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Research Questions

Does biodiversity affect economic choices of felling age in productive forests?

- ◆ What is the best measure of biodiversity for UK forests to incorporate into economic modelling?
- ◆ What data exist on how biodiversity changes with the age of UK woodlands?
- ◆ Does inclusion of biodiversity affect optimum felling age?

Hypothesis

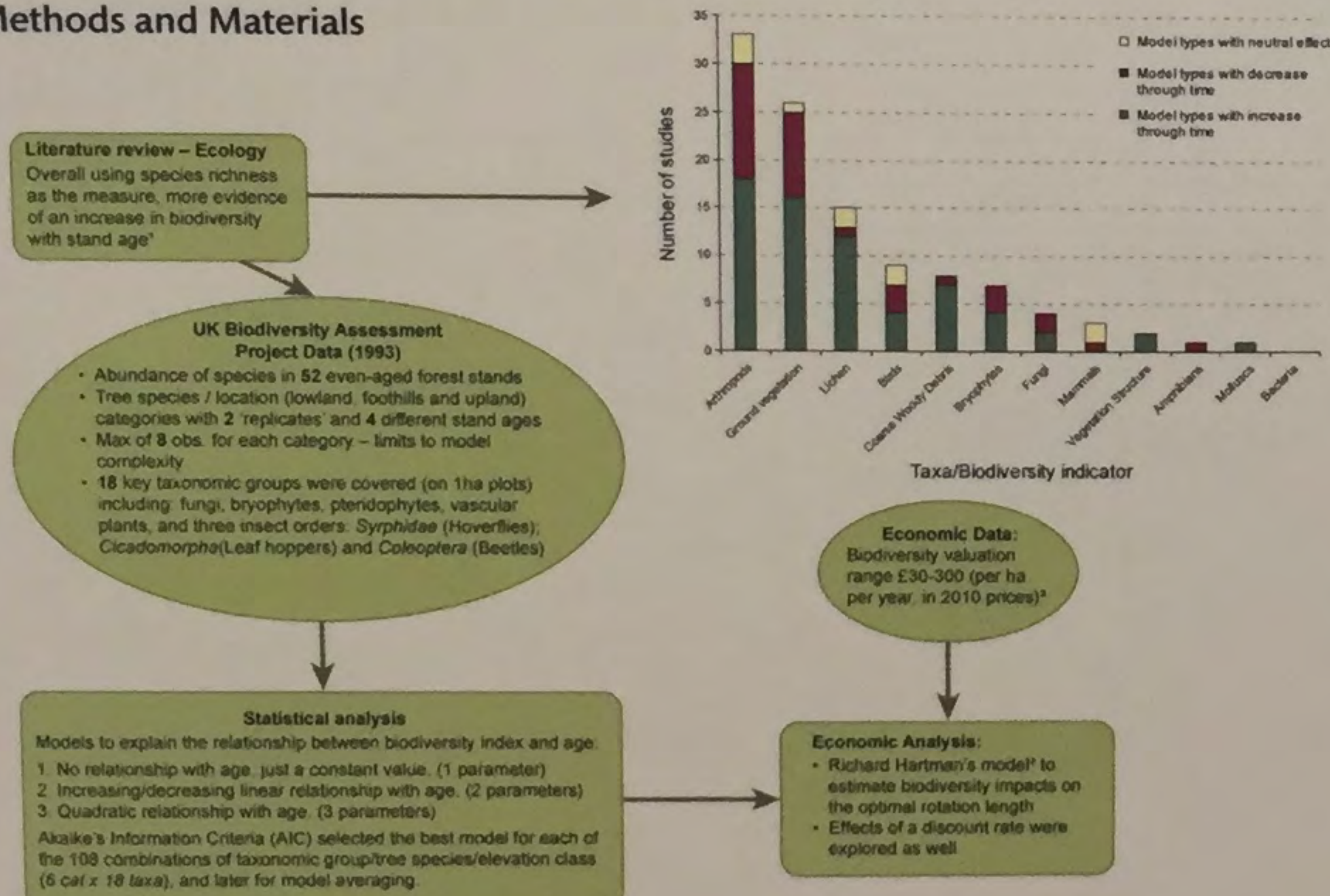
H₀: Yes, biodiversity impacts optimal rotation length.

- ◆ Ecologists may argue for a stronger H₀^{*}. Yes, a lot!

