

## ABSTRACT

**Soshenskyi O. M., Girs O. A., height-diameter ratio of tree trunks of linden stands.**

Studying of height-diameter ratio of tree trunks is a very important issue in forest valuation. The previous experience of scientists affirms that there is a connection between these two indicators, thus the research of regularity data during the development of forest evaluation standards is required.

During the research of height-diameter ratio of tree trunks of small-leaved lime (*Tilia cordata* Mill.) the materials of 40 sample areas laid in stands of different age groups ( 17 in immature and middle-aged stands, 23 in premature, mature and overmature stands) were used. Sample areas were laid in the most typical for the wood species under study types of site indexes.

Studying of height -diameter ratio of tree trunks of linden stands was conducted with the help of method developed by Forest Mensuration and Forest Inventory Department of the National University of Life and Environmental Science of Ukraine. According to this method the above mentioned ratio was analyzed in relative quantities, because it makes easier the process of modeling of relative heights:

$$h_{ik}^{\text{відн}} = \frac{h_{ik}}{h^{\text{баз}}} \quad (1)$$

Where:  $h_{ik}^{\text{відн}}$  – relative value of height of  $i$  level thickness of  $k$  sample area;

$h_{ik}$  – absolute height of  $i$  level thickness of  $k$  sample area, m;

$h^{\text{баз}}$  – height of basic level thickness, m.

Basic height of each sample area in accordance with adopted methodology is equal to height of basic level thickness: for immature and middle-aged stands – 16 cm, for premature, mature and overmature stands – 24 cm. Valuation of absolute height was classified by degrees of thickness and within each level of thickness average values, root-mean-square abmodality and coefficient of variableness were calculated.

Coefficient of variableness of average values of relative heights within thickness level which makes up from 0 to 12,5% allows to develop an analytical model of relative height within age groups.

According to the results of research mathematical models of relative heights of linden stands were developed:

- immature and middle-aged stands

$$h^{eioH} = 2,24 - \frac{40,51}{d + 16,56} \quad (2)$$

- premature, mature and overmature stands

$$h^{eioH} = \begin{cases} 3,298 - \frac{210,76}{d + 68,37} & d < 24 \\ 1,294 - \frac{3,61}{d - 11,88} & d \geq 24 \end{cases} \quad (3)$$

Abmodality of modeled relative heights from actual data makes up about 1%.

In order to pass from relative to absolute heights the following equation was used:

$$h_i = h^{eioH} \times h^{oa3} \quad (4)$$

where  $h_i$  – tree trunk height of i level thickness.

During the development of discharge tables numeration of discharges and interval between them were conformed to the current assortment tables. In the result the limits of discharge heights according to the thickness level were received. Comparative analysis of developed discharge tables for premature, mature and overmature linden stands with the current tables shows that they differ by no more than  $\pm 4\%$ . This fact indicates the compliance of current standards with forest valuation features of linden stands.

Discharge tables for immature and middle-aged linden stands was developed for the first time.