THE EVOLUTION OF SEED PRODUCTION IN DIOECIOUS HEMP IN THE PERIOD 2016-2018, IN CLIMATE CONDITIONS FROM S.C.D.A. LOVRIN

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Abstract: Hemp is a multi-purpose crop, being used mainly for the production of stems and fiber, seed, but also for food and medicine. In the western part of the country and not only, dioecious hemp finds favorable conditions for cultivation. One of the research centers in Romania, with a rich tradition in hemp breeding and cultivation is at S.C.D.A. Lovrin. Hemp is a plant with special requirements for temperature, humidity and fertilization. The optimum temperature at which the highest seed and stem productions are obtained is 20-22°C together with a good supply of pressing nutrients. During the analyzed period, 2016-2018 the climatic conditions had an atypical evolution, considerably influencing the harvest. The aim of the paper is to evaluate the production of a number of ten varieties, Romanian and foreign, from the S.C.D.A. Lovrin. Climatic conditions had a significant influence on production, the minimum production being recorded in 2017 (240 kg/ha - average experience) and the maximum in 2018 (786 kg/ha seed average experience).

Keywords: dioecious hemp, seed production, variety, cannabis sativa, temperature, humidity.

INTRODUCTION

On the territory of Romania, hemp was and is cultivated exclusively for obtaining fibers used in the manufacture of clothing and other household products. By 1990, about 337,000 ha of hemp for fiber and 9,000 ha of hemp for seed were cultivated worldwide, of which the largest area was cultivated in China. Significant cultivated areas are also found in France, Italy, Austria, Ukraine. In Romania, the surface cultivated with hemp, in the last years is below 1000 ha (V. TABĂRĂ, 2005).

Hemp has real chances of relaunch in the coming years with a tendency towards the consumption of natural products. Hemp finds good cultivation conditions in most areas of the country that make it possible to obtain rich and quality harvests. The location of seed crops is made in the most favorable areas for hemp cultivation: the Western Plain, the Transylvanian Plain, the Northeastern Plain of Moldova, the center of the Romanian Plain and the northern part of the Getic Plateau (V. TABĂRĂ, 2005).

In order to increase the production of fiber and seed, the improvement works resulted in the creation of new varieties much superior. One of the main targets of the improvement works was to increase the production of seed, drought resistance, resistance to shaking, etc. cultivates for its natural fiber content in the highest percentage 26-32%, due to its own physical and mechanical properties and for oil-rich seeds up to 36%, the content of oil seeds varies from one variety to another (I. ŞANDRU, RODICA PARASCHIVOIU et al., 1996).

Over time, new knowledge has accumulated based on the results of research conducted with new technologies in modern agriculture, which has led to a return to interest in hemp cultivation. (V. TABĂRĂ, 1984).

Hemp is considered a large nutrient-consuming plant, due to its high vegetative mass and the rate of accumulation of dry matter in the first part of the vegetation period (N. CEAPOIU, 1958). The absorption of most nutrients is done between June 15 - July 31, when 70-80% of nitrogen, 65-80% of phosphorus and 75-80% of potassium are consumed, after which this consumption is reduced (D. DAVIDESCU and VELICICA DAVIDESCU, 1969). Productions of over 800 kg / ha can be made on N₈₀ P₅₀ K₅₀ agrofunds (O. SEGĂRCEANU et al., 1978). Of the three macroelements, nitrogen significantly influences crop quality. Its production and quality in crop plants increases proportionally with the increase of administered doses (AGAPIE et al, 2016; AGAPIE et al, 2017). Phosphorus and potassium, applied unilaterally, do not influence the quality of crops, they are used only as a substrate for nitrogen. The best results are obtained at the combined application of the three macroelements, both in terms of productivity and crop quality (AGAPIE et al, 2018).

In the case of crops for organic farming, hemp reduces the weeding of soils even for problem weeds. It is also a very good precursor plant for most crops, being next to soil-improving legumes (O. SEGĂRCEANUŞI COLAB., 1981). In very favorable cultivation areas, four-year crop rotation is recommended for hemp (ANA ARFIRE, 1975).

In our country, seed production is quite low, of 300-500 kg / ha, although the potential of cultivated hemp varieties is 800-1200 kg / ha, it is influenced by the variety and growing conditions.
MATERIAL AND METHOD
As initial material were studied the local varieties of dioecious hemp as well as foreign varieties that existed in the collection during that period, thus having the opportunity to study a more diverse and valuable material. The research was conducted at S.C.D.A. Lovrin on a typical chernozem, slightly glazed and weakly alkalized.

In the study are taken 10 varieties: 3 Romanian and 7 foreign, the Romanian ones being the creations of S.C.D.A. Lovrin.

