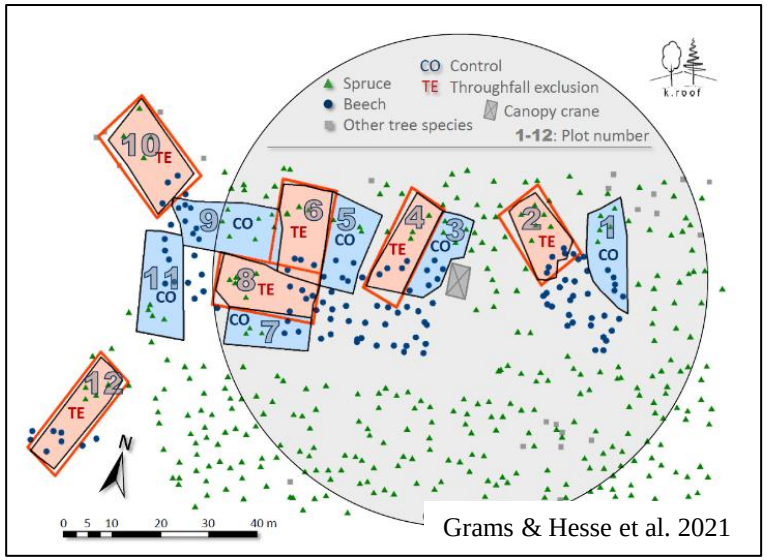
High resilience of water related physiology after five years of repeated summer drought of mature beech and spruce.

BENJAMIN D. HESSE, TIMO GEBHARDT, BENJAMIN D. HAFNER, KYOHSUKE HIKINO, KARL-HEINZ HÄBERLE, THORSTEN E. E. GRAMS

KROOF Experiment

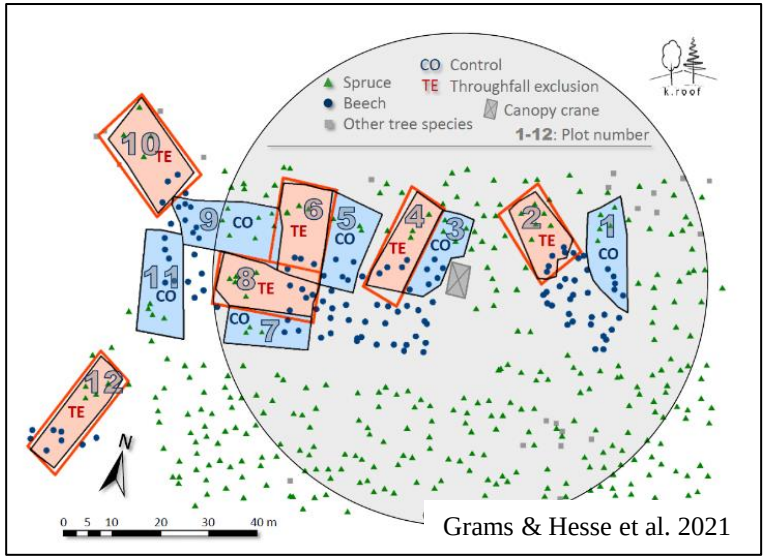
- Near Freising/Munich
- Mixture of *Fagus sylvatica* (planted ~1930) and *Picea abies* (planted ~1950)
- 12 plots (6 CO & 6 TE)



Grams & Hesse et al. 2021

KROOF Experiment

- Near Freising/Munich
- Mixture of *Fagus sylvatica* (planted ~1930) and *Picea abies* (planted ~1950)
- 12 plots (6 CO & 6 TE)
- Rainfall exclusion via automated roof system
  ➔ 5 years of summer drought
- Luvisol with Loess layer
- Canopy crane
- Sprayed with insecticide



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KROOF II

- Re-watering of the TE-plots in 2019
  - Applied with soaker hoses
  - Measured parameters:
    - Leaf water potential
    - Leaf gas exchange
    - Leaf PV-curves
    - Xylem sap flow density

