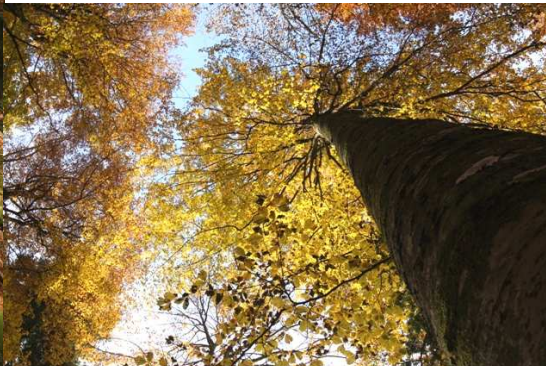




Influence of tree characteristics and forest management on tree microhabitats

Yoan Paillet, Aurélie Vuidot, Frédéric Archaux, Frédéric Gosselin
Cemagref - France



“Deadwood and Dying trees”
Rouyn-Noranda, QC, Canada
May 15-19th 2011

1. Objectives and issues



Conservation of forest biodiversity

Political decisions based on “**anecdote and myth**”
(Sutherland et al. 2004)

Scientific bases needed

Monitoring forest attributes and species

Relevant and scientifically sound **biodiversity indicators**

Unmanaged forests = **reference state** for forest
management and biodiversity

1. Objectives and issues



Tree microhabitats = structure based indicators

“Microhabitats” linked to trees and snags

⇒ **cavities, bark characteristics, cracks...**

Potential **feeding and breeding niches** for several organisms (birds, bats, insects)

May explain **biodiversity differences** between managed and unmanaged forests

... link with forest management and tree characteristics **rarely studied**



Available online at www.sciencedirect.com



Forest Ecology and Management 255 (2008) 1251–1261

Forest Ecology
and
Management

www.elsevier.com/locate/foreco



Microhabitats in lowland beech forests as monitoring tool

Forest Ecology and Management 257 (2009) 1453–1464



Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco



Tree microhabitat structures as indicators of biodiversity in Douglas-fir forests of different stand ages and management histories in the Pacific Northwest, U.S.A.

Alexa K. Mich

^a University of Applied
^b Technische Universität

Biological Conservation 144 (2011) 441–450



Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon



Influence of tree characteristics and forest management on tree microhabitats

Aurélie Vuidot, Yoan Paillet*, Frédéric Archaux, Frédéric Gosselin

Cemagref, UR EFNO, Domaine des Barres, Nogent-sur-Vernisson, France



1. Objectives and issues



Relative influence of tree characteristics and forest management on microhabitat occurrence at the tree level?

⇒ **Tree species**

⇒ **DBH**

⇒ **Vitality (living trees vs. snags)**

⇒ **Management type (managed vs. unmanaged)**

Could we validate microhabitats as biodiversity indicator?

2. Materials and methods



Study sites

⇒ 5 sites : 39 unmanaged, 36 managed

75 plots

⇒ Mixed Oak-Beech (Lowland)

