Accelerating succession through selective thinning

Swinfield, Harrison, Antoni and Afriandi

Natural succession rapidly produces high biomass forests

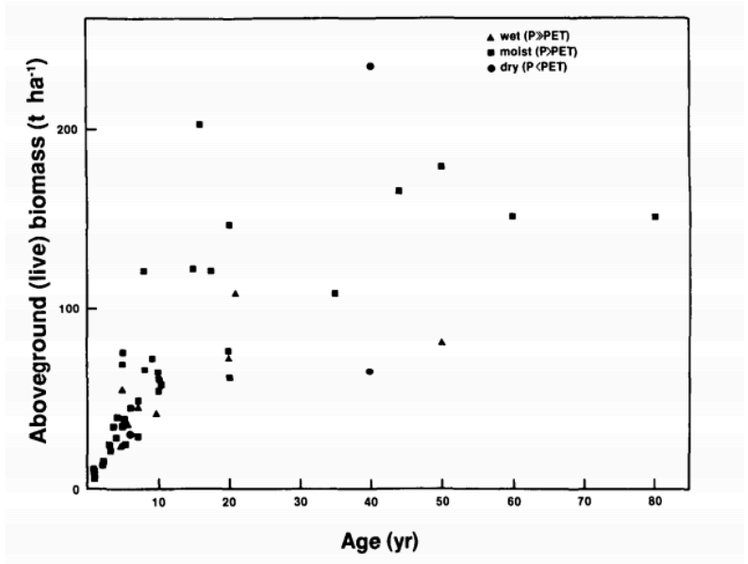
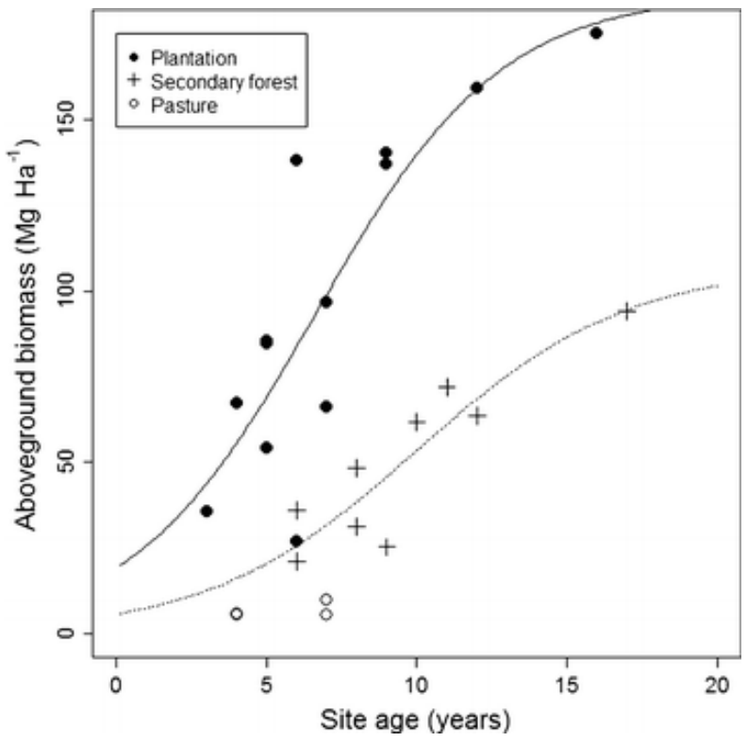
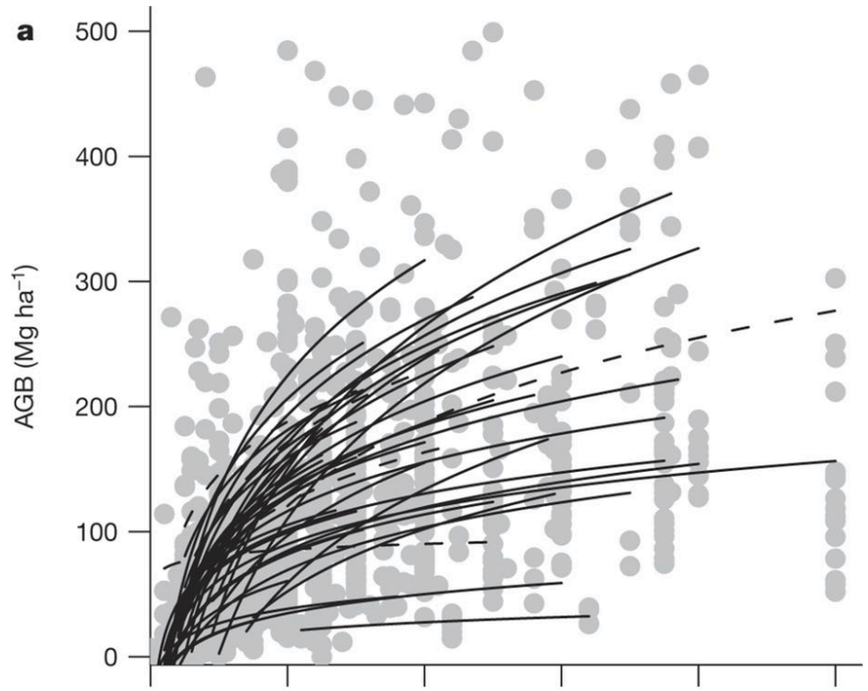
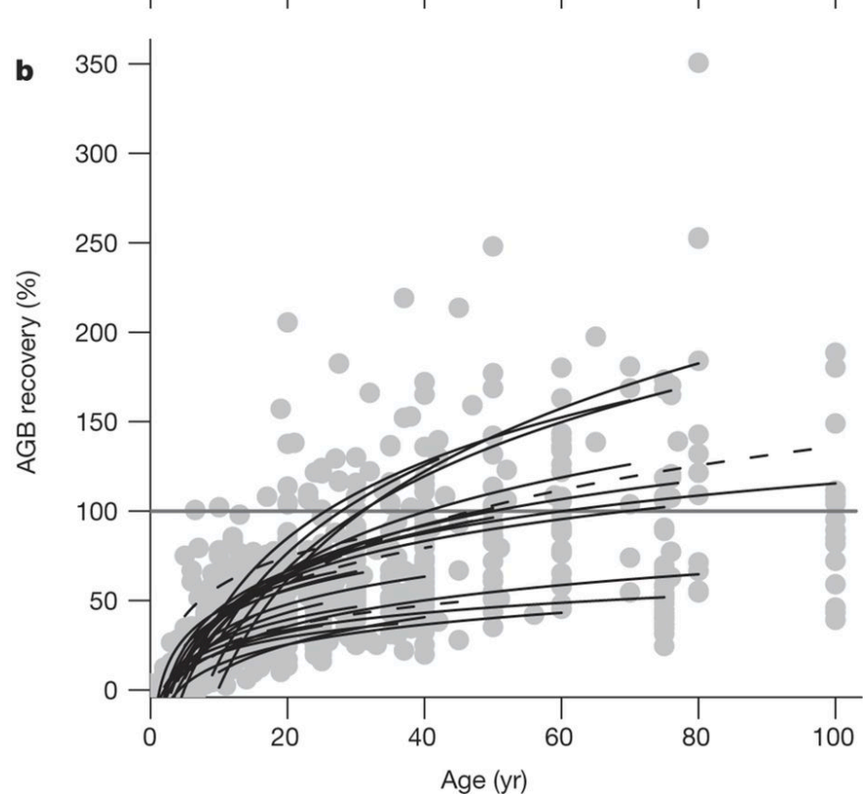


Figure 3. Above ground biomass (excluding litter) of different aged secondary forests. Data are from the following sources keyed to Table 3: 2, 3, 5, 7–9, 12, 15–17, 20–24, 26–28.



