STUDY ON THE FORM DEFECTS OF TREE TRUNKS IN PLANNING UNIT NUMBER 6, IN THE V DUMBRAVA MANAGEMENT UNIT, THE FOREST DISTRICT FROM ALESD, THE COUNTY FOREST ADMINISTRATION FROM ORADEA

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Abstract

The study made in planning unit number 6, in the V Dumbrava Management Unithighlights the variability and proportion of form defects in the case of the following tree trunks: sessile oak (Quercus cerris), Turkey oak (Quercus cerris) and white oak (Quercus pubescens).

Key Words: swelling, ovality, bifurcation, saber butt, sweep, burls.

INTRODUCTION

The form defects of tree trunks occur as the result of different internal and external disruptive factors, that inflience the trees during their growth.

The severity of the form defect of the trunk can be highlighted only if we take into account the things made from that trunk and what they are going to be used for afterwards.

The value of the wood that has these irregularities goes down and causes the decrease of its use.

The study of form defects is important in the refinement of the quality of the wood by admoniting, limiting and reducing their causes.

MATERIALS AND METHODS

The study was made on a crop of sessile oak, turkey oak and white oak in the Crişul Repede pass, around a locality called Suncuiuş, in Bihor county, on the Măgurii hill.

This lot presented here is administered by the National Forest Administration, County Forest Administration from Oradea, the Forest District from Aleşd.

The lot has the following characteristics:

- area: 6 ha
- altitude: 450 m
- consistency: 0,6
- slope: 30 º
- average diameter: 20 cm
- average height: 14 m
- age: 80 years
- stat: S

In lot number 6 there were delimitated two experimental areas (I and II), being rectangular and having the following measures: 40mx80m=3200m.

These two experimental areas were placed with the short side on the contour line. In the first experimental area 36 trees were inventorized, and in the second 35.

To determine the degree of form defects the caliper and the Romanian dendrometer were used. The caliper was used to determine the values for swelling and ovality, and the dendrometer to determine the bifurcation. The other form defects of the trunk were observed visually.

The frequency index (Id) for each form defect of the trunk was determined by using:

Id = Nd/N

where: Nd – the number of the trees with a certain defect in the experimental area; N – the total number of trees in the experimental area

RESULTS AND DISCUSSIONS

Swelling

Swelling represents a form defect of the tree trunk which means its abnormal inspissation towards the collar.

Swelling is estimated through the difference between the trunks diameter around collar D and its d diameter at 1m height. The values are expressed in cm/m.

The frequency index in swelling is Id I = 0,75 for experimental area I and Id II = 0,83 for experimental area II.

In table number 1 the measure of swelling on species in the two experimental areas is presented.

Table 1

The measure of swelling on species

Species	Experimental area	Total of trees		Trees with swelling		Swelling variation on measures (cm)									
		nr.	%	nr.	%	5,1-10 little		10,1-15 medium		15,1-20 big		20,1-25 very big		>25 extremely big	
						%	nr	%	nr	%	nr	%	nr	%	nr
Sessile oak	I	18	50	12	33	25	9	8	3	-	-	-	-	-	-
	II	9	26	8	23	20	7	-	-	3	1	-	-	-	-
Turkey oak	I	11	31	11	31	19	7	6	2	3	1	3	1	-	-
	II	8	23	7	20	14	5	6	2	-	-	-	-	-	-
White oak	I	7	19	4	11	11	4	-	-	-	-	-	-	-	-
	II	18	51	14	40	32	11	6	2	3	1	-	-	-	-
Total	**I**	**36**	**100**	**27**	**75**	**55**	**20**	**14**	**5**	**3**	**1**	**3**	**1**	**-**	**-**
	II	**35**	**100**	**29**	**83**	**66**	**23**	**12**	**4**	**6**	**2**	**-**	**-**	**-**	**-**

By analyzing these results we can see a greater balance of this form defect in area II and mainly with white oaks. (fig.1)

