

A wide-angle photograph of a vast agricultural field. The foreground is filled with rows of green crops, likely wheat or barley, showing distinct vertical furrows. The field extends to a flat horizon under a bright blue sky dotted with wispy white clouds.

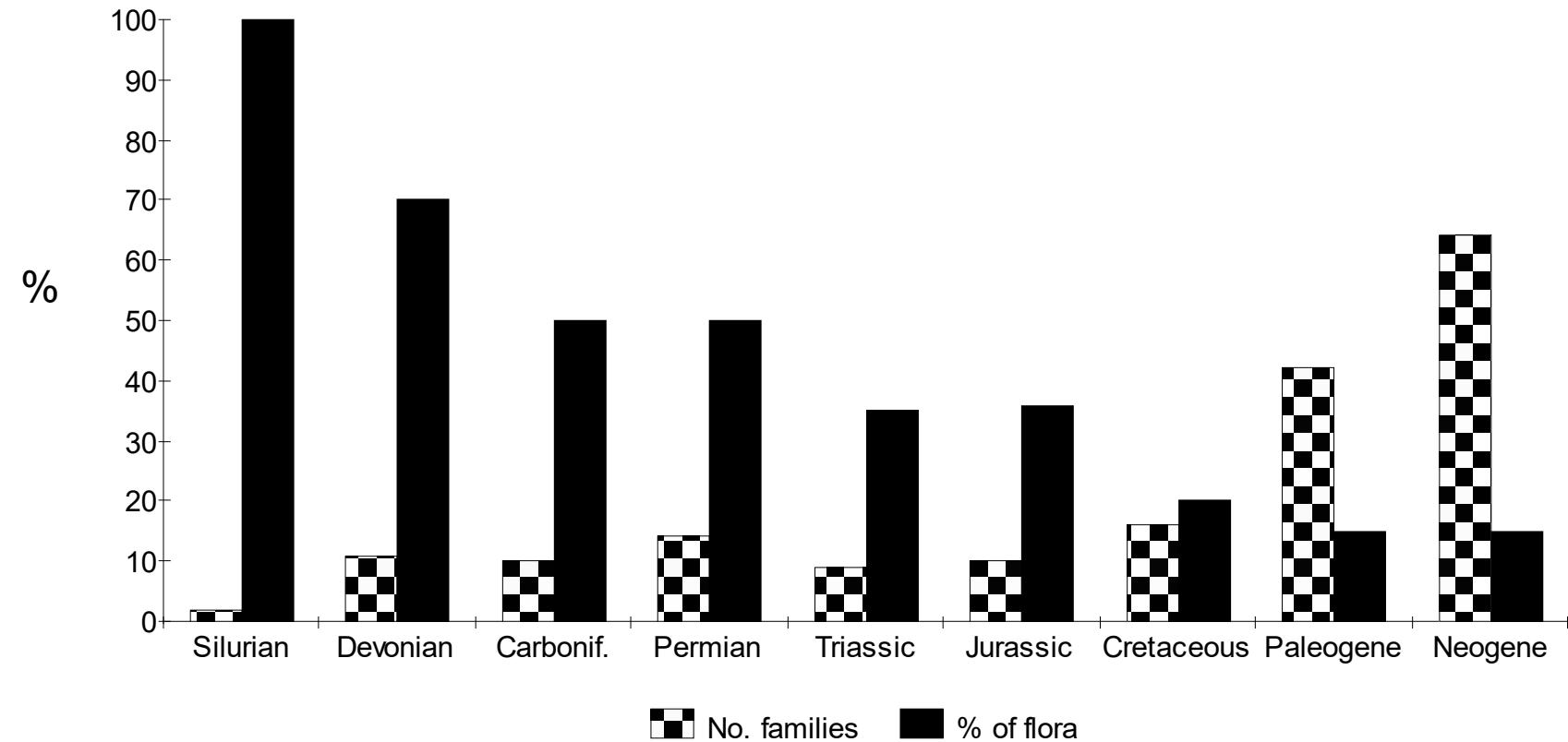
Ekologiska konsekvenser av klonskogsbruk

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Ekologiska konsekvenser av klonskogsbruk

- Clones in nature
- Swedish 'natural' spruce forest
- Effects on other species
- Effects on ecosystem services

Clonal families through time



Natural clones in Swedish forests

- Many forest herbs e.g. *Anemone nemorosa* (Vitsippa), *Ficaria verna* (Svalört), *Lamiastrum galeobdolon* (Gulplister), *Galium odoratum* (Myskmadra).