Sang et al. (2013)





Poorter et al. (2015)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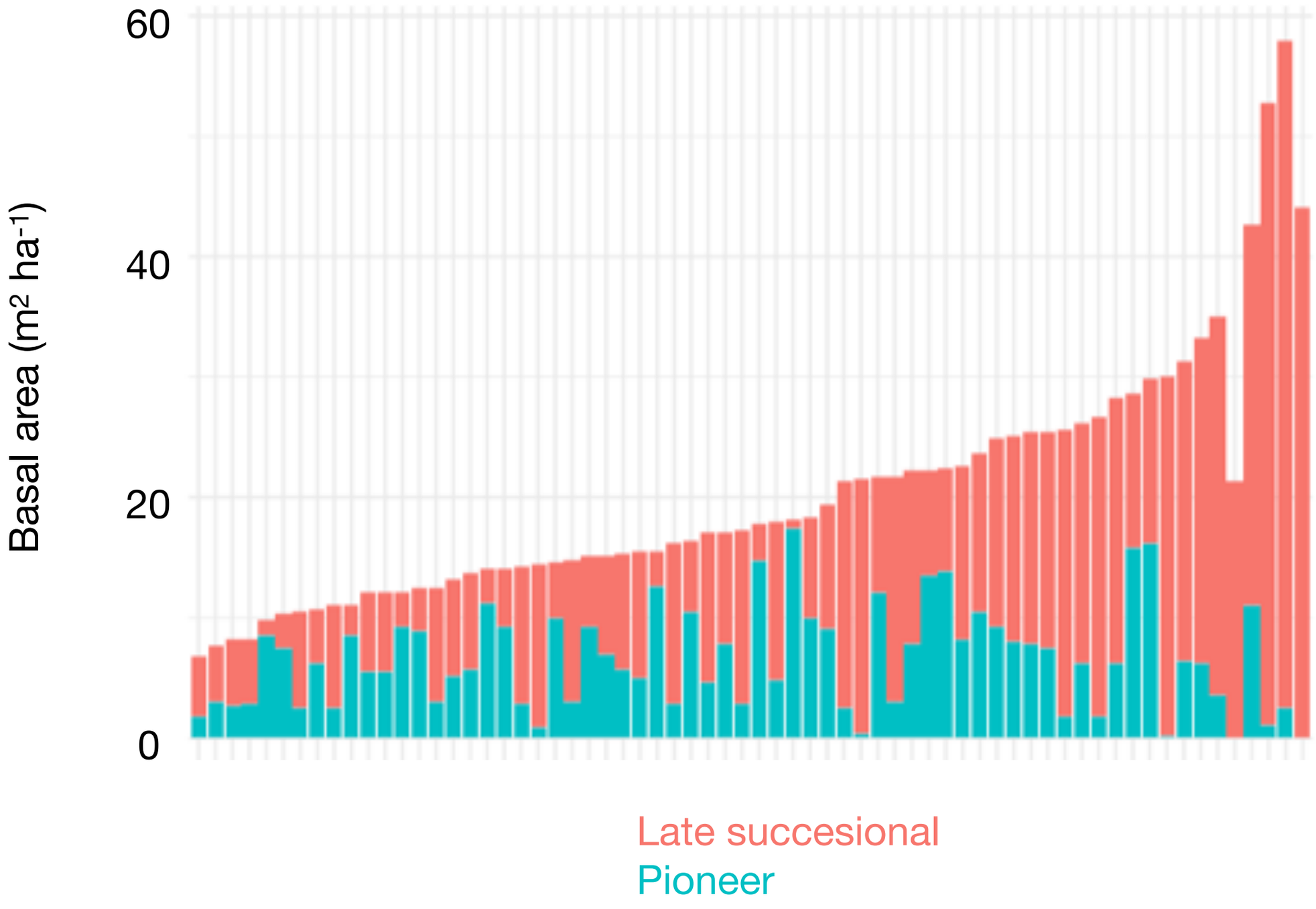
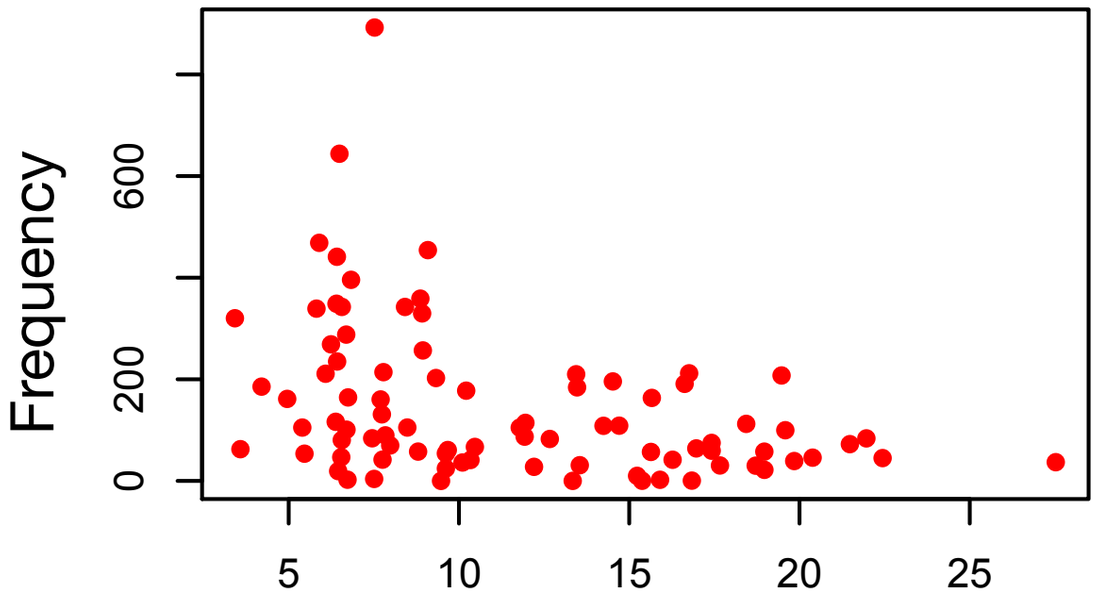
PC800 HYPERFIRE PRO
RECONYX

