ASPECTS OF MECHANIZATION OF THE POSSIBILITIES OF WEEDINGS OF THE U.P. I SÎNIOB, O.S. SĂCUIENI, D.S. ORADEA

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Abstract
Tending of crops and forest stands younger work of major importance in forest management of forest is under continual review, which occurs through various means and methods in creating the necessary balance in the harmonious development of the desired species, as economically and environmentally.
During these actions play an important role in youth culture and tending operations made on the recommendation of specialists stand in annual programs, observing the legislation and technical guidance.
Cuttings of tending for young crops and forest stands contain a variety of issues, with multiple features and their execution process includes a variety of situations, due to a multitude of variable factors which must be taken into account to achieve works.
Among the factors that influence decision making in the process of completing the works for the cuttings of tending and young forest stands may be outlined goal pursued, tree species, age, diameter and their density, slope land, form of relief, climate, soil composition and humidity, altitude, to.
Depending on these factors, works tending crops and young forest stands can be achieved with hand tools or mechanical means.
To make the works of tending crops and young forest stands need to be given to creating opportunities for access to stands, facilitating making the actual cuttings and collecting the resulting material, where appropriate, the whole rotation.

Key words: weeding, improvement cutting, young stand, moto-tool, mechanization of work, density

INTRODUCTION

Romanian sustainable forestry strategy during 2000 - 2020 provides that in the future realisation into stands for the execution of works tending may be performed in better conditions by creating a network of internal accessibility of young forest stands.

The strategy mentions ,, To execute the works tending and management of forest stands at the level required by their status which will allow refining the intensity of each intervention according to local conditions, stationary and stand, careful attention to an internal accessibility of young forest stands. Thus, open forest stands from the early stages of their development through a network of light adapted to local conditions, meets the requirements of silvicultural and nature of technological, economic and landscape-recreational".

The strategy has also considered the extension works tending and management of forest stands, differentiated regionally, to ensure their quality and stability. One of the fundamental principles of forest management to be kept constantly in mind when establishing and executing works tending in culture and young stands is the degree of accessibility of these stands (xxx., 2000, ICAS, Bucureşti).

The forest specialist literature, and, technical standards for the tending and management of forest stands are details of the works tending system seedlings and young

forest stands, showing the purpose, means, methods, intensity and periodicity of achieving them "(xxx. , 2000).

Weedings applied in forestry crops, before the conclusion of close crop and consists of removal of vegetable layer, undershrubes, shrube, shoots and root-shoot around the main species of seedlings and even prevents their suppression.

Timely execution of these works has a great importance especially in cultures main species that do not support shading.

MATERIAL AND METHODS

Forest fund covered in this study belongs to Ciuhoi and comes from the Forestry Department Sacueni (UP I Siniob) following reconstitution of ownership to the Law no. 1 / 2000. It is located in the territorial radius of the village Ciuhoi, Bihor County. Geographically, the forests are located in plain Banato - Crisana and fitoclimatic, village forests are part of the floor "plain forest (CF).

The actual area of UB I Ciuhoi is 191.51 ha. It was determined by the plans of the planimetration equipped with management plan details. Forest is found in the territorial limits of the UP I Siniob Sacueni Forestry. He formed two bodies of woods and state forest, arable land, ranges and private forests (communal forests and forests belonging to individuals).

Research has had several issues as follows:

-information, the documentation of the specialized technical literature, the themes of scientific research, technical documentation, etc.

-conceptual studies, analysis, and develop technical solutions;

-application, putting into practice the technical solution;

Working method for the technical means to works tending of crops and young forest stands has been tested in natural conditions of laboratory-stand.

-for determining fuel consumption in different working conditions used method greatly to the fuel tank.

