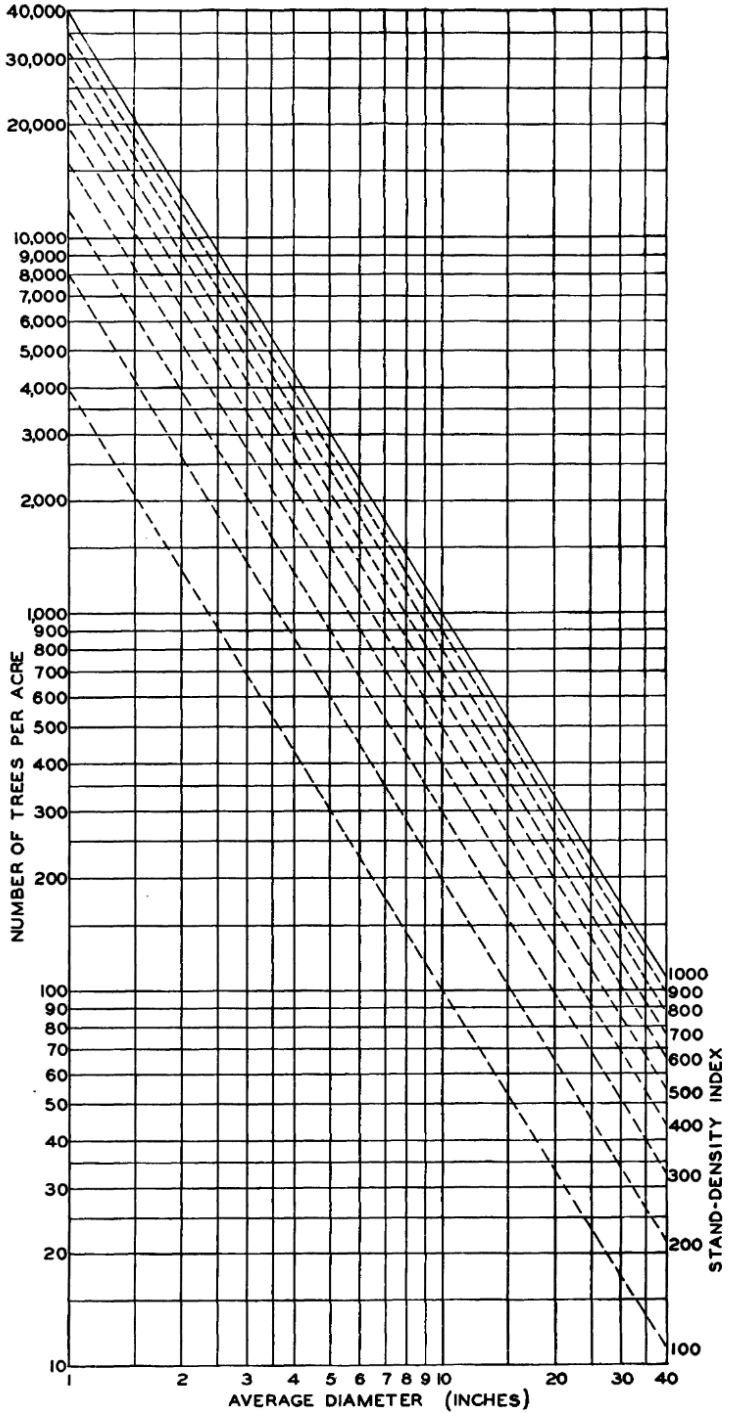
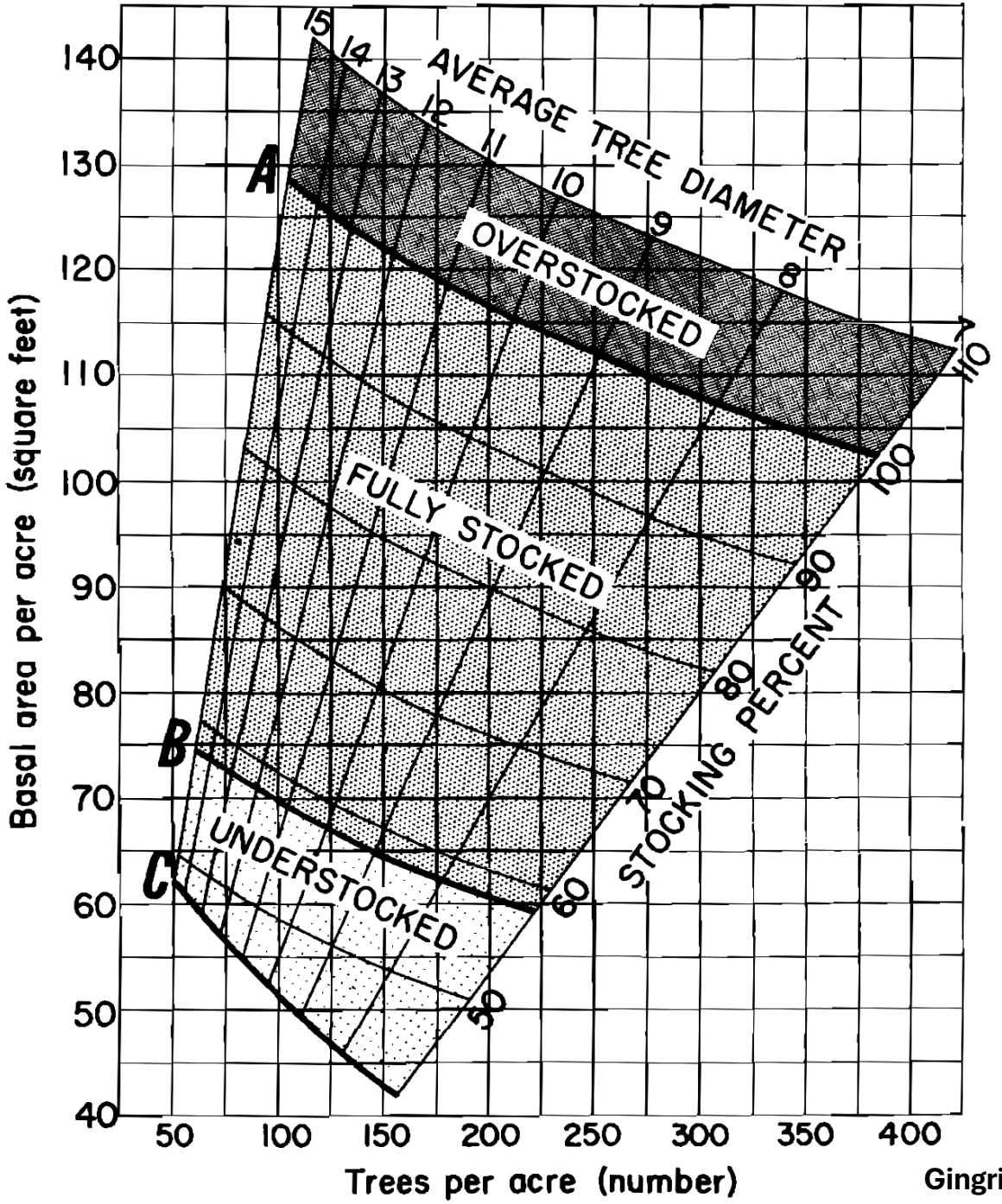
Stand density management for ecological outcomes

