

## STUDY REGARDING THE DIAMETER AT THE BASE RING OF SOME ACACIA VARIETIES IN THE FIRST YEARS OF VEGETATION

Budău Ruben\*, Timofte Adrian Ioan\*\*

\*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru Str., 410048 Oradea;  
Romania, e-mail: ruben\_budau@yahoo.com

\*\* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru Str., 410048 Oradea;  
Romania, e-mail: adi\_timofte@yahoo.com

### Abstract

*As element of vegetative growth, the acacia seedlings' diameter at the base ring plays an especially important role both in the assessment of the quality of the material to be planted as well as of the degree of its development in the years after planting.*

**Key words:** acacia, average diameter, base ring

### INTRODUCTION

In the experience from Bârzești, between the two acacia varieties used in the study, *Robinia pseudoacacia*, *rectissima* variety and *Robinia pseudoacacia*, *oltenica* variety, there were visible differences regarding the seedlings' diameter at the base ring, after the first two years of vegetation after setting in. Furthermore, the two acacia varieties differed obviously in regards to the seedlings' diameter at the base ring both at the end of the first year as well as at the end of the second year of vegetation after planting.

The acacia seedlings, upon planting, had the age of one year displaying, practically, very close size values in the two varieties, for the height of the stem and the thickness of it at the base ring.

The performed measurements on all the seedlings, before planting, confirmed their classification in the quality classes I and II, from the point of view of the stems' height and of their average diameter at the base ring. The concrete results of these measurements are presented in the table, the significance of the differences between the two tested acacia varieties being established with the aid of the "t" test (Student), (ARDELEAN, 2010).

### MATERIAL AND METHODS

The researches took place in Arad county, Bârzești locality, near the Codru Moma mountain chain.

The performed measurements of 50 individuals of each acacia variety used in the study show that, at the end of the first year of vegetation after planting, the *rectissima* variety displayed values of the seedlings'

diameter at the base ring ranging between 2,01 – 4,12 cm, with a variability coefficient of this character of 19.6% (average variability).

The variability limits of this character, at the *oltenica* variety, following the first year of vegetation after planting, have been tighter, with values ranging between 1,73 – 3,37 cm and a variability coefficient much smaller than the one obtained at the *rectissima* variety (10,2%). It seems that, under the aspect of the variability of the seedlings' diameter at the base ring, at the end of the first year of vegetation after planting, the *oltenica* variety is much more homogenous than the *rectissima* variety, although, as also mentioned in the analysis of the seedlings' height, the *oltenica* variety seems to be originating from *rectissima*.

At the end of year II after planting, at the *rectissima* variety the seedlings' diameter at the base ring displayed values ranging between 3,23 – 5.66 cm, with a variability coefficient of this character of 21,4 %, which indicates a great variability of the respective character. At the *oltenica* variety, the variability limits of the seedlings' diameter at the base ring, at the end of year II of vegetation after planting, were much larger than at the end of the first year of vegetation (2,41 – 4,58 cm), with a variability coefficient resembling the one obtained by the *rectissima* variety at the end of the 2<sup>nd</sup> year after planting ( $s\% = 22,6$ ).

On the basis of these results we may state that, in regards to the variability of the seedlings' diameter at the base ring, in the first two years after planting, the two varieties used in the study behaved in an obviously different way.

Concretely, at the end of 2010, the *rectissima* variety displayed an average diameter of the base ring, in the analysed seedlings, 0,43 cm greater than the one recorded at the *oltenica* variety. At the end of year II after planting (2010), the difference between the two varieties was and is more consistent (1,22 cm in favour of the *rectissima* variety) in regards to the seedlings' diameter at the base ring. It is worth recording that, both in 2010 and 2011, the above mentioned differences were statistically ensured at the levels of  $P_{5\%}$ , respectively  $P_{1\%}$ , which suggests that, at least from the point of view of this character, the two acacia varieties used in the study are, really, different from each other.

As in the case of the seedlings' height, one must take into account for this character as well the fact that the seedlings planted in the spring of 2010, in the experience from Bârzești, already had the age of one year and displayed a certain degree of development of the diameter at the base ring. According to the data presented in table 1.

Table 1

The influence of the acacia variety on the yearly growths of the seedlings' average diameter at the base ring, in the first two years after planting.  
Bârzești, 2011-2012.

Variant designation	Annual growth (cm) of the average Ø at the base ring at the end of the years		Yearly(cm) average growths	± d (m) average 2011-2012	Difference significance
	2010	2011			
<i>Rectissima</i>	1,91	2,11	2,01	-	-
<i>Oltenica</i>	1,42 <sup>o</sup>	1,36 <sup>oo</sup>	1,39	-0,61	<sup>o(o)</sup>
<i>DL 5 % =</i>	0,31	0,30		0,37	
<i>DL 1 % =</i>	0,72	0,70		0,62	
<i>DL 0,01%=</i>	2,28	2,21		1,16	

The analysis, as a series of experiences of the type variants x years, of the average values regarding the yearly growths of the diameter at the base ring, highlights the fact that, ever since the first year of vegetation after planting, between the two varieties the seedlings' height growth differences were significant ( $\pm d = 0,49 > DL_{5\%}$ ). In the second year of vegetation at the *rectissima* variety the seedlings' diameter at the base ring grows on average with 0,75 cm compared to the *oltenica* variety, the yearly growth difference being, this time, distinctly significant ( $\pm d = 0,75 > DL_{1\%}$ ).