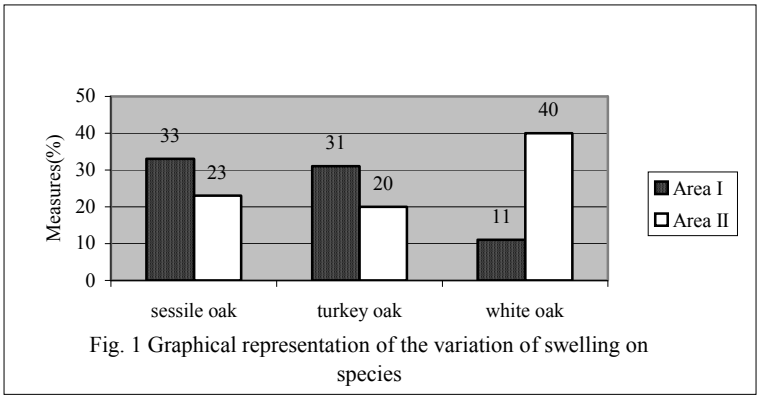

Fig. 1 Graphical representation of the variation of swelling on species

Ovality

Ovality of tree trunks is a form defect characterized by the deviation of the cross section from the circular form.

The ovality of the trunk can be calculated by relating the difference between the maximum diameter D and minimum diameter d to the maximum diameter D. Ovality was determined at the hight of 1,3 m from the ground by using a calipera and it is expressed in per cents (%). The two diameters D and d are perpendicular on eachother.

The frequency index with ovality is Id I = 0,5 for experimental area I and Id II = 0,45 for experimental area II.

In table number 2 the measure of ovality on species in the two experimental areas is presented.

Table 2

The measure of ovality on species

Species	Experimental area	Total of trees		Trees with ovality		Ovality variation on measures (cm)									
		nr.	%	nr.	%	≤ 5 Very little		5,1-10 little		10,1-15 medium		15,1-20 big		>20 very big	
						%	nr	%	nr	%	nr	%	nr	%	nr
Sessile oak	I	18	50	9	25	-	-	19	7	-	-	6	2	-	-
	II	9	26	4	11	-	-	-	-	3	1	6	2	3	1
Turkey oak	I	11	31	8	22	-	-	11	4	8	3	3	1	-	-
	II	8	23	4	11	-	-	-	-	6	2	6	2	-	-
White oak	I	7	19	1	3	-	-	3	1	-	-	-	-	-	-
	II	18	51	8	23	-	-	6	2	14	5	3	1	-	-
Total	**I**	**36**	**100**	**18**	**50**	**-**	**-**	**33**	**12**	**8**	**3**	**9**	**3**	**-**	**-**
	II	**35**	**100**	**16**	**45**	**-**	**-**	**6**	**2**	**23**	**8**	**15**	**5**	**3**	**1**

As one can see in the chart the measure of ovality is mainly medium and big and it appears equally with all three main species (fig. 2)

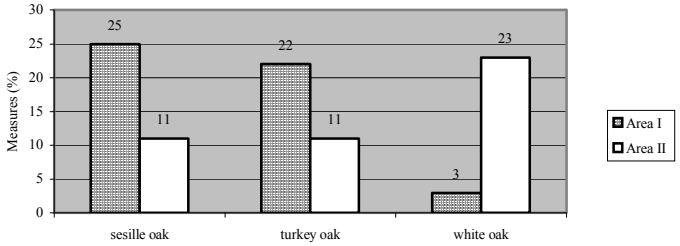

Fig. 2 Graphical representation of the variation of ovality on species

Bifurcation

Bifurcation represents a form defect that occurred due to the division of the trunk into two or more main ramifications at a certain height.

The height of the tree trunks where the bifurcation appears was determined by using the dendrometer.

The values for the frequency index for bifurcation are Id I = 0,45 and Id II = 0,49.

In table number 3 the variation of bifurcation on species in the two experimental areas is presented.