MANAGE STAND DENSITY

Stocking Guidelines

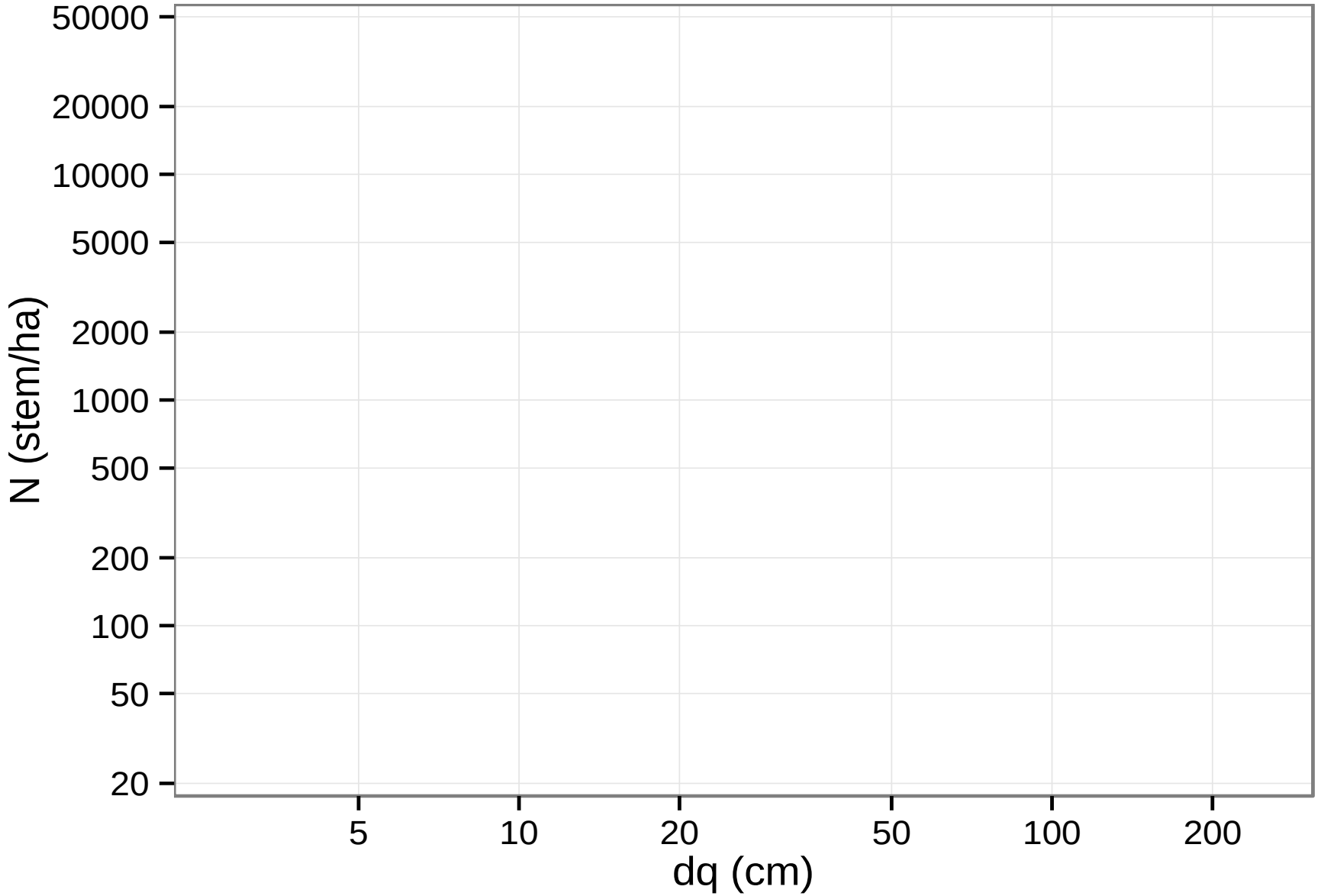


Reineke 1931

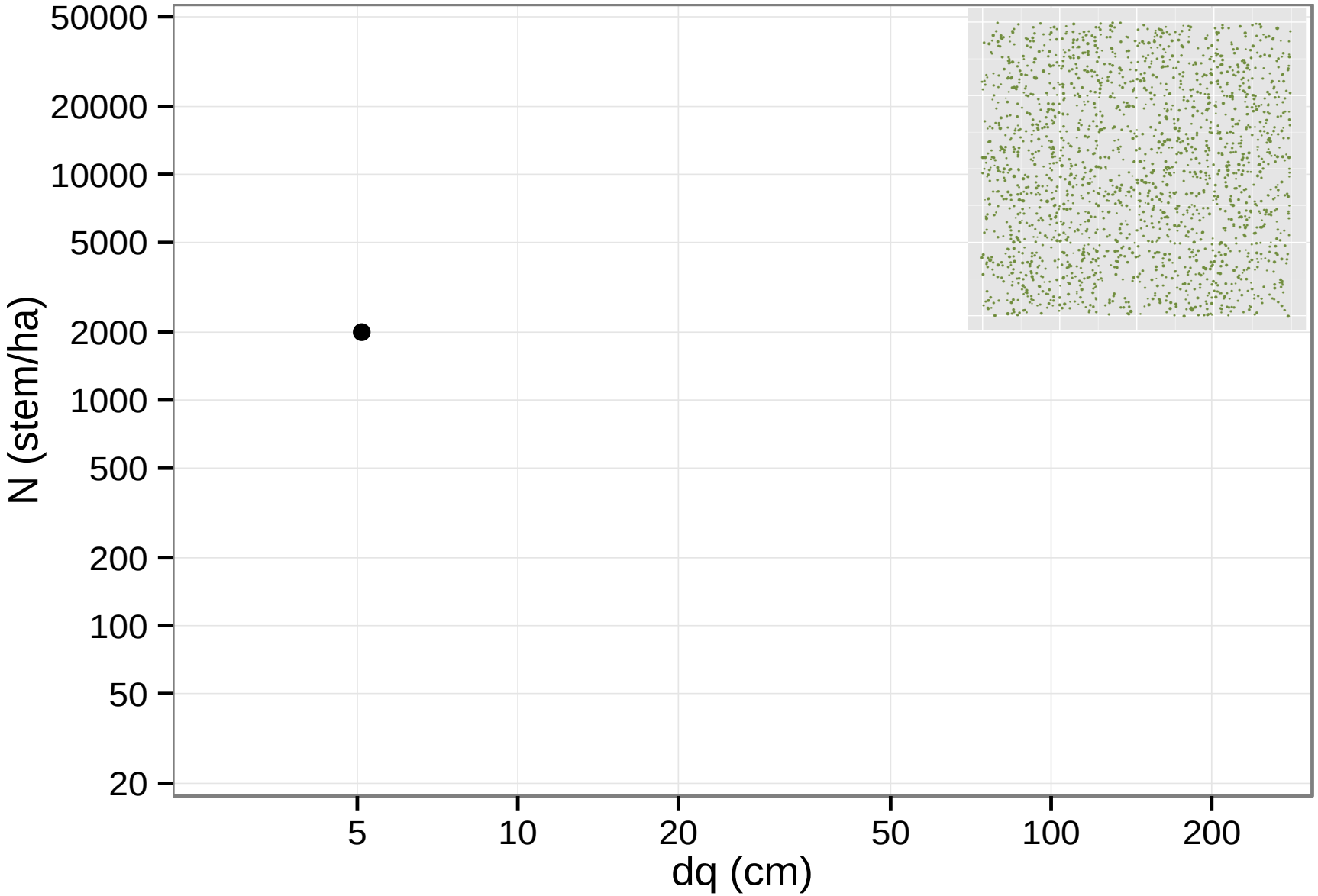


Gingrich 1967

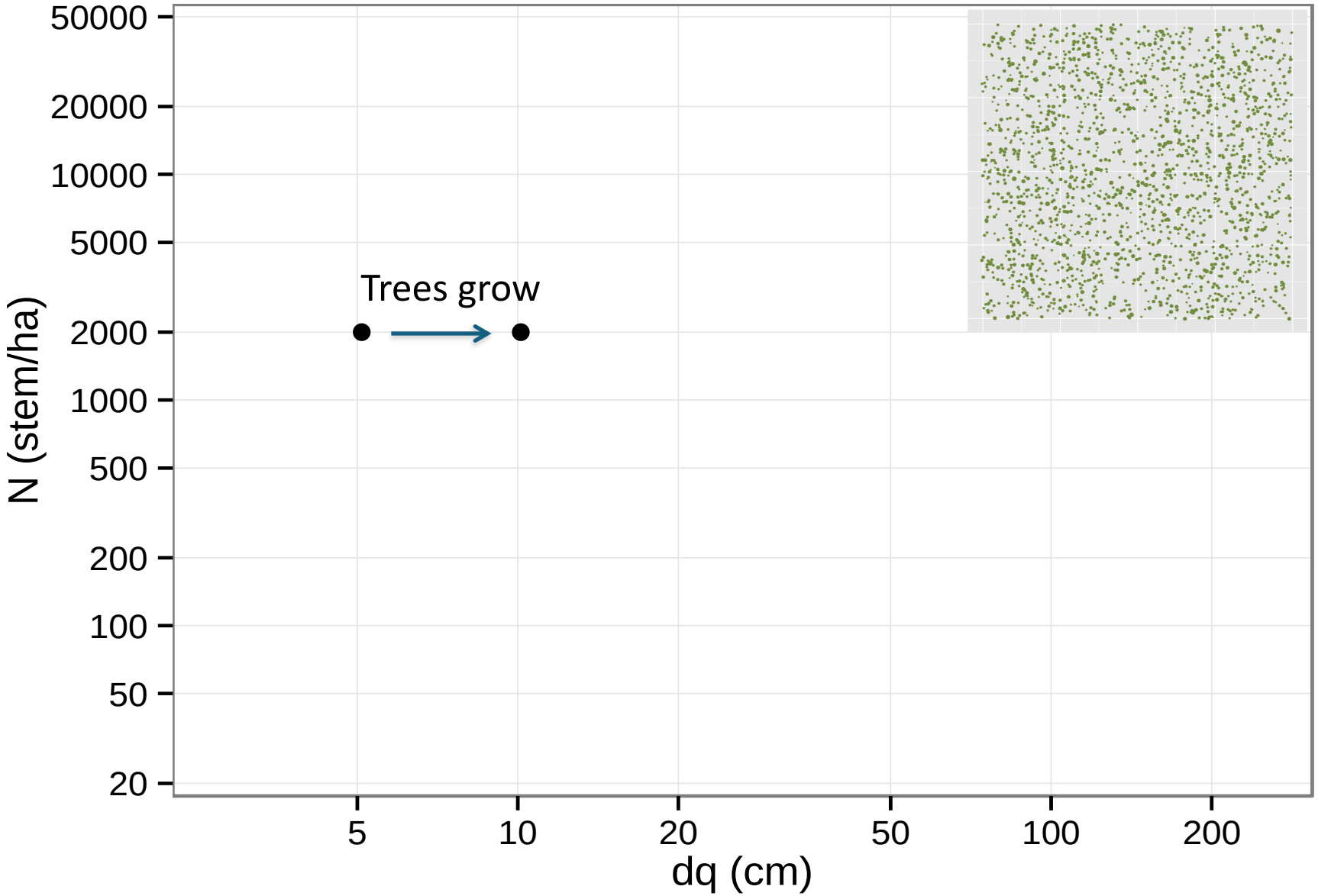
Stand density diagram



Stand density diagram



Stand density diagram



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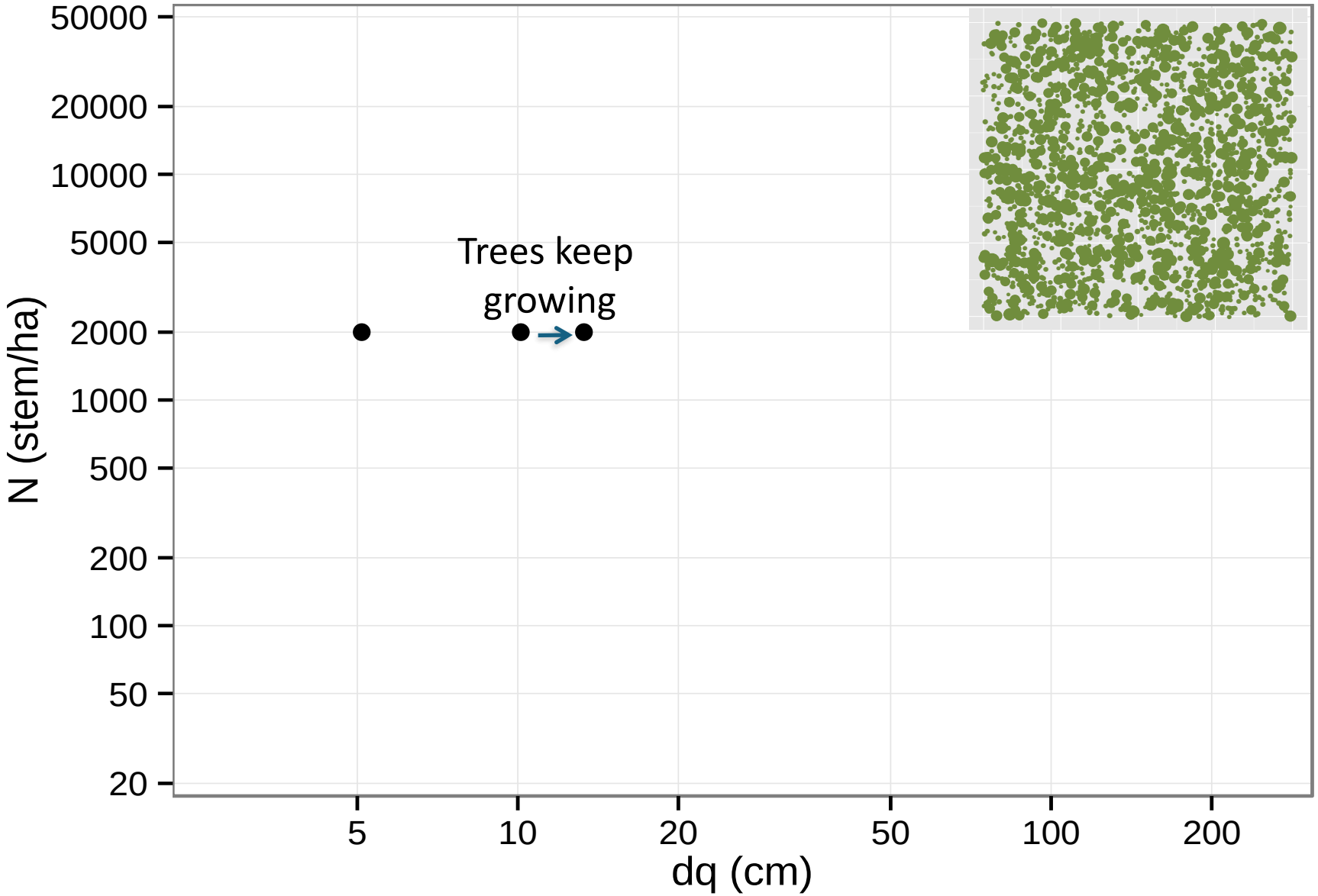
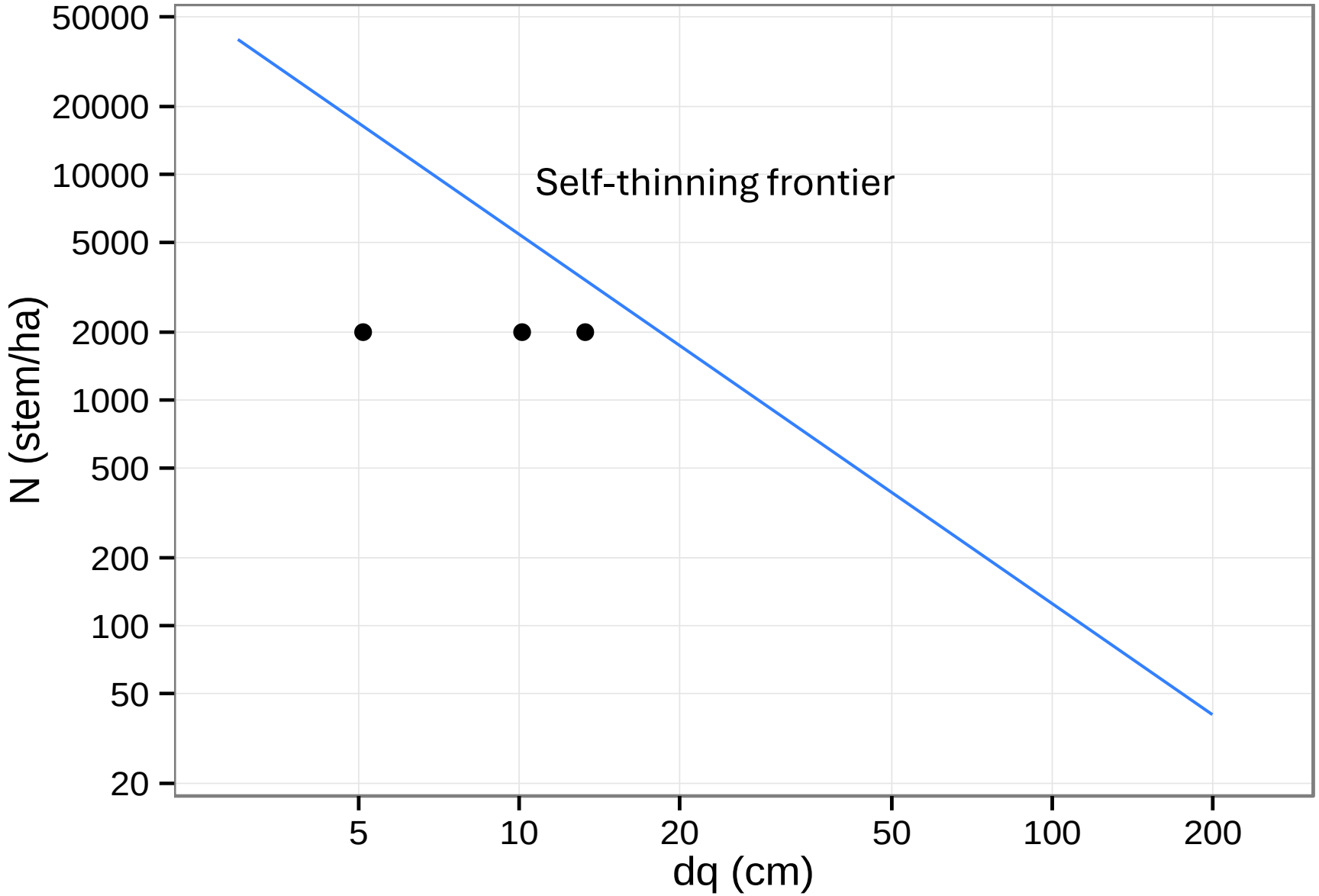


