

Genetic effects of applying Continuous Cover Forestry in non-native conifer UK populations

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BACKGROUND
GENERAL AIMS OF RESEARCH
EXPERIMENTAL APPROACH
RESULTS





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BACKGROUND



CHALLENGES IN THE 21st-CENTURY FOREST MANAGEMENT

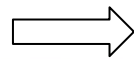
Climate change

Higher temperatures

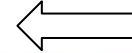
Species
switch

Pests &
diseases

Drought &
Fires



**Continuous Cover
Forestry approach**



Multi-purpose forests

Timber production

Biodiversity

Landscape

Public access, safety and recreation

Water quality and flooding risk

Carbon management – both in the soil and in standing timber

Cultural values – including archaeology, history and community interest





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CONTINUOUS COVER FORESTRY APPROACH

Principles:

Ecosystem management

Natural regeneration and disturbances

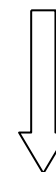
Work with site limitations

Irregular stand structure with a mixture of ages and species



Development:

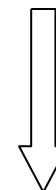
Even-aged plantations



Thinnings

...

First stages of irregular stands



Planting
Selection thinnings

Irregular, mixed stand



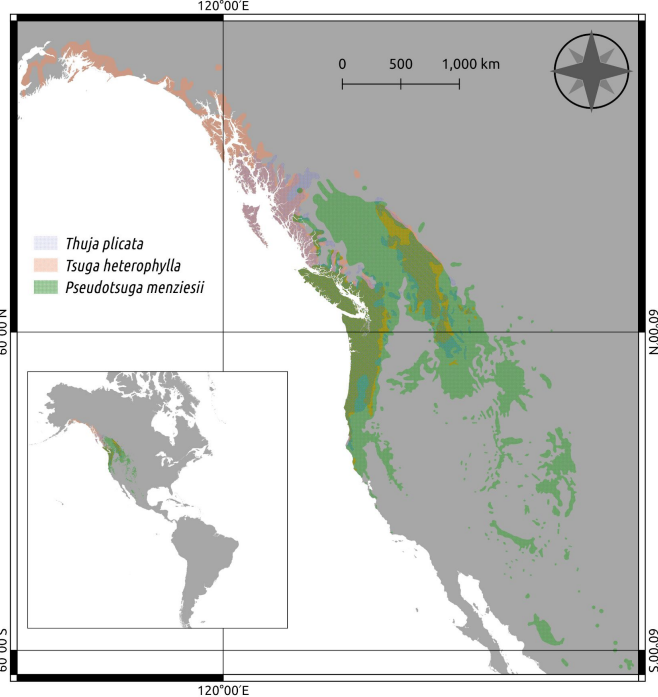


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UK POPULATIONS



CIES



Seed sources used
in forest species
replacements in
Europe

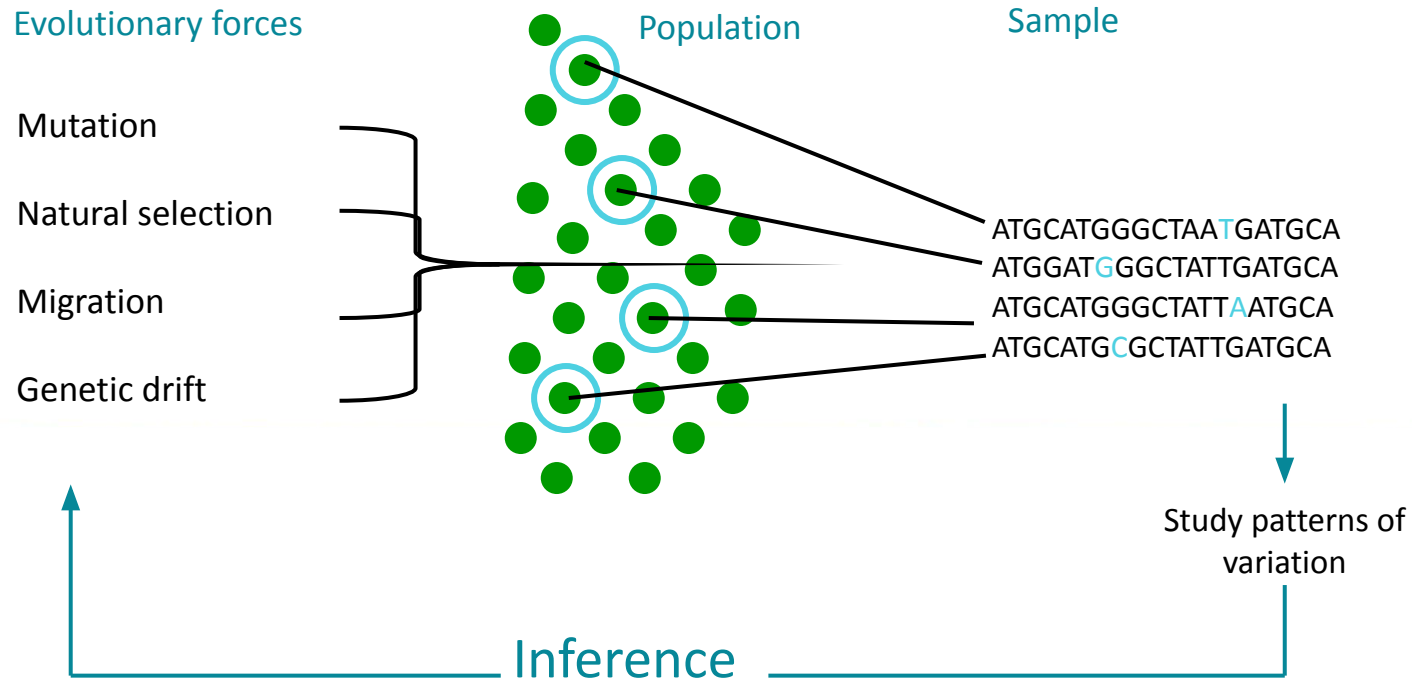




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FACTORS INFLUENCING GENETIC DIVERSITY

How the evolutionary forces shape the patterns of genetic diversity observed?

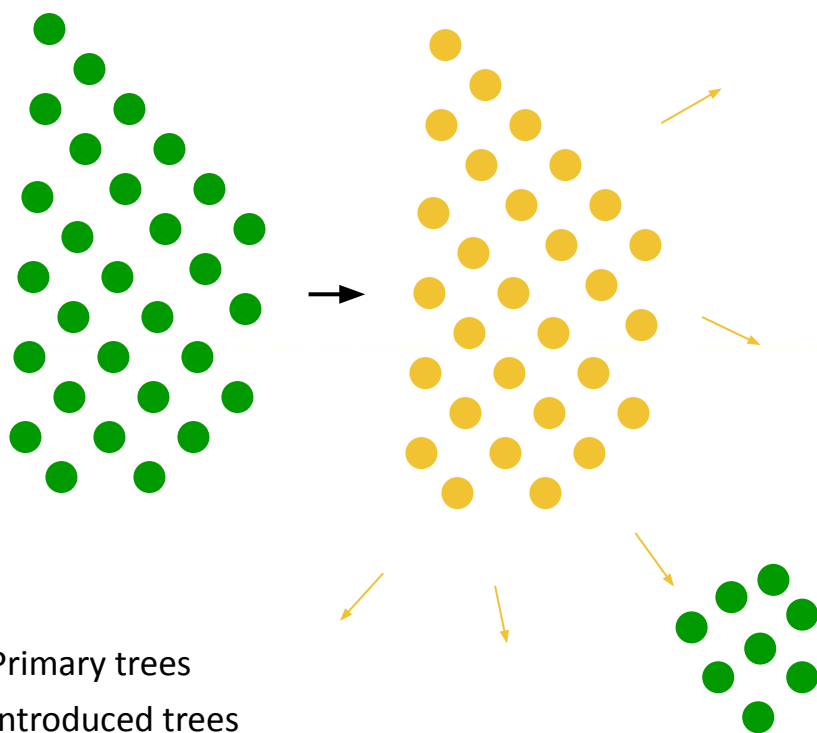


Slide modified from Pauline Garnier-Géré

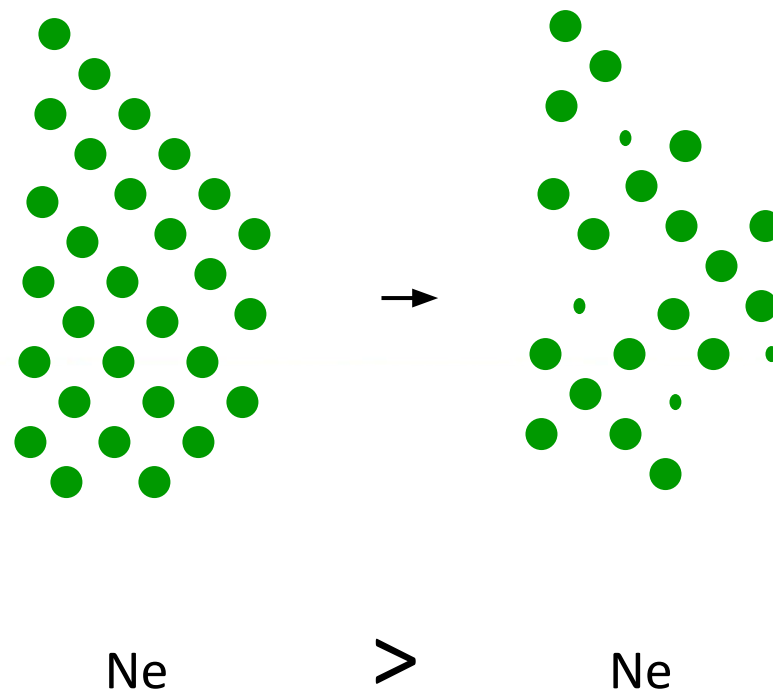
FACTORS INFLUENCING GENETIC DIVERSITY

Effects on genetic diversity by different forest management systems

Clear-cutting + artificial regeneration



Systems based on natural regeneration





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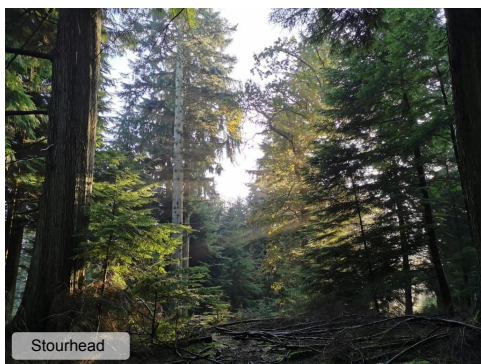
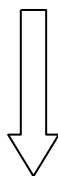


