

## SOME ASPECTS REGARDING THE TILLERING CAPACITY IN TWO ACACIA VARIETIES

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### Abstract

Due to its multiple uses as well as due to the obvious economic and ecological advantages which its cultivation offers, the Acacia (*Robinia spp*), as main type of forestry culture, presents special importance in our country.

The placement of the experimental culture was done at the Bărzani Farm, from Arad county, Bârzești locality, a place which presents the following geographic coordinates: 46°29'N; 22°7'E, the altitude of the terrain on which the experimental culture is placed being of circa 465 metres. The objective of this work was to establish to what degree the oltenica acacia variety differs from the rectissima acacia variety in the pedoclimatic conditions from Bârzești from the point of view of the tillering capacity.

In our country, the acacia develops and produces a large quantity of plant biomass in the warm regions, with gentle and long autumns, sheltered from early frosts which cause the freezing of the young, unligified stalks. At average yearly temperatures of under 7-8°C it vegetates faintly, suffers from frosts, and the cold winds and rime cause the breaking of the branches, the detachment of the stalks from the stubs, the cleaving of the forked stems (Stănescu et al., 1997). The state of the acacia is profoundly affected by light, which makes the pure arboreta thin out early which leads to the overgrowth of the weeds in the soil and gradually to its drying out.

**Key words:** acacia, root suckers, tillers, variety, rectissima, oltenica, acacia culture, acacia biomass, protection curtains

### INTRODUCTION

The majority of the species of the *Robinia* genus are known to have the capacity to breed by means of root suckers (root tillers) and by means of cuttings (Drăcea 1926, 2008; Ciuvăț et al., 2013; Costea et al., 1969;), and those with growth in the form of shrub (*R. hispida* și *R. viscosa*, both known in our country under the name of red acacia) are predisposed to form root sucks as early as the second year of vegetation.

The majority of the specialized literature works consider that *Robinia pseudoacacia*, L, species of which the two acacia varieties used in the study are part of, (*Robinia pseudoacacia* var. *rectissima* and *R. pseudoacacia* var. *oltenica*) are characterized by a monopodial growth, with a single straight stem, well pruned in tight bulk, but shorter and forked in the thinned plantations (Clinovschi, 2005; Elena Săvulescu, 2010; Cristina Mănescu, 2010; Doniță, 1999; Șofletea and Curtu, 2000; Bîrlănescu et al., 1966). This species also forms in the first years of life, root tillers, their

growths being downright impressive in the first five years of vegetation (8 – 10 m).

Most often the tillers equal or even surpass the main stem in height, especially in the specimens bred by seeds in which the main stem grows slower in the first years (Clinovski, 2005). In the plantations with high densities of trees at the surface unit the tillers appear but their development is much slower than that of the main stem, most of them drying out after 2-3 years of life (Ciuvăț et al., 2013).

## **MATERIAL AND METHODS**

The researches were carried out in the 2011 – 2014 at the Bărzani Farm from Bârzești locality, Arad county. In both varieties the biological material was represented by seedlings obtained from seed, on a sample consisting of 150 trees one determined the tillering capacity of the two acacia varieties.

The terrain intended for establishing the experimental field was processed, by means of a deep furrow (fallowing), followed by two discings meant to break down the clumps and to achieve a primary levelling of the soil (\*\*\*).

The planting scheme used was 2 m between rows x 1 m between plants per row, scheme recommended for acacia (\*\*\*).

## **RESULTS AND DISCUSSION**

Taking into account that the *oltenica* variety is a selection from the *rectissima* variety cultivated in the south of the country, many times as protection curtains against erosion on the sands of Oltenia, we considered opportune to monitor, in this experimental culture, if the two varieties used in the study differ in terms of their capacity to produce basal tillers, in the first four years of vegetation after planting. The results of the observations and the measurements carried out in the years 2011 – 2014 are presented in table 1.

Because the acacia root must reach a certain degree of development and maturation in order to produce tillers, it is normal for the data of the first year of vegetation (2011) to be missing from table 1. If to the above considerations we add the fact that in 2011 the planting of the seedlings in the experimental culture was made fairly late (the last decade of the month of April) due to the climatic conditions from the respective spring, it is easy to understand that until the end of the respective year the majority of the seedlings hadn't achieved a development degree which would allow them to produce root basal tillers.

In the second year of vegetation after planting (2012), none of the 150 plants of the sample used in the study in the *rectissima* variety produced root basal tillers, while in the *oltenica* variety, 12 % of the plants of the studied sample produced such tillers. It is noteworthy that at the end of the respective vegetation year, the tillers had fairly marked sizes (average height of 1,11 m and base diameter of 0,92 cm), in relation to the sizes of the main stem (h = 3,71 m and Ø at the base ring = 3,84 cm, according to table 1). Without resorting to statistical computations it is obvious that as early as the second year after planting the *oltenica* variety differs radically from the *rectissima* variety in terms of tillering capacity.

