

Does forest biodiversity respond to pulses of saproxylic microhabitats induced by tree dieback: a case study in mountain French silver fir forests

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Do Tree-related Microhabitats and associated biodiversity respond to forest dieback?

A case study in French mountain Silver Fir forests

BOUGET, C., LARRIEU, L., BURNEL, L., CHERET, V., LADET, S., LOPEZ-VAAMONDE, C., MOLIARD, C., MOLINA, J., PARMAIN, G., SAJDAK, G., SIRE, L., WILLM, J.





Climate change, droughts and forest diebacks



29 SET - 5 OUT



Dieback-induced changes in forest conditions



Weakened trees with crown decline TreM (Tree-related Microhabitats) Crown deadwood Polypores Cavities...

Dead trees and deadwood

Openings and microclimate









Mountain forests as sentinels of climate change





International **CLIMTREE** project

Ecological and Socioeconomic Impacts of Climate-Induced Tree Diebacks in Highland Forests



Silver fir, a model tree species for dieback studies in southwestern Europe



Silver fir defoliation at its Southernmost distribution limit = drought sensitivity



Bouget et al.

Long-term climatic warming is a major driver of growth decline in silver fir

Severe periodical dieback crises since 1973



CONTEXT-4

Sampling design



A stratified and almost balanced sampling design replicated in 2 French regions











Focus on key TreMs / associated beetle guilds



Key microhabitats rose in density in declining stands



RESULTS-2

1

...the rise in dead wood density in declining stands was nonetheless stronger !







Dieback-induced increase in local cavity density does not foster abundance/diversity of cavicolous beetles





...the same for fungicolous beetles associated to polypores

Bouget et al.

RESULTS-4

3

...but dieback-induced increase in local cavity density does strengthen rare cavicolous species richness







3

Xylophagous beetles are affected by logs and snags, but also by crown deadwood density



Bouget et al.

RESULTS-6

TreM-associated beetles increase in abundance and richness with dieback intensity at the landscape scale

5



Salvage logging does slightly depress microhabitat density





Bouget et al.

RESULTS-8

Salvage logging does not impact TreM-associated beetle guilds



Take-home messages



Ongoing dieback (studies): data analyses in progress

Opportunistic meta-analysis:

TreM & Biodiversity response to dieback in various contexts









Ongoing dieback (studies): data analyses in progress

Time series of dieback level at the landscape scale

Longitudinal approaches about the effects of past regional pulses of resources on present biodiversity

> Ecology, 89(3), 2008, pp. 621-634 © 2008 by the Ecological Society of America

Journal of Ecology

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FORUM

Identification of 100 fundamental ecological guestions

William J. Sutherland¹, Robert P. Freckleton², H. Charles J. Godfray³, Steven R. Beissinger⁴, Tim Benton⁵, Duncan D. Cameron², Yohay Carmel⁶, David A. Coomes⁷, Tim Coulson⁸, Mark C. Emmerson⁹, Rosemary S. Hails¹⁰, Graeme C. Hays¹¹, Dave J. Hodgson¹², Michael J. Hutchings¹³, David Johnson¹⁴, Julia P. G. Jones¹⁵, Matt J. Keeling¹⁶, Hanna Kokko¹⁷, William E. Kunin¹⁸, Xavier Lambin¹⁴, Owen T. Lewis³, Yadvinder Malhi¹⁹, Nova Mieszkowska²⁰, E. J. Milner-Gulland²¹, Ken Norris²², Albert B. Phillimore²³, Drew W. Purves²⁴, Jane M. Reid¹⁴, Daniel C. Reuman^{21,25} Ken Thompson², Justin M. J. Travis¹⁴, Lindsay A. Turnbull²⁶, David A. Wardle²⁷ and Thorsten Wiegand²⁸

54 How do resource pulses affect resource use and interactions between organisms?

Bouget et al.

WHAT CAN WE LEARN FROM RESOURCE PULSES?

LOUIE H. YANG,^{1,3} JUSTIN L. BASTOW,¹ KENNETH O. SPENCE,² AND AMBER N. WRIGHT¹

PROSPEC



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....for field and lab work

and forest owners and managers...for allowing access to their properties



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