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KROOF II

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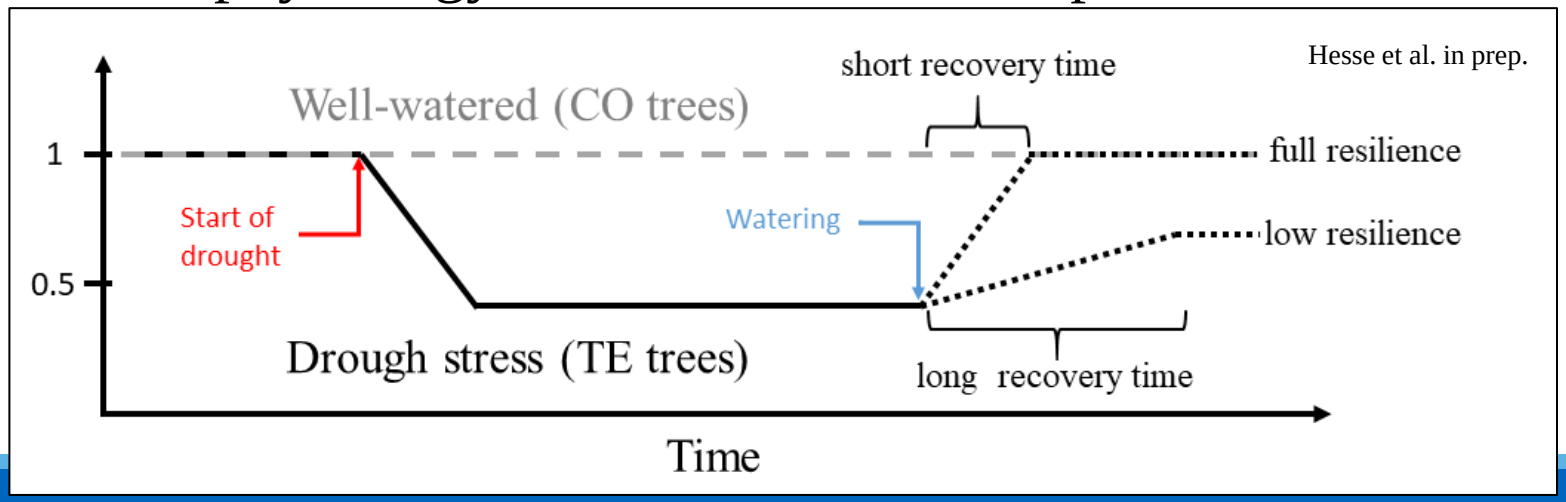