Stand density diagram



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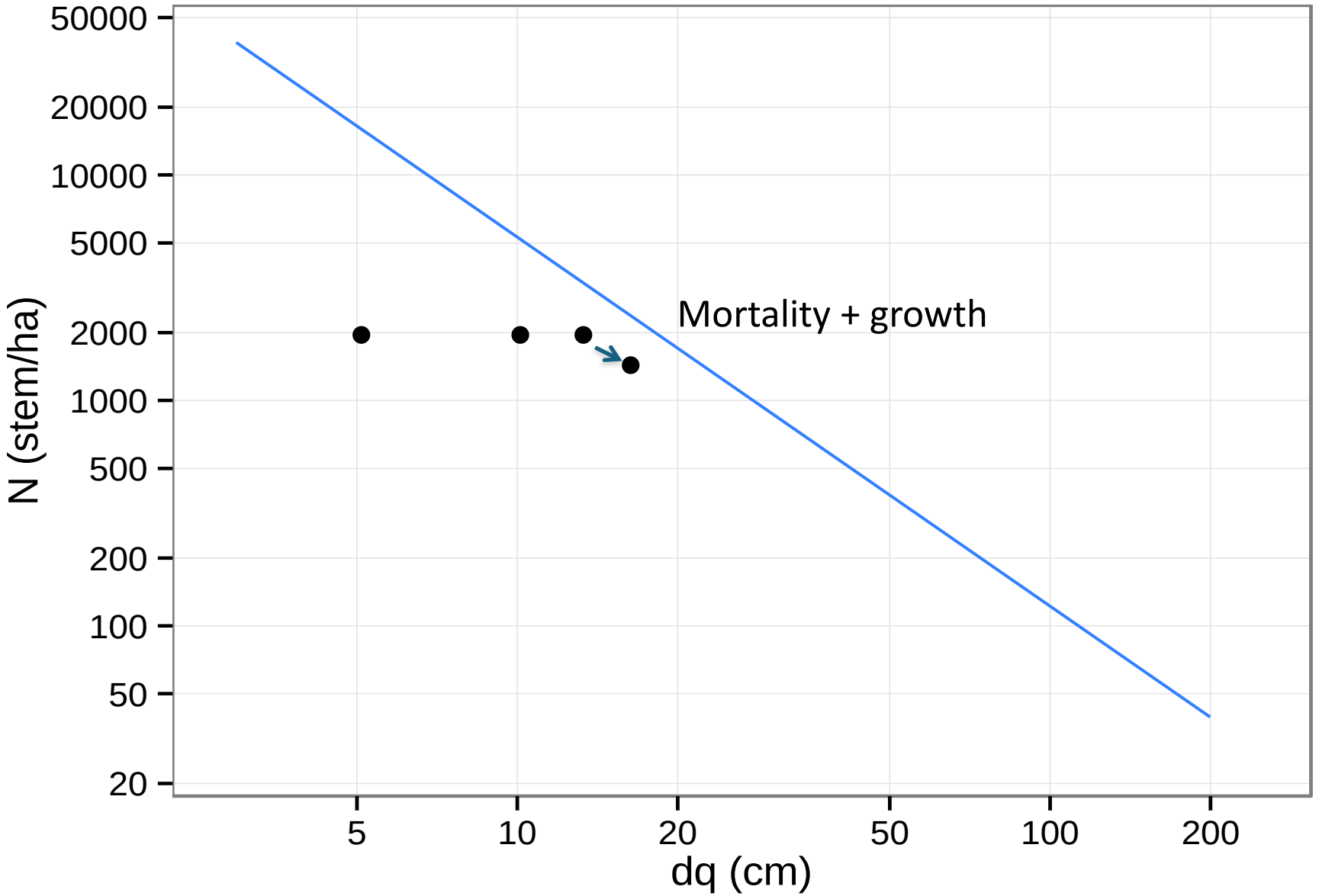
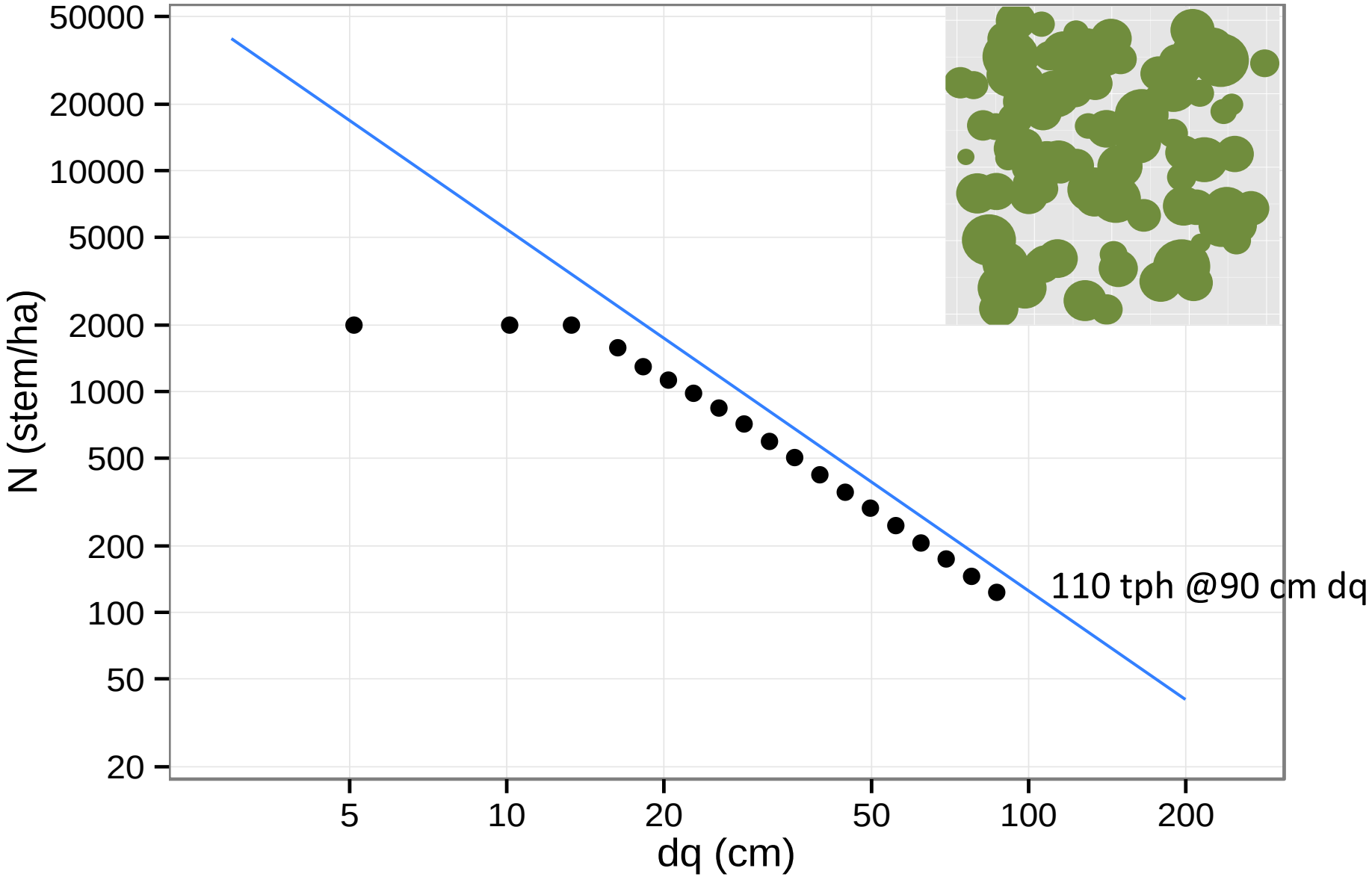
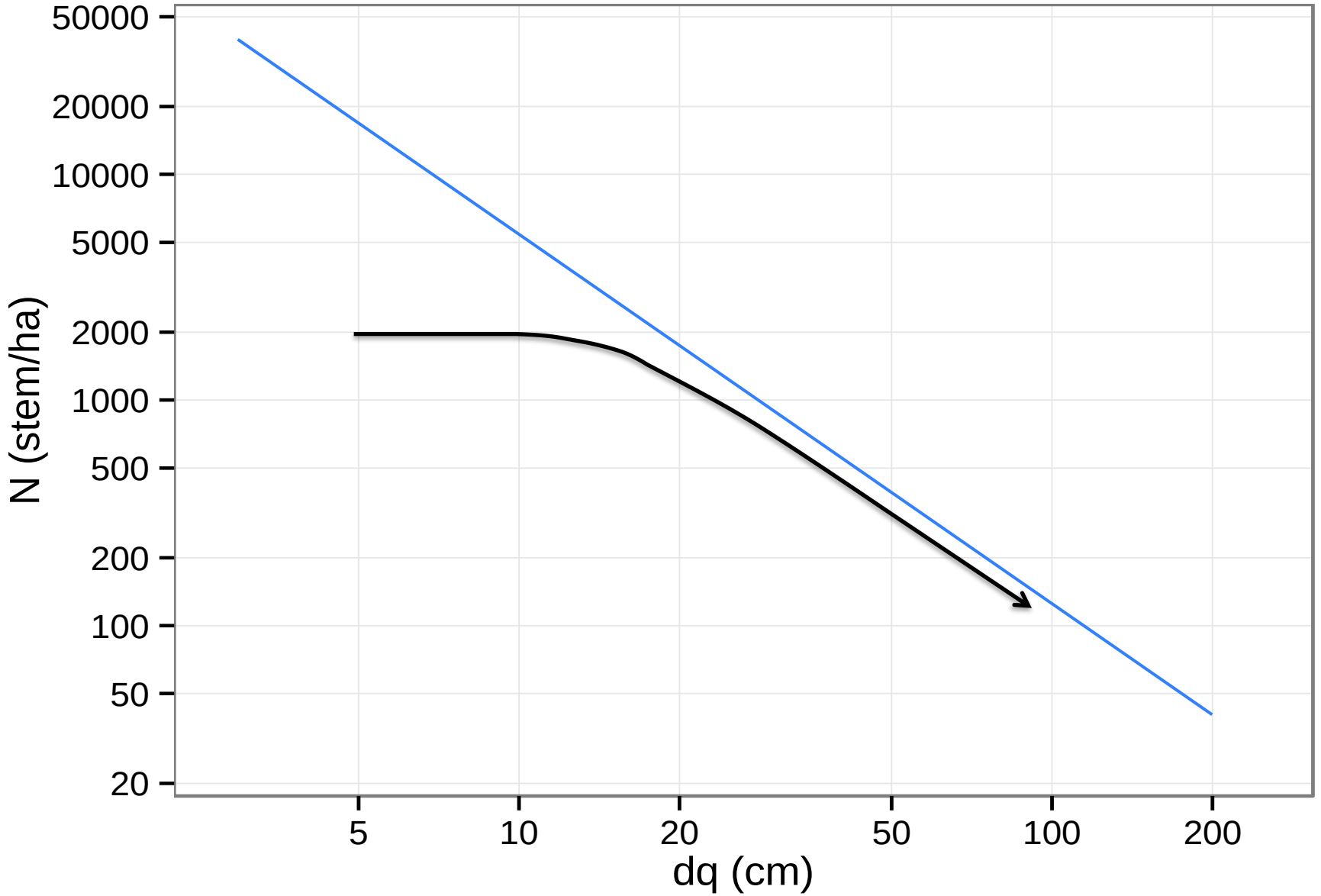


