triacanthos 'Spiral'
- 18: Maackia amurensis
- 19: Gleditsia triacanthos 'Spiral'
- 20: Ficus religiosa 'Spiral'
- 21: Maackia amurensis
- 22: Gleditsia triacanthos 'Spiral'
- 23: Amelanchier arborea
- 24: Ostrya virginiana
- 25: Ginkgo biloba 'Autumn Gold'
- 26: Abies balsamea
- 27: Pinus strobus 'Fastigiate'
- 28: Pinus nigra 'Austriaca'
- 29: Thuja occidentalis
- 30: Picea canadensis
- 31: Thuja occidentalis
- 32: Ginkgo biloba