Natural clones in Swedish forests

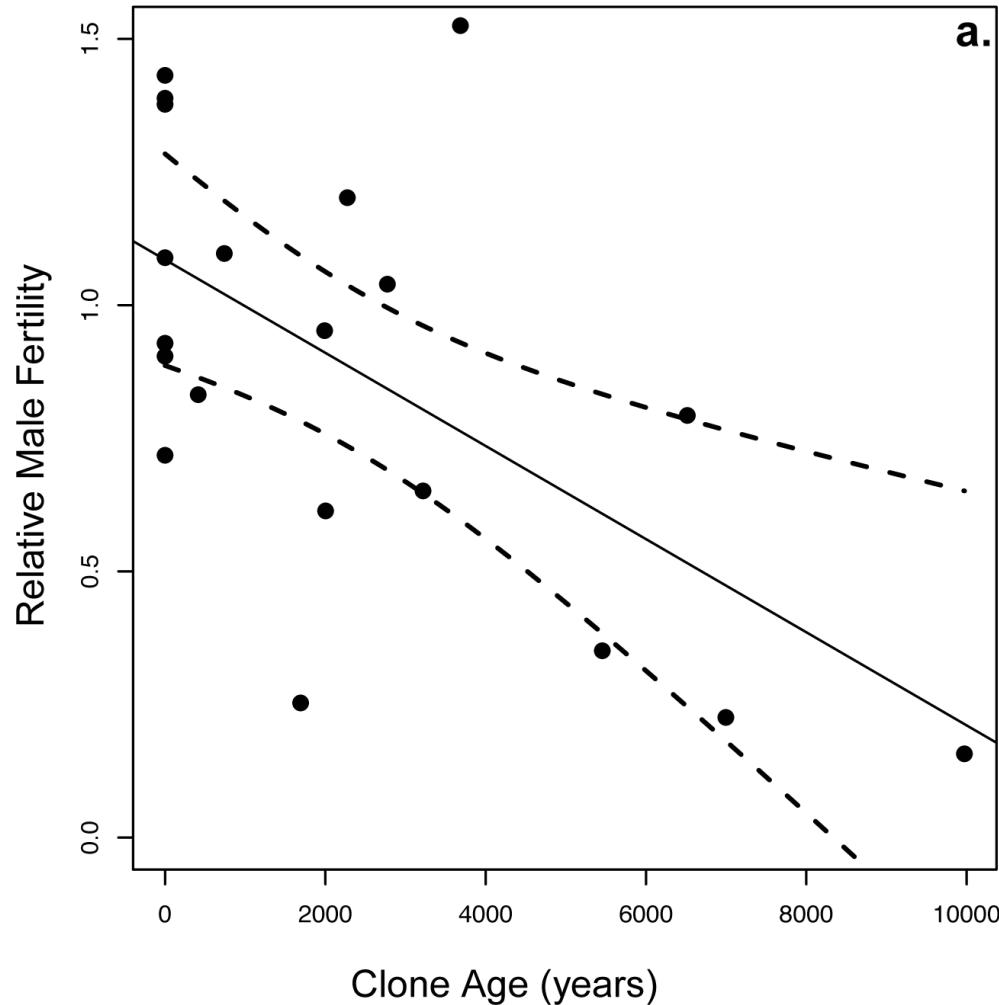
- Many forest herbs e.g. *Anemone nemorosa* (Vitsippa), *Ficaria verna* (Svalört), *Lamiastrum galeobdolon* (Gulplister), *Galium odoratum* (Myskmadra).
- Several deciduous trees show clonal growth through root suckering e.g. asp, körsbär, al, björck, avenbok, hassel, ek, sälg, lind

Size and age of clones in nature

Table 1. Some large plant clones (after Cook 1985).