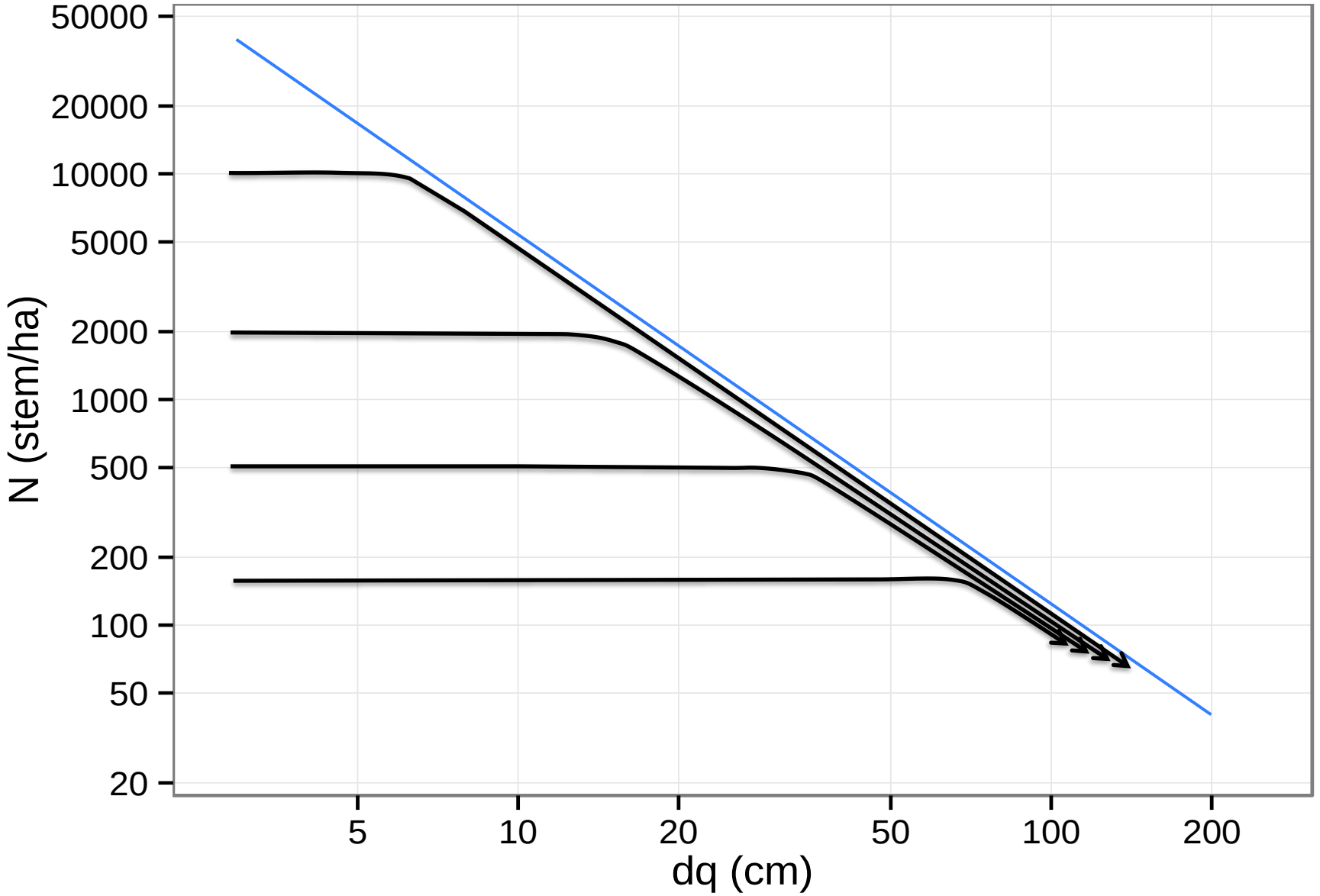
Stand density diagram



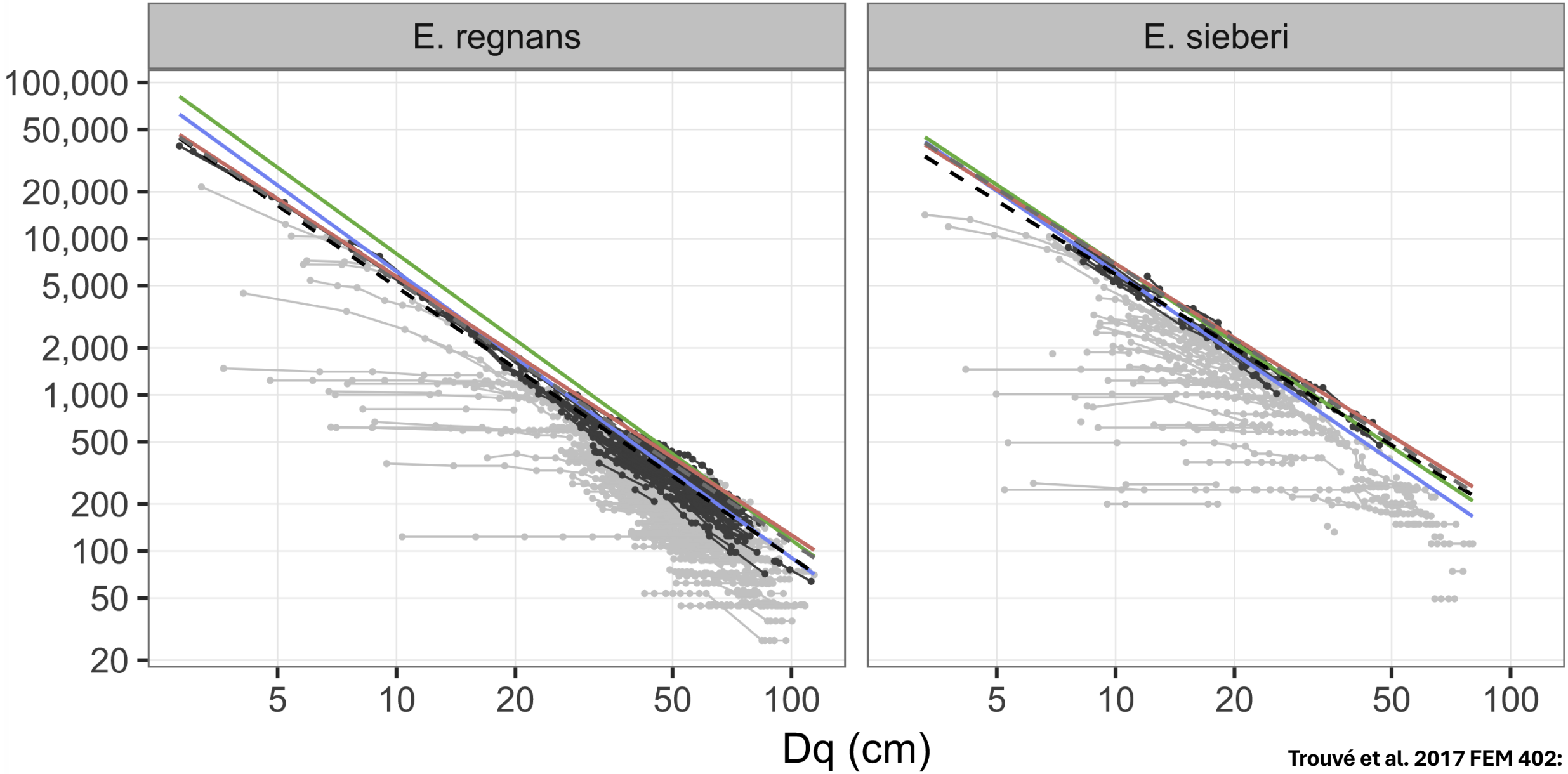
Stand density diagram



Stand density diagram



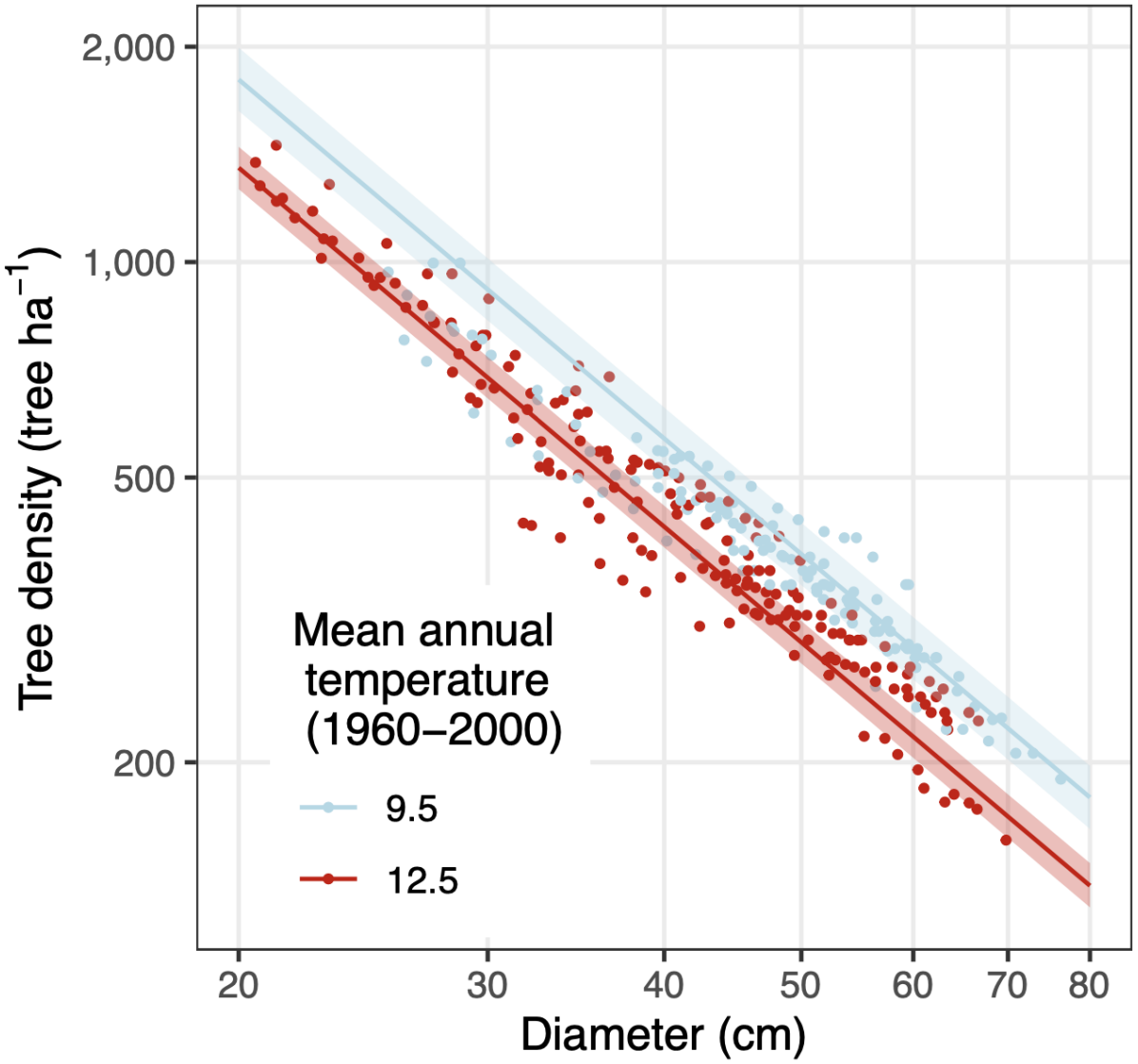
Examples of self-thinning lines

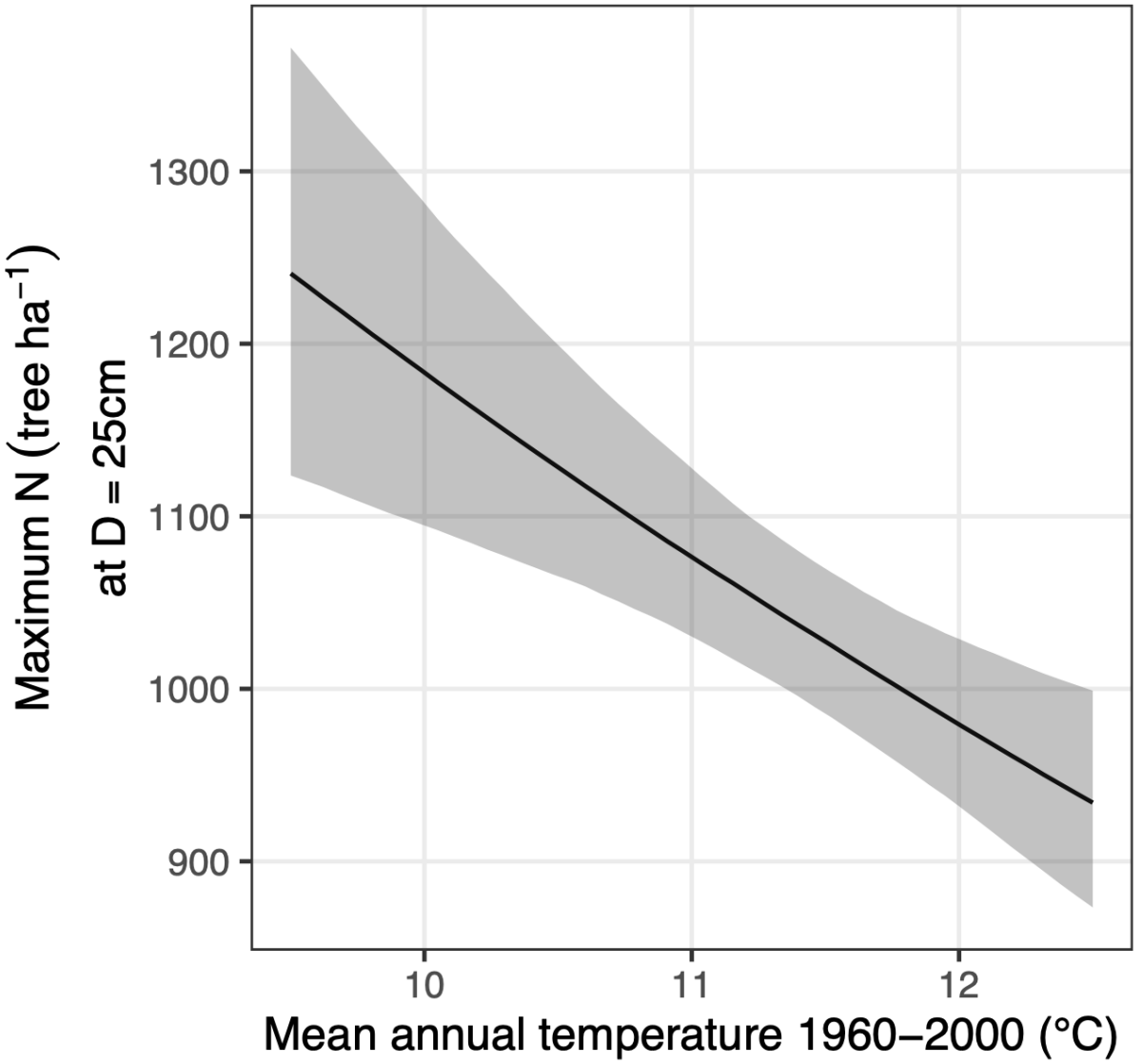


Trouvé et al. 2017 FEM 402: 122

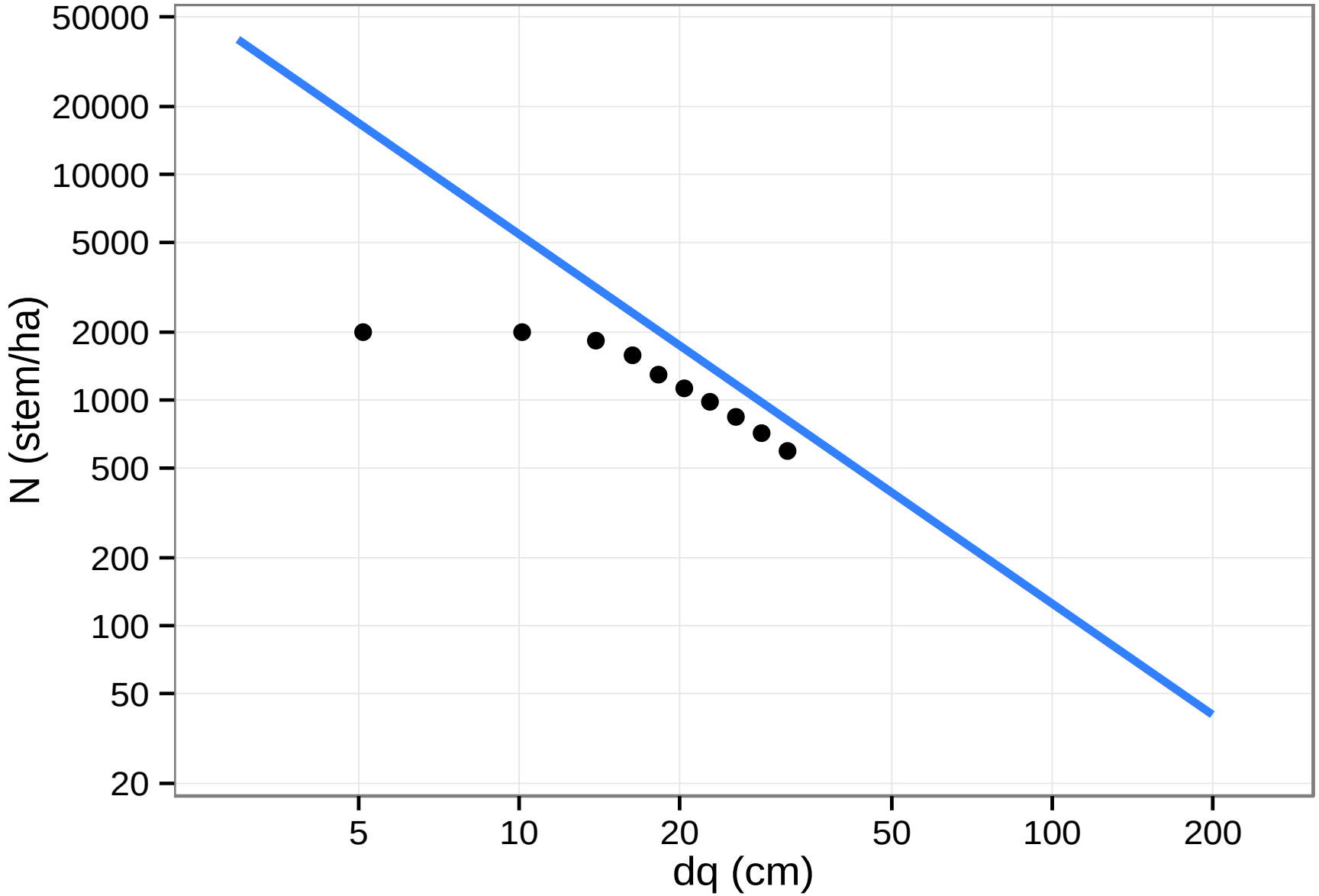
DENSITY MANAGEMENT AND CLIMATE

Self-thinning line and climate

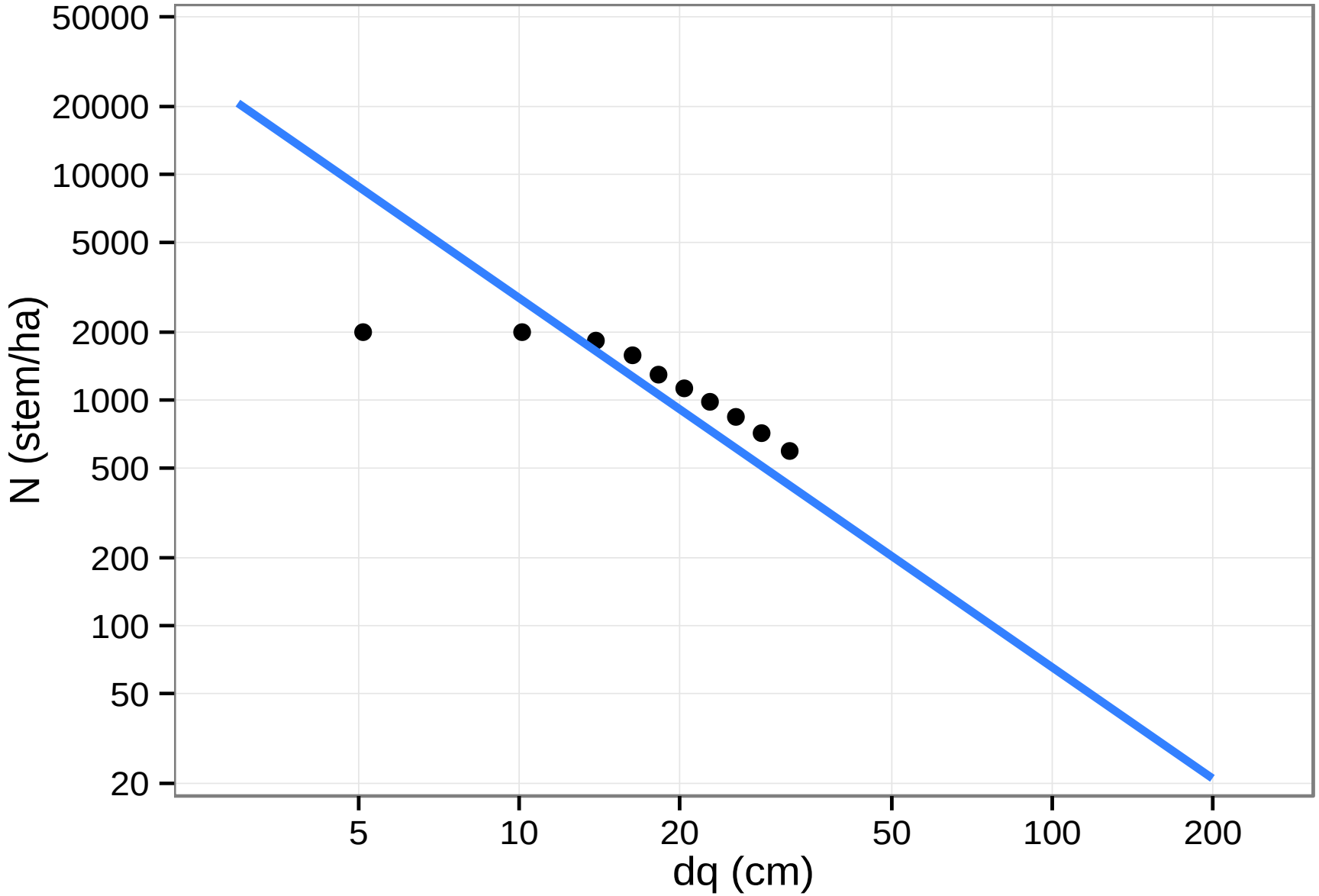




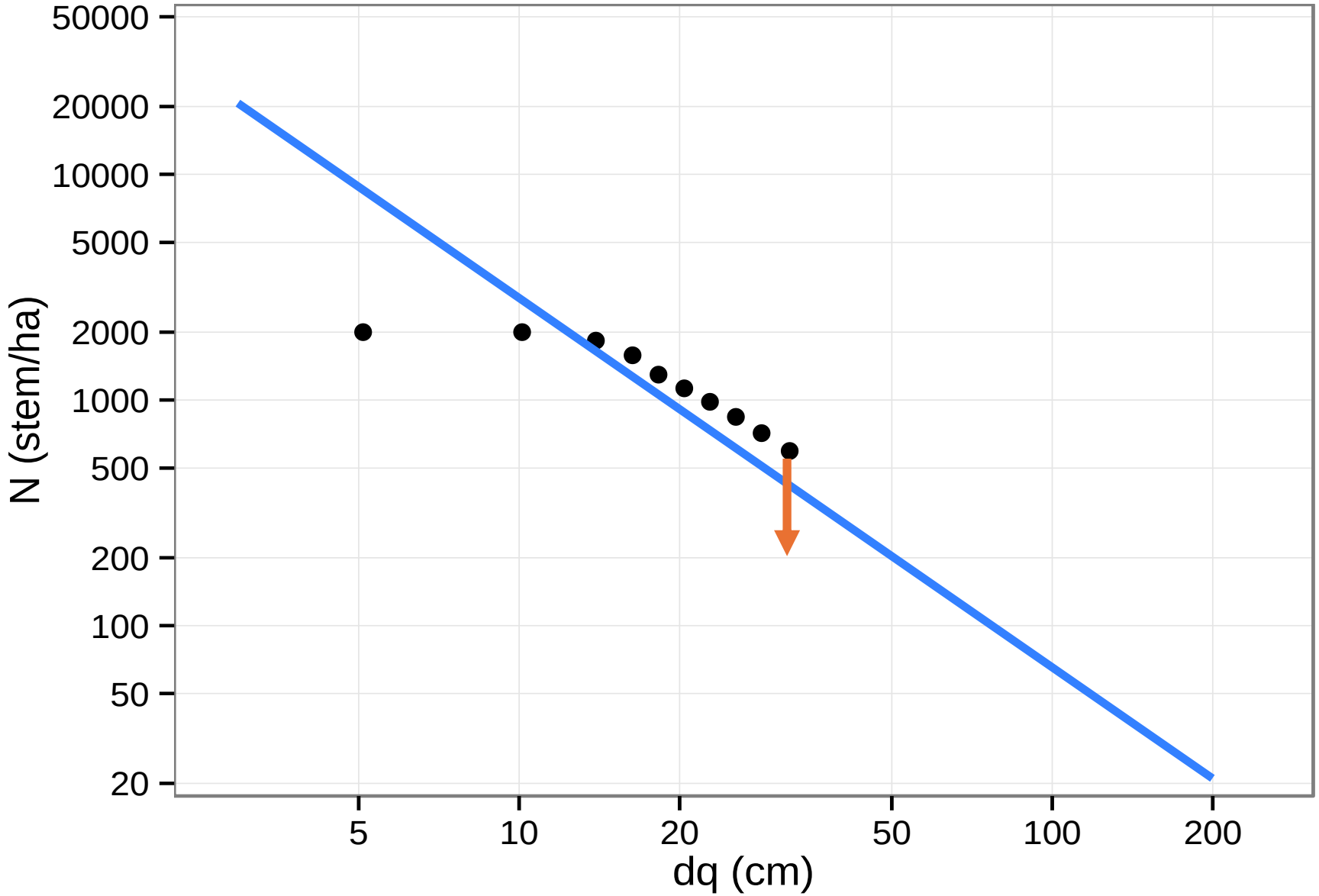
Stand density diagram



Stand density diagram

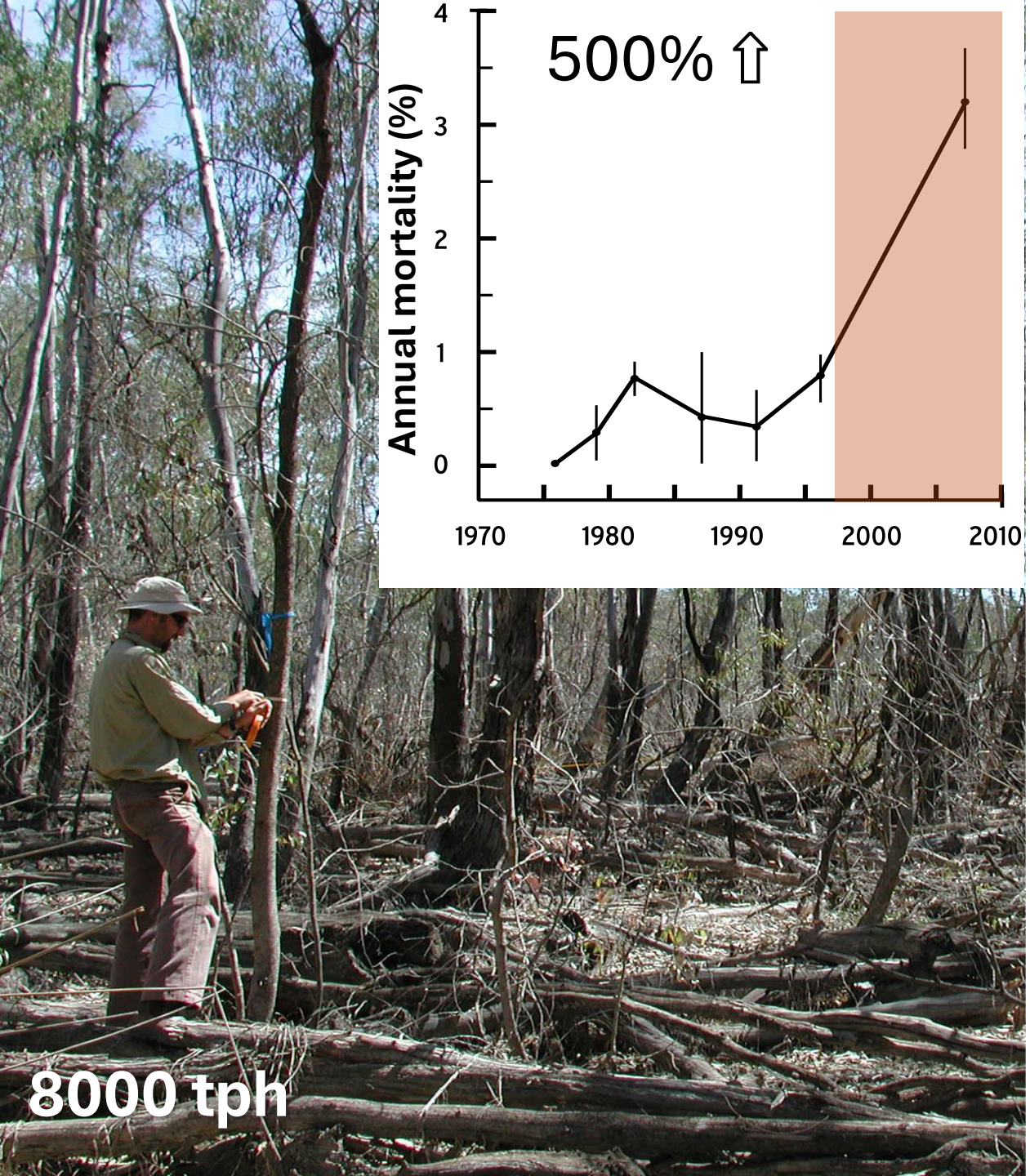


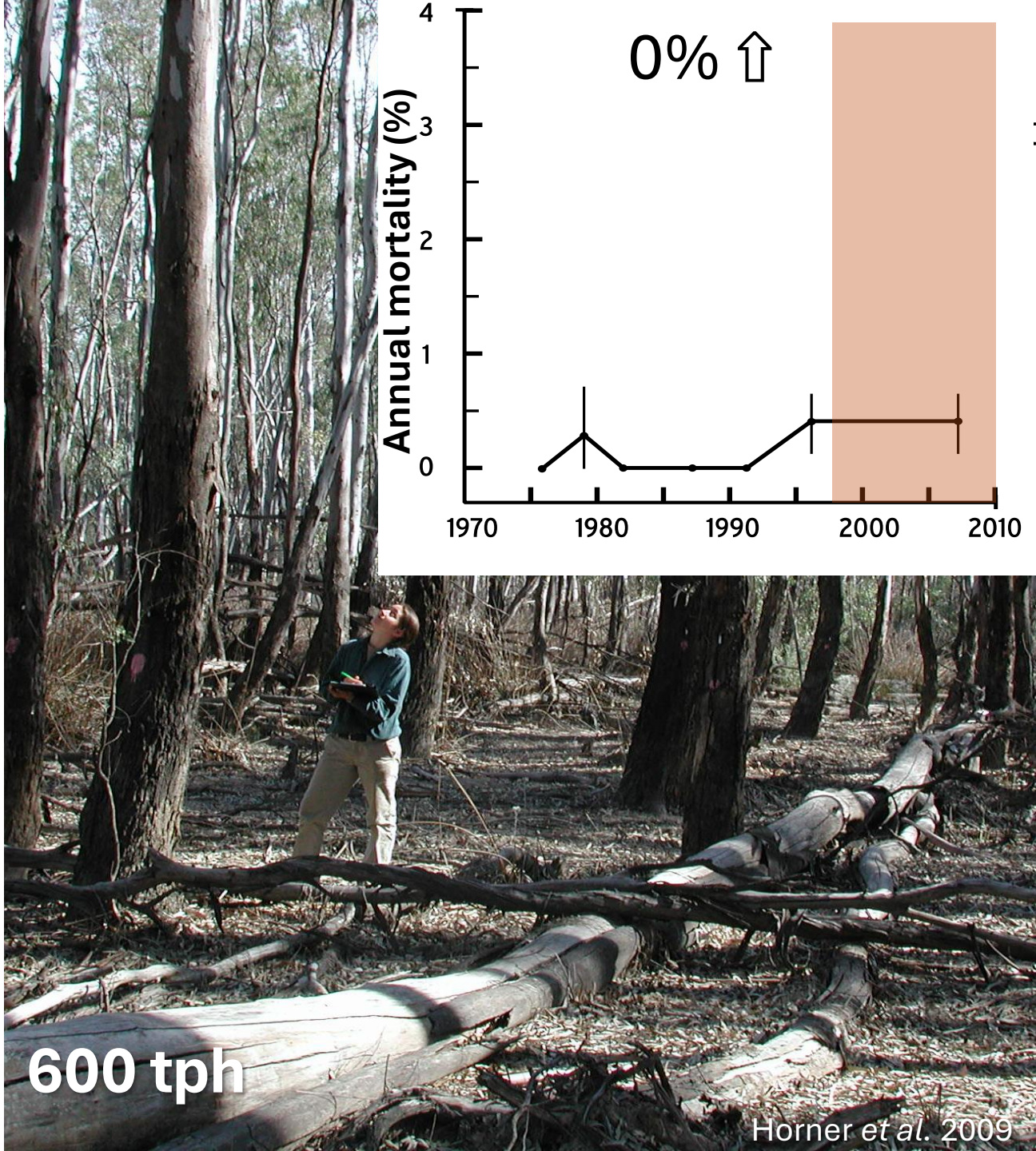