-main technical parameters determining the structure of working time and productivity chronometrical method used and number of specimens cut, the actual measurement of the surface where the cuttings were made of sections of material cut, but other research methods as follows:

- Dimensional measurement method;
- Method of direct observation;
- Similarity method;
- Analysis method;
- Method comparison;
- Photograph method;

Inventorying statistics of forest stands studied (Giurgiu, V., 1972)

$$n = \frac{t^2 \times s_{\%}^2 \times F}{F \times \Delta_{\%}^2 + t^2 \times f \times s^2{}_{\%}} \qquad (1)$$

where:

-n- number of surveys;

-d- distance between sampling;

-F- stand area;

-$\Delta_{\%}$- allowable tolerance;

-t-coverage probabilities corresponding coefficient taken into account;

-f- place the sample size;

-$s_{\%}$- coefficient of variation of volumes on the stand (the statistical unit instead of sample).

In this context all samples plot (SSpi = E) is the sample selection or a community that is extracted from the population.

Statistical-mathematical analysis carried out on observations obtained by sampling is to inform the closeness of the sample and the population in terms of a sample plot and the population.

The main aspects of statistical inventories are:

- the form of the sample plot;
- size of the sample plot;
- number of sample plot;
- module location of the sample plot.

Type of sample surfaces

In form or plot of the sample experienced a series of forms as follows: square, rectangle, circle. It was found that the most commonly used is the circular, it is the optimal solution to implement due to the following features (Giurgiu, V., 1972):

- perimeter circle of the sample surface is less equal than other forms of survey area which means a lower possibility to encounter the limits of their trees;
- cost of inventory works through strip solution is higher than the circular perimeter;
- the same area coefficient of variation for circular sample plot is less than the coefficient of variation if rectangular area;

Optimal size of the sample plot

About the optimal size of the circular sample plot was shown that the value of such areas should be between 100-500m^2 If this case study of the surface of the sample size will be 100 m^2.

Equipment used

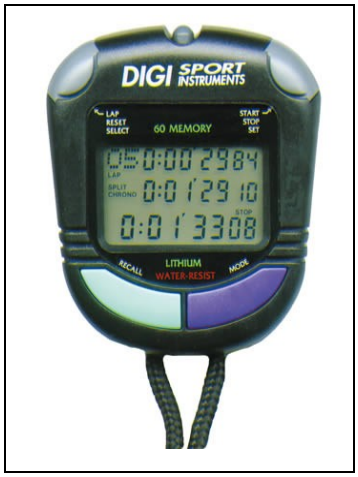
To obtain the data required to develop the work we used a range of modern equipment:

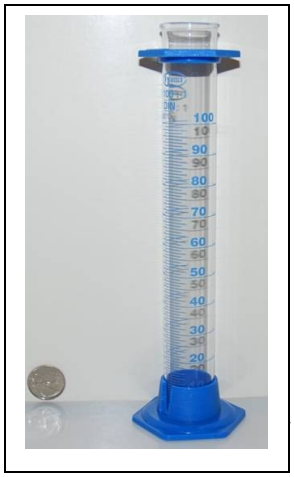
a).Tape measure metric is used to determine the samples plot (Fig.1);

b).Sliding used to measure cut sections of trees extracted (Fig.2);

c).Stopwatch - device used to measure working time (Fig.3);

d).Graduated cylinder is capable of determining fuel consumption (Fig.4).





Hand Machines- Moto-tool „ STIHL" FS 300 (Fig. 5)
Used to works tending, weedings, releases cutting and not go beyond cleanings.

Fig. 5. Moto - tool „ STIHL" FS 300

Table 1

Technical characteristics of the moto – tool *„ STIHL" FS 300*

Displacement	30,8 CM^3
Power	1,3 Kw/1,8 CP
Maximum rotation of the engine	12300 rot/min
Idling speed	2800 rot/min
Maximum speed training tree (training the cutting tool)	8930 rot/min
Overall length (without cutting tool)	1765 mm
Fuel tank capacity	0,64 l (640 cm^3)
Weight	7 kg

The data presented in table 1, were extracted from catalog presentation STIHL products company since 2009.

