ANALYSIS OF HARVESTING COSTS OF SMALL DIMENSIONS WOOD

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Abstract

This paper presents some aspects in the case of small dimensions wood. It also presents how they are used, their provenance, legislative aspects. If the thin wood is easily determined in the feeling area volume and the operating costs and the way of utilization of this product are well known, the kernels are most often on the field, and their collection and capitalization are not profitable due to the high operating costs up to the primary platform. As a case study, 17 parcels of exploitation were selected in the Sudrigiu Forest District, Bihor Forest Administration. In these forests wind blows occurred in 2017. The exploitation costs were determined by drawing up the exploitation estimate, in three variants: exploitation of the wood without brackish, with corks and removal and preparation of bracelets. The main factors influencing the costs of exploiting these crops have been identified and ways to mitigate these costs and ways of collecting more efficiently.

Key words: cost of works, costs, exploitation period, tree branches, accessibility, collection roadways, felling area

INTRODUCTION

Small wood includes thin wood, small wood, mining residues, thin coats. By small wood is meant wood from chips, tears, tree peaks, round wood cuts and the like. This small size material must not be confused with the thin wood provided as such in the exploitation estimates. (***, 1977)

Small scale woodworking solutions can be grouped into two groups of categories:

- Treating wood in felling area with chopping devices;
- Packaging small wood in felling area or primary platform.

Small wood can be utilized in various forms: directly in the form of raw wood, different assortments obtained by processing, forming and primary processing, mechanical machining or chemical processing.

Small wood should be used in felling area, road or even in warehouses. Crows with a diameter of more than 5 cm are stamped and cut into lengths corresponding to the means of transport and their storage is in a pre-determined place. Thin wood, under 5 cm in diameter, is stored in piles. If there are commands, these chips can be shaped in sheaves for chipboard factories (chipboard). These products result from any exploitation work, even after care cuts, hygiene.

In practice, small wood means wood with a diameter (thickness) of less than 18 cm and a variable length. In addition to the notion of small wood, similar names also appear: waste, thin wood, fine wood, remains, etc. The exploitation activity is generating debris, that is why the cleaning of the felling area is done. (***, 2011)

Choosing the method of exploitation according to the desired assortment, the place where the priority sorting is done, the existence of the corridors and the outposts. In our country, it is forbidden to apply the system wood of the trees with the crown - the full tree system - from 2002, except when the outfit is done by funicular or suspended. (Order no. 635/2002, Order no. 606/2008, Order no. 1540/2011)

Collecting wood in the form of a shredder leads to a maximum simplification of the production process, correlated with the highest degree of possible mechanization of the exploitation works.

MATERIAL AND METHOD

There are more and more programs developed at the forestry level by forestry engineers, computer scientists or teachers working in the forestry sector, programs that estimate the operating costs for a particular felling area. Some programs are more detailed, others strictly follow local needs, but it is rather difficult to give back exactly all the elements and factors that give the inputs and outputs for such a program. For harvesting, collecting and shaping, stacking, bracing some operations that interact with the exploitation method and technology, the tools and tools used, the place where certain operations are performed, relief factors, forestry factors, and economics are required.

The study was conducted within the Sudrigiu Forest District, Bihor Forest Administration and 17 felling areas exploited during the period 01-08.2018. In these stands there were wind-blows following the storm of September 2017. For these felling areas, the mining of the exploitation works with the estimation of the exploitation costs for the entire technological process was drawn up. The currencies were determined using a program developed in Microsoft Excel.

For the 17 felling areas, finally, the unit costs with the exploitation of wood were determined, with and without removing the bracelets at the primary platform and preparing them for dispatch / loading. Also, the costs of removing these chips to the primary platform were determined separately.

The felling areas are provided with accidental cuts I, ages 74 (parlays 547, 552, 557, 564 and 580) and 124 years (game 567). The total volume of the extract was 22207 cubic meters, divided into groups of

species as follows (figure 2): beech (Fa) 79.6%, chercinee (Q) 19.6% and less than 1% resinous (R), soft wood (DM) and hard wood (DT).