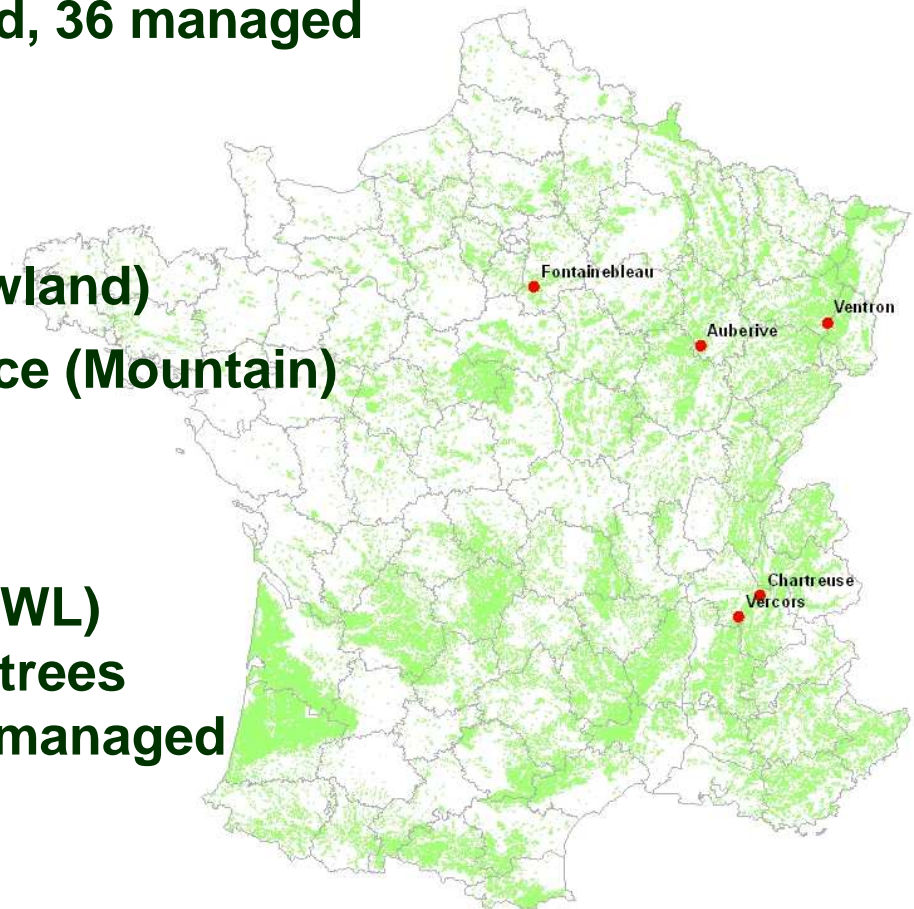
⇒ Mixed Beech-Fir-Spruce (Mountain)

1252 trees

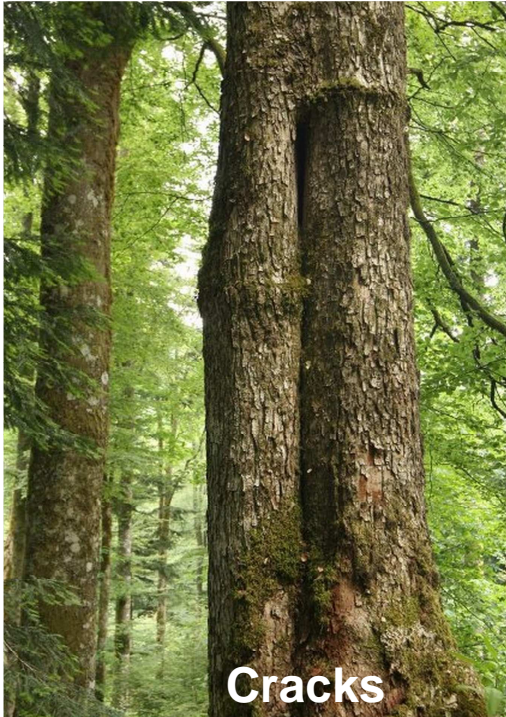
⇒ DBH \geq 30cm (\geq 20cm LWL)

