Developing predictive models for forest trees

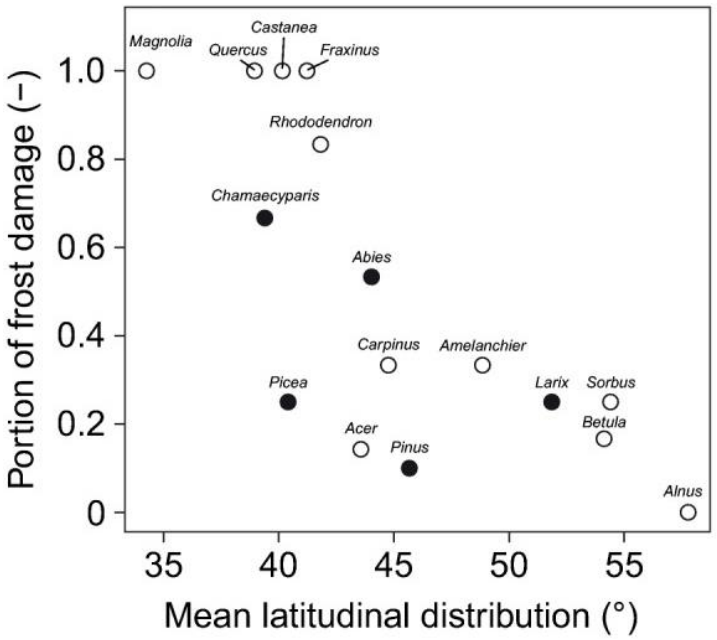
Why we should consider phenology as well as growth traits

Annika Perry, Witold Wachowiak, Joan Beaton, Glenn Iason, Joan Cottrell, Stephen Cavers