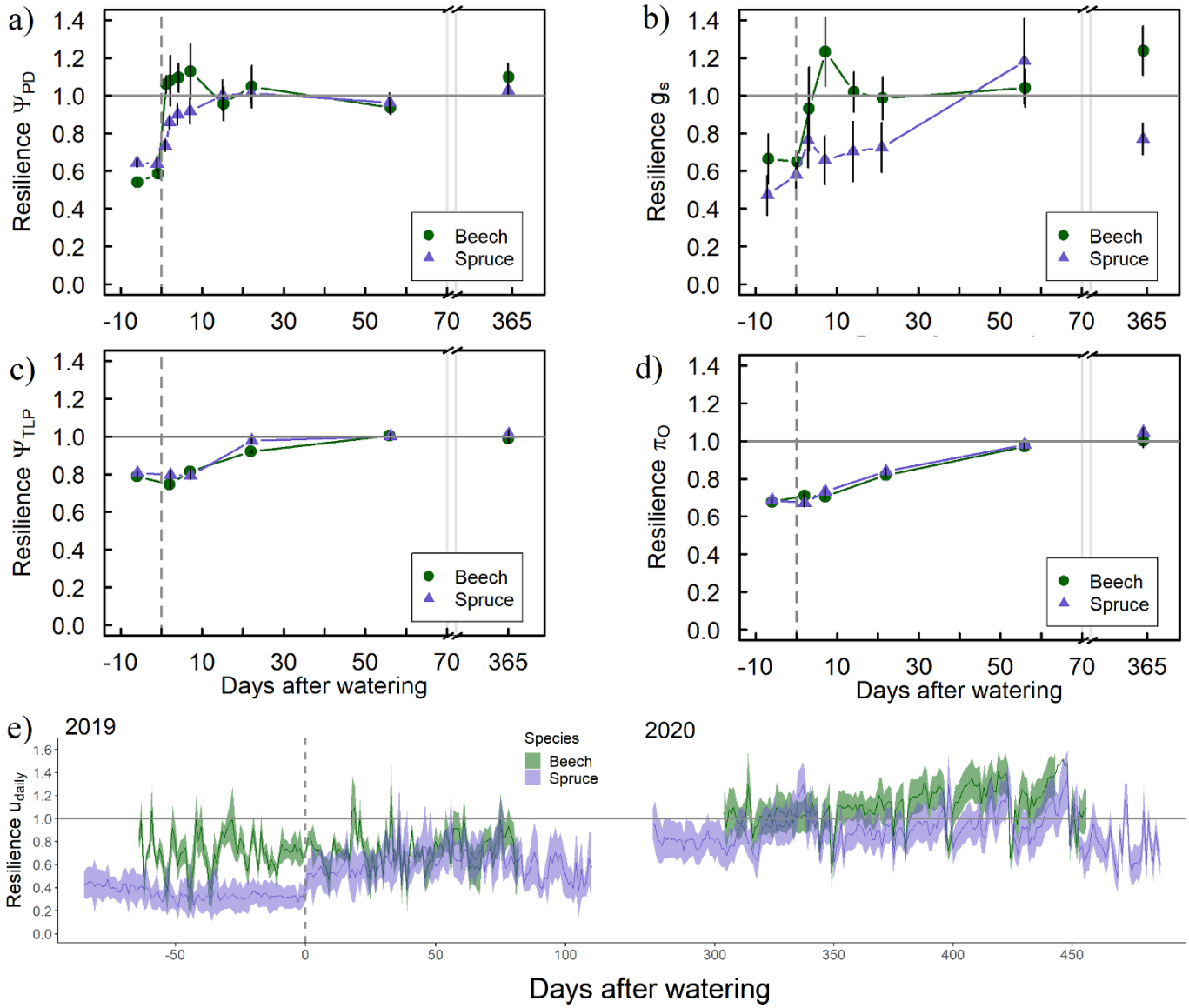
- Resilience after 5 years of summer drought of the water relations/physiology in mature beech and spruce