⇒ 60 snags / 1192 living trees

⇒ nb trees managed~unmanaged



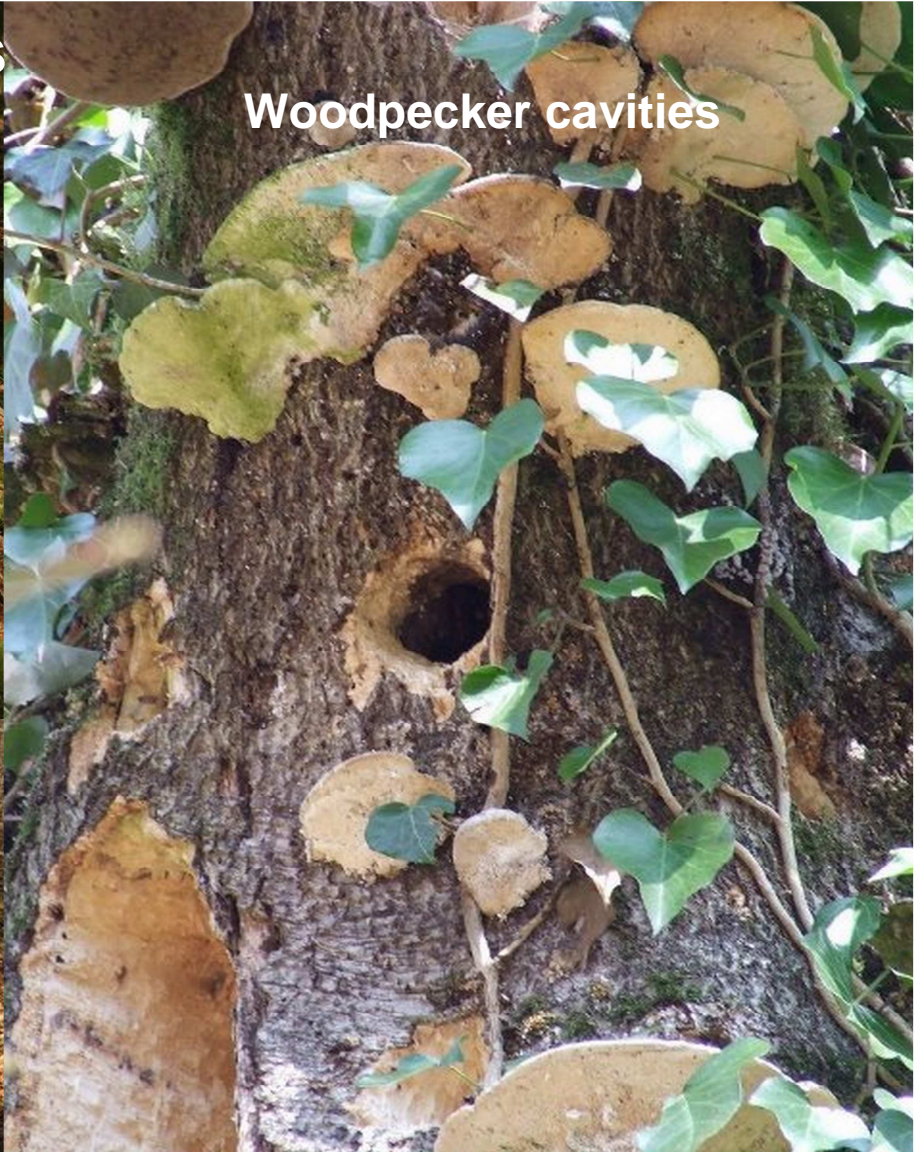
26 microhabitats



Cracks



**Bark losses
& pockets**



Woodpecker cavities



Bryophytes & Ivy



**Canker &
witch brooms**



Conks of fungi

2. Materials and methods



Response variables

- ⇒ **Number of microhabitat type / tree**
- ⇒ **Occurrence of each microhabitat on a tree**

