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GROWTH MEASURING TECHNIQUES IN FOREST ASSESSMENT

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ABSTRACT

The systematic control of biomass production plays an important role in forest assessment. Considering the high costs entailed by forest growth estimation, a cautious sample sizing is needed. The paper deals with sample sizing in the assessment of one of the most important forest growth variables, i.e. stand basal area increment.

INTRODUCTION

The high costs entailed by forest growth estimation to assess forest biomass production make it necessary a cautious sizing of the samples. To this end, the Authors carried out a research study on sample sizing for the assessment of one of the most important forest growth variables, the stand basal area increment. The study was conducted in even-aged *Abies alba* stands located in the northern Appennines (Abetone e Maresca, Pistoia).

METHODS

The estimation of the stand basal area increment is generally performed by the following steps:

- measuring the radial annual increment (*I*) and diameter at breast height (*DBH*) of a determined number of sample trees, distributed representatively among the *DBH* classes of the stand;
- calculating the basal area increment (*BAI*) of every single sample tree

$$BAI = \pi/4 \cdot [DBH^2 - (DBH - 2 \cdot I)^2]$$

- processing the parameters of the growth equation

$$BAI_i = a \cdot DBH_i^{\ b} \qquad [1]$$

- estimating *BAI* of the trees of every *DBH* class by the above growth equation [1].

In this study, the experimental sampling for the *BAI* assessment was carried out on stem b.h. cross-sections of 770 trees selected by objective criteria (during clearcutting) in 7 compartments (age range = 25-70 years) in the investigated *Abies alba* forests. In laboratory, 4 diameters were measured per cross section, corresponding to reference lines determined by multiples of 45° angle to the steepest slope line where the tree had stood. The last five years' radial increment was measured on each of the 8 radii resulting from these 4 diameters. The last five years' *BAI* was calculated on the basis of 32 different measurement methods, corresponding to the 32 possible combinations of diameters (4) and radial increments (8) measured in every single cross section. Hence, for every measurement method, the following formula was applied: