

Factors affecting local measurement of above-ground Net Primary Production.



Or, "why modelling fine-scale NPP is hard!"

Algorithmic uncertainty e.g. woody annual mass increment

Combine DBH, tree height and tree ring measurement to give annual woody increment (g dry mass m⁻² yr⁻¹) (Husch, B. 1963. *Forest Mensuration & Statistics*).

$$\text{Mass increment} = \pi \cdot F \cdot D \cdot H \cdot W \cdot wd$$

F = 0.462 (form factor expresses ratio of volume of tree stem to a cylinder)

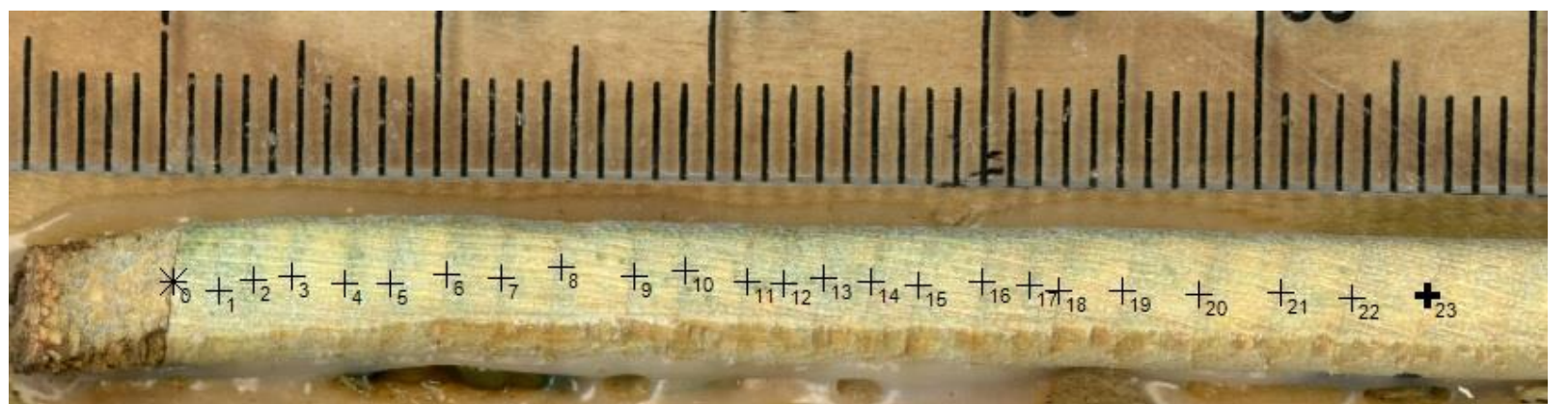
D = current DBH

H = height

W = width of most recent ring

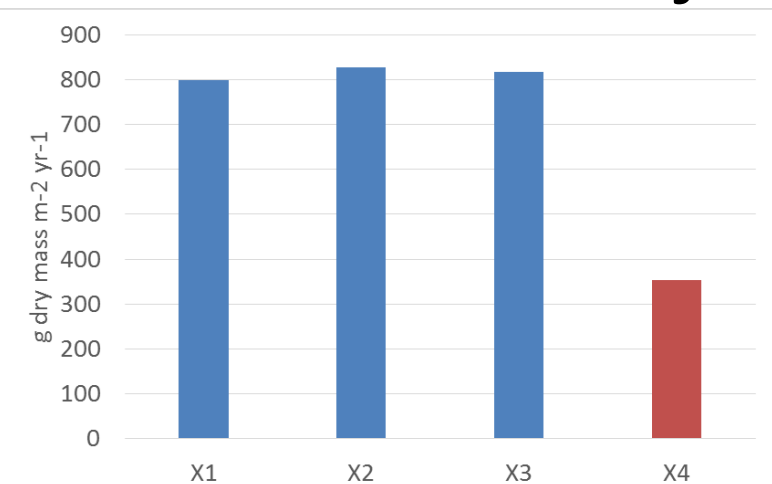
wd = wood density

Mass increment is most sensitive to choice of F. Less sensitive to Dbh or tree ring uncertainty.



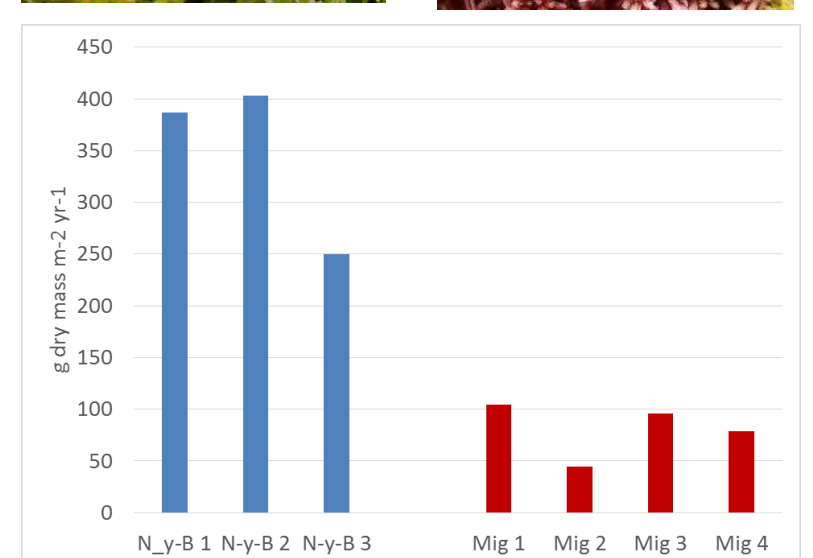
Variation in abiotic factors e.g. shade, pH

NPP suppressed in X4 because of shade from adjacent Ash



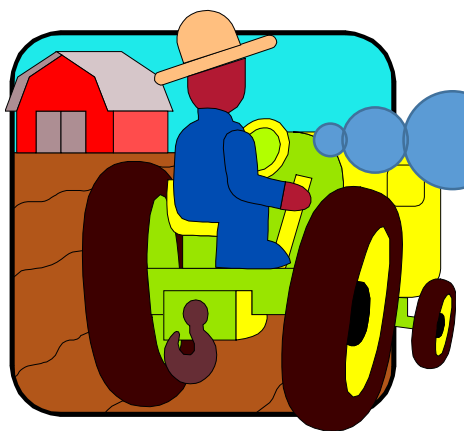
Minerotrophic flushing associated with dramatic increase in aNPP within blanket bog system compared to ombrotrophic plane.

Different species are responsible.



Land-use eccentricities e.g. FYM application in hay meadow

Lower than usual aNPP in unimproved meadow. The farmer always finishes spreading in this field and so often has less FYM left. You wouldn't know unless you spoke to him though!



My fatha did it like that, his fatha did and it's how I do it.



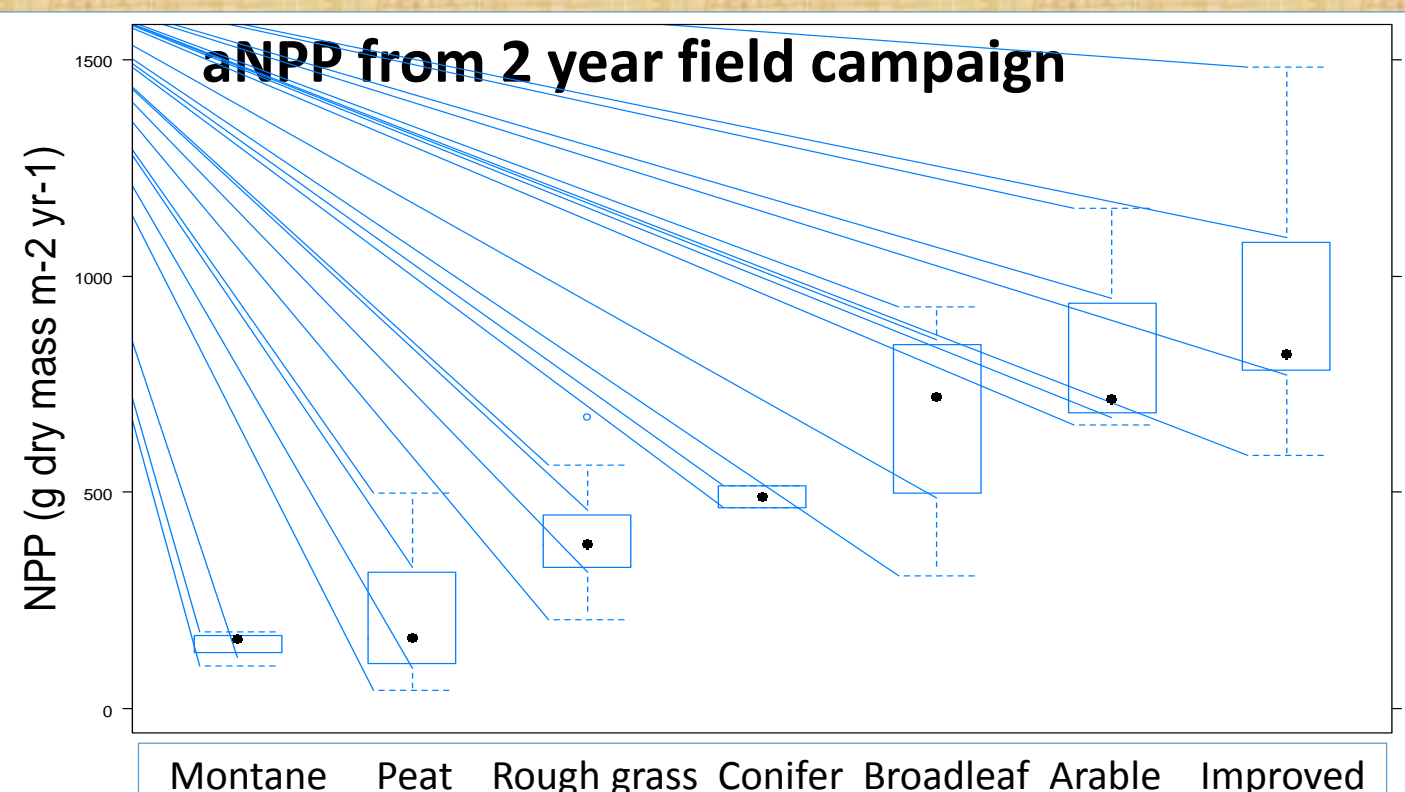
Methodological pragmatism e.g. inability to manipulate stock



In grazed systems livestock may over or under-stimulate grass growth (McNaughton et al (1996) *Ecology* **77** 974-977). Hence exclosures may give biased estimates. Ideally you would manipulate animals (e.g. Laliberté et al (2013) *Ecology* **93**, 145-155). This is usually not feasible.



CONCLUSION: These factors contribute to within-ecosystem variation in our aNPP observations that we use to test the dynamic models. Field results shown here



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