RESULTS AND DISCUSSION

This work was carried weeding mechanized with motounealta STIHL FS 300 in UB. I Salard, fail. 36 B, of the Forestry Sacueni a culture of heaven in the age of 4 years, an average slope of 30 on a surface of 100 m^2, having provided these data according to the degree of aweed of seedlings.

Table 2

The data to perform the work of weeding using motouneltei STIHL FS 300

N.o.	Species	Diameter (cm)Weeding seedlings	Seedling height (cm)	Cutting time around seedlings (hours)	Gasoline consumption / seedling weeding (liters)	Time of changing place from one seedling to another (hours)	Gasoline consumption / time of changing place (liters)	1:50 STIHL oil consumption (liters)
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Ce	0,4	50	00:00:31	0,00606	00:00:05	0,00003	0,000122
2	Ce	0,6	50	00:00:26	0,00505	00:00:04	0,00003	0,000102
3	Ce	0,5	35	00:00:36	0,00707	00:00:06	0,00004	0,000142
4	Ce	0,7	55	00:00:26	0,00505	00:00:08	0,00005	0,000102
5	Ce	0,8	40	00:00:26	0,00505	00:00:03	0,00002	0,000101
6	Ce	0,5	35	00:00:41	0,00808	00:00:07	0,00004	0,000162
7	Ce	0,7	50	00:00:21	0,00404	00:00:05	0,00003	0,000081
8	Ce	0,4	35	00:00:36	0,00707	00:00:07	0,00004	0,000142
9	Ce	0,5	40	00:00:21	0,00404	00:00:03	0,00002	0,000081
10	Ce	0,6	35	00:00:26	0,00505	00:00:07	0,00004	0,000102
11	Ce	0,5	40	00:00:36	0,00707	00:00:06	0,00004	0,000142
12	Ce	0,7	35	00:00:26	0,00505	00:00:11	0,00006	0,000102
13	Ce	0,5	30	00:00:26	0,00505	00:00:04	0,00003	0,000102
14	Ce	0,5	40	00:00:21	0,00404	00:00:03	0,00002	0,000081
15	Ce	0,5	30	00:00:21	0,00404	00:00:05	0,00003	0,000081
16	Ce	0,4	30	00:00:26	0,00505	00:00:04	0,00003	0,000102
17	Ce	0,6	80	00:00:16	0,00303	00:00:03	0,00002	0,000061
18	Ce	0,3	35	00:00:31	0,00606	00:00:05	0,00003	0,000122
19	Ce	0,4	45	00:00:36	0,00707	00:00:06	0,00004	0,000142
20	Ce	0,7	80	00:00:21	0,00404	00:00:01	0,00001	0,000081
21	Ce	0,5	50	00:00:31	0,00606	00:00:05	0,00003	0,000122
22	Ce	0,6	60	00:00:26	0,00505	00:00:04	0,00003	0,000102
23	Ce	0,8	70	00:00:26	0,00505	00:00:09	0,00005	0,000102
24	Ce	0,5	50	00:00:41	0,00808	00:00:07	0,00004	0,000162
25	Ce	0,2	30	00:00:31	0,00606	00:00:05	0,00003	0,000122
26	Ce	0,6	35	00:00:10	0,00202	00:00:09	0,00005	0,000041
27	Ce	0,6	45	00:00:26	0,00505	00:00:04	0,00003	0,000102
28	Ce	0,5	35	00:00:31	0,00606	00:00:08	0,00005	0,000122
29	Ce	0,6	70	00:00:26	0,00505	00:00:04	0,00003	0,000102
30	Ce	0,7	60	00:00:31	0,00606	00:00:05	0,00003	0,000122
31	Ce	0,6	50	00:00:36	0,00707	00:00:10	0,00006	0,000143
32	Ce	0,6	60	00:00:16	0,00303	00:00:03	0,00002	0,000061
33	Ce	0,3	35	00:00:31	0,00606	00:00:05	0,00003	0,000122
34	Ce	0,8	70	00:00:16	0,00303	00:00:09	0,00005	0,000062
35	Ce	0,3	40	00:00:41	0,00808	00:00:07	0,00004	0,000162
36	Ce	0,3	35	00:00:26	0,00505	00:00:04	0,00003	0,000102
37	Ce	0,4	50	00:00:21	0,00404	00:00:03	0,00002	0,000081
38	Ce	0,3	35	00:00:36	0,00707	00:00:06	0,00004	0,000142
39	Ce	0,7	50	00:00:16	0,00303	00:00:03	0,00002	0,000061
40	Ce	0,6	50	00:00:31	0,00606	00:00:09	0,00005	0,000122
41	Ce	0,6	55	00:00:31	0,00606	00:00:05	0,00003	0,000122
42	Ce	0,6	45	00:00:52	0,0101	00:00:09	0,00005	0,000203