Hesse et al. in prep.

Quick recovery of beech and delayed in spruce



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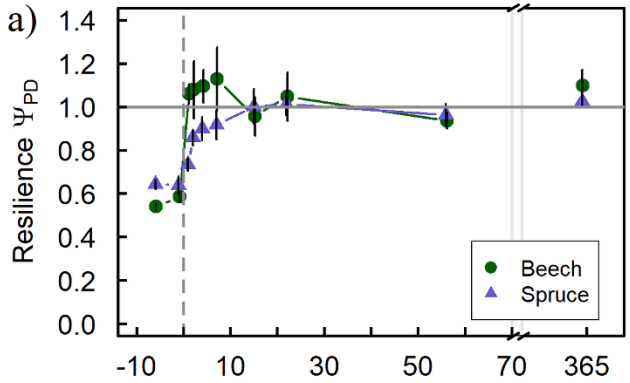
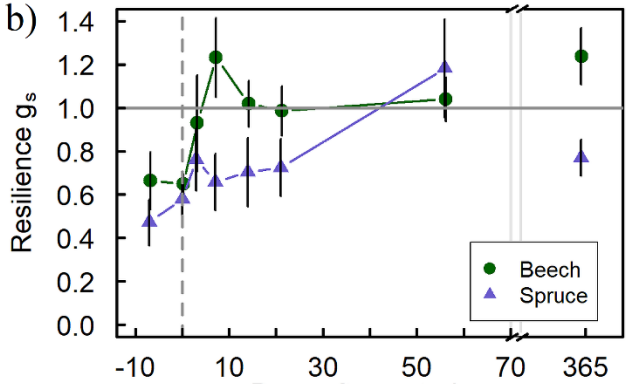
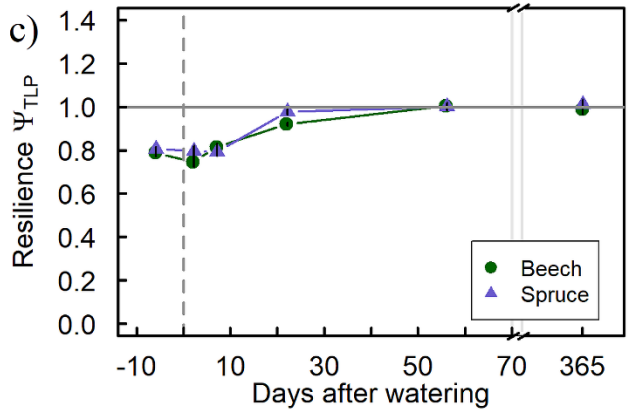
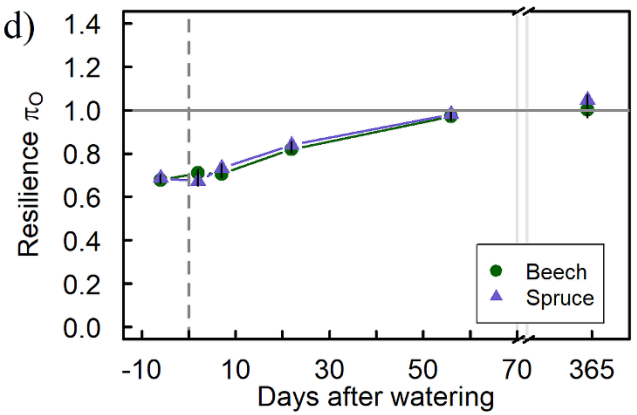
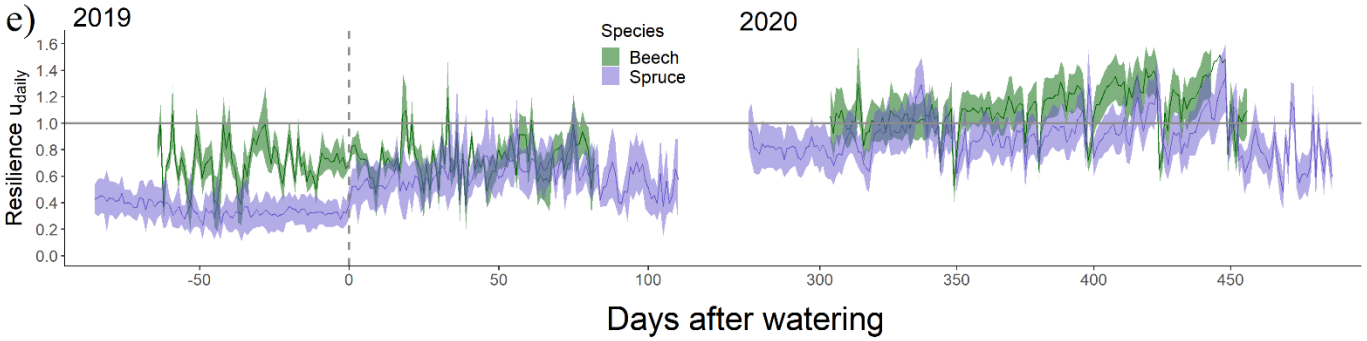
Very similar recovery of beech and spruce











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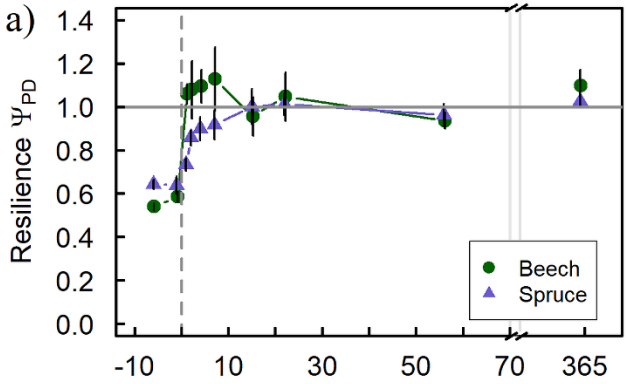