Stand density diagram




8000 tph


600 tph





Horner *et al*. 2009

Reducing stand density increases climate resilience

878

NRC Research Press

NOTE

Thinning increases climatic resilience of red pine

Matthew Magruder, Sophan Chhin, Brian Palik, and John B. Bradford

Ecological Applications, 23(8), 2013, pp. 1735–1742

Effects of thinning on drought vulnerability and climate response in north temperate forest ecosystems

ANTHONY W. D'AMATO,[1,5] JOHN B. BRADFORD,[2] SHAWN FRAVER,[1,4] AND BRIAN J. PALIK[3]

[1]*Department of Forest Resources, University of Minnesota, St. Paul, Minnesota 55108 USA*
[2]*U.S. Geological Survey, Southwest Biological Science Center, Flagstaff, Arizona 86001 USA*
[3]*Northern Research Station, USDA Forest Service, Grand Rapids, Minnesota 55744 USA*
[4]*School of Forest Resources, University of Maine, Orono, Maine 04469 USA*

A window of opportunity for climate-change adaptation: easing tree mortality by reducing forest basal area

John B Bradford[1*] and David M Bell[2]

Ecological Applications, 26(7), 2016, pp. 2190–2205

Heavy and frequent thinning promotes drought adaptation in *Pinus sylvestris* forests

JULIA A. SOHN,[1,3] FLORIAN HARTIG,[2] MARTIN KOHLER,[1] JÜRGEN HUSS,[1] AND JÜRGEN BAUHUS[1]