Models tested

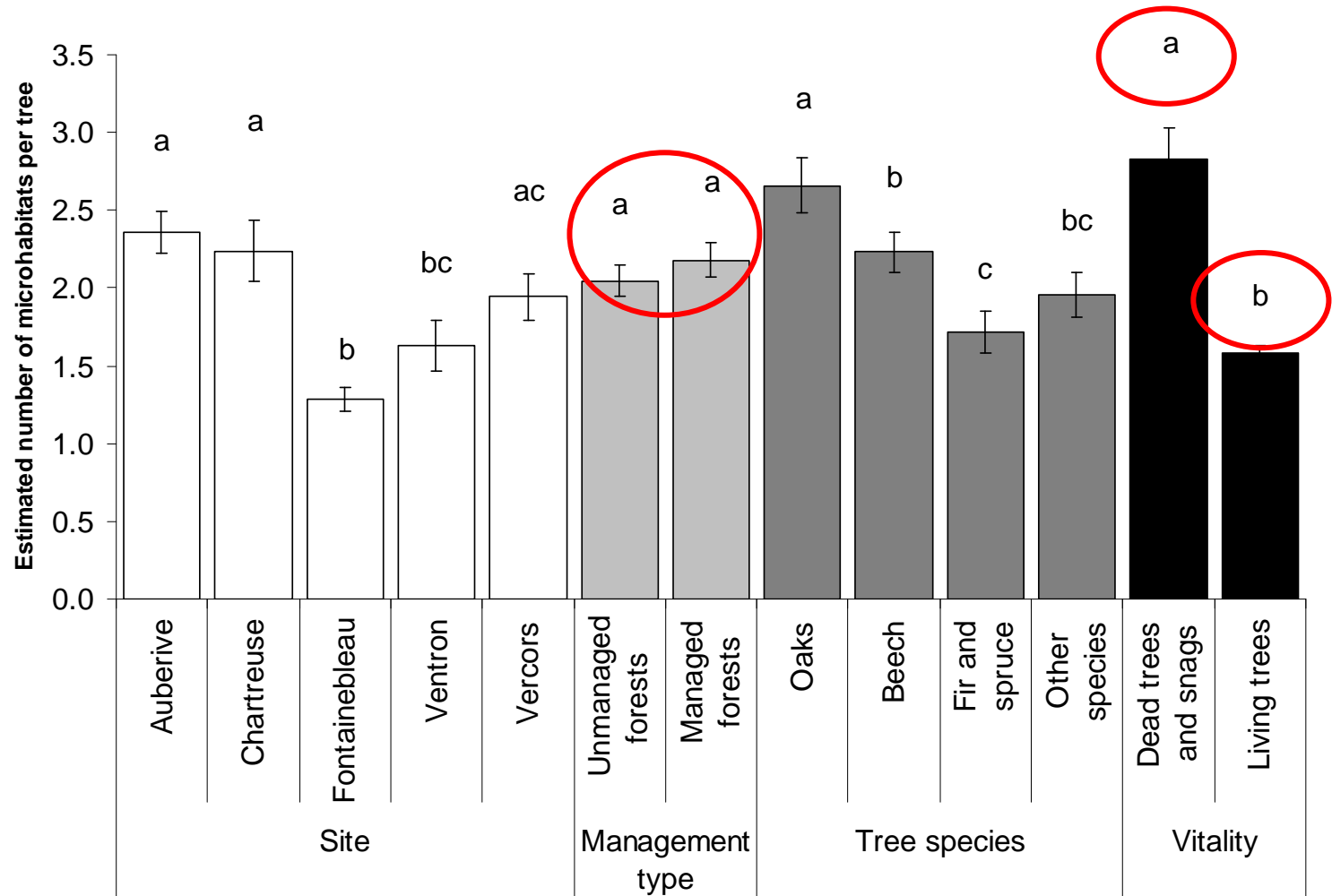
- ⇒ **Null**
- ⇒ **One factor (Management type, DBH, Tree sp, Vitality, Site)**
- ⇒ **Additive and interactions**

GLMM with quasi-poisson method / binomial error distribution and “tree” random effect