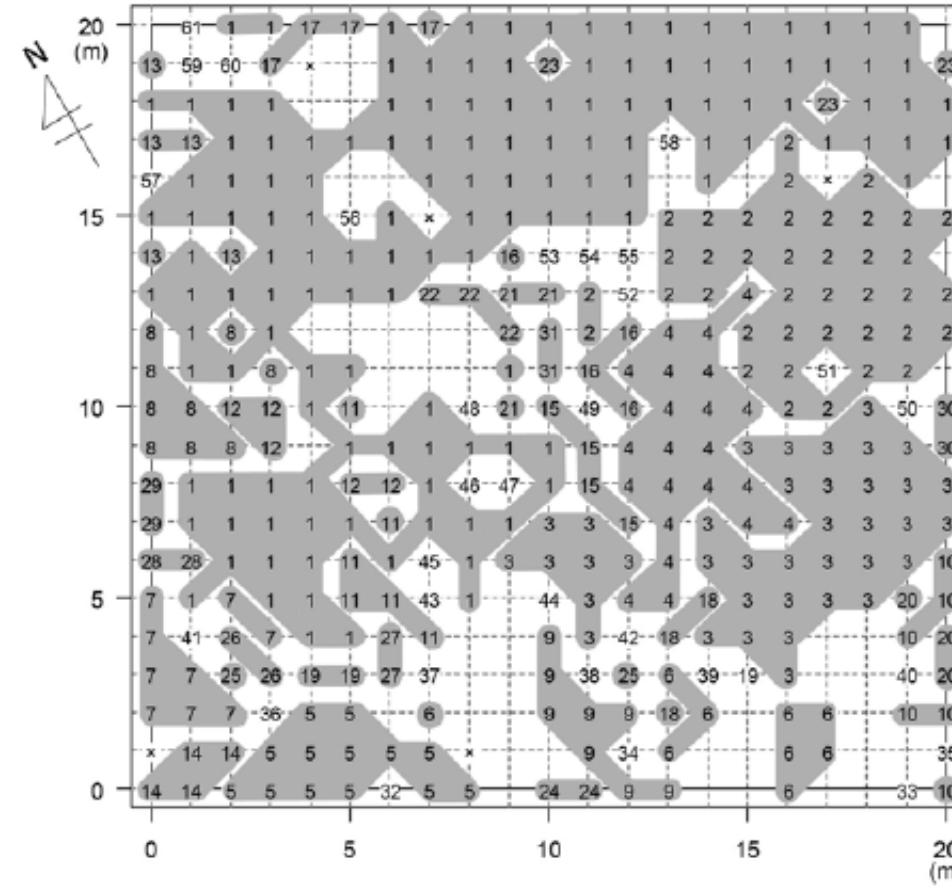
Species	Diameter (m)	Age (years)
<i>Gaylussacia brachycerium</i>	1980	13,000
<i>Hokus mollis</i>	880	1000+
<i>Populus tremuloides</i>	510	10,000+
<i>Pteridium aquilinum</i>	489	1400
<i>Lycopodium complanatum</i>	250	850
<i>Festuca rubra</i>	220	1000+
<i>Convallaria majalis</i>	83	670+
<i>Calamagrostis epigeios</i>	50	400+
<i>P. mariana</i>	14	300+
<i>Festuca ovina</i>	8	1000+
<i>Larrea tridentata</i>	8	11,000+

Populus tremuloides (kanadensisk asp)
can live for c.10000 years



Ally et al. 2010

Genet structure in a forest herb *Cardamine* (Bräsmor)