If one analyses the average of the first two years of vegetation after planting, one observes that the *rectissima* variety increases its average diameter of the seedlings at the base ring with 2,01 cm/year, while at the *oltenica* variety the yearly average growth of the diameter at the base ring is only 1,39 cm, the difference between the yearly average growths being very close to the distinctly significant level of statistical insurance ( $\pm d = 0,61$  and  $DL_{1\%} = 0,62$ ).

One must note that, in the case of the diameter of the seedlings at the base ring, the differences of the two varieties have the same degrees of significance both based on years and on the averages of the years, regardless whether they are calculated on the basis of the absolute value of the character at the end of the two experimental years or on the basis of the real values of the yearly growths of the diameter of the seedlings at the base ring. We consider that the second way of calculation is much more correct because it also takes into account the growths of the diameter at the base ring recorded by the two varieties in the year 0 of vegetation (nursery), as it results from Figure 1.

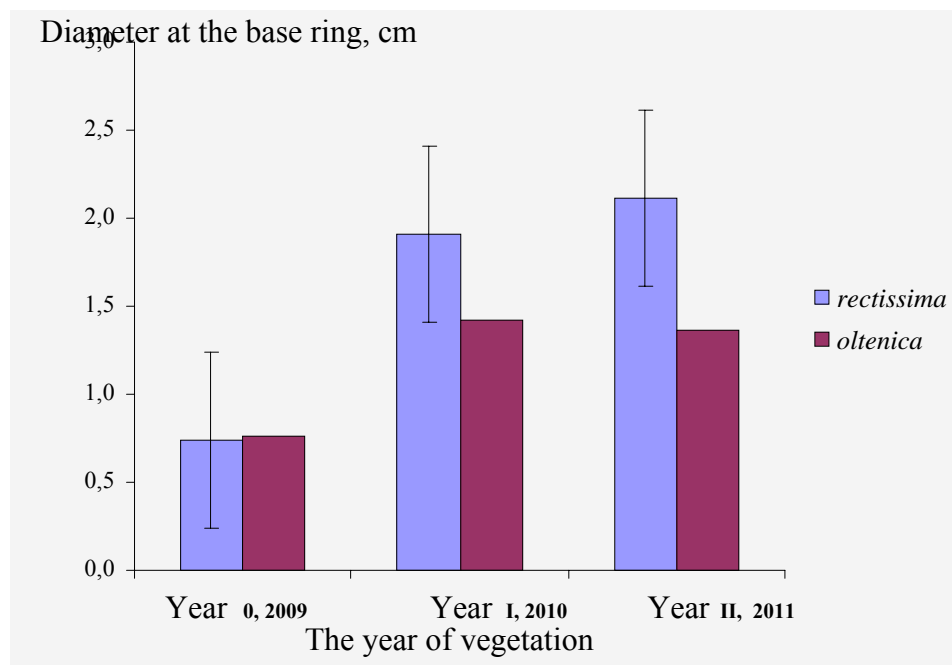


Figure 1. The yearly average growths of the diameter at the base ring of the acacia seedlings (Calafat and Secuieni, 2009; Bârzești, 2010 – 2011)

One observes from Figure 1, that the seedlings of the two acacia varieties, planted in Bârzești in the spring of 2010, had practically the same values of the diameter at the base ring (0,74 and 0,76 cm). A year after planting, the *rectissima* variety surpasses the *oltenica* variety by values of the diameter at the base ring over the limit of the significance for  $DL_{5\%}$ . After another year, the *rectissima* variety distances itself from the *oltenica* variety, in regards to the yearly growth of the seedlings' diameter at the base ring, above the level of the significance for  $DL_{5\%}$ .

Even though, at Bârzești, the experimental years 2010 and 2011 seem to have been equally favourable to the growth in diameter at the base ring of the acacia seedlings, between the two varieties there are real and significant differences regarding the yearly average values of this character, which suggests that, in regards to this character, the respective varieties differ from each other.

The results presented and discussed in this subchapter allow us to conclude that, in regards to the seedlings' diameter at the base ring in the first two years after planting, in Bârzești, the *rectissima* acacia variety has a significantly and distinctly significantly more vigorous growth than the *oltenica* variety. This statement is concordant with the most of the results

published in the scholarly literature (NICULESCU MARIANA, 2008) which state that, in general, in the first years after planting, the vigour of the *oltenica* variety is lower than that of the *rectissima* variety.

## CONCLUSIONS

The results regarding the vegetative development of the two acacia varieties, tested in Bârzești in 2010 and 2011, allow the formulation of only some preliminary conclusions regarding the behaviour of the respective varieties in the first two years of vegetation after planting.

From the beginning we must admit that, for a correct and objective characterization of the *rectissima* and *oltenica* varieties regarding the dynamic of their vegetative development, the first two years of vegetation after planting and only five characters of vegetative development are far from ensuring a satisfying volume of results. For these reasons, in the final conclusions of the present report, we shall refer strictly to the performances recorded by the two varieties, for the analysed characters of vegetative development, without making any kind of assessments regarding the opportunity or lack of opportunity of the proposal for the introduction, in the classification of the species *Robinia pseudoacacia*, of the *oltenica* variety.

The results presented and discussed in the report allow us to conclude that, in regards to the diameter at the base ring of the seedlings in the first two years after planting, in Bârzești, the *rectissima* acacia variety has a significantly and distinctly significantly more vigorous growth than the *oltenica* variety.

The discussion of the results regarding the analysis of the variant for the seedlings' diameter at 30 cm above ground level suggests that the variability of the recorded values was determined, in the case of this character as well, predominantly by the differences between the two tested varieties ( $F_{\text{calc.}} > F_{p5\%}$ ). The differences between the experimental years and the interaction variants x years, in the case of this character, have had no significant effects on the variability of the experimental results.

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