43	Ce	1	70	00:00:31	0,00606	00:00:05	0,00003	0,000122
44	Ce	0,6	50	00:00:41	0,00808	00:00:07	0,00004	0,000162
45	Ce	0,8	60	00:00:31	0,00606	00:00:05	0,00003	0,000122
46	Ce	0,7	67	00:00:36	0,00707	00:00:06	0,00004	0,000142
47	Ce	0,7	70	00:00:36	0,00707	00:00:06	0,00004	0,000142
48	Ce	0,5	50	00:00:31	0,00606	00:00:05	0,00003	0,000122
49	Ce	0,6	60	00:00:26	0,00505	00:00:04	0,00003	0,000102

Table 2 continuation

The data to perform the work of weeding using motouneltei STIHL FS 300

N.o.	**Species**	**(cm)Weeding seedlings diameter**	**Seedling height (cm)**	**Cutting time around seedlings (hours)**	**Gasoline consumption / seedling weeding (liters)**	**Time of changing place from one seedling to another (hours)**	**Gasoline consumption / time of changing place (liters)**	**1:50 STIHL oil consumption (liters)**
0	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***
51	Ce	0,8	70	00:00:16	0,00303	00:00:03	0,00002	0,000061
52	Ce	0,3	40	00:00:26	0,00505	00:00:06	0,00003	0,000102
53	Ce	0,5	50	00:00:16	0,00303	00:00:03	0,00002	0,000061
54	Ce	0,9	70	00:00:21	0,00404	00:00:03	0,00002	0,000081
55	Ce	0,4	50	00:00:47	0,00909	00:00:08	0,00005	0,000183
56	Ce	0,5	60	00:00:21	0,00404	00:00:03	0,00002	0,000081
57	Ce	0,4	50	00:00:26	0,00505	00:00:04	0,00003	0,000102
58	Ce	0,3	35	00:00:41	0,00808	00:00:07	0,00004	0,000162
59	Ce	0,8	68	00:00:16	0,00303	00:00:03	0,00002	0,000061
60	Ce	0,3	45	00:00:26	0,00505	00:00:06	0,00003	0,000102
61	Ce	0,5	40	00:00:16	0,00303	00:00:03	0,00002	0,000061
62	Ce	0,9	70	00:00:21	0,00404	00:00:03	0,00002	0,000081
63	Ce	0,4	50	00:00:47	0,00909	00:00:08	0,00005	0,000183
64	Ce	0,4	60	00:00:21	0,00404	00:00:03	0,00002	0,000081
65	Ce	0,4	50	00:00:21	0,00404	00:00:03	0,00002	0,000081
66	Ce	0,3	45	00:00:41	0,00808	00:00:07	0,00004	0,000162
67	Ce	0,8	70	00:00:16	0,00303	00:00:03	0,00002	0,000061
68	Ce	0,6	60	00:00:21	0,00404	00:00:03	0,00002	0,000081
69	Ce	0,4	45	00:00:31	0,00606	00:00:05	0,00003	0,000122
70	Ce	0,6	55	00:00:31	0,00606	00:00:05	0,00003	0,000122
71	Ce	0,7	67	00:00:36	0,00707	00:00:06	0,00004	0,000142
72	Ce	0,8	75	00:00:21	0,00404	00:00:03	0,00002	0,000081
73	Ce	0,4	45	00:00:41	0,00808	00:00:07	0,00004	0,000162
74	Ce	0,9	77	00:00:21	0,00404	00:00:03	0,00002	0,000081
75	Ce	0,4	50	00:00:47	0,00909	00:00:08	0,00005	0,000183
76	Ce	1,3	80	00:00:16	0,00303	00:00:03	0,00002	0,000061
77	Ce	0,4	45	00:01:07	0,01314	00:00:11	0,00007	0,000264
78	Ce	0,8	70	00:00:52	0,0101	00:00:09	0,00005	0,000203
79	Ce	1	77	00:00:41	0,00808	00:00:07	0,00004	0,000162
80	Ce	0,6	60	00:00:36	0,00707	00:00:06	0,00004	0,000142
81	Ce	0,7	65	00:00:31	0,00606	00:00:05	0,00003	0,000122
82	Ce	0,6	57	00:00:36	0,00707	00:00:06	0,00004	0,000142
83	Ce	0,7	65	00:00:31	0,00606	00:00:05	0,00003	0,000122
84	Ce	1,2	90	00:00:26	0,00505	00:00:04	0,00003	0,000102
85	Ce	0,5	55	00:01:02	0,01212	00:00:10	0,00006	0,000244
86	Ce	0,6	50	00:00:41	0,00808	00:00:07	0,00004	0,000162
87	Ce	0,8	70	00:00:31	0,00606	00:00:05	0,00003	0,000122
88	Ce	0,4	55	00:00:36	0,00707	00:00:06	0,00004	0,000142