Table 3

The variation of bifurcation on species

Species	Experimental area	Total of trees		Trees with bifurcation		Variation of bifurcation according to its height on the trunk (cm)					
		nr.	%	nr.	%	1-5		5,1-10		10,1-15	
						%	nr	%	nr	%	nr
Sessile oak	I	18	50	9	25	17	6	8	3	-	-
	II	9	26	6	17	11	4	6	2	-	-
Turkey oak	I	11	31	2	6	6	2	-	-	-	-
	II	8	23	2	6	3	1	3	1	-	-
White oak	I	7	19	5	14	6	2	8	3	-	-
	II	18	51	9	26	26	9	-	-	-	-
Total	**I**	**36**	**100**	**16**	**45**	**29**	**10**	**16**	**6**	**-**	**-**
	II	**35**	**100**	**17**	**49**	**40**	**14**	**9**	**3**	**-**	**-**

As one can see in the chart the bifurcation appears mainly at the height of 1-5 m and more rarely at 5,1-10 m, mainly with the sessile oak and white oak (fig.3)

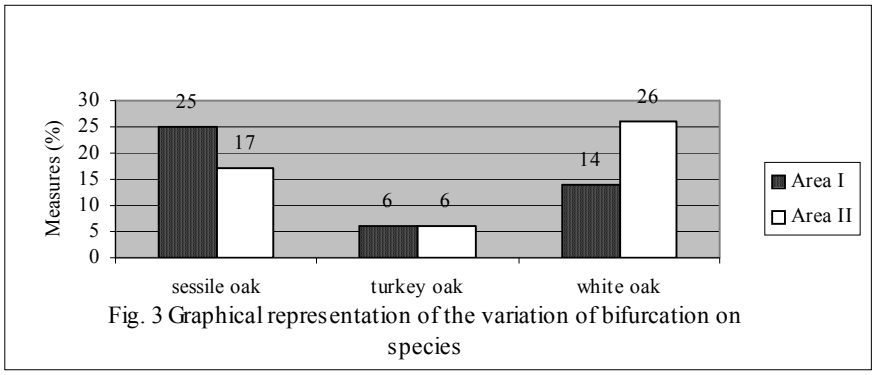

Fig. 3 Graphical representation of the variation of bifurcation on species

Saber butt

Saber butt is a curved deviation of the trunk axis close to the collar.

The values for the frequency index for saber butt are Id I = 0,47 and Id II = 0,2. In table number 4 the variation of saber butt on species in the two experimental areas is presented.

Table 4

The variation of saber butt on species

Species	Experimental area	Total of trees		Saber butt trees	
		nr.	%	nr.	%
Sessile oak	I	18	50	10	28
	II	9	26	2	6
Turkey oak	I	11	31	4	11
	II	8	23	1	3
White oak	I	7	19	3	8
	II	18	51	4	11
Total	**I**	**36**	**100**	**17**	**47**
	II	**35**	**100**	**7**	**20**

We can see a greater balance of this form defect with the sessile oak and a smaller one with turkey oak and white oak (fig. 4).

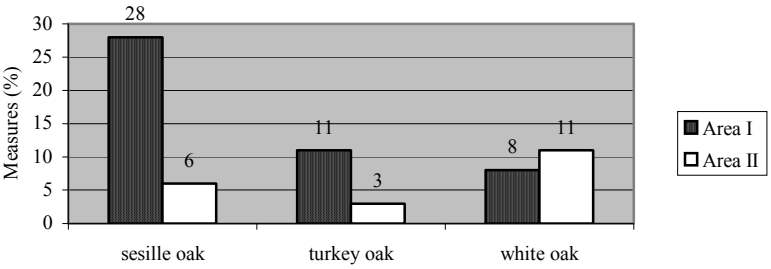

Fig. 4 Graphical representation of the variation of saber butt on species

Sweep

In this form defect there is a curved deviation of the axis from the longitudinal axis. Depending on how often it appears on the axis of the trunk it can be simple or multiple.

This form defect has been determined only concerning the way it appears on the trunk, as it is difficult to determine it at this type of trees.

The values for the frequency index for sweep are Id I = 0,78 and Id II = 0,62.

In table number 5 the variation of sweep on species, depending on the way it appears on the trunk, in the two experimental areas is presented.

Table 5

The variation of sweep on species

Species	Experimental area	Total of trees		Sweep trees		Variation of sweep according to the way it appears on the trunk			
		nr.	%	nr.	%	Single sweep		multiple sweep	
						nr.	%	nr.	%
Sessile oak	I	18	50	14	39	7	19	7	19
	II	9	26	7	20	2	6	5	14
Turkey oak	I	11	31	9	25	4	11	5	14
	II	8	23	4	11	-	-	4	11
White oak	I	7	19	5	14	2	6	3	8
	II	18	51	11	31	1	3	10	29
Total	**I**	**36**	**100**	**28**	**78**	**13**	**36**	**15**	**41**
	II	**35**	**100**	**22**	**62**	**3**	**9**	**19**	**54**

According to this study the multiple sweep has the greatest balance, appearing frequently with the sessile oak mainly in the first experimental area (fig.5).