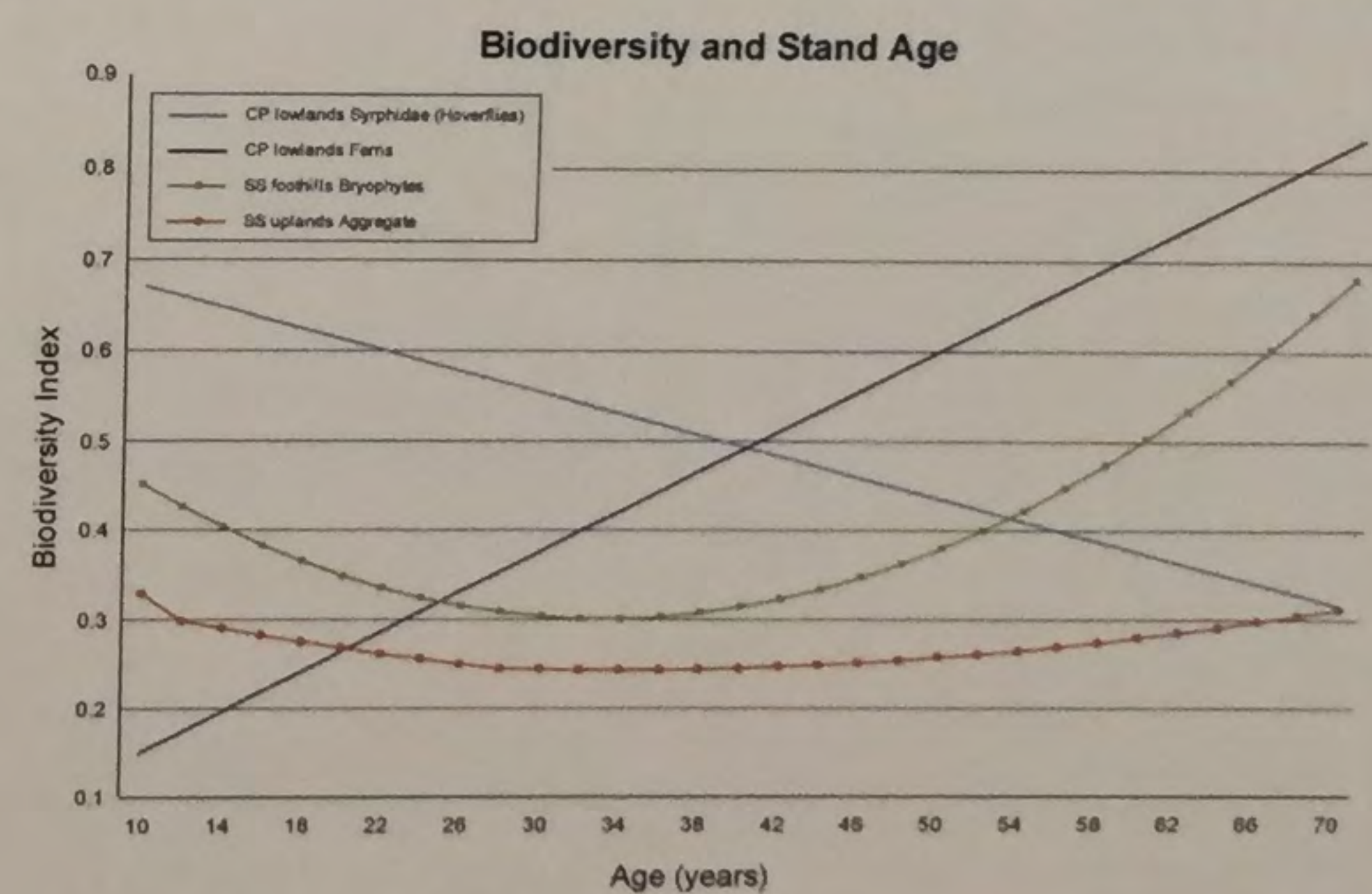
More details at Forest Research website
<https://www.forestry.gov.uk/fr/BEEH-9XAH>

Biodiversity and rotation length: economic models and ecological evidence

Methods and Materials



However, the overall results mask diverse relationships for individual taxonomic groups:



The main types of relationship identified made minimal difference (with one exception) to optimal rotation length in economic models under standard valuation range for biodiversity:

Biodiversity Value	Sitka spruce, Aggregate	Sitka spruce, Quadratic	Corsican pine, Linear negative	Corsican pine, Linear positive
£30	42	42	36	37
£300	41	41	34	43
£1000	40	38	29	157
Faustmann	42	42	36	36

Note: Figures in red mark results which differ from Faustmann baseline (blue) by 5 or more years