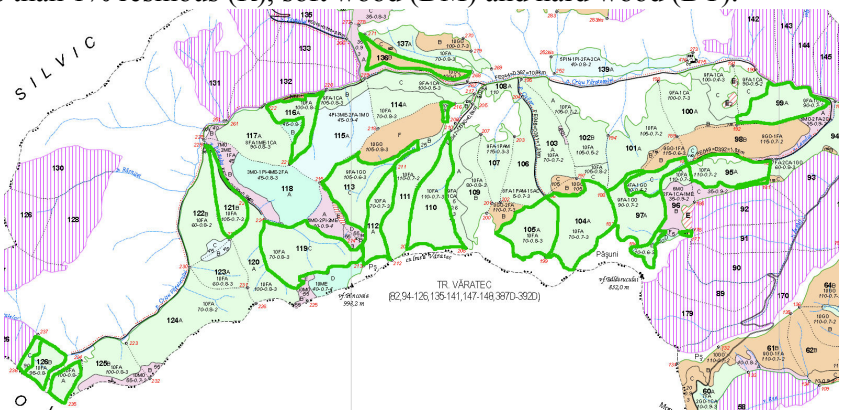

Fig. 1. Study Localization - UP VII%, Sudrigiu Forest District, Bihor Forest Administration. Felling area analyzed (***, 2014)

Table 1

Presentation of data from the felling areas in which the study was conducted

No. crt.	Coupe no.	U.A.	volume of the average tree, în cm/tree			Age, years	Area, ha	Volume, cm	Accessibility grade	slope, degrees
			total	R+DM	F+DT					
1	543	113C%	0,86	0	0,86	109	10,0	132	3	25
2	545	121B	1,29	0,50	1,29	109	14,0	1020	2	25
3	547	112A 113C	1,23	0	1,23	74 109	27,8	1007	4	25
4	551	72B 73B	1,31	0	1,31	114 114	21,5	612	3	25
5	552	119C 126A 126B 126C	1,46	0	1,46	74 104 99 94	59,8	1289	3	25
6	554	95A 95B	1,74	0	1,74	114 114	13,4	2011	2	25
7	555	110	1,81	0	1,81	114	10,0	1653	3	25
8	557	105A	1,70	3	1,70	74	23,6	1483	2	25
9	558	99A	1,16	0	0,00	94	0,4	37	3	25
10	562	116A	1,10	1,00	1,10	104	15,6	753	3	33
11	564	104A	1,26	0	1,26	74	18,0	4149	5	25
12	567	66	1,32	0	1,32	124	20,6	2855	5	25
13	568	97A 97C	1,70	0	1,70	94	27,7	3398	3	25
14	571	65A 65,C	1,05	0	1,05	104	5,9	151	3	25
15	574	96C,E	1,69	0	1,69	114	4,5	283	4	25
16	580	104A	1,77	0	1,77	74	17,6	1098	5	25
17	582	136B	0,29	0,53	0,29	104	10,0	276	2	34
Total							300,4	22207		

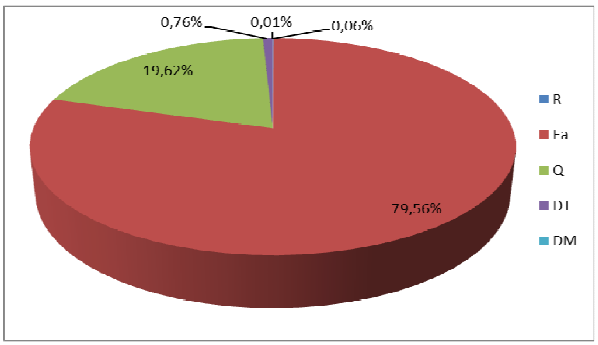

Fig. 2. Distribution of the extraction volume from the 17 fellin areas by species group

After the drawing of the exploitation estimate with all the necessary operations, unit costs of exploitation (lei/cm were determined:
- Variant V1 - exploitation of wood without the collection of bracelets (they remain in the felling area);
- Variant V2 - Wood mass exploitation, including the collection of bracelets and their preparation for recovery or dispatching;
- Variant V3 - Costs for harvesting, removing bracelets and preparing them for shipping in the primary platform.

Table 2

Unit operating costs for the three variants

No. crt.	Coupe no.	Exploitation duration, month	unitary operating costs in the variant …, in lei/cm		
			V1	V2	V3
1	554	5,5	41,04	47,80	98,46
2	557	5,5	41,88	49,23	108,20
3	568	5,5	44,23	51,36	101,11
4	555	5,5	44,82	51,75	101,11
5	545	5,5	45,58	53,27	116,89
6	552	5,5	47,32	54,29	113,35
7	551	4,5	50,73	56,38	113,40
8	547	5,5	53,09	60,35	112,73
9	580	5,5	54,23	61,25	110,86
10	564	6	55,21	62,50	108,08
11	574	3	55,65	61,52	112,58
12	567	5,5	57,56	63,37	110,02
13	562	4,5	60,85	69,17	125,28
14	571	2	62,13	68,03	123,02
15	543	3	67,24	73,46	136,98
16	582	3	75,03	83,55	141,95
17	558	1	76,83	81,88	129,91

In table 1, the slopes were arranged in the order of increasing the exploitation costs without tree branches (variant 1) and resulted costs between 41.0 and 76.8 lei, with a variation amplitude W = 35.8lei.