UK Centre for Ecology & Hydrology

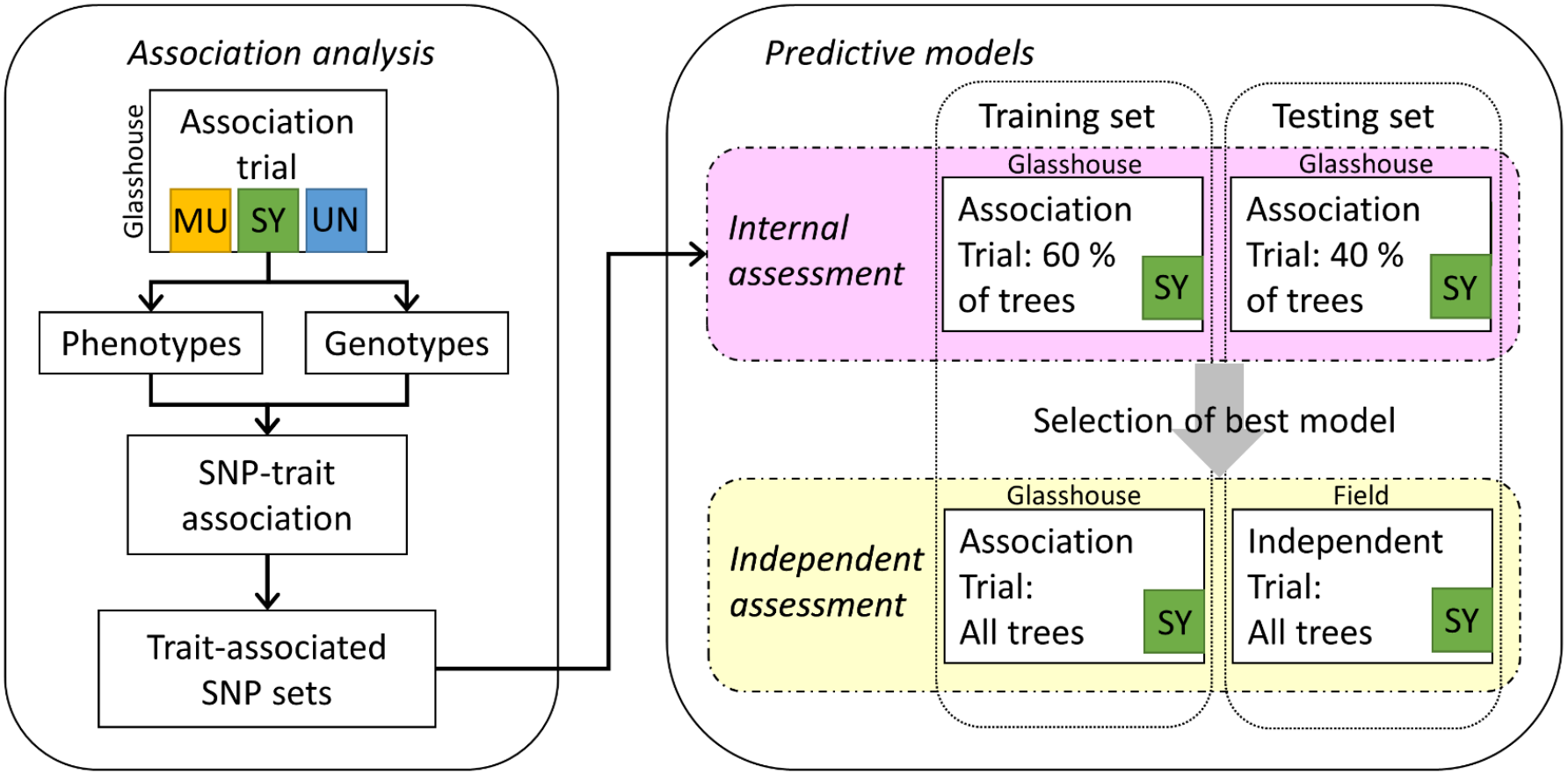
Phenology

- Definition: the timing of recurring seasonal biological events. These traits determine the timing and duration of the growing season and reproductive period
- Planting trees outside of their native range or far from their home site may result in a mismatch between their phenology and the environment
- Phenology prediction is usually based on environmental variation BUT variation in phenology also has a significant genetic component (as demonstrated using common garden experiments)
- Survival and fitness may be affected, e.g. early budburst = frost damage



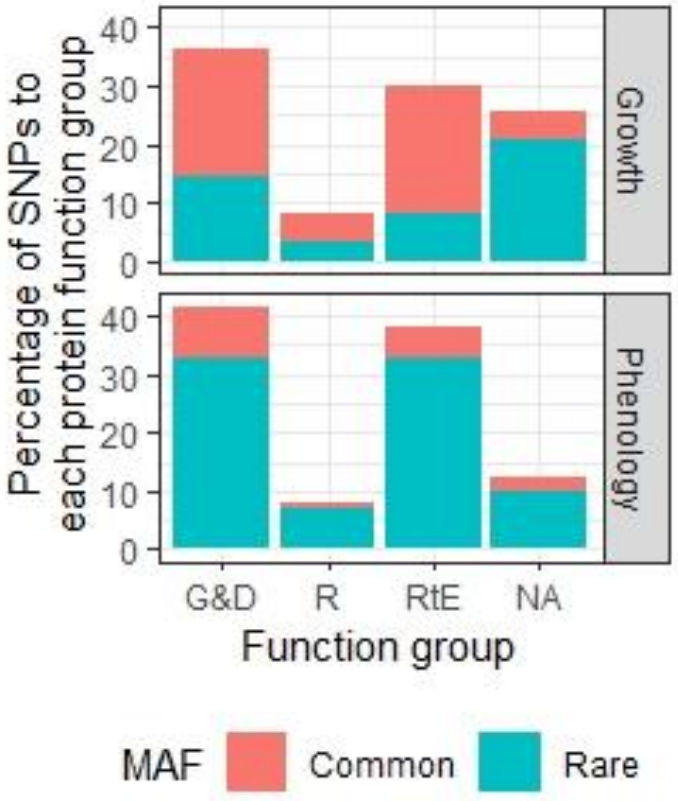
Muffler et al., 2016. Global Ecology and Biogeography. 25(9): 1061-1071

