PRODUCTION RESULTS OBTAINED AT MONOECIOUS HEMP VARIATIES FOR FIBER AFTER „SECUIENI METHOD"

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Abstract

In this paper are presented the results obtained regarding the evolution of monoecious hemp for fiber crop by applying the „Secuieni method", method which consists in applying shearings during the intense growth phase of the plant. The great advantage of this method is that the seed norm is reduced from 60 kg/ha to 6 kg/ha, and as a result of the shearings applied at the leaves insert will grow 2 – 6 lateral shoots, reduced that increase the fiber production. Another advantage is the plants small size, which does not exceed 3 m. In the research conducted at A.R.D.S Secuieni, during 2011 – 2013, this method was applied to three monoecious hemp varieties (Diana, Denise and Dacia). The results obtained in the conducted experiments revealed that the productions, both at the fiber and the seed, were strongly influenced by the climatic conditions of the area, these being different in the two experimental years and the results are presented separately on each year of study. At the uncut variant were achieved the highest yields, which is justified by the fact that the plants have developed luxuriant, but instead the fiber quality is lower. The plant subjected to shearing, develops branches, the number of harvestable stems is doubled or even tripled, resulting a slightly lower production, but of a superior quality compared to the uncut variant.

Key words: monoecious hemp, production, branches, shearing.

The monoecious hemp is a recessive character difficult to maintain, but which through selection and improvement works were achieved varieties with high monoecious, high production of stalks, rich in good quality fiber and high yielding seed (Gauca, 1986). A particularly valuable character of the monoecious hemp is the advanced precocity compared with the dioecious varieties, with the possibility of earlier harvest, when the weather conditions are favorable to harvesting, conditioning and drying seeds (Bondarenko, 1985).

The monoecious hemp varieties, local ones that were created at the Agricultural Research – Development Station Secuieni, and also the foreign ones suffer a progressive impairment in biologically and genetically aspect, and is manifested by reducing the seed production caused by the inflorescences masculinization and reducing the percentage of female flowers (Gauca, 1995; Meijer, 1995).

In this paper are presented the results obtained regarding the evolution of three monoeciuos hemp for fiber varieties by applying the „Secuieni method**",** method which consists of applying cuts in the plant intense growth phase.

MATERIAL AND METHOD

The researches were conducted during 2011-2013 at A.R.D.S. Secuieni and they aimed the behavior of three monoecious hemp for fiber varieties (Denise, Diana, Dacia), by applying the „Secuieni method**".** Secuieni method consists of applying cuts during the vegetation period in order to reduce the plant height and to form new shoots. When the plants enter in the intense growth phase and have 5 – 6 floors with opposite leaves the first cutback of the growing peak is applied at 30 – 35 cm from ground level. Due to the cutting applied at the leaves insertion 2 – 6 lateral shoots will grow, that remain in culture as such. After the first shearing, when the shoots have sufficiently developed, it applies a second shearing over the first cut, at 15 – 20 cm.

The experienced has been placed after the subdivided parcels method, on a typical cambic chernozem soil type, with water pH 7.05, 2.12% humus content, medium stocked with nitrogen (12.0 ppm), well supplied with mobile phosphorus (162.4 ppm) and mobile potassium (638.6 ppm). The experience was of 3 x 2 x 3 type, in three repetitions. The experimented factors were:

- A factor – varieties used with three graduations: a_1 – Denise; a_2 – Diana; a_3 – Dacia;
- B factor – different distances between rows with two graduations: b_1 – 25 cm; b_2 – 50 cm;

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- C factor – applying cuts in order to decrease the plants height with three graduations: c_1 - uncut; c_2 – cut only once; c_3 – cut twice;

The experimentation was conducted under non-irrigated conditions and fertilized with $N_{15}P_{15}K_{15}$ – 300 kg/ha and NH_4NO_3 – 200 kg/ha. The sowing was done in the optimal epoch, starting with the third decade of April, the previous plant was the winter wheat and the applied seed norm was of 6 kg/ha, compared with the seed norm from the classic system of 60 – 80 kg/ha. The obtained data were statistically processed and interpreted after the variance analysis method (Ceapoiu, 1968).

The 2011 -2012 agricultural year recorded normal temperatures compared with the multiannual average, but in terms of rainfall was a dry year, the deviations from the multiannual average were of -67.0 mm (July) and 43.8 mm (May) (*figure 1*).

Throughout the hemp entire vegetation period (from sowing to physiological maturity), the deviation from the multiannual average of rainfall ranged between -67.0 mm (July) and 43.8 mm (May) (*figure 1*).