3. Results



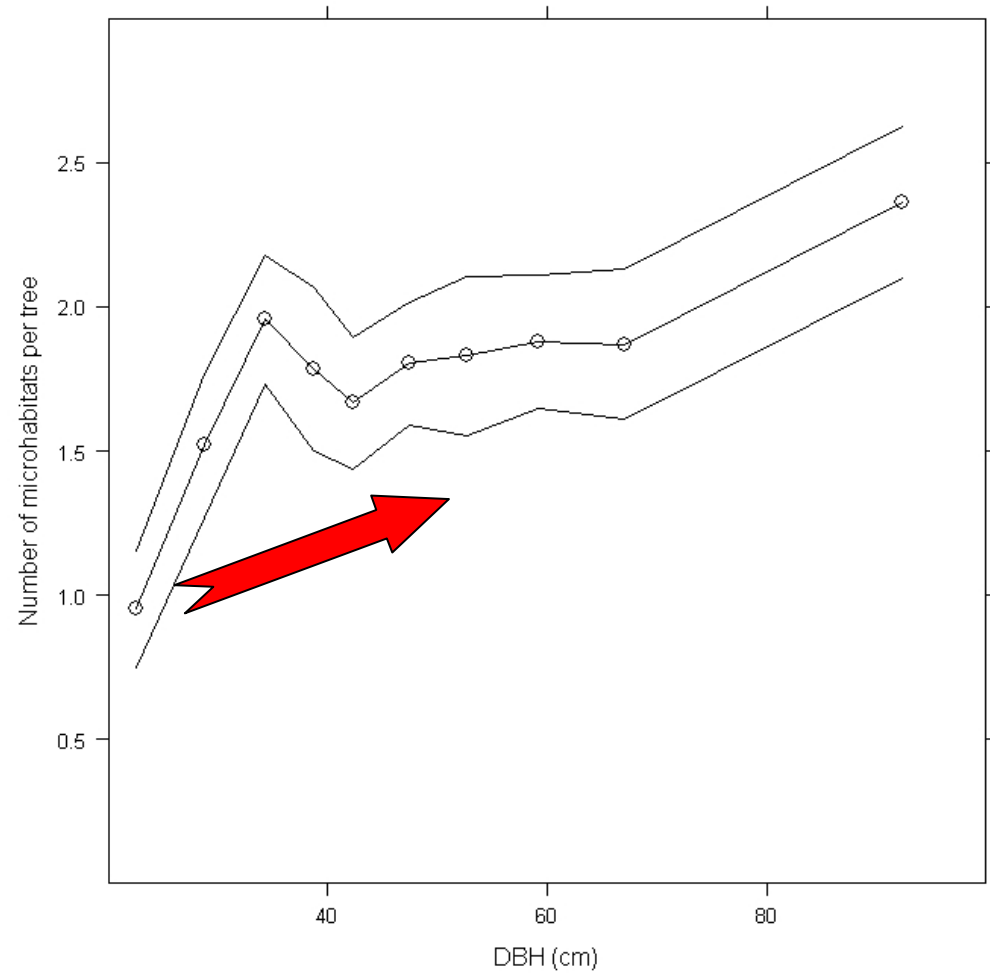
Number of microhabitat type / tree



3. Results



Number of microhabitat type / tree



3. Results



Occurrence of microhabitats

Conks of fungi (40)
Woodpecker cavities (46)



Snags > living

Non-woodpecker
cavities (62)



↗ DBH

Canker (70)



Coniferous > Deciduous

3. Results



**Deadcrown 10-25%
(246)**



**Oaks > Other deciduous
Oaks = coniferous**



Cracks (163)



**Snags > living
↗ DBH**



**Bark characteristics
(530 + 127)**



**MAN > UNM
Snags > living
↗ DBH**



**Presence of
bryophytes
(485)**



**Snags < living
Coniferous < Deciduous**

4. Discussion and conclusions



Tree characteristics prevail...