Developing predictive models for growth *and* phenology in pine



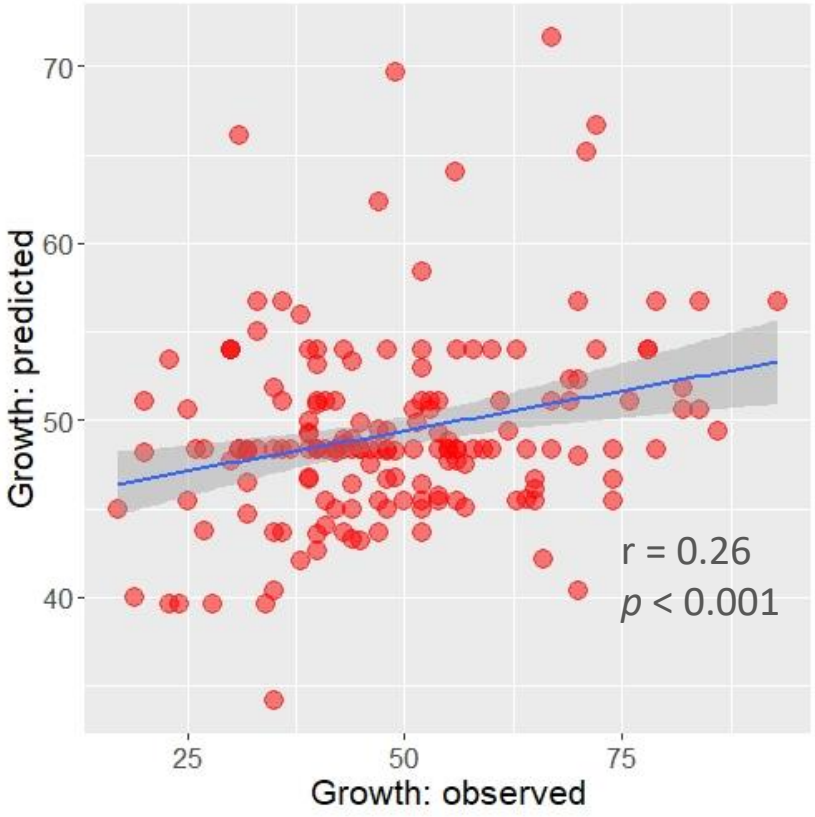
Summary of significantly associated SNPs

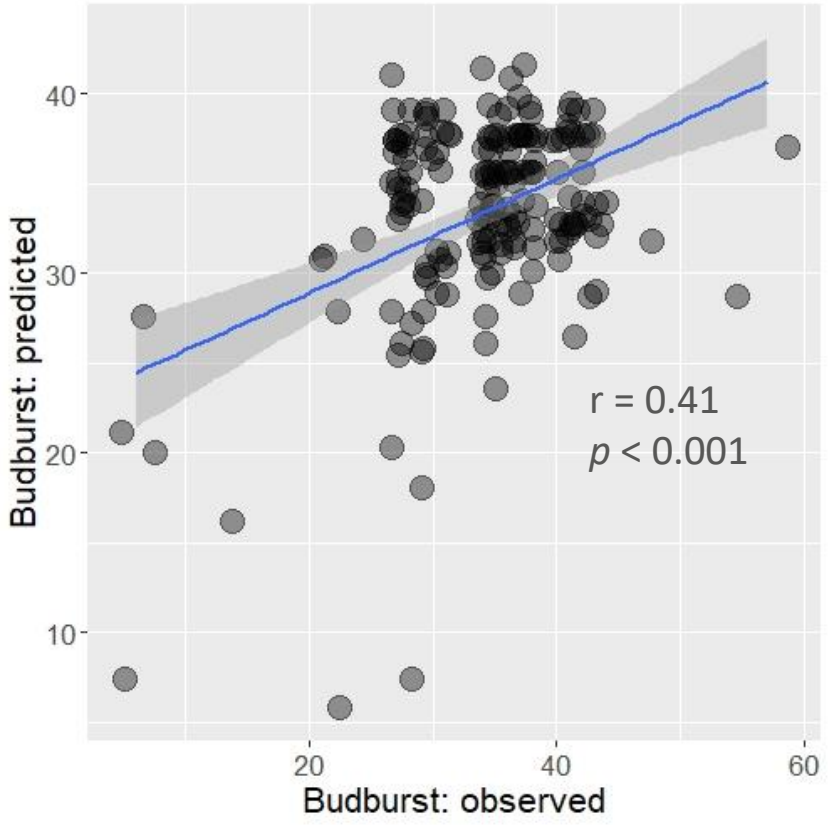
Trait	Count
Growth	42
Phenology	77



Common: MAF > 0.05

Predictive models: internal assessment





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Identifying and testing marker–trait associations for growth and phenology in three pine species: Implications for genomic prediction