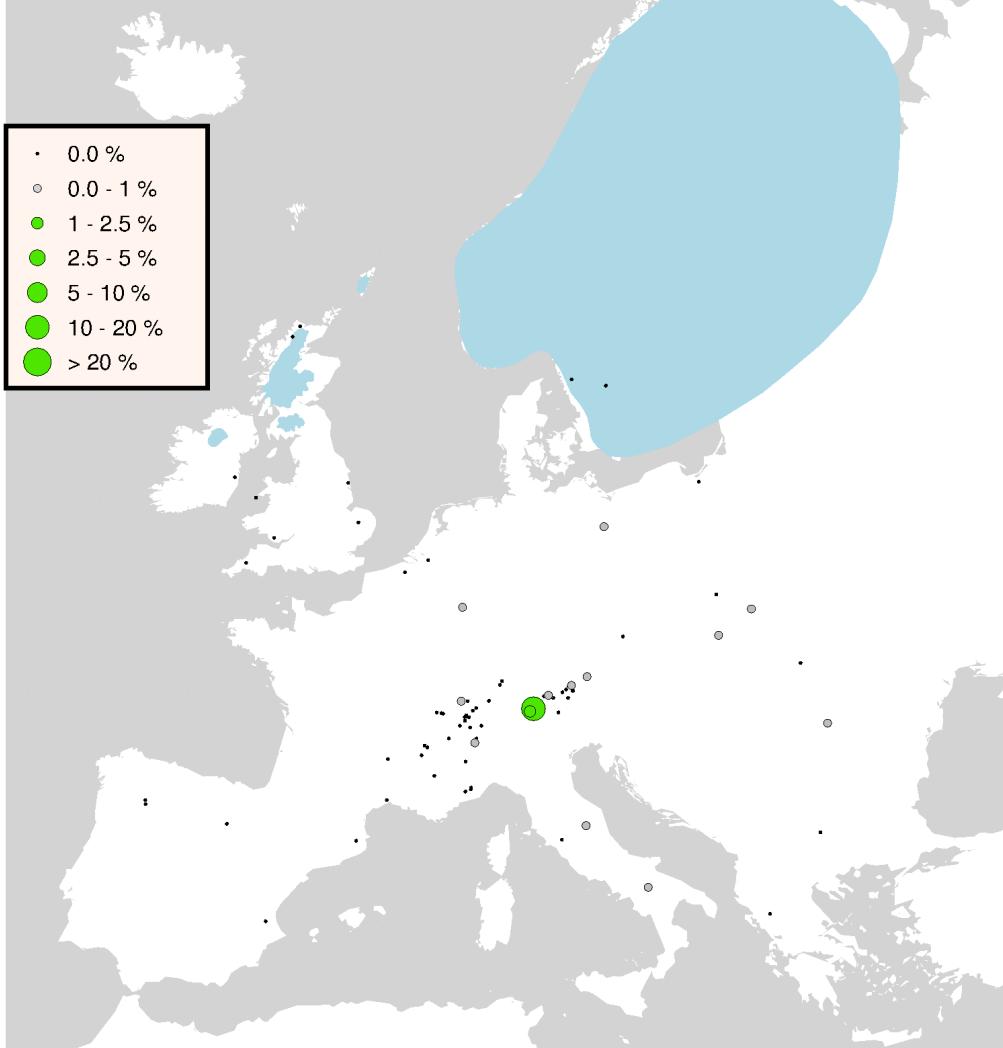


Tsujimoto et al. 2020

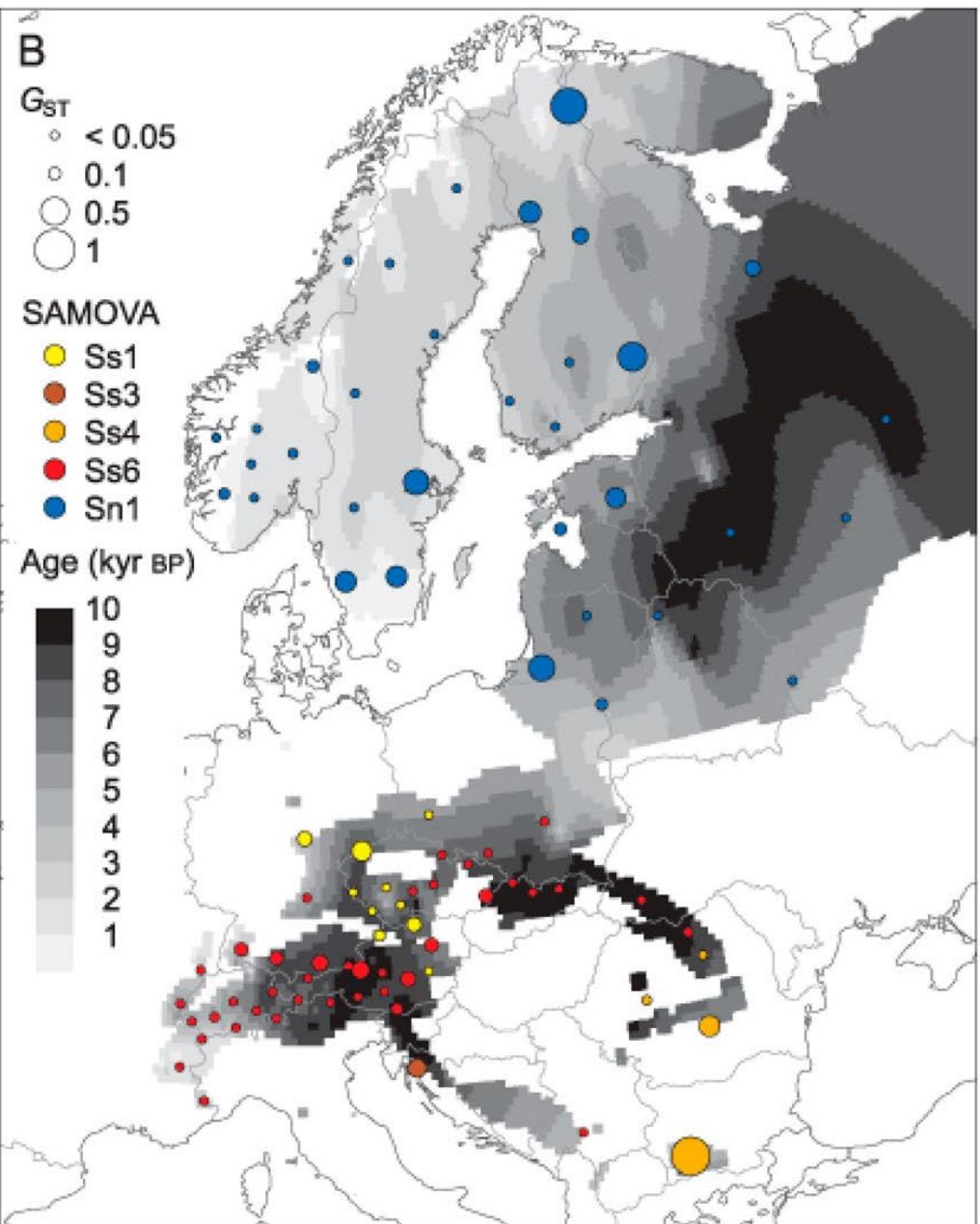