89	Ce	0,7	65	00:00:21	0,00404	00:00:03	0,00002	0,000081
90	Ce	0,8	60	00:00:36	0,00707	00:00:06	0,00004	0,000142
91	Ce	0,7	70	00:00:41	0,00808	00:00:07	0,00004	0,000162
92	Ce	0,4	55	00:00:41	0,00808	00:00:07	0,00004	0,000162
93	Ce	0,8	65	00:00:21	0,00404	00:00:03	0,00002	0,000081
94	Ce	0,7	70	00:00:47	0,00909	00:00:08	0,00005	0,000183
95	Ce	0,9	80	00:00:36	0,00707	00:00:06	0,00004	0,000142
96	Ce	0,7	75	00:00:31	0,00606	00:00:05	0,00003	0,000122
97	Ce	0,6	65	00:00:36	0,00707	00:00:06	0,00004	0,000142
98	Ce	0,5	55	00:00:31	0,00606	00:00:05	0,00003	0,000122
99	Ce	0,6	50	00:00:26	0,00505	00:00:04	0,00003	0,000102
100	Ce	0,5	55	00:00:41	0,00808	00:00:07	0,00004	0,000162

Table 2 continuation

The data to perform the work of weeding using motouneltei STIHL FS 300

N.o.	Species	(cm)Weeding seedlings diameter	Seedling height (cm)	Cutting time around seedlings (hours)	Gasoline consumption / seedling weeding (liters)	Time of changing place from one seedling to another (hours)	Gasoline consumption / time of changing place (liters)	1:50 STIHL oil consumption (liters)
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
101	Ce	0,8	70	00:00:26	0,00505	00:00:04	0,00003	0,000102
102	Ce	0,7	60	00:00:47	0,00909	00:00:08	0,00005	0,000183
103	Ce	0,9	70	00:00:36	0,00707	00:00:06	0,00004	0,000142
104	Ce	0,9	75	00:00:26	0,00505	00:00:04	0,00003	0,000102
105	Ce	0,5	50	00:00:47	0,00909	00:00:08	0,00005	0,000183
106	Ce	0,5	40	00:01:07	0,01314	00:00:11	0,00007	0,000264
107	Ce	1,3	80	00:00:26	0,00505	00:00:04	0,00003	0,000102
108	Ce	0,5	55	00:00:31	0,00606	00:00:05	0,00003	0,000122
109	Ce	0,6	60	00:00:26	0,00505	00:00:04	0,00003	0,000102
110	Ce	0,6	50	00:00:36	0,00707	00:00:06	0,00004	0,000142
111	Ce	0,7	70	00:00:31	0,00606	00:00:05	0,00003	0,000122
112	Ce	0,9	50	00:00:26	0,00505	00:00:04	0,00003	0,000102