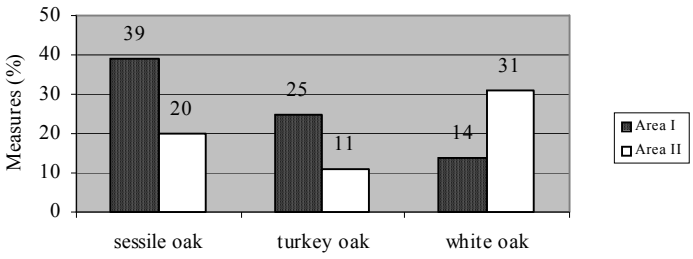

Fig. 5 Graphical representation of the variation of sweep on species

Burls

They represent globular swellings of the tree trunks.

The frequency index for burls is Id I = 0,39 and Id II = 0,48.

In table number 6 the variation of burls on species in the two experimental areas is presented.

Table 6

The variation of burls on species

Species	Experimental area	Total of trees		Burls trees	
		nr.	%	nr.	%
Sessile oak	I	18	50	13	36
	II	9	26	5	14
Turkey oak	I	11	31	-	-
	II	8	23	5	14
White oak	I	7	19	1	3
	II	18	51	7	20
Total	**I**	**36**	**100**	**14**	**39**
	II	**35**	**100**	**17**	**48**

We can see that sessile oaks have the greatest number of burls (fig.6)

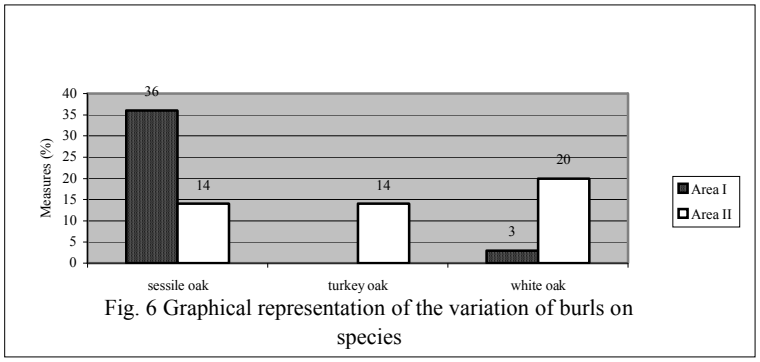

Fig. 6 Graphical representation of the variation of burls on species

CONCLUSIONS

The form defects of the trunk are well represented in the studied lot, mainly due to the precarious stationary conditions (big slope, rocks at the surface, thin soil).

One can see a greater frequency and balance of form defects with the sessile oak and white oak compared to the Turkey oak.

Concerning the proportion of form defects the greatest frequency can be found with swelling and sweep (fig.7).

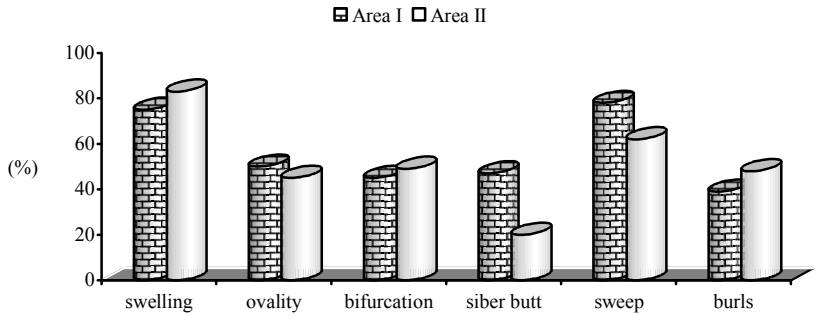

Fig. 7 The proportion of form defects in planning unit 6

The data presented here are important elements for the knowing of the behaviour of certain forest species in certain stationary conditions concerning the defect of wood.

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