Selective thinning of pioneers presents an opportunity

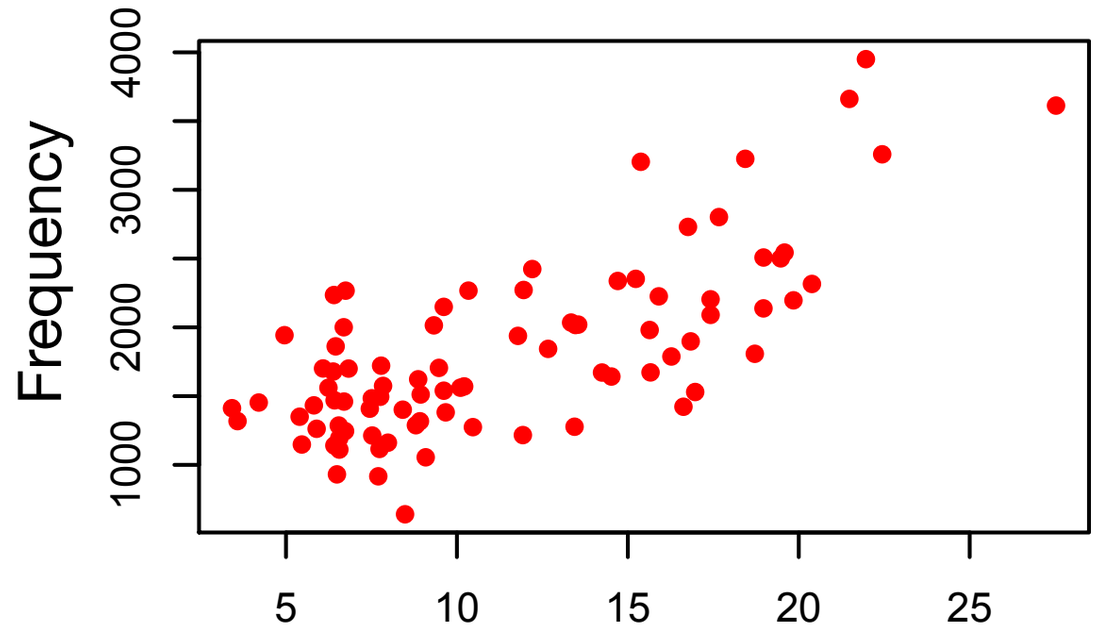


Choosing the correct moment

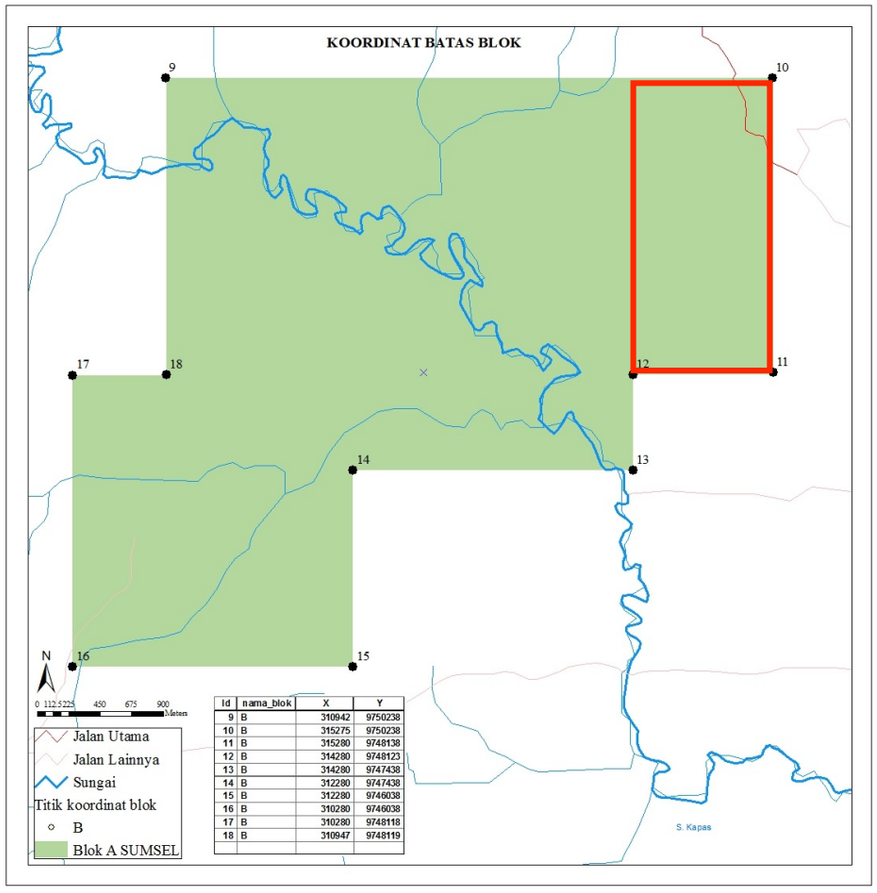
Pioneer stems
(10-20 cm DBH)



Late successional stems
(10-20 cm DBH)