The factors that influence these costs are (for the 17 felling areas analyzed) in order of importance: Gross total exploited volume (fig.2), Exploitation duration (fig.3), Average tree volume (Fig. 4).

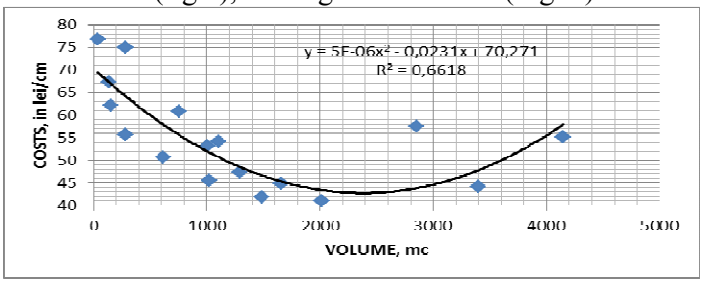

Fig. 2 Representation of the correlation between the unit cost of exploitation and the gross volume of the untreated felling area (variant 1)

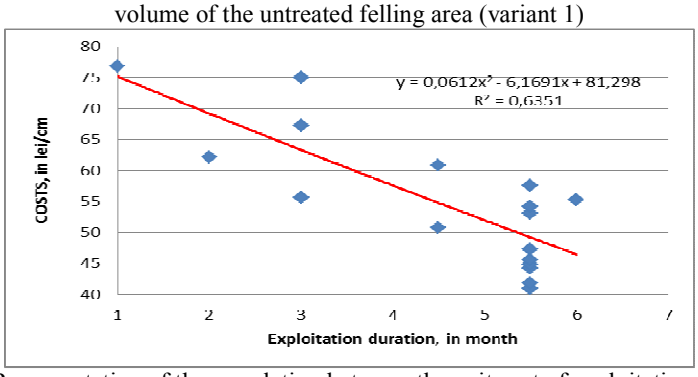

Fig. 3 Representation of the correlation between the unit cost of exploitation and the exploitation period for non-branch wood (variant 1)

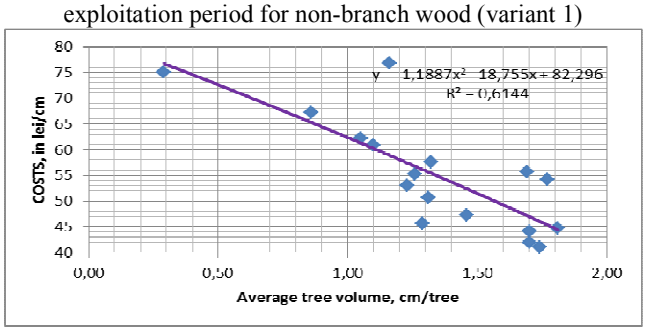

Fig. 4 Representation of the correlation between the unit cost of exploitation and the average tree volume for non-branch wood (variant 1)

Arranging the slopes in ascending order of exploitation costs with christmas (variant 2 exploitation) resulted costs between 47.8 and 83.6 lei, with an amplitude of variation W = 35.7 lei. In this case, the factors influencing these costs are (for the 17 felling areas analyzed) in order of

importance: Average tree volume (fig.5), Gross total exploited volume (fig.6), Exploitation duration (fig.7).

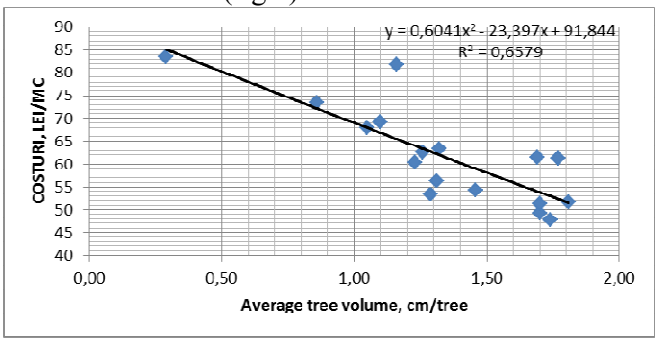

Fig. 5 Representation of the correlation between the unitary cost of exploitation and the average tree volume for branch wood (variant 2)

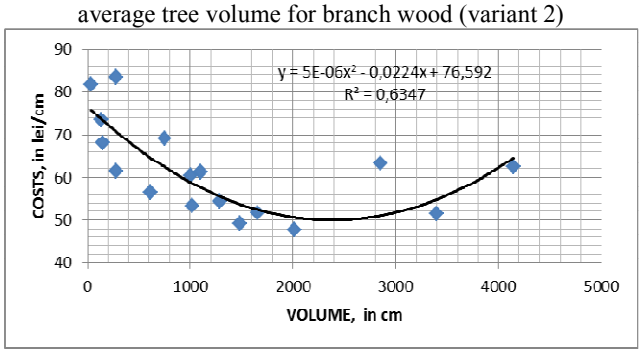

Fig. 6 Representation of the correlation between the unit cost of exploitation and the volume of branches of the felling areas (variant 2)

