



LEAF AREA DETERMINATION IN *Populus alba* L. BY NON-DESTRUCTIVE METHOD BASED ON LEAF PARAMETERS

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Abstract: *The study aimed to determine the leaf area of poplar by non-destructive methods, based on foliar parameters. The biological material was represented by the *Populus alba* L. species, from the Protected Area Cenad Forest. Leaves were taken, randomly from the crown of trees, from mature branches.*

• Introduction

The leaves of plants are organs of major importance in relation to the reception of solar energy, and the photosynthetic and metabolic processes of plants (NIINEMETS, 2010; BURGESS et al., 2017). Non-destructive methods in foliar study are very useful, due to the speed of determination and high work accuracy, which has advantages in large numbers of samples (ALI et al., 2017; DRIENOVSKY et al., 2017a,b; CARVALHO et al., 2018; FARAGÓ et al., 2018; SAVVIDES and FOTOPOULOS, 2018).

• Material and method



Measurements of leaf dimensional parameters, length (L) and width (w) were made. The measurement was made with a ruler, with an accuracy of ± 0.5 mm.

The leaves were scanned in a 1:1 ratio. The images were analyzed and the values of the scanned leaf area (SLA) and the perimeter (Per) were obtained (RASBAND, 1997).

• Results and discussions

It can be observed how the value of the measured leaf area (MLA) varies depending on the values of the correction factor. Considering as a reference the SLA values, against which the calculated MLA values were reported, the smallest error was recorded under the conditions of using the correction factor (CF) with the value 0.66, at which the average of the minimum error (MEM) was $MEM = -0.053$.

The ANOVA test ($\alpha = 0.001$) highlighted the safety of the experimental data and the presence of variance in the data set, under the conditions $F > F_{crit}$, $p < 0.001$.

The correlation analysis showed the existence of very strong correlations between MLA and SLA ($r = 0.981$), between MLA and foliar parameters L ($r = 0.919$), w ($r = 0.954$), and Per ($r = 0.961$), between SLA and Per ($r = 0.952$), between SLA and w ($r = 0.951$), as well as between Per and w ($r = 0.935$). Strong correlations were recorded between SLA and L ($r = 0.888$), and between Per and L ($r = 0.882$), and a moderate correlation was recorded between L and w ($r = 0.771$).

• Conclusions

The determination of the leaf area in the species *Populus alba* L. was possible based on the leaf parameters and the correction factor found ($CF = 0.66$), in statistically safety conditions. Among the foliar parameters, leaf width (w) had a higher contribution in the precise definition of SLA and MLA, based on equations resulting from regression analysis. The matching relationship between SLA and MLA values was described by a linear equation, in conditions of high statistical safety, which highlights the accuracy of MLA determination.