Experimental assessment of thinning



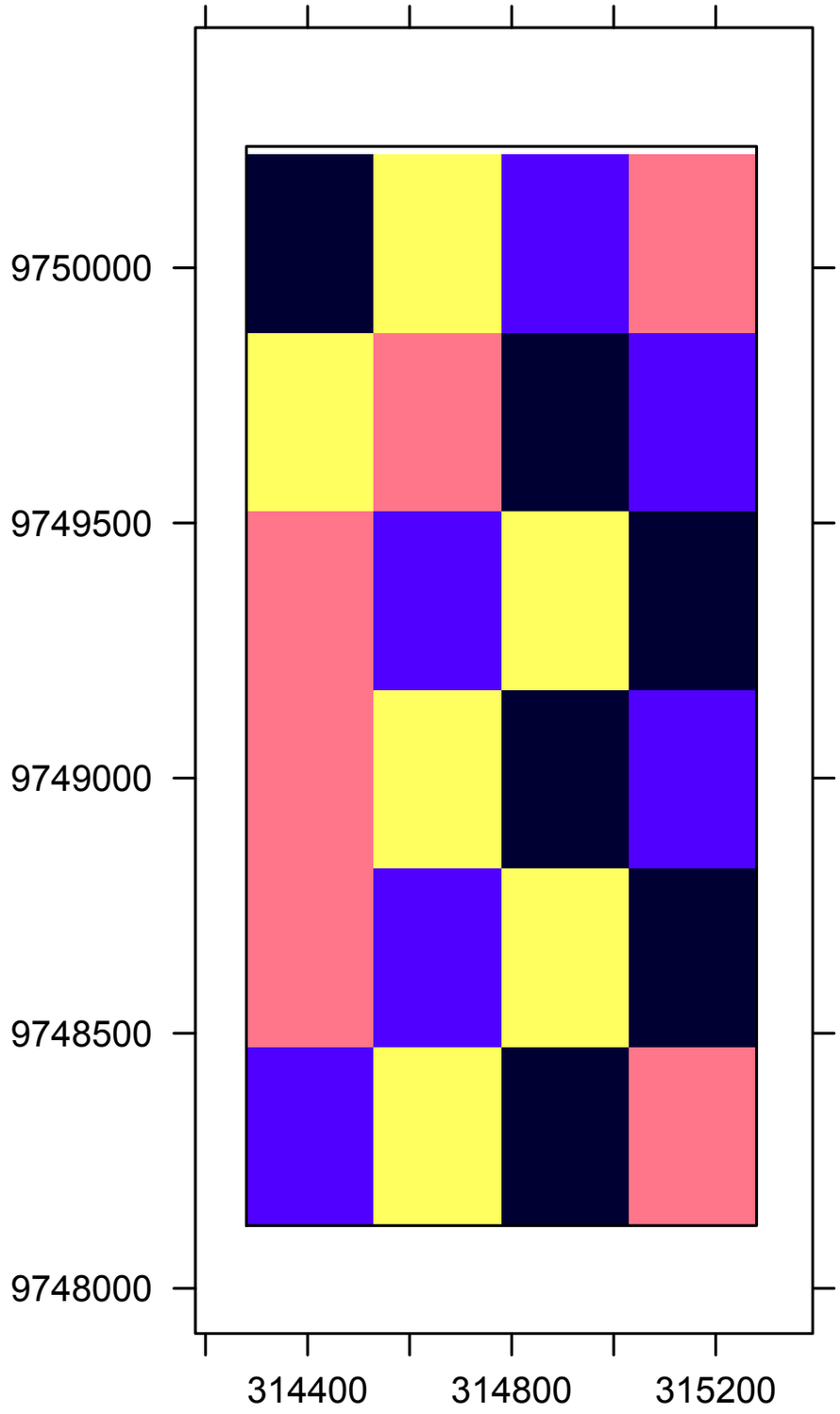
Treatment

<20 cm

<15 cm

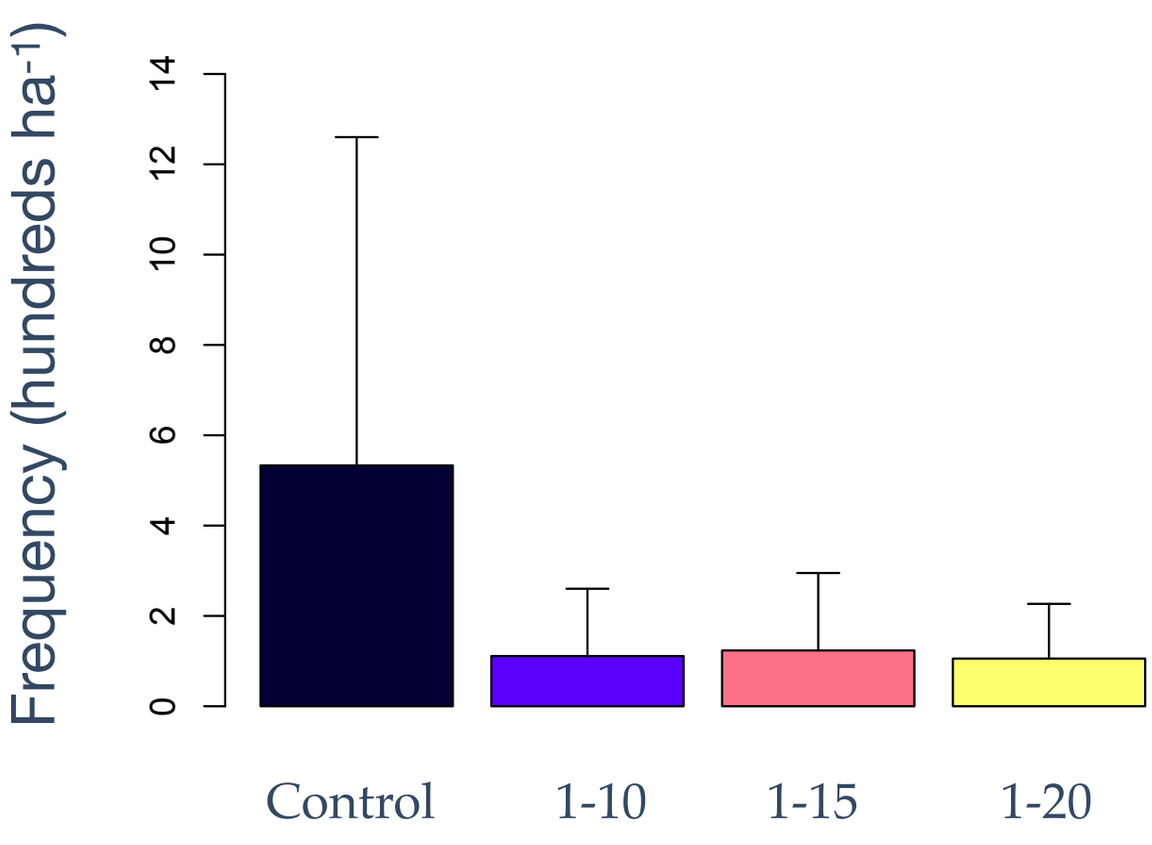
<10 cm

Control

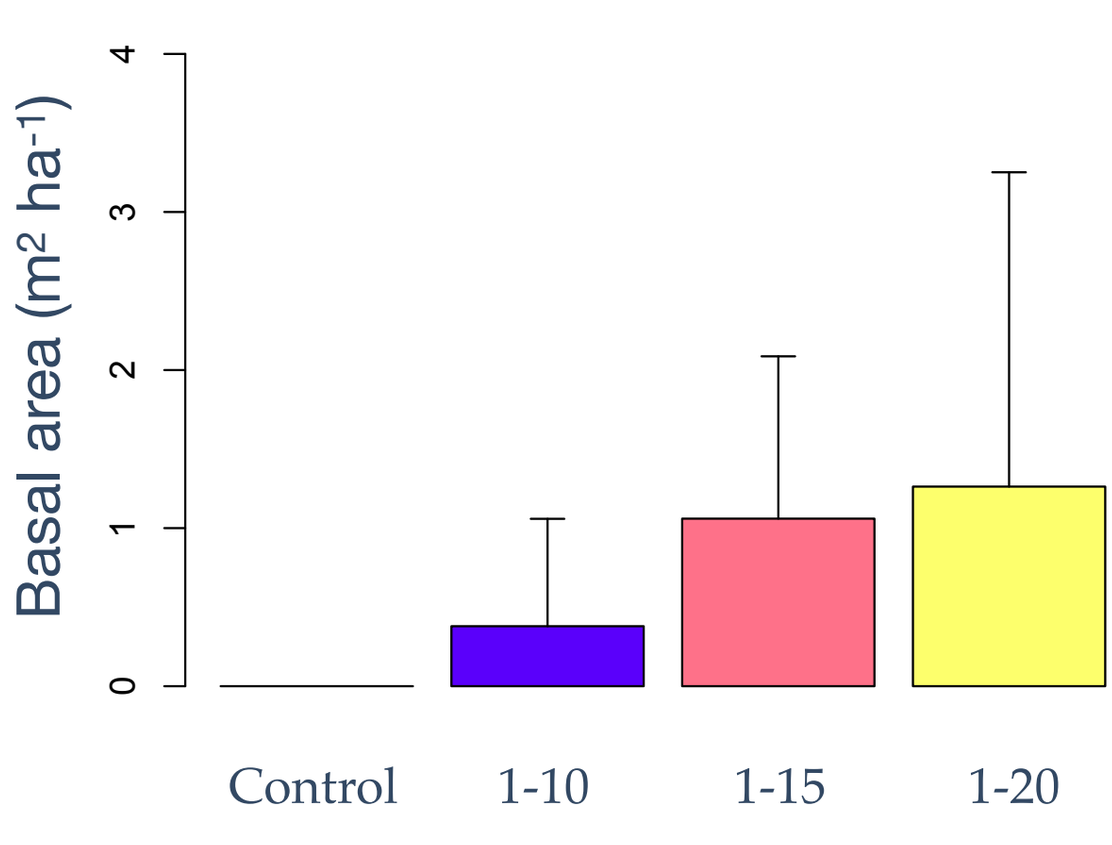


Treatment effect

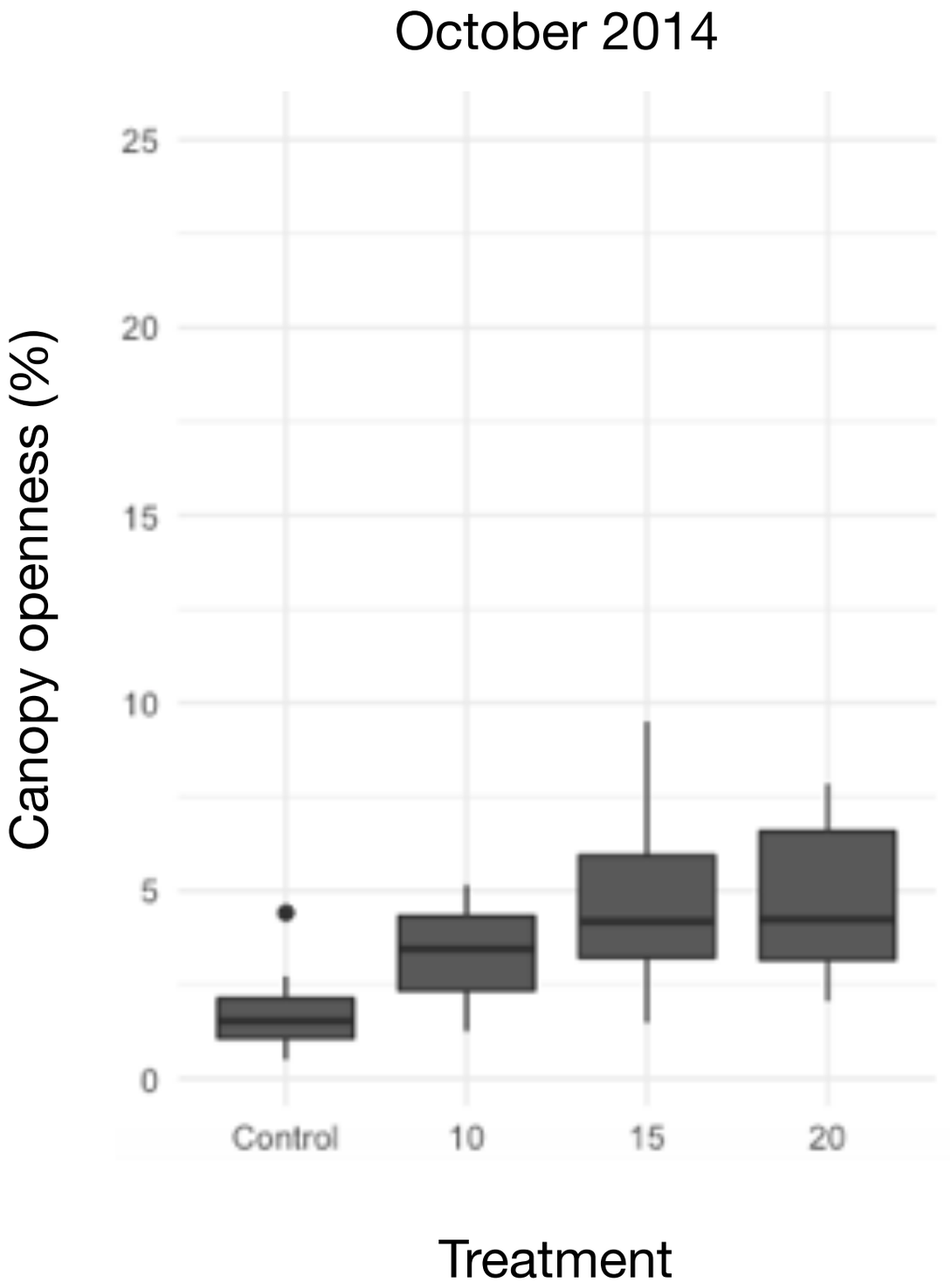
Number of pioneer stems remaining (2-10cm DBH)