The 2012 -2013 agricultural year was a normal year in terms of temperatures and precipitations (tab.2). Throughout the hemp entire vegetation period (from sowing to physiological maturity), the deviations from the multiannual average of rainfall ranged between -22.0 mm (August) and 61.0 mm (June) (*figure 2*).

RESULTS AND DISCUSSIONS

The experience was placed with varieties of hemp for fibers (Denise, Diana, Dacia) cultivated in the classic system with the distance between rows of 12.5 cm (tab. 1) and with a seed norm of 60 kg/ha and after „Secuieni method" sown at a distance between rows of 25 and 50 cm and with a reduced seed norm of 6 kg/ha. At Denise variety in the 2011 – 2012 agricultural year were obtained productions of stalks and fibers negatively very significant at the variants sown at a distance of 25 and 50 cm where it was applied a cut even two cuts compared with the control variant in which no shearing was applied , but compared with the classical system of sowing was obtained also seed. By the shearings that were applied at Denise variety, the plants haven't grown luxuriant, the height dropped from 2.7m to 1.8m where two cuts were applied, but also the stem diameter decreased from 10.7 mm to 4.5mm, and correlating these two variables we notice that it is direct and interpreted as very significant (*figure 3*).

At the Diana variety the strains productions ranged from 7785 kg/ha (25 cm between rows, two cuts) to 14950 kg/ha (50 cm between rows, no shearing), but in terms of the correlation between plant height and stems diameter it was noticed that it was direct and the correlation coefficient was highly significant (*figure 4*).

The Dacia variety achieved strains productions compared with the control variant negativ distinct significantly at the variants sown at 25 and 50 cm between rows where were applied two shearings. By the application of shearings the fiber bproductions at Dacia variety compared with the control had negative very significant productions, but which compared with classical culture obtained also seed, the productions achieving a very significant production increase at the variant sown at 25 cm between rows and where were applied two shearings (*table 2*) and significant at the variant sown at 50 cm between rows where were applied also two shearings. Through the shearings that were applied to Diana and Dacia varieties the plant height and the stems diameter were reduced, the correlation between this two variables was direct and interpreted as very significant (*figures 4* and *5*).

In the 2012-2013 agricultural year, the Denisevariety recorded stems productions between 10225 kg/ha (50 cm between rows, two cuts) and 13250 kg/ha (25 cm between rows, one cut), which compared with the control variant were interpreted as negatively very significant. In the classic system the recorded stems production was of 14550 kg/ha (table1), close to the variant sown at 50 cm between rows where was applied a single cut (13453 kg/ha), but which had also realized seed productions of 1590 kg/ha (25 cm between rows, two shearings) achieving a production yield very significant, compared with the control variant.

Regarding the correlation between stems length and diameter at Dacia (*figure 7*) and Diana (*figure 8*) varieties in 2012 – 2013 agricultural year, it appears that it was direct and the correlation coefficients were very significant. Like the other two varieties, Denise (25 cm between rows) the stem diameter was influenced by the plant height, and the correlation between these two variables was direct and interpreted as significant (*figure 6*).

The Diana variety realized strains production of 15686 kg/ha at the variants sown at 25 cm between rows and where was applied a single cut, realizing a very significant production increase. By applying two shearings the largest seed production was achieved in the variant sown at 50 cm between rows (2305 kg/ha) with a significantly distinct production increase.

CONCLUSIONS

The researches on the productive capacity of Denise, Diana and Dacia varieties considered for the study showed the differences which varied

depending on the crop year, but also on the number of shearings applied;
The importance of applying the Secuieni method is that the seed norm is reduced from 60 kg/ha (classical system) to 6 kg/ha.
Through shearings application, the plants no longer have a luxuriant growing, reducing their height from 2.8 m (uncut) to 1.8 m (two shearings) which facilitates the mechanized harvesting;
By the application of „Secuieni method" may get stalk and fiber productions of similar quality as the ones from classical system;
Through „Secuieni method" it is obtain a seed quantity similar compared with the culture system specific to hemp seed.

Table 1

Stalk and fiber productions at the monoecious hemp varieties sown in classical system

Variety	Distances between rows	2011 – 2012				2012 – 2013			
		Stems length (m)	Strain diameter (mm)	Stalk productions kg/ha	Fiber productions kg/ha	Stems length	Strain diameter	Stalk productions kg/ha	Fiber productions kg/ha
Denise	12.5 cm	1.9	4.2	10277	2727	2.9	8.5	14550	3692
Diana	12.5 cm	1.9	4.5	10060	2710	3.0	8.1	13950	3603
Dacia	12.5cm	2.1	5	11532	3159	3.1	7.9	14300	3914