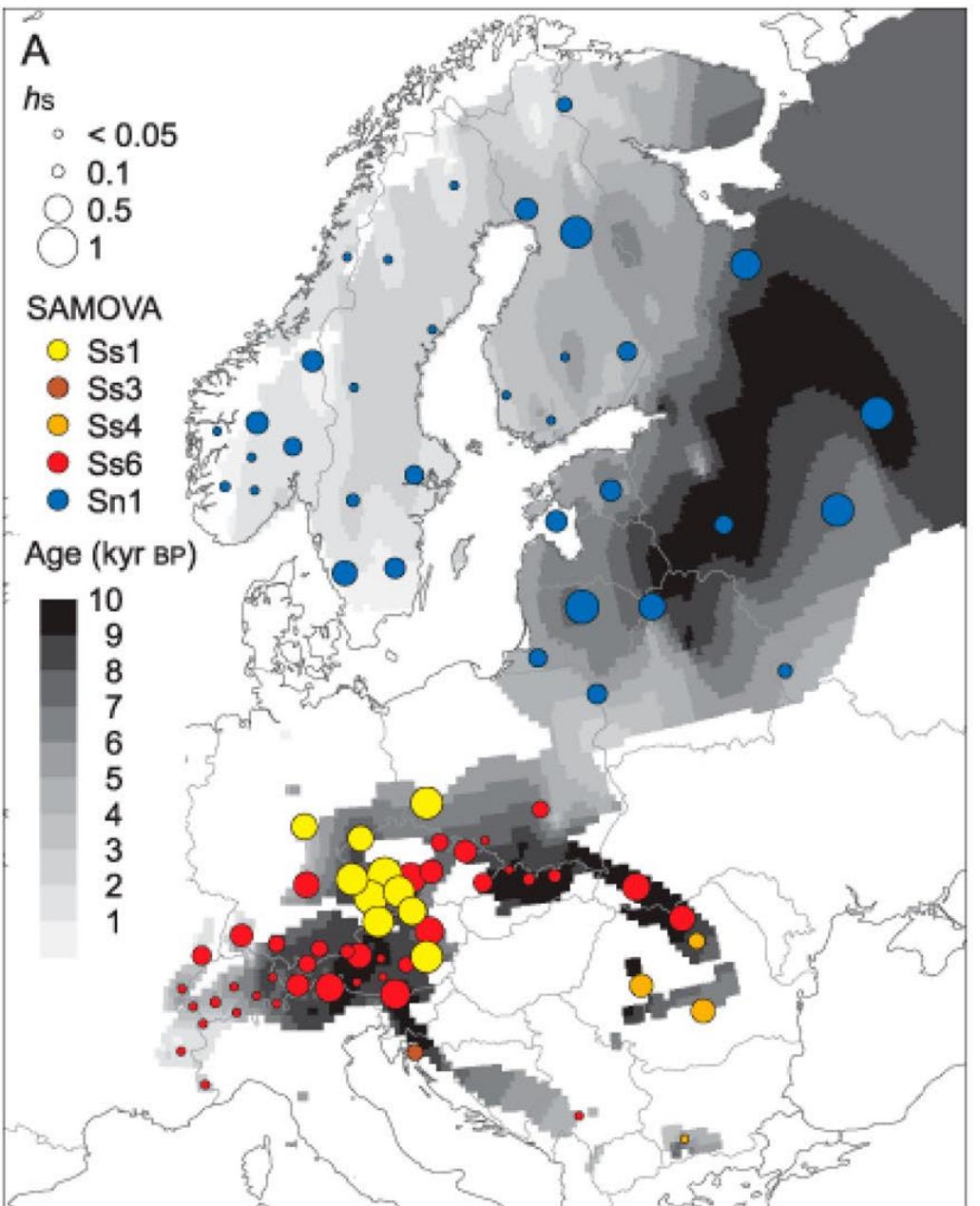
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Picea 15.0 ka cal. BP