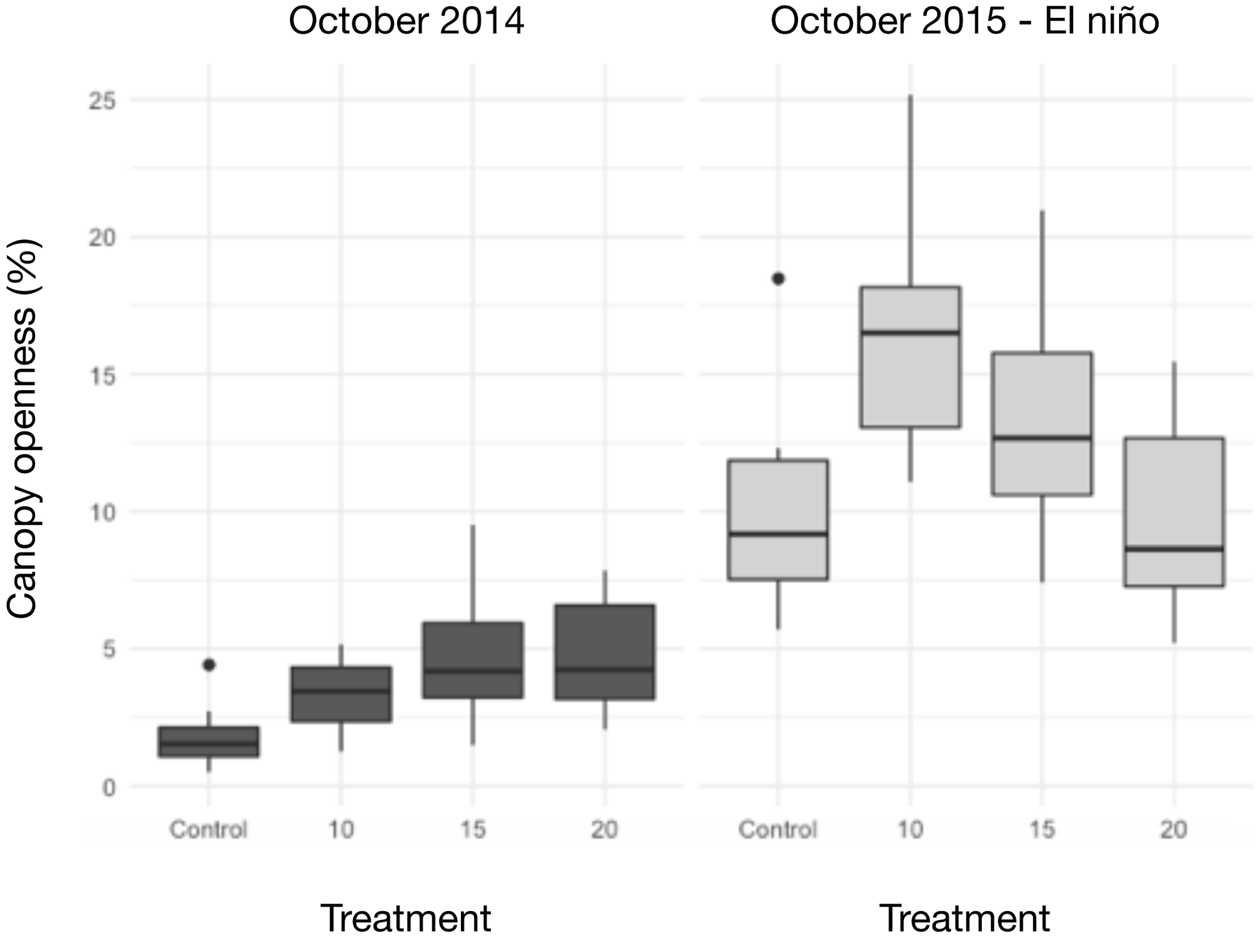
Basal area removed



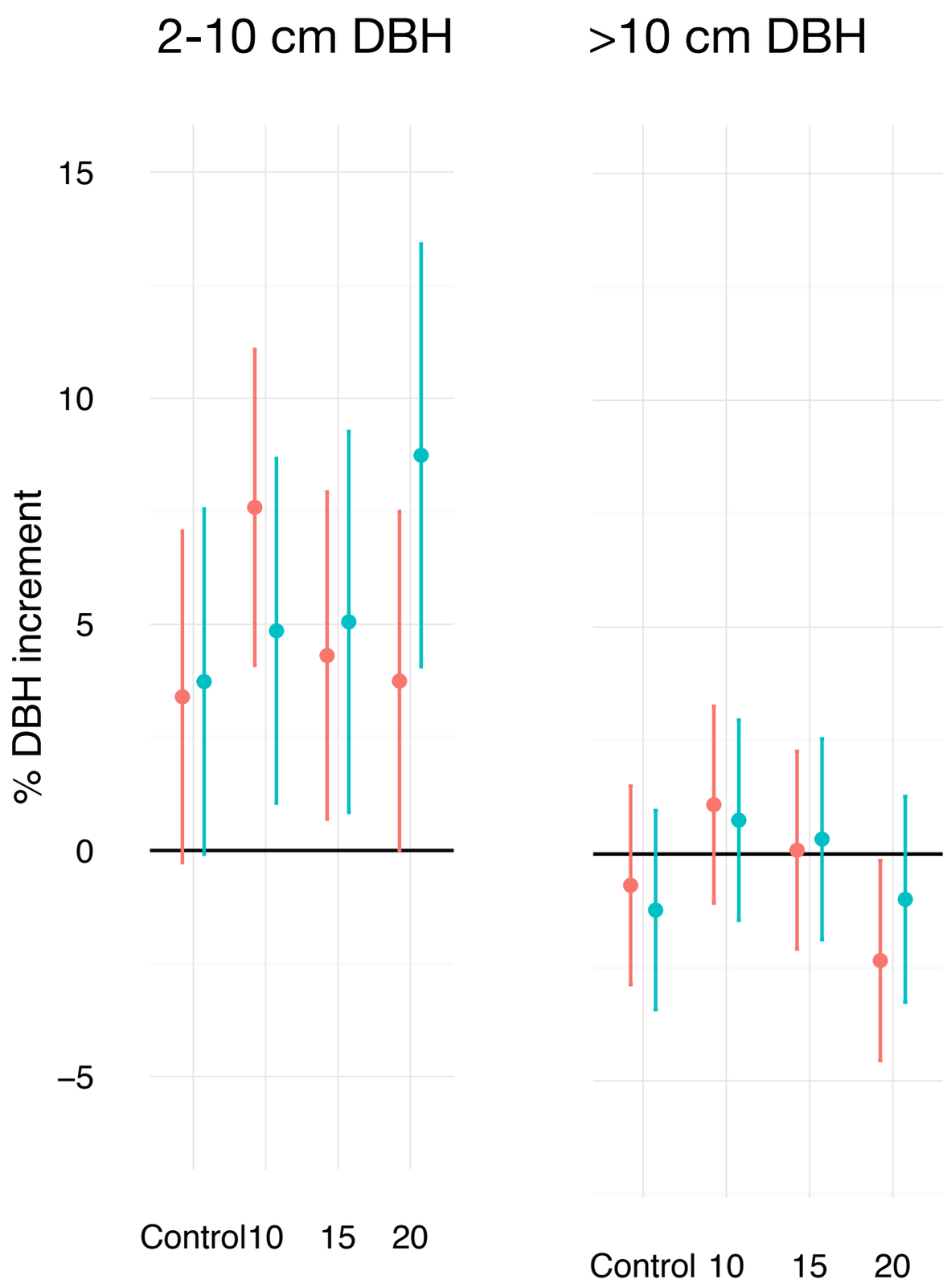
Canopy openness



Canopy openness



Effect on growth



Control

10

15

20

DBH 2016 (cm)