Table 2

Strain, fiber and seed productions at the monoecious hemp varieties

Variety	Distances between rows	Applied works	2011 – 2012			2012 – 2013		
			Stem productions kg/ha	Fiber productions kg/ha	Seed productions kg/ha	Stem productions kg/ha	Fiber productions kg/ha	Seed productions kg/ha
Denise	25 cm	NT	11597 MT	2783 MT	440 MT	15683 MT	3492 MT	1116 MT
		T1	8100 000	2033 000	264 000	13250 000	3069 00	930
		T2	11296	2553 0	336 00	10833 000	2546 000	1590 ***
Denise	50 cm	NT	10490	2480 0	328 00	13610 00	3202	976
		T1	8636 000	2081 000	162 000	13453 000	3107 0	788 00
		T2	8530 000	1959 000	276 000	10225 000	2464 000	1416 **
Diana	25 cm	NT	11236 MT	2891 MT	458 MT	14213 MT	3368 MT	1785 MT
		T1	8293 000	2005 000	273 000	15686 ***	3885 **	2060 *
		T2	7785 000	1773 000	237 000	11650 000	2888 00	1720
Diana	50 cm	NT	14950 ***	3491 ***	397	14950	3491 0	1390 00
		T1	9056 000	2099 000	181 000	14136	3553	1810
		T2	8080 000	1857 000	238 000	12183 00	2858 0	2305 **
Dacia	25 cm	NT	12356 MT	3379 MT	349 MT	19776 MT	5442 MT	1848 MT
		T1	10880 000	2662 000	333	14270 000	3803 000	1803
		T2	9400 000	2334 000	518 ***	13383 000	3586 000	1585
Dacia	50 cm	NT	12335	3306	462 **	18013	4744 00	1823
		T1	11286 0	2805 000	301	13726 000	3734 000	1575 0
		T2	10153 000	2423 000	427 *	9835 000	2680 000	1623 0

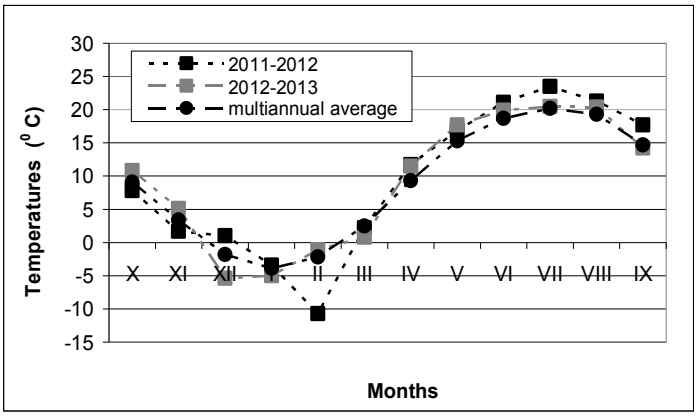

Figure1 **The average temperatures recorded at A.R.D.S. Secuieni, during 2011 – 2013**

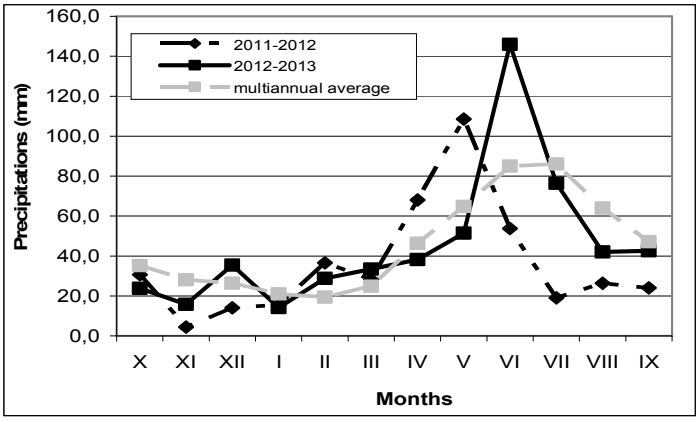

Figure 2 **The average rainfall recorded at A.R.D.S. Secuieni, during 2011 – 2013**

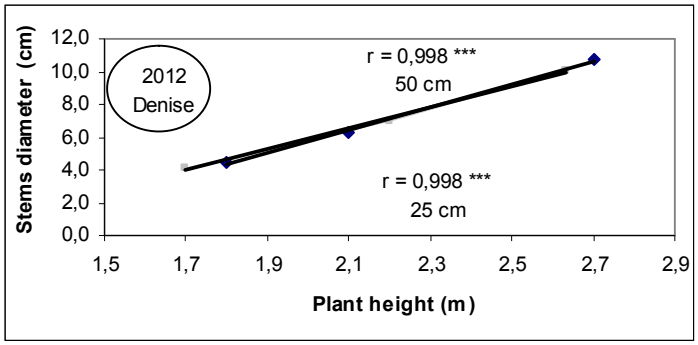

Figure 3 **The correlation between the stems length and diameter at Denise variety (2011 – 2012)**