Table 1

Tendency of two black locust varieties to produce multiple stems from root suckering in the first four years of vegetation

Variety	2012			2013			2014		
	% of trees with multiple stems	Mean height of multiple stems, m	Mean of root neck diameter cm	% of trees with multiple stems	Mean height of multiple stems, m	Mean of root neck diameter cm	% of trees with multiple stems	Mean height of multiple stems, m	Mean of root neck diameter cm
<i>rectissima</i>	-	-	-	2,0	0,87	0,62	dried out	-	-
<i>oltenica</i>	12,0	1,11	0,92	32,0	1,81	1,64	14,0	2,76	2,54

The difference between the two varieties becomes even more striking in the third year after planting when, the *rectissima* variety (2 % of the sample) produces a single basal tiller and in the *oltenica* variety 16 plants (32 % of the sample) produce basal tillers. Of course, the vigour of the basal tillers, in the *oltenica* variety is clearly superior to that recorded by those signalled in the *rectissima* variety, because the respective tillers are in different years of vegetation (the first year for *rectissima* and first and second year for *oltenica*).

One could assert, based on these data, that the *oltenica* variety has an obvious tillering capacity, in the first four years after planting, while the *rectissima* variety seems to be practically devoid of such capacity.

The data of the fourth year of vegetation after planting (2014) bring serious corrections to what was asserted above, at least regarding the tillering capacity of the *oltenica* variety. In this variety, in nine out of 16 plants which in the third year of vegetation presented basal tillers, the respective tillers disappear by drying out, most probably due to the fact that under the tree the solar rays' intensity diminishes with the development of the plants from the tree, the same phenomenon being present in the sole basal tiller recorded in the *rectissima* variety. Thus, at the end of the fourth year of vegetation, (14%) of the plants from the studied sample of the *oltenica* variety still presented viable tillers while in the *rectissima* variety no plant presented such tillers.

The graphical representation (fig.1) and the regression equation of the percentage of plants which produce basal tillers compared to the year of vegetation after planting, in the *oltenica* variety, suggest that, in case the same drying out rhythm of the basal tillers would be maintained in the fifth year as well, at the end of the respective year only 1,01% of the plants would still present such tillers. This means that the *oltenica* variety would also begin from the fifth year after planting to have a typically monopodial growth, the same as the one manifested in all these four years by the *rectissima* variety, in total conformity with that which is claimed by the specialized literature regarding the type of growth for the trees of the *R. pseudoacacia* species.

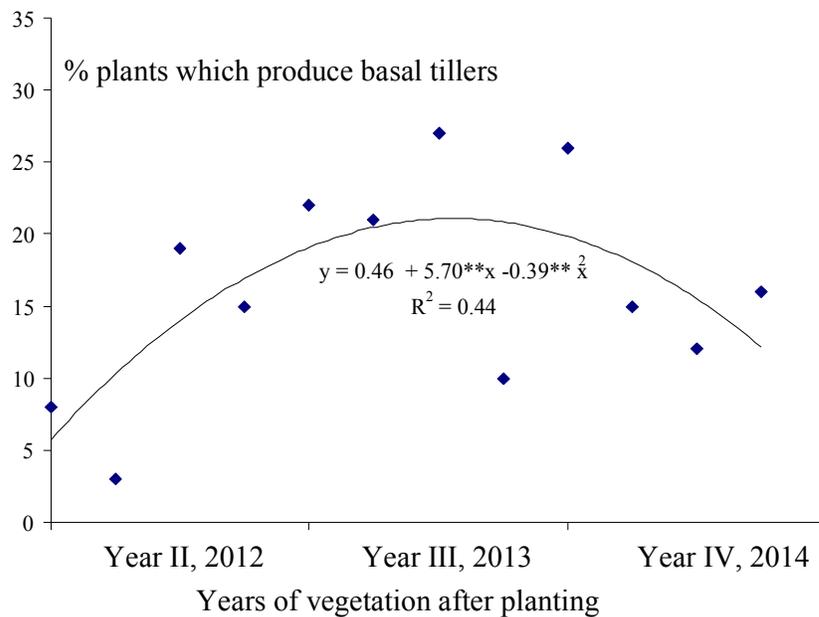


Fig. 1. Regression of the % of trees producing multiple stems vs. year of vegetation after planting, in cv. oltenica

Certainly the two tested acacia varieties differ from one another regarding their tillering capacity, in the first four years of vegetation after planting. The *oltenica* variety produces basal tillers beginning from the second year of vegetation after planting, reaching a maximum tillering level(32 %) in the third year after planting; the *rectissima* variety is, practically, devoid of tillering capacity in the first four years of vegetation after planting in the conditions from Bârzești.

In the fourth year after planting the *oltenica* variety loses, by drying up, the great majority of the basal tillers, so there is the possibility, statistically, for it to no longer present plants with such formations from the fifth year, the trees continuing to grow with a single stem (monopodial) just like those of the *rectissima* variety.

## CONCLUSIONS

Based on the above presented data, one may issue the following preliminary conclusions:

- certainly, the two tested acacia varieties differ obviously from each other regarding their tillering capacity, in the first four years of vegetation after planting;
- the *oltenica* variety begins to produce basal tillers as of the second year of vegetation after planting reaching a maximum level of tillering (32 %) in the third year after planting;
- the *rectissima* variety is, practically, devoid of tillering capacity in the first four years of vegetation after planting;
- in the fourth year after planting the *oltenica* variety loses, by drying up, the great majority of the basal tillers, so there is the possibility, statistically, for it to no longer present plants with such tillers from the fifth year, the trees continuing to grow with a single stem (monopodial) just like those of the *rectissima* variety.

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