15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0



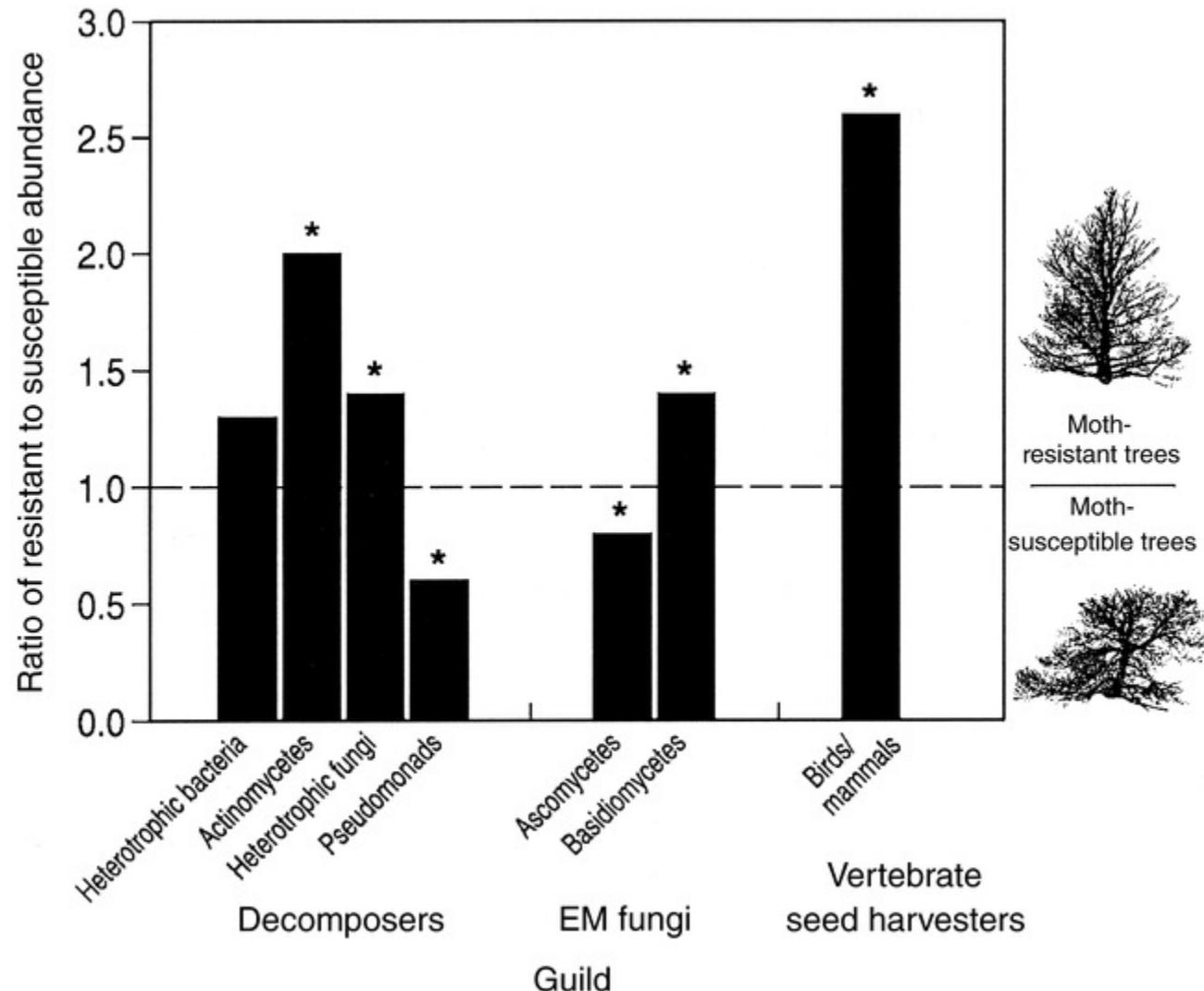
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Community genetics and extended phenotypes

“Few studies span from genes to ecosystems, but such integration is probably essential for understanding the natural world” (Whitham et al. 2003)