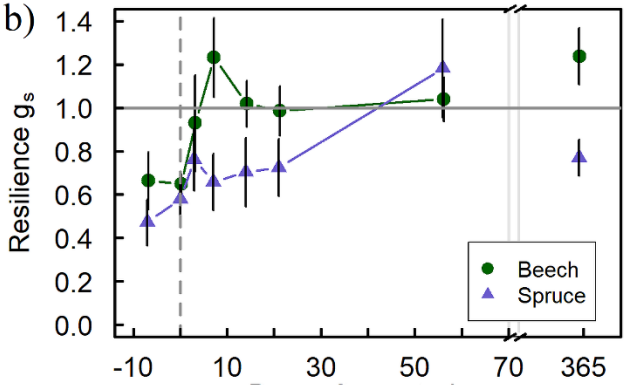

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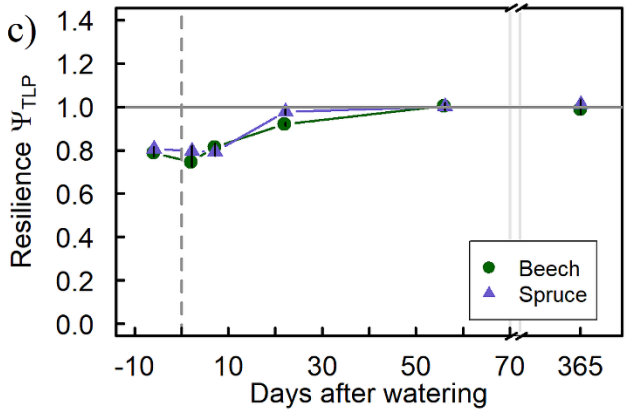
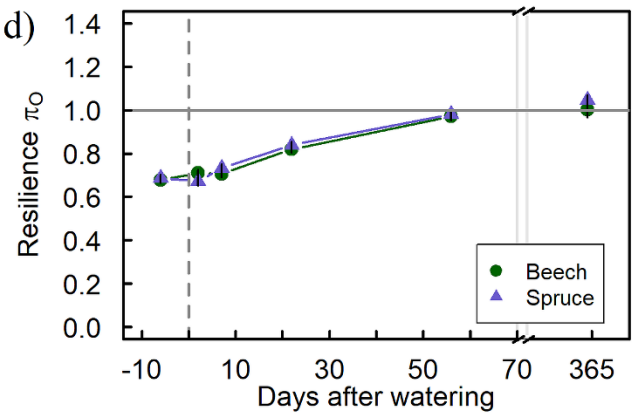
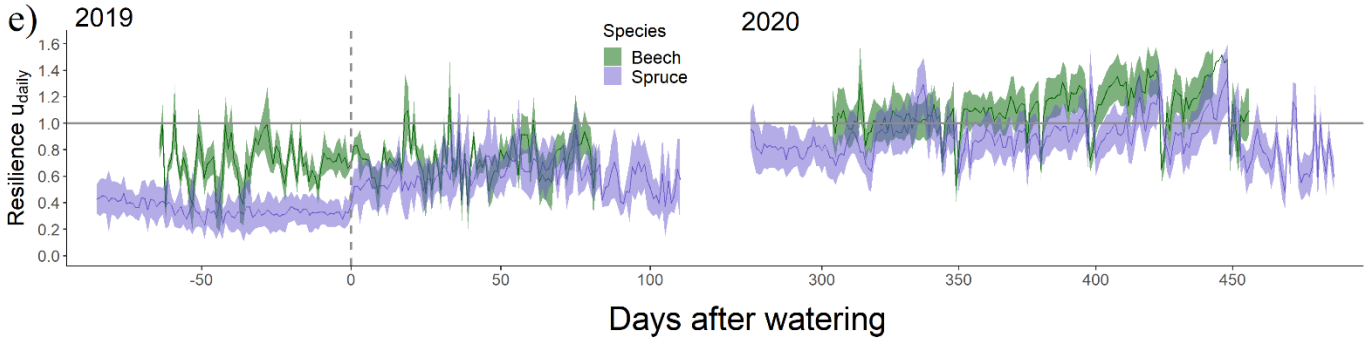
Very similar recovery of beech and spruce