113	Ce	0,5	70	00:00:47	0,00909	00:00:08	0,00005	0,000183
114	Ce	0,5	55	00:00:52	0,0101	00:00:09	0,00005	0,000203
115	Ce	1	80	00:00:26	0,00505	00:00:04	0,00003	0,000102
116	Ce	0,5	60	00:00:57	0,01111	00:00:10	0,00006	0,000223
117	Ce	1,1	77	00:00:26	0,00505	00:00:04	0,00003	0,000102
118	Ce	0,4	55	00:00:16	0,00303	00:00:03	0,00002	0,000061
119	Ce	0,3	47	00:00:21	0,00404	00:00:03	0,00002	0,000081
120	Ce	0,4	60	00:00:26	0,00505	00:00:02	0,00001	0,000101
121	Ce	0,5	50	00:00:21	0,00404	00:00:03	0,00002	0,000081
122	Ce	0,3	47	00:00:16	0,00303	00:00:00	0	0,000061
TOTAL				**01:03:10**	**0,73833**	**00:11:03**	**0,00415**	**0,014850**

Analyzing data from table. 2 is observed that the total time to perform the work of weedings around seedlings is different depending on the degree of heaviness on each seedling in hand, and consumption of fuel (gas 9 ROZ oil STIHL + 1:50) differs from a seedling weeding to another.

In determining the fuel consumption and equipment productivity, the structure of working time most important, the measured time are:

The time in which the cutting weeds around the seedlings (at this time is consumed the greatest amount of fuel as the engine speed function in charge in approximately 7000 rp/m).

While aid contains the following operations:

- moving from a seedling to another;
- when searching seedling not seen;
- the observation of seedling green or dry;

During helpful engine is off and work at rotation speed when fuel consumption is minimal**.**

For an explicit analysis as were calculated to get your land and were represented by the graphs below:

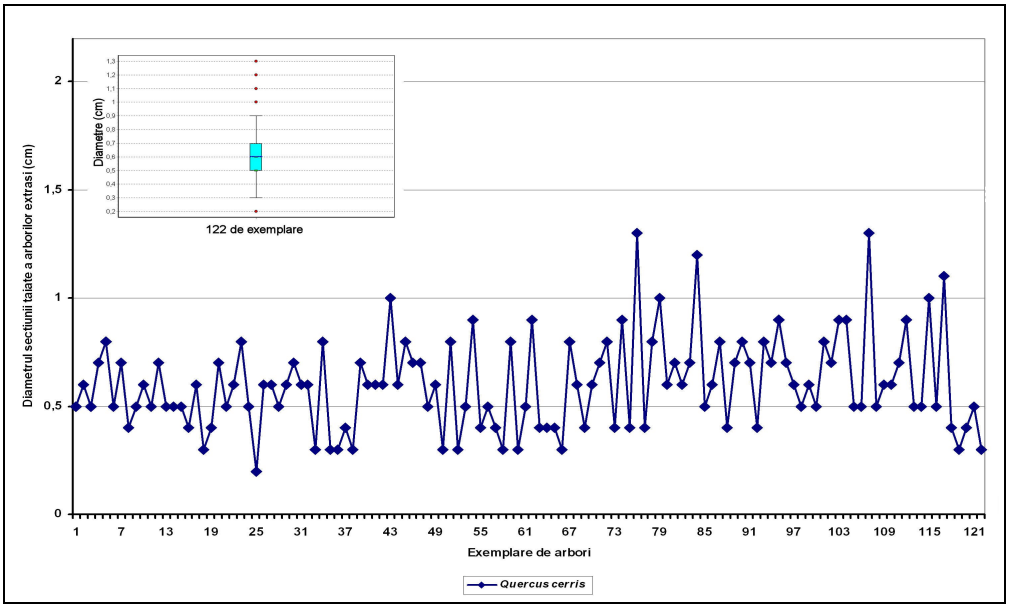


Fig. 6. Variation of sections cut diameters (cm) in the works for weeding BoxPlot representation and 122 copies of Quercus cerris, the O.S. Sacueni, U.B. I Salard, u.a. 36 B