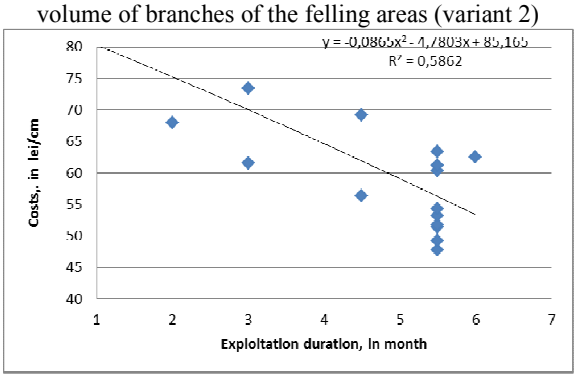

Fig. 7 Representation of the correlation between the unit cost of exploitation and the exploitation period for branch wood (variant 2)

For the extraction and preparation of the bracelets in the primary platform (in the 3rd variant) the values ranged between 98.4 and 142 lei / m3, the amplitude of variation being of 43.5 lei. Analyzing the influence of certain factors on these costs, it is noticed that there are negative curvilinear correlations with the gross operating volume and the period of exploitation of the felling areas. (Figures 8 and 9).

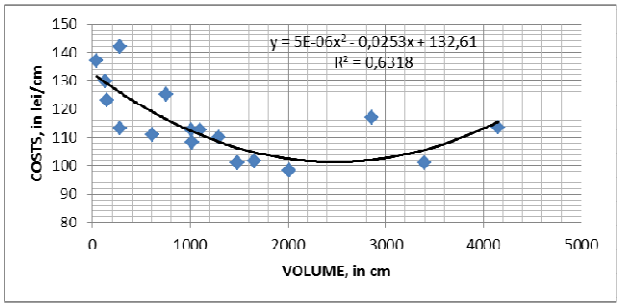

Fig. 8 Representation of the correlation between the unit cost of exploitation and the gross gross volume of the felling area for branches (variant 3)

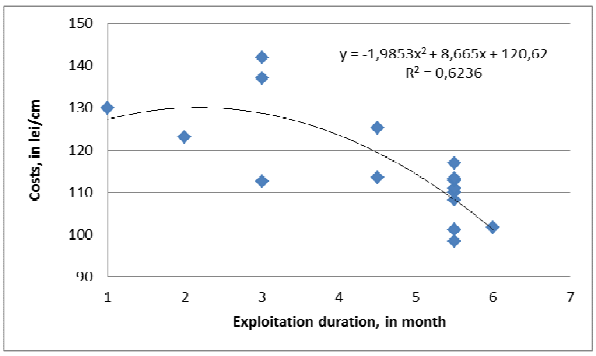

Fig. 9 Representation of the correlation between the unit cost of exploitation and the exploitation period for the branches (variant 3)

CONCLUSIONS

The exploitation of woody or snowy wood has some features that make exploitation very difficult, unprofitable and if it is not done on time and fairly, forestry, ecological and economic effects have major and negative consequences. In order to extract the complete wood, we need high performance machines (tractors, shredders, platforms, trailers), access roads in felling areas.

The mode of collection is recommended to be given by the tree-working system or ARCOT (tree-crown-log). It is known that the full tree system is forbidden since 2002 but this still applies in some situations on the ground.

The exploitation costs, as seen, are large and very large in the case of separate collection of branches. It is recommended to equip economic agents and forest managers with trailed or worn-out shredders to convert the exploitation remnants, branches, small wood into the chip, and apply the chip system.

Analyzing the three proposed variants resulted in negative (indirect) correlations and strong links between unit costs of exploitation and:
- gross volume (correlation coefficients r = -0,81 *** variant 1; -0,80 *** V2; -0,79 *** V3);
- average tree volume (r = -0,78 *** V1; -0,81 *** V2);
- exploitation period (r = -0,80 *** V1; -0,77 *** V2; -0,79 *** V3).

A very good way would be for these branches to be chopped up in the felling area and applied the ”chip system”. It would increase the incomes obtained and would lower the price to the population for pellets, briquettes, wood boards etc. In our country the biggest issue is the accessibility of the stands and the range of machines available on the market.

Modern technologies are needed in Romanian forests because most of the care, hygiene or accidental work is economically viable.

Also, the damage that may occur during the exploitation of wood must be diminished and the immediate economic efficiency of each work executed as well as the overall profitability achieved through the whole range of works leading the forest to the exploitation period.

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