GENERAL AIMS OF RESEARCH





Enough genetic
diversity?
Gene pool
transmission?



OBJECTIVES

Asses the genetic diversity in **canopy trees** and compare it with the genetic diversity that appears in **natural regeneration** seedling and saplings.

Assess the level of genetic variability **across the main species** in *Pseudotsuga menziesii*, *Thuja plicata* and *Tsuga heterophylla* by comparing them to native N. Am. forests.

Determine the **provenance** of non-native conifer **UK plantations** by comparing them to native **N. Am. populations**.

Evaluate differences in the genetic diversity at **different stages of CCF** plantations in both canopy trees and natural regeneration.





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EXPERIMENTAL APPROACH



EXPERIMENTAL APPROACH - Sampling

N. Am.

UK

50 adults
150 nat. regen

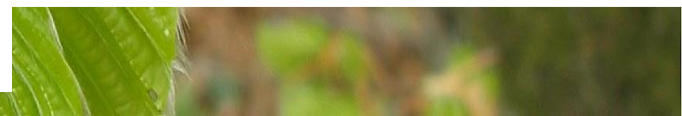
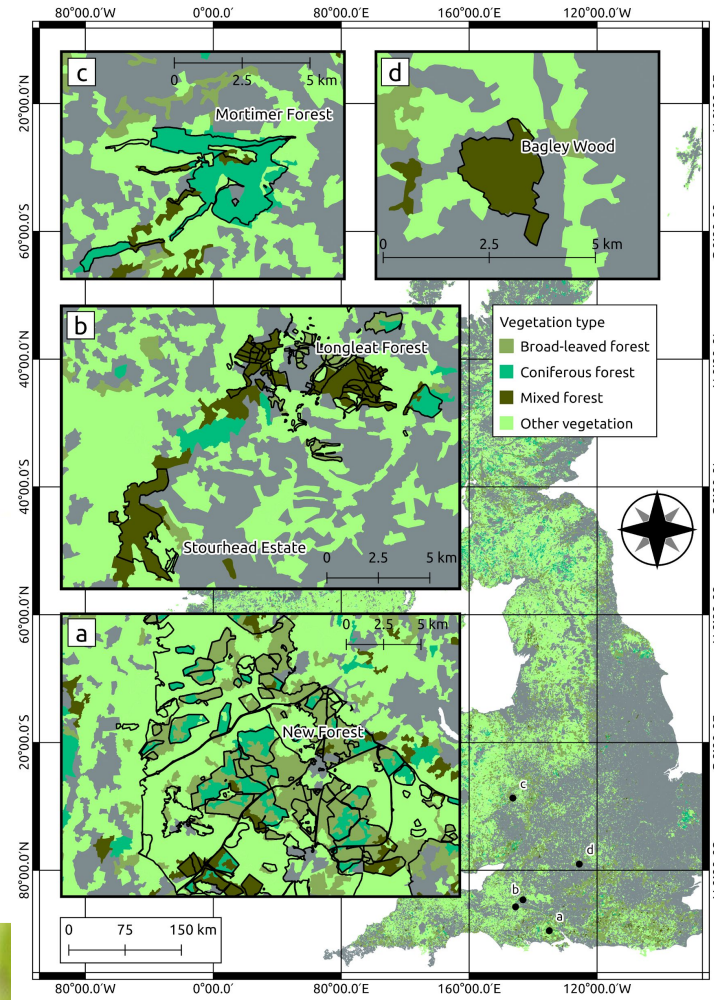


EXPERIMENTAL APPROACH - Sampling

UK

50 adults
150 nat. regen

5 sites
12 stands





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EXPERIMENTAL APPROACH - Inventorying

2-3 random plots per stand

5 meters of diameter

Number and proportion of species

Size class

Regen proportion

Stand structure



EXPERIMENTAL APPROACH - Genotyping

T. plicata

P. menziesii

T. heterophylla

Genotyping

SNPs resource screening

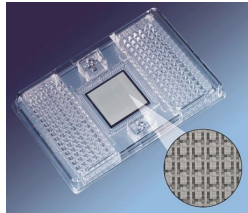
SNPs selection

candidate SNPs

SNPs discovery

Homologous sequences

GBS/RADseq





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RESULTS





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RESULTS

To be continue...





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ACKNOWLEDGMENTS



Dr Gary Kerr