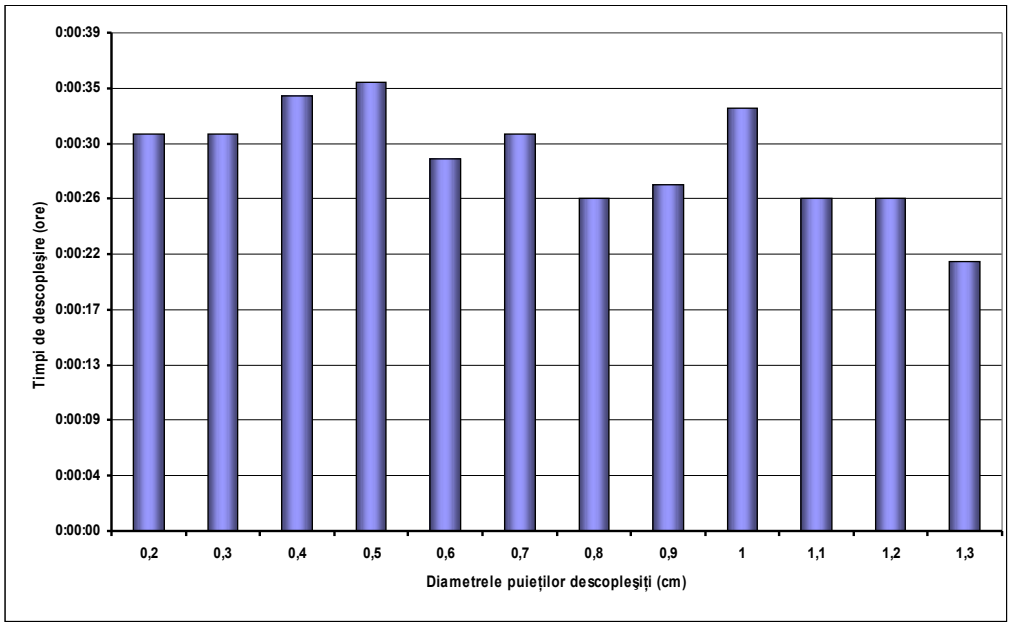


Fig. 7 Variation weeding times (hours) for classes of tree diameters within the works of weedings made in O.S. Sacueni, U.B. I Salard, u.a. 36 B

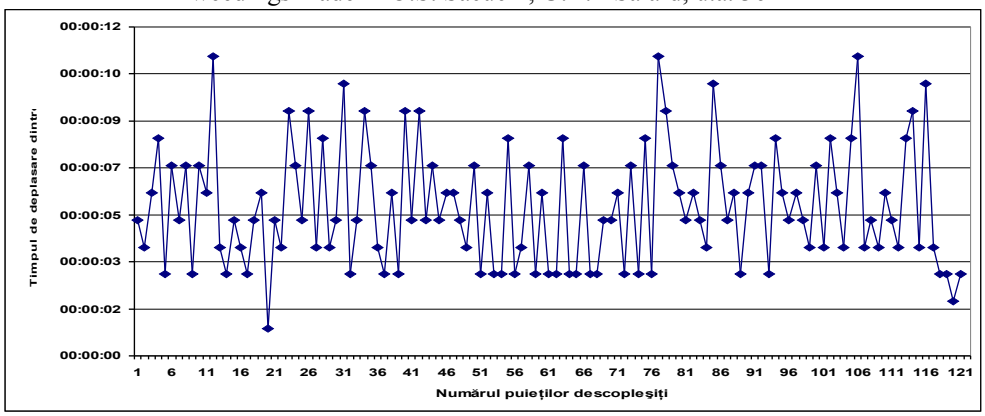


Fig. 8. Variation of travel time between seedlings weeding (hours) within the works weeding made in O.S. Sacueni, U.B. I Salard, u.a. 36 B