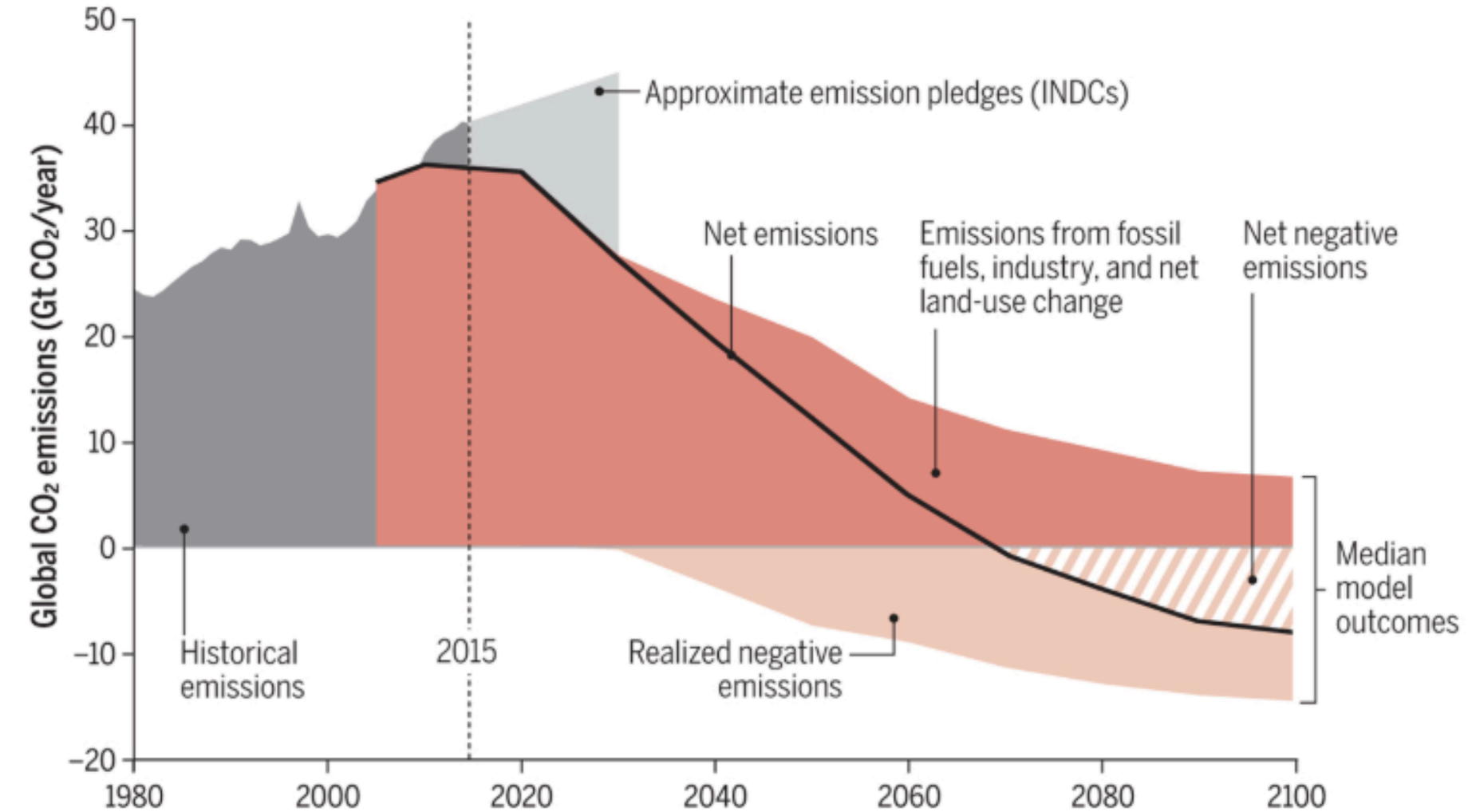
12.5
10.0
7.5
5.0
2.5

0.0
2.5
5.0
7.5
10.0

success.type
late
pio

DBH 2014 (cm)

Dependence on BECCS



Anderson and Peters (2016)

To the future

Harvesting pioneer species offers a unique opportunity to enhance stand value and simultaneously generate an income

Our experiment suggests that the technique is effective

How important is the ecological role of pioneers?

What is the long term effect on species composition?

Can pioneer species be used for bio-energy?

Better economic models are needed for natural forest management

Ministry of Foreign Affairs of Denmark
DANIDA | International Development Cooperation

Many thanks

Maybe oil palm is still more competitive

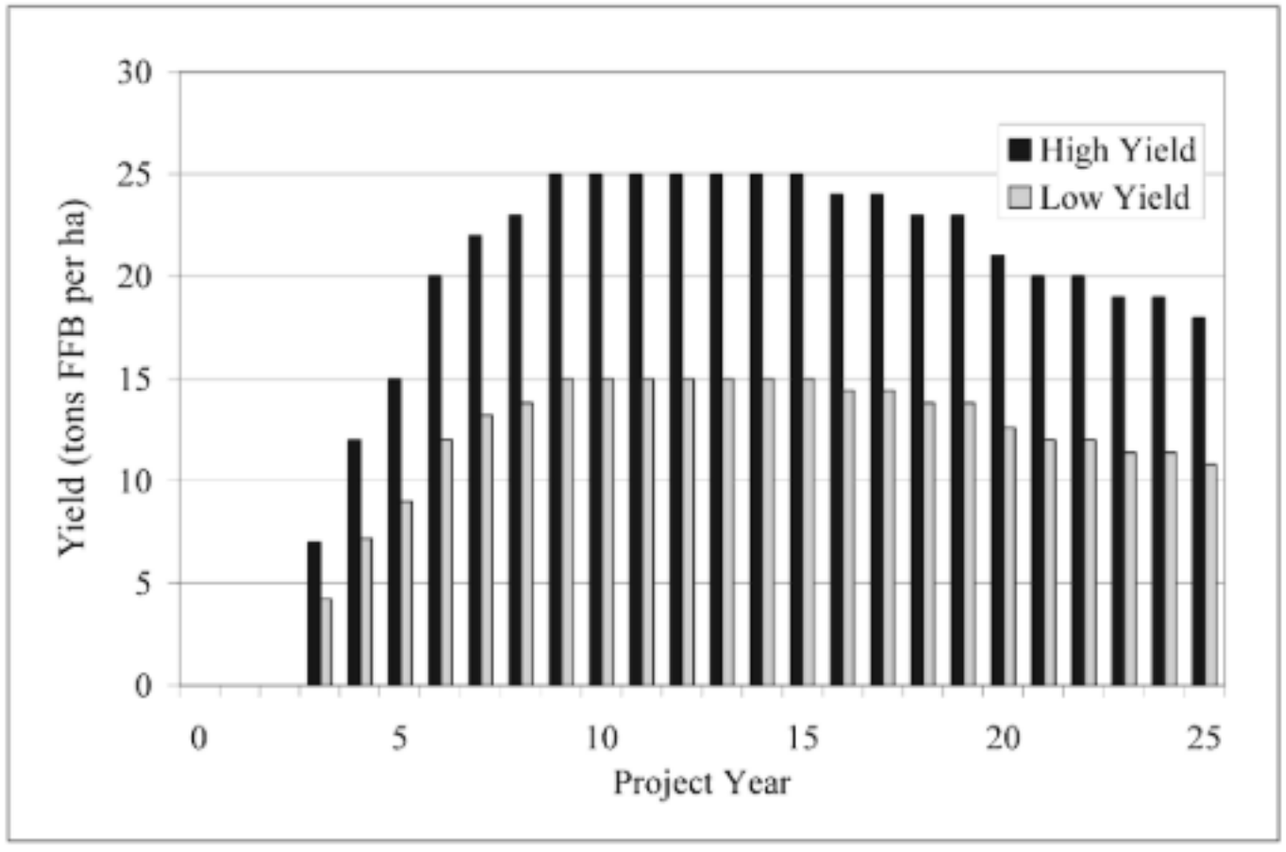
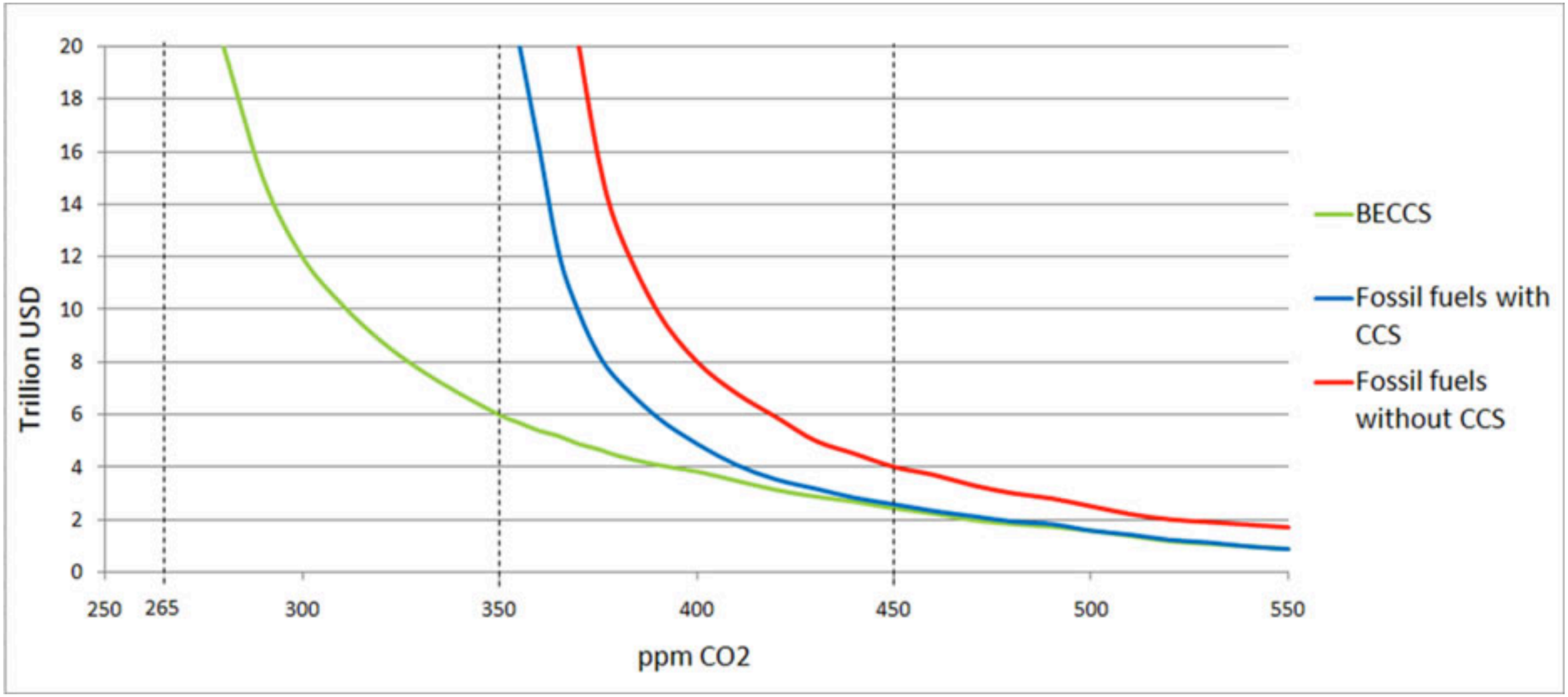