Annika Perry[1] | Witold Wachowiak[2] | Joan Beaton[3] | Glenn Iason[3] | Joan Cottrell[4] | Stephen Cavers[1]

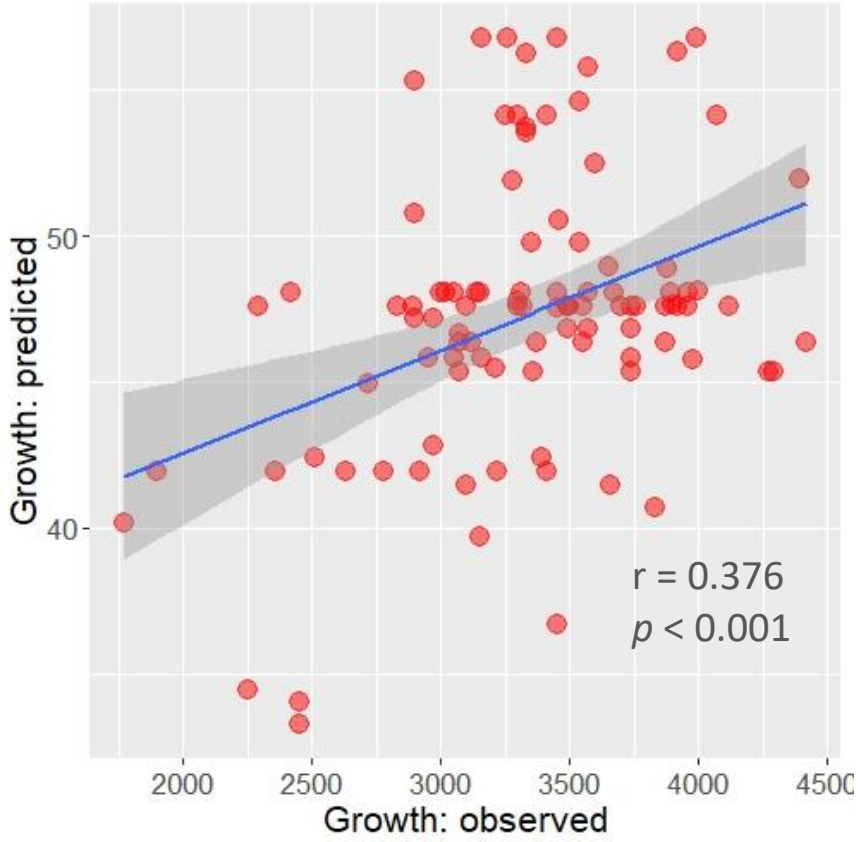
[1]UK Centre for Ecology & Hydrology Edinburgh, Penicuik, UK
[2]Institute of Environmental Biology, Faculty of Biology, Adam Mickiewicz University in Poznań, Poznań, Poland
[3]James Hutton Institute, Aberdeen, UK
[4]Northern Research Station. Forest

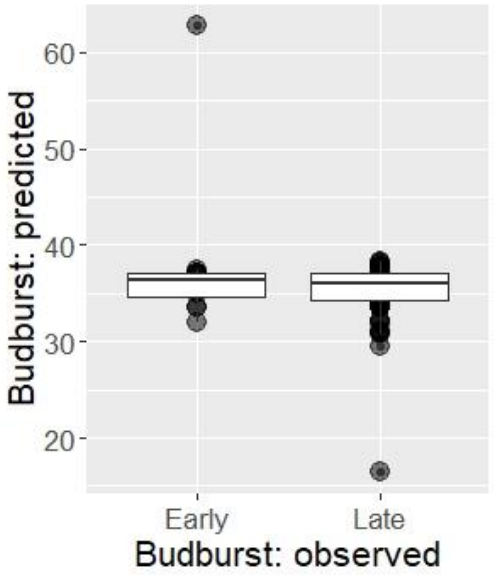
Abstract

In tree species, genomic prediction offers the potential to forecast mature trait values in early growth stages, if robust marker–trait associations can be identified. Here we apply a novel multispecies approach using genotypes from a new genotyping array, based on 20,795 single nucleotide polymorphisms (SNPs) from three closely related