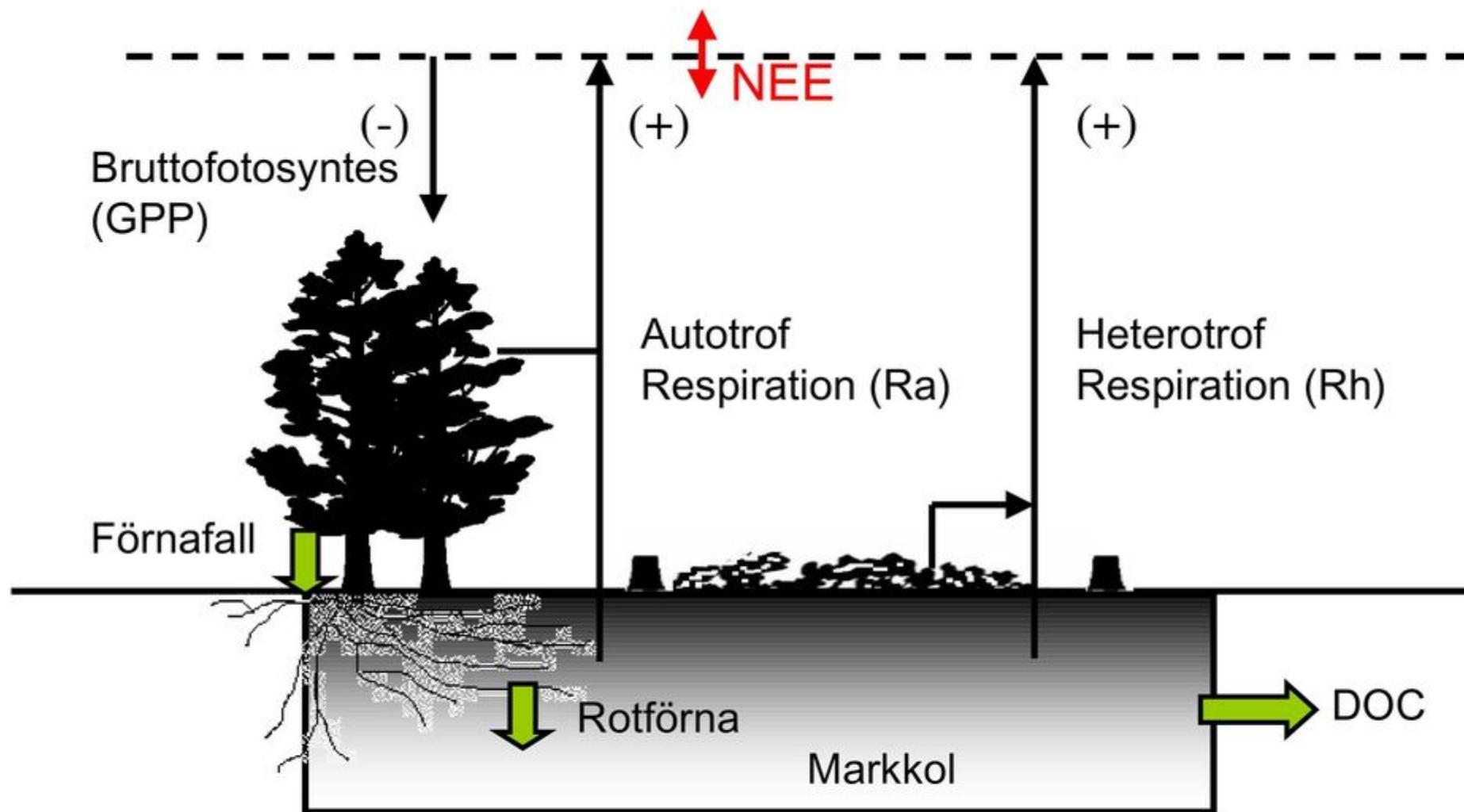
Pinus edulis (pinjenöt) and *Dioryctria albovitella* (a stem-boring moth)



Ekologiska konsekvenser av klonskogsbruk

- Clones in nature
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- Effects on other species
- Effects on ecosystem services – skogens kolbalans

Kolflöden i skogsekosystem



= Partikelflöde
 = Gasflöde

The fate of carbon in a mature forest under carbon dioxide enrichment

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<https://doi.org/10.1038/s41586-020-2128-9>

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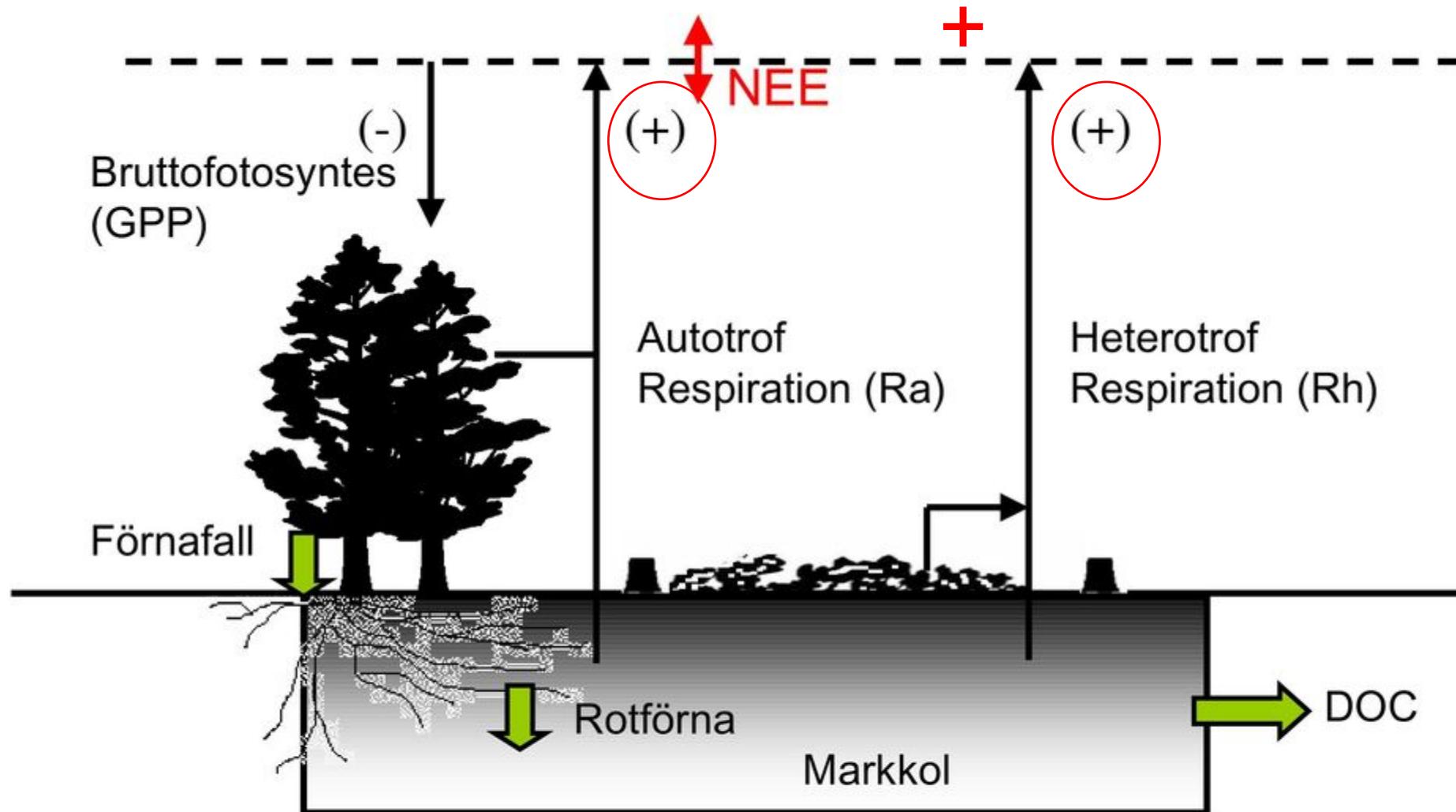
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 Check for updates