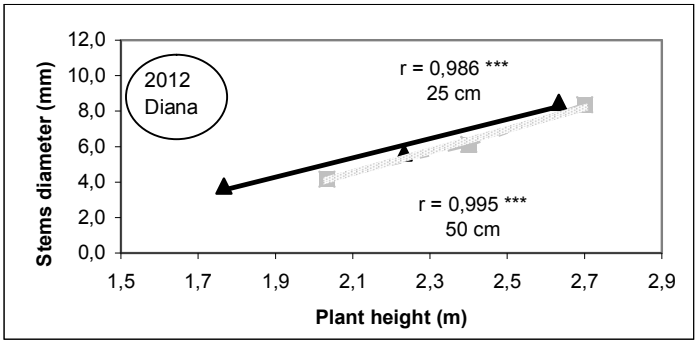

Figure 4 **The correlation between the stems length and diameter at Diana variety (2011 – 2012)**

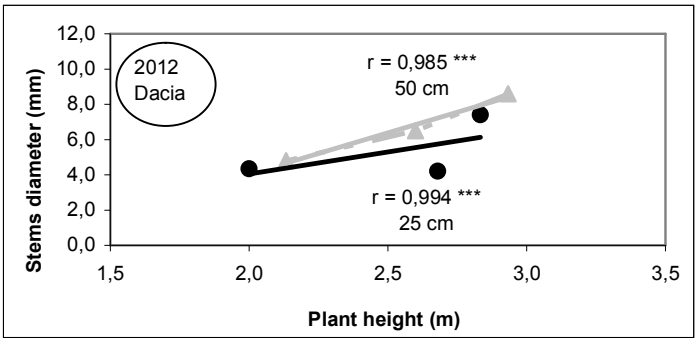

Figure 5 **The correlation between the stems length and diameter at Dacia variety (2011 – 2012)**

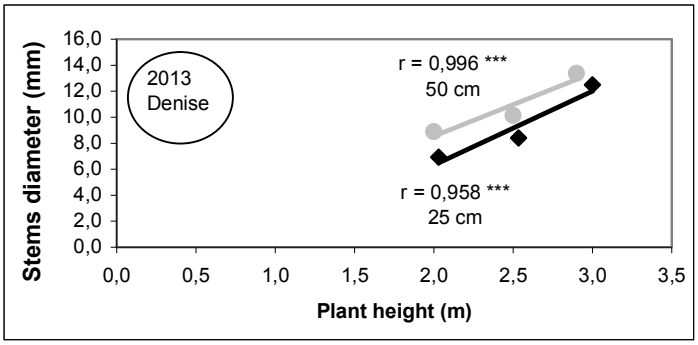

Figure 6 **The correlation between the stems length and diameter at Denise variety (2012 – 2013)**

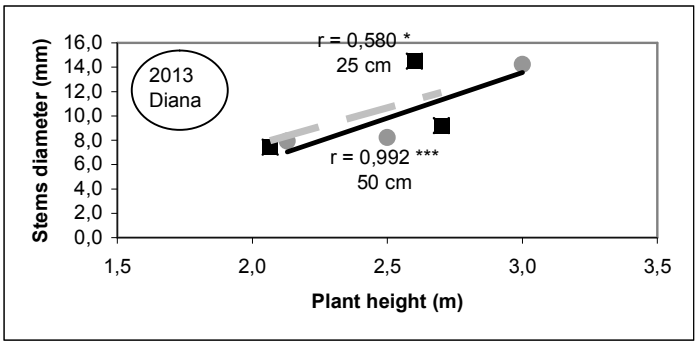

Figure 7 **The correlation between the stems length and diameter at Diana variety (2012 – 2013)**

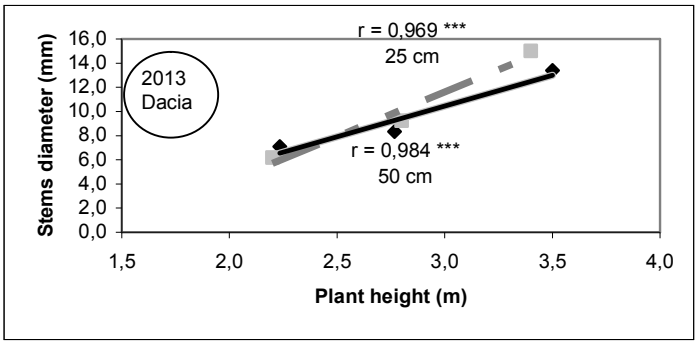

Figure 8 **The correlation between the stems length and diameter at Dacia variety (2012 – 2013)**

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