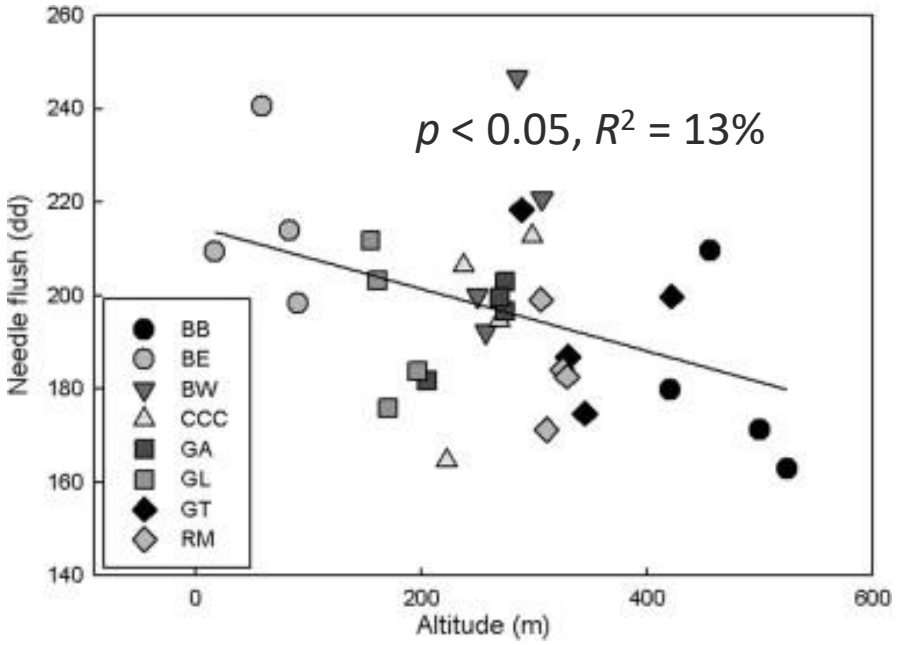
Thank you

Predictive models: independent assessment





Glasshouse



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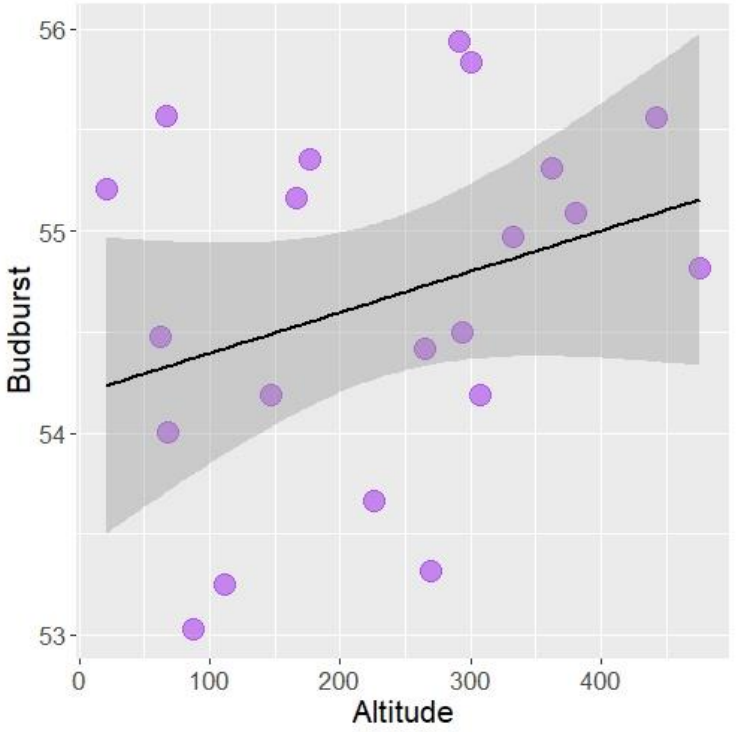
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