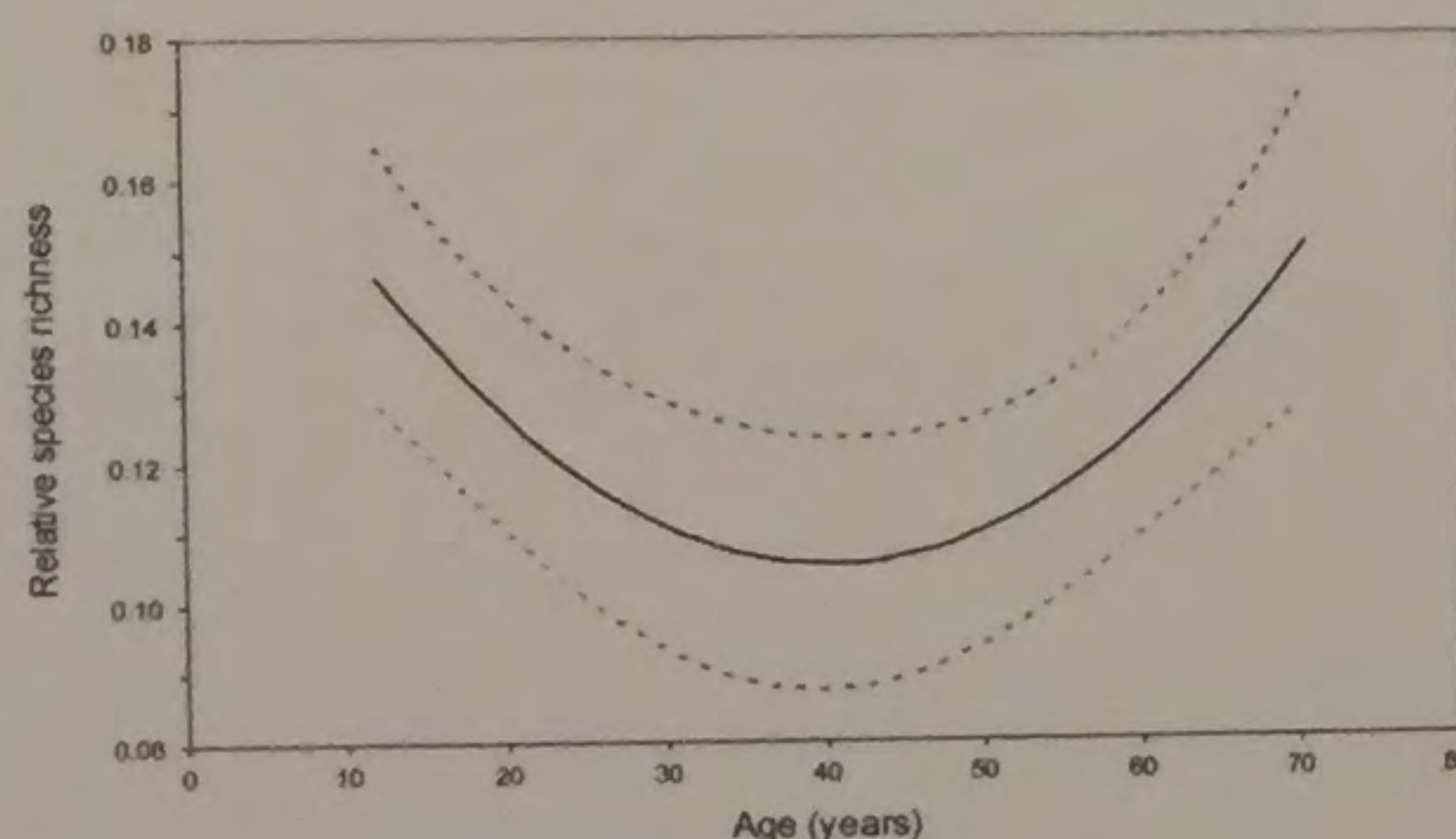
- ◆ Higher value for biodiversity (beyond published) led to larger changes in optimal rotation length in more cases (yellow colour row in the table above).
- ◆ Lower discount rates for biodiversity led to extended (or even indefinite) rotations lengths.

Conclusions

- ◆ Evidence on changes in biodiversity with stand age in UK forests is sparse (despite a very substantial field campaign)
- ◆ There are relatively few statistically significant relationships between biodiversity and stand age for UK forests and those identified are often weak. Relationships also vary between taxa.
- ◆ Even with a strong positive relationship with age, and biodiversity values within accepted estimates, the rotation length was not always extended significantly
- ◆ Our results are at odds with the prevailing view amongst ecologists of a very important role of stand age and suggest the need for further improvement of the underlying evidence base, as well as refinement of biodiversity estimation, discounting and valuation methodologies.

Results

Generally little evidence of significant relationships between overall species richness and stand age with a few exceptions, e.g. Sitka spruce in the uplands (with a 95% confidence interval).



- ◆ Majority of cases (more than 50%) – no relationship
- ◆ Linear – second most common model
- ◆ Quadratic – least common

References

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