Very similar recovery of beech and spruce

- No reaction in beech
- Small increase in spruce



- Full recovery of beech
- Still slightly reduced in spruce

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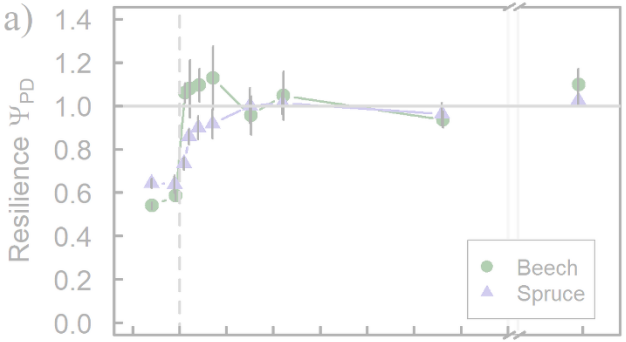
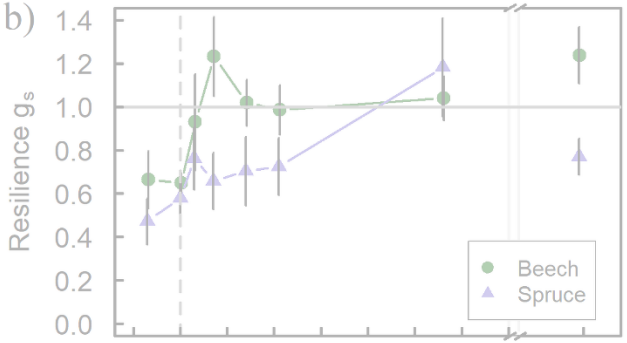


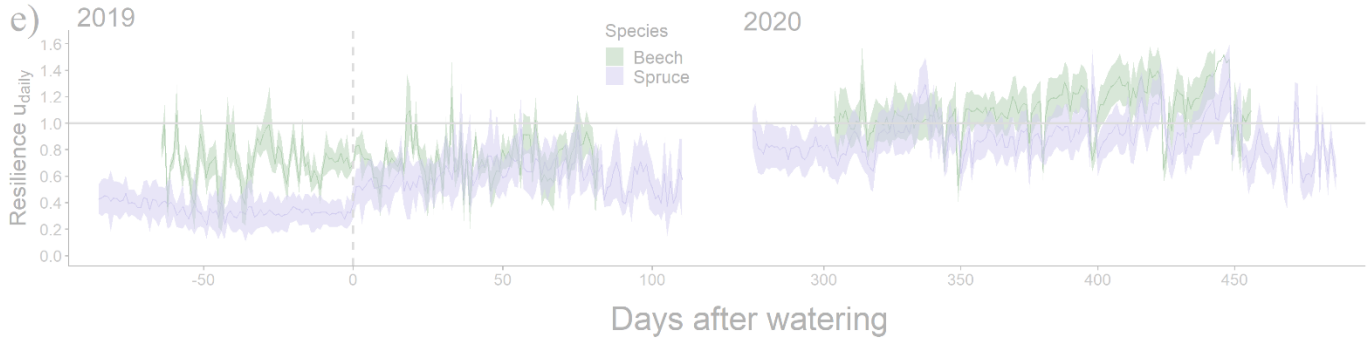


Quick recovery of beech and delayed in spruce

Physiology recovers often quicker in beech than spruce

- Heavy loss of fine roots in spruce
- Reduced leaf area of spruce
- High ABA level in spruce leaves even after drought release
- Loss (re-filling) of internal water storages in spruce

- No reaction in beech
- Small increase in spruce



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