The experiment took place over a period of 3 years 2016-2018, during which various climatic conditions were captured. The placement in the field was done according to the randomized blocks method, with the ten variants in three repetitions. The surface of a variant is 12.6 m².

The calculation and interpretation of the experimental results was done by the method of analysis of variance (ANOVA).

RESULTS AND DISCUSSIONS
The climatic conditions in the three years analyzed were very varied. Regarding the evolution of the temperature in the analyzed period, it registers a positive deviation varying between 1.5° and 2.3°C, with the highest value recorded in 2018. The increase of the average monthly temperature is highlighted throughout the year, but the spring months and summer recorded the largest deviations from the multiannual average of the area, calculated over a period of 68 years.

![Figure 1. The temperature evolution in the period 2016-2018](image-url)

The precipitations whose annual amount totals 520 mm, value representing the multiannual average over 68 years, were very varied in volume in the three years analyzed. The year 2016 was a surplus in precipitations registering positive monthly deviations throughout the year, except for the months of November and December. The year 2017, deficient in precipitation, registered a negative deviation of 152.5 mm compared to the multiannual average of the area, the very small amount of precipitation falling during the vegetation period of hemp determined the lowest seed production in the analyzed period.

Due to the particularly favorable climatic conditions in 2018, the hemp culture had a very good evolution. The highest seed production is registered, being an optimal year in terms of precipitation on the surface unit.
In 2016, the ten varieties registered yields between 934 kg / ha (maximum) and between 557 kg / ha (minimum). Compared to the control variety Lovrin-110, the highest seed production was achieved at the Armanca variety of 934 kg / ha, with an increase of 330 kg / ha, among the domestic varieties and among the foreign varieties at Tyumen-85 of 762 kg / ha, with an increase of 175 kg / ha. The average production of 2016 was 706.1 kg / ha. Compared to the average experience for 2016, clearly higher increases registered three varieties: Silvana (with 72.9 kg / ha), Armanca (with 227.9 kg / ha) and Tyumen-85 (with 55.9 kg / ha).

From the analysis of the production results for 2017, on the varieties studied, yields between 281 kg / ha maximum and 198 kg / ha minimum were registered. The highest seed production, compared to the control variety Lovrin-110, was registered by the Silvana variety with 259 kg / ha among the domestic varieties and among the foreign varieties Tyumen-85 with 281 kg / ha, insignificant increases. The average production of 2017 was 240.3 kg / ha. Compared to the average of the experience, higher increases registered two varieties: Lovrin-110 (with 29.7 kg / ha) and Tyumen-85 (with 40.7 kg / ha).
The year 2018 stands out with very significant increases. Productions between 1030 kg / ha (maximum) and 560 kg / ha (minimum) were registered. The highest seed production, compared to the control variety Lovrin-110, was registered by the Tyumen-85 variety with 1030 kg / ha, with an increase of 179 kg / ha and Cuban 967 kg / ha, with an increase of 155 kg / ha, among foreign varieties and among local varieties Silvana with 991 kg / ha, with an increase of 179 kg / ha. The average production of the year was of 785.73 kg / ha. Compared to the average of the experience for 2018, clearly higher increases registered five varieties: Lovrin-110 (with 26.27 kg / ha), Silvana (with 205.27 kg / ha), Silistra (with 103.27 kg / ha), Tyumen-85 (with 244.27 kg / ha) and Kuban (with 181.27 kg / ha).

**CONCLUSIONS**

Due to the very different climatic conditions in the three years 2016, 2017 and 2018, we can say that the seed production had different values and that both the climatic conditions and the cultivated variety had a great influence on the seed production. High temperatures and lack of precipitation during the vegetation period and especially during flowering, pollination are reflected in the decrease of seed production.
During the three years, the varieties stood out: Armanca in 2016 with 934 kg / ha, Lovrin-110 in 2017 with 270 kg / ha, Silvana in 2018 with 991 kg / ha and from the foreign varieties Tyumen-85 in year 2018 with 1030 kg / ha.

Even if the average production for the three years is between 500 kg / ha and 600 kg / ha, it can be seen from this point of view that the foreign domestic varieties give very good yields, in the conditions of Lovrin.

BIBLIOGRAPHY
5. CEAPOIU N., 1958, Canepa, studiu monografic, Editura Academiei Republicii Populare Romane.
7. SEGĂRCEANU OPRÉA., 1981, Aspecte actuale ale tehnologiei culturii canepii, productia vegetala, cereale si plante tehnice, nr. 2.
8. SEGĂRCEANU OPRÉA., 1978, Elemente noi in tehnologia culturii canepii de fibre si de samanta, cereale si plante tehnice, nr.2.
10. TABĂRĂ VALERIU, 1984, Cercetari privind cateva aspecte ale tehnologiei canepii pentru samanta, teza de doctorat, I.A. Timisoara.