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“the majority of the extra carbon was emitted back into the atmosphere via several respiratory fluxes, with **increased soil respiration alone accounting for half of the total uptake surplus**. Our results call into question the predominant thinking that the capacity of forests to act as carbon sinks will be generally enhanced under eCO₂”

Kolflöden i skogsekosystem



Increasing wildfires threaten historic carbon sink of boreal forest soils

Xanthe J. Walker , Jennifer L. Baltzer, Steven G. Cumming, Nicola J. Day, Christopher Ebert, Scott Goetz, Jill F. Johnstone, Stefano Potter, Brendan M. Rogers, Edward A. G. Schuur, Merritt R. Turetsky & Michelle C. Mack

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10k Accesses | **76** Citations | **387** Altmetric | [Metrics](#)

“In response to climate change the size, severity, and frequency of boreal forest fires has been increasing, a trend that is expected to continue.”

”Som svar på klimatförändringarna har boreala skogsbränder ökat allvarlighetsgraden och frekvensen, en trend som förväntas fortsätta”

Serious mismatches continue between science and policy in forest bioenergy

Michael Norton¹ | Andras Baldi² | Vicas Buda³ | Bruno Carli⁴ | Pavel Cudlin⁵ |
Mike B. Jones⁶  | Atte Korhola⁷ | Rajmund Michalski⁸ | Francisco Novo⁹ |
Július Oszlányi¹⁰ | Filpe Duarte Santos¹¹ | Bernhard Schink¹² | John Shepherd¹³ |
Louise Vet¹⁴ | Lars Walloe¹⁵ | Anders Wijkman¹⁶

This review, based on recent work by Europe's Academies of Science, finds that current policies are failing to recognize that removing forest carbon stocks for bioenergy leads to an **initial increase** in emissions.

Denna granskning, baserad på det senaste arbetet från Europas vetenskapsakademier, visar att den nuvarande politiken inte erkänner att avlägsnande av skogs kolbestånd för bioenergi leder till en första utsläppsökning.

Serious mismatches continue between science and policy in forest bioenergy

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The ‘carbon neutrality’ concept is a gross misrepresentation of the atmosphere’s CO₂ balance since it ignores the slowness of the photosynthesis process which takes several decades for trees to reach maturity.

Konceptet ”koldioxidneutralitet” är en grov missuppfattning av atmosfärens koldioxidbalans, eftersom den ignoreras fotosyntesprocessens långsamhet, vilket tar flera decennier för träd att bli mogna.

Slutsatser

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- Spruce in Sweden chiefly originates from one refugium and has maintained its 'original' diversity.
- Effects of clonal spruce on other species are poorly known.
- Increased forest production to reduce carbon emissions is influenced by fire risk and soil carbon stores.

Slutsatser

- Det finns flera klonarter i svenska skogar.
- Gran i Sverige har huvudsakligen sitt ursprung i ett refugium och har bibehållit sin ”ursprungliga” genetisk mångfald.
- Effekter av klongran på andra arter är dåligt kända.
- Ökad skogsproduktion för att minska koldioxidutsläppen påverkas av brandrisk och markkolförråd.