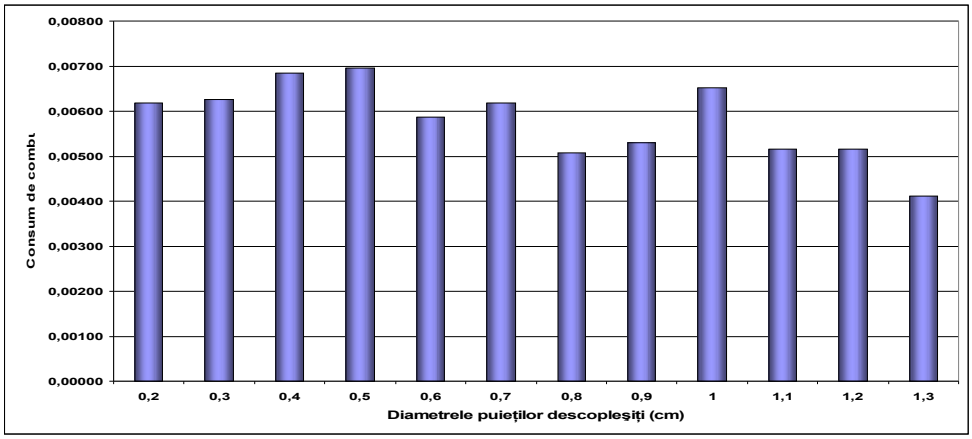


Fig. 9. Variation of fuel consumption (liters) for weeding seedlings represented on diameter class in the weedings operation made the O.S. Sacuieni, U.B. I Salard, u.a. 36 B

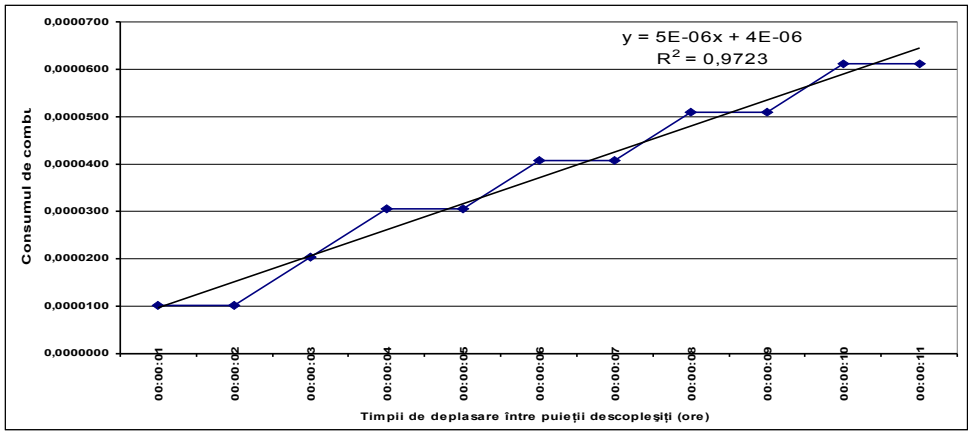


Fig. 10. Correspondence between the times of changing place between trees extracted hours fuel consumption (liters) and the regression equation, within the O.S. works weedings made Sacuieni, U.B. I Salard, u.a. 36 B

CONCLUSIONS

Mechanization of weeding represents an important forest management considering the benefits are obtained.

Moto-tools use of performance allows the obtaining of good results in technically and economically.

The results obtained may be established consumption requirement, requirement of time and production standards for work performed due to the peculiarities of that forest stands and technical working conditions.

Making future works weedings - mechanized is an objective that is in the attention of forestry management.

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