Figure 2.3. Low and high yield profiles for oil palm (Source: Cramb and Ferraro 2012)

Cramb and McCarthy (2016)

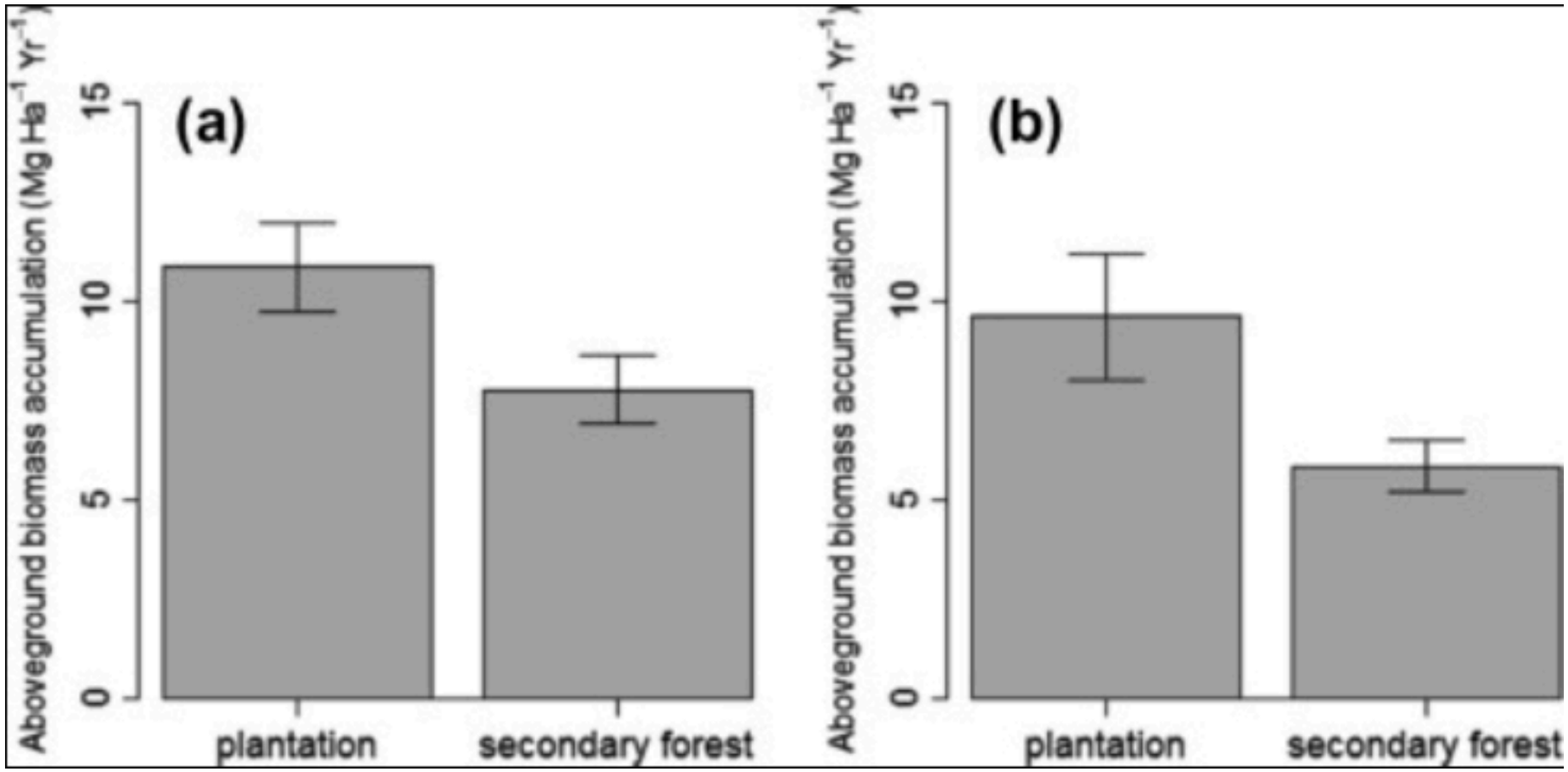
Slik (2004)

Mortality was highest in logged forests, due to extremely high mortality of pioneer *Macaranga* trees (65.4%). Canopy openness was significantly higher during the drought than during the non-drought year (6.0, 8.6 and 10.4 vs 3.7, 3.8 and 3.7 in undisturbed, old logged and recently logged forest, respectively) and was positively correlated with the number of dead standing trees. The increase in light in the understorey was accompanied by a 30 to 300-fold increase in pioneer *Macaranga* seedling densities.



Negative carbon capture and storage

Meta analysis by Bonner et al. (2013) - comparison to A. mangium



Producing biomass from secondary forest growth

100 t ha-1 in the first 15 years (Brown and Lugo, 1990)

Litter production is recovers rapidly (up to 12-13 t ha-1 yr-1) by 12-15 years - This leads to rapid below ground carbond sequestration in young secondary forests (Brown and Lugo, 1990)