[1]*Department of Silviculture, University of Freiburg, Tennenbacherstr. 4, Freiburg, D-79085 Germany*
[2]*Department of Biometry, University of Freiburg, Tennenbacherstr. 4 Freiburg, D-79085 Germany*

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

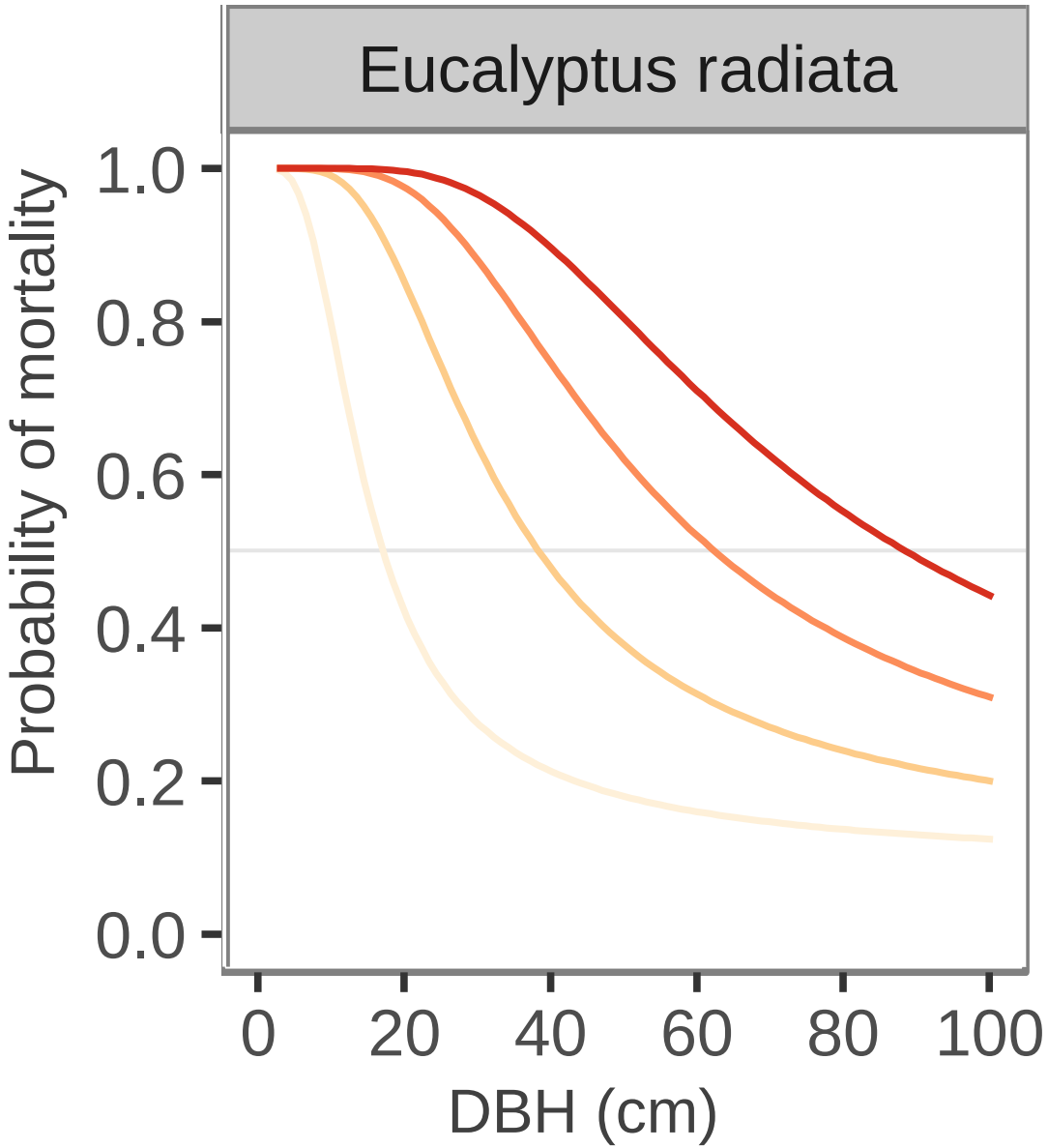
Potential of forest thinning to mitigate drought stress: A meta-analysis

Julia A. Sohn *[,1], Somidh Saha [1], Jürgen Bauhus

Chair of Silviculture, University of Freiburg, D-79085 Freiburg, Germany

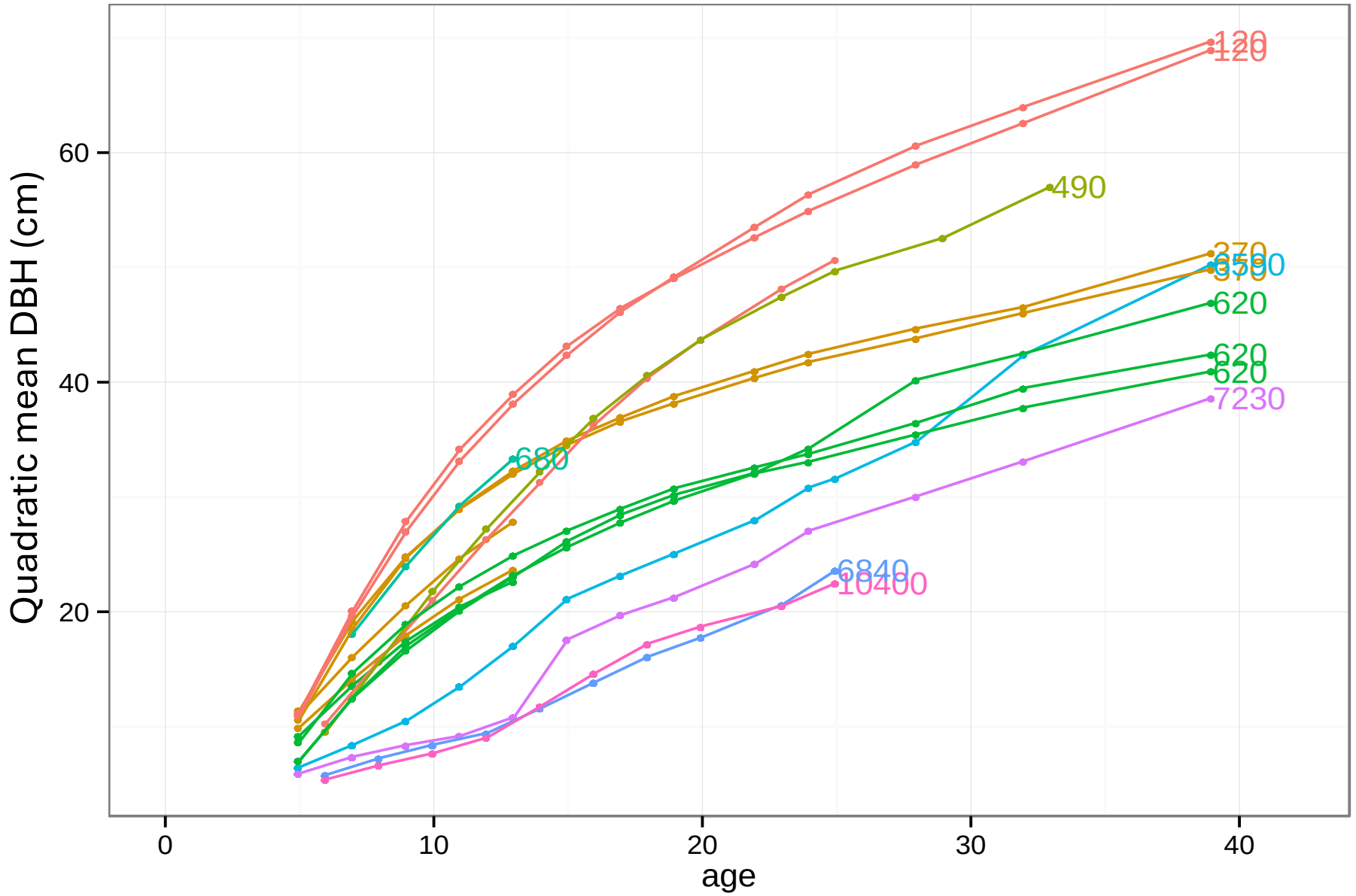
DENSITY MANAGEMENT CAN REDUCE FIRE SEVERITY...

