Modelling the yields of *Boletus edulis* in *Picea abies* stands in eastern Finland

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- *Boletus edulis* yields were inventoried during 2010–2014 and stand characteristics measured from 56 sample plots in planted spruce stands.
- The annual yields were predicted using a non-linear mixed-effect modelling:
  $yield = \exp\{f(\cdot) + u\} + e$, where u is random plot effect.
- Stand characteristics and climatic factors were used as predictors.
- In simulations, *B. edulis* yields were predicted along the development and management of a spruce stand.

Yield modelling

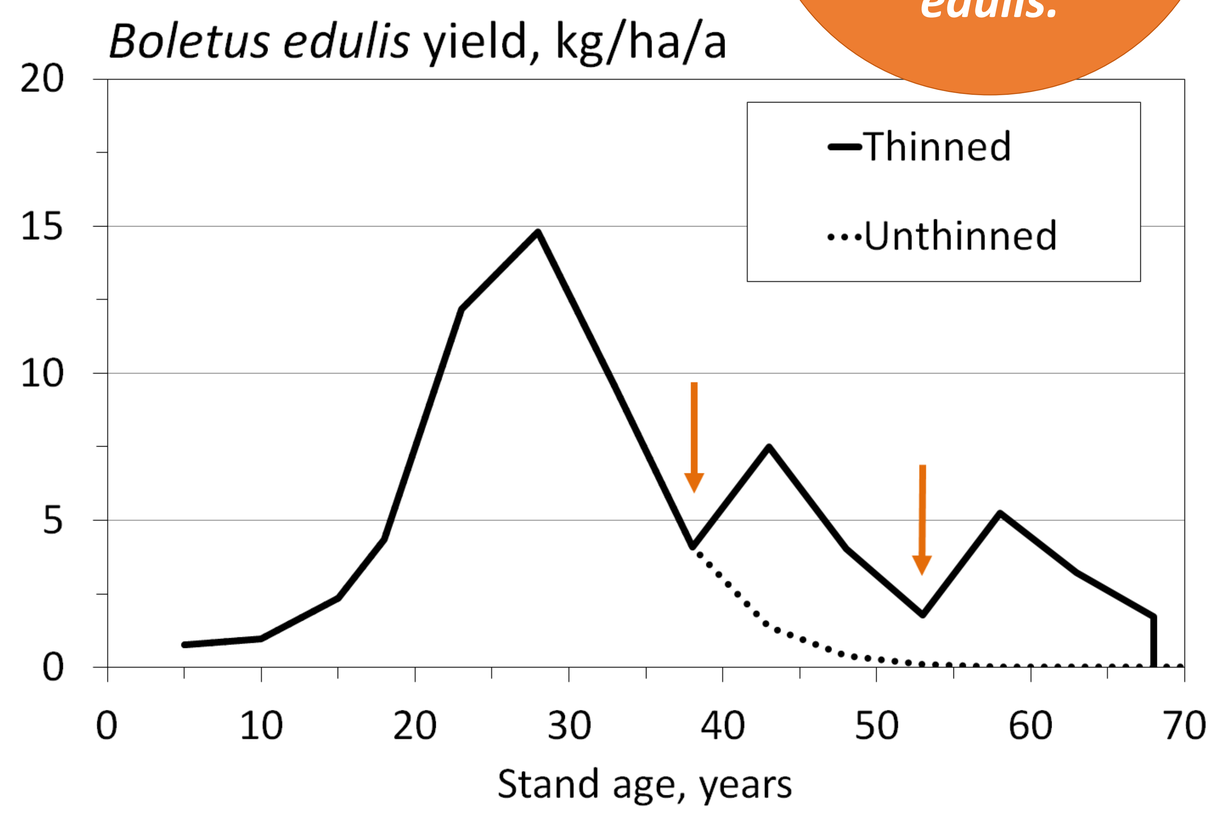
A yield model for *Boletus edulis*. Estimates of the parameters, variance components and fitting statistics. The fitting statistics using both fixed and random effects are in parentheses. N=255.

Boletus edulis, kg/ha/a	
Variable	Parameter
Intercept	-1.9819
Year 2010 (ref. 2014)	0.4161
Year 2011	1.8743
Year 2012	0.6166
Year 2013	0.3267
Stand basal area, m^2/ha	0.1778
Stand basal area^2, m^2/ha	-0.0049
Stand basal area/(Age+5)	2.0907
var(u)	0.6906
var(e)	32.8326
R^2, %	20.6 (72.4)
Bias, %	28.7 (-0.2)
RMSE, %	215.4 (98.6)

High unexplained variation between plots.

Yield predictions

Thinnings increase the yields of *Boletus edulis*.



Predicted development of the yields of *Boletus edulis* in a spruce stand. Thinnings (arrows) and final cutting were simulated according to the silvicultural recommendations. Unthinned regime is shown by using dashed lines.

The net present value (3 %) of *Boletus edulis* is 10 % (452 €/ha) of the value of timber.

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