⇒ **Large diameter trees : longer history / more damages**

⇒ **Snags : more favourable to microhabitats in association with decay process**

... no effect of forest management per se

⇒ **indirect effects (older trees)?**

⇒ **larger densities in unmanaged forests?**

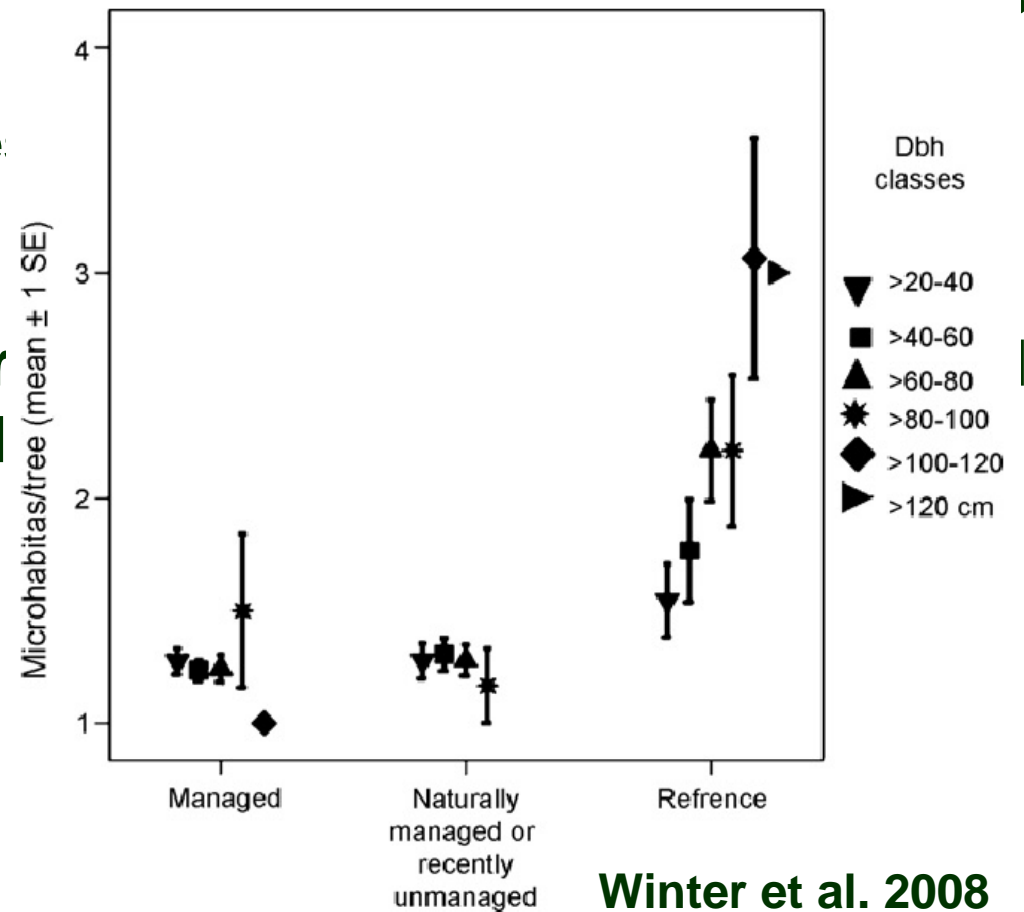
4. Discussion and conclusions



Highlight the importance of snags

- ⇒ Provide nesting and foraging niches for numerous species
- ⇒ Saproxylic beetle

A microhabitat- and unmanaged



Winter et al. 2008

4. Discussion and conclusions



To be continued...

⇒ 15 sites in France

⇒ >3000 trees in the current database

⇒ link with other projects (L. Larrieu)



4. Discussion and conclusions



Could we validate microhabitats as biodiversity indicators?

... not yet!



⇒ **Observer effect?**

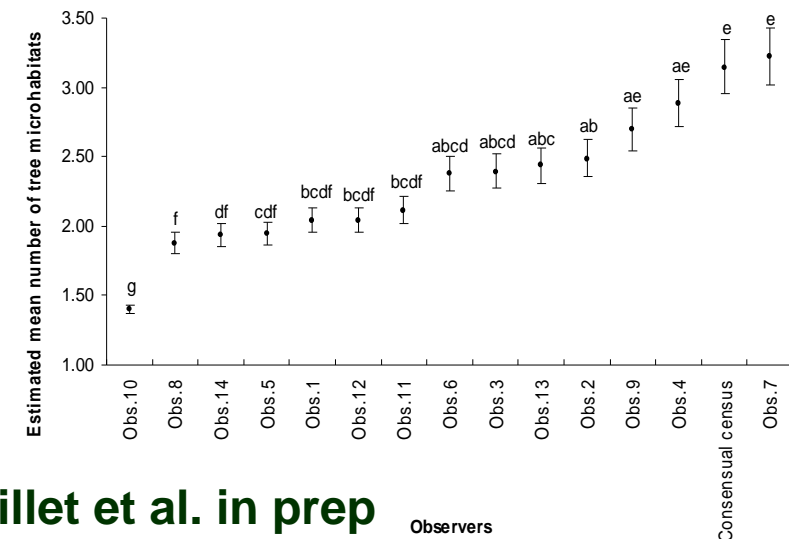
⇒ **Is our list exhaustive (other contexts)?**



⇒ **Cost of the survey**

⇒ **Spatial scale (densities?)**

⇒ **Link with biodiversity**



Paillet et al. in prep

Observers



Influence of tree characteristics and forest management on tree microhabitats

Y. Paillet, A. Vuidot, F. Archaux, F. Gosselin
Cemagref – France

<https://gnb.cemagref.fr>

THANKS FOR YOUR ATTENTION