Bigger trees are more resistant to fire



Trouve *et al*. 2021

Eucalyptus regnans density management trials

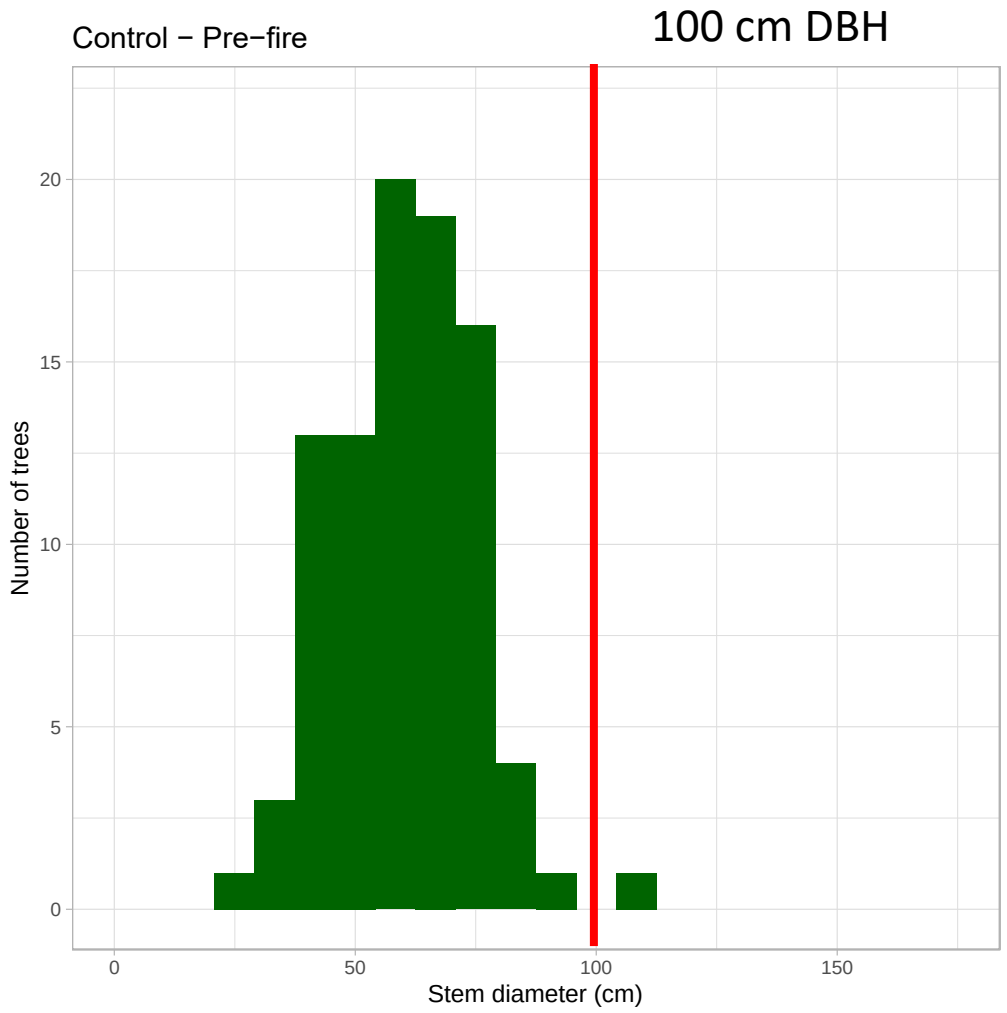


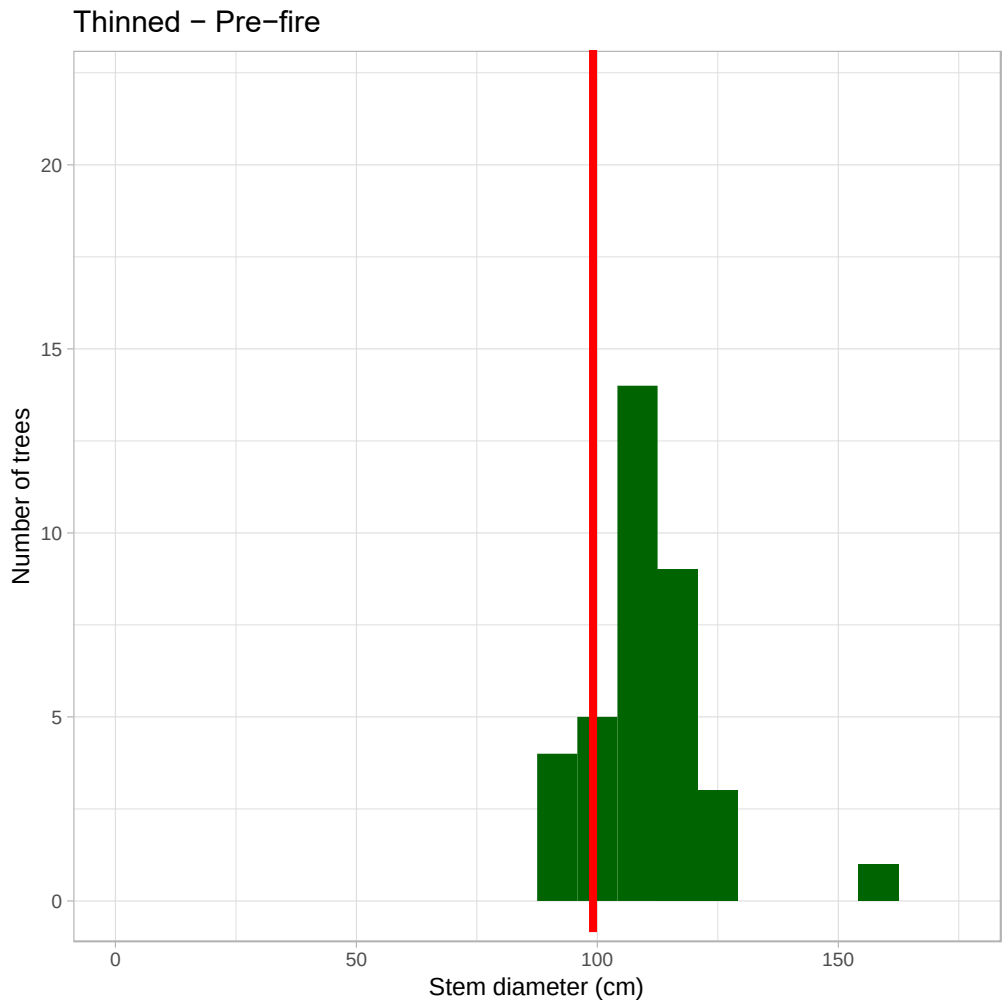
Low density

↓

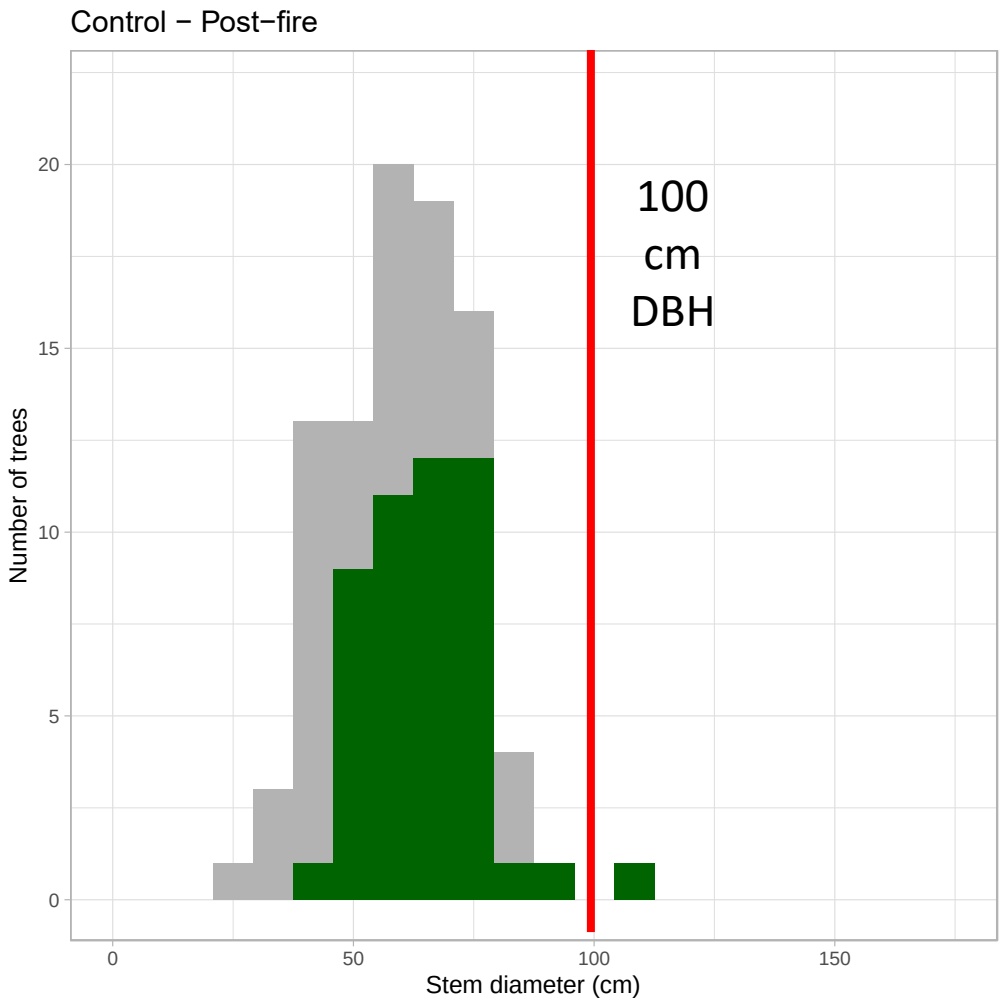
High density

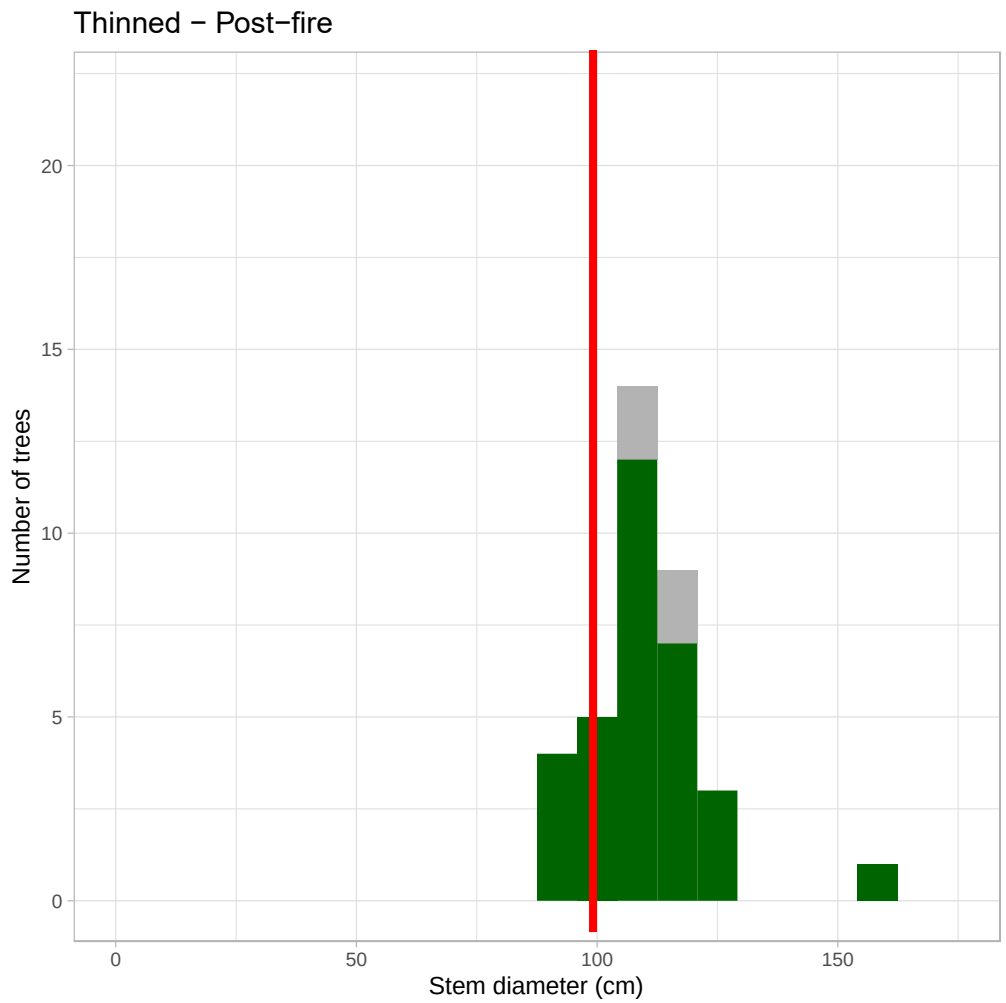
Thinning increases tree growth and reduces fire-induced mortality





Thinning increases tree growth and reduces fire-induced mortality





…AND LOTS OF STUDIES SHOW THIS

ARTICLE

Special Feature: Long-term ecological effects of forest fuel and restoration treatments

ECOLOGICAL APPLICATIONS
ECOLOGICAL SOCIETY OF AMERICA

Forest restoration and fuels reduction work: Different pathways for achieving success in the Sierra Nevada

Scott L. Stephens[1] | Daniel E. Foster[1] | John J. Battles[1] | Alexis A. Bernal[1] | Brandon M. Collins[1,2,3] | Rachelle Hedges[4] | Jason J. Moghaddas[5] | Ariel T. Roughton[4] | Robert A. York[1]

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Thinning with follow-up burning treatments have increased effectiveness at reducing severity in California's largest wildfire

Kristen L. Shive [a,*], Michelle Coppoletta [b], Rebecca Bewley Wayman [c], Alison K. Paulson [d], Kristen N. Wilson [e], John T. Abatzaglou [f], Saba J. Saberi [c], Becky Estes [b], Hugh D. Safford [c,g]

[a] *Department of Environmental Science, Policy and Management, University of California, Berkeley, USA*
[b] *USDA Forest Service, Region 5 Ecology Program, USA*
[c] *Department of Environmental Science and Policy, University of California, Davis, USA*
[d] *USDA Forest Service, Humboldt-Toiyabe National Forest, USA*
[e] *The Nature Conservancy, USA*
[f] *School of Engineering, University of California, Merced, USA*
[g] *Vibrant Planet, USA*

Hankin *et al. Fire Ecology* (2023) 19:40
https://doi.org/10.1186/s42408-023-00202-6

Fire Ecology

FIELD NOTE

Open Access

How forest management changed the course of the Washburn fire and the fate of Yosemite's giant sequoias (*Sequoiadendron giganteum*)

Lacey E. Hankin[1*], Chad T. Anderson[1], Garrett J. Dickman[1], Parker Bevington[1] and Scott L. Stephens[2]

Fig. 6 Fire behavior in **A** an untreated area above the Mariposa Grove treatment units, and **B** a thinned area near the community of Wawona

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Tamm review: A meta-analysis of thinning, prescribed fire, and wildfire effects on subsequent wildfire severity in conifer dominated forests of the Western US

Kimberley T. Davis [a,*], Jamie Peeler [b], Joseph Fargione [c], Ryan D. Haugo [d], Kerry L. Metlen [e], Marcos D. Robles [f], Travis Woolley [g]

[a] *Missoula Fire Sciences Lab, Rocky Mountain Research Station, USDA Forest Service, Missoula, MT, USA*
[b] *Department of Ecosystem and Conservation Sciences, University of Montana, Missoula, MT, USA*
[c] *The Nature Conservancy, Minneapolis, MN, USA*
[d] *The Nature Conservancy, Portland, OR, USA*
[e] *The Nature Conservancy, Ashland, OR, USA*
[f] *The Nature Conservancy, Tucson, AZ, USA*
[g] *The Nature Conservancy, Flagstaff, AZ, USA*


MANAGING STAND DENSITY
CAN IMPROVE FOREST
HEALTH AND RESILIENCE


Thank you!

Changes in carrying capacity may be temporary or permanent