

ANALYSIS OF THE SUITABILITY OF SCDA LOVRIN AREA FOR THE CULTIVATION OF HYSSOPUS OFFICINALIS L

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Abstract.

Hyssop is not a demanding crop with regard to the soil, but, being cultivated on relatively small areas and in a sustainable or ecological system, it is recommended that it be cultivated on soils rich in nutrients and clean of weeds. The purpose of this study is to evaluate the suitability of the area where the Lovrin Agricultural Development Research Station is located for the hyssop crop. The Lovrin Agricultural Research and Development Station is based in Lovrin township, Timiș county, the settlement being representative from a pedoclimatic and traditional point of view for the area served. The results obtained from this study highlighted the readiness of the soil on which the resort is located for the cultivation of medicinal plants.

Keywords: Medicinal plants, hyssop, experimental factors, SCDA Lovrin

INTRODUCTION

According to Köpen, the climate in this area is more humid and fits the Cfbx formula, specific to the area, being open to western winds and under the influence of Mediterranean and Atlantic currents.

The average annual temperature is around 10.80C, although this can vary. The month with the highest recorded temperatures is July, and with the lowest temperatures, January.

The highest temperature recorded in this area, +39.50C, was recorded on July 3, 1950, and the lowest, -30.50C, on February 17, 1956.

The spring fogs are registered until May at the latest, and the autumn ones, starting from mid-October. The sum of the average daily temperatures in the fog-free period is approx. 36160C, and of those higher than 100C, on average 16080C. Compared to the southeastern region of the country, winters here are mild and usually accompanied by little snow.

Average annual precipitation is 502.8 mm, of which 63% falls during the crop growing season, with the rainiest months being June and July.

MATERIALS AND METHODS

The research method was the analysis of climate data recorded at the Meteorological Station in Lovrin in relation to the requirements according to the vegetative stage of development of hyssop plants. From the point of view of the soil, the territory of the resort is located in the forest-steppe area, with a high hydrostatic level of the water table and differentiated parental rocks, which determined a very varied pedological background. As dominant soil types, in this area we have chernozem and cambic chernozem, occupying approx. 95% of the surface, the percentage of 5% being eumezobasic brown soil, lacovisti and salinized soils. The types of chernozem that have a high hydrostatic level of phreatic water are called, at the level of variety, wet phreatic, glazed, salinized, alkalized in depth.

On these types of soil, glaciation, salinization and carbonation phenomena occurred, with a weaker or stronger intensity, phenomena that determined the formation of a wide range of types, subtypes and varieties of individualized soils in 54 soil units

RESULTS AND DISCUSSIONS

In this area, climatic events are frequent and varied, they can influence during the vegetation period, in favor or against the physiological processes of the plants.

Considering the fact that the areas cultivated with medicinal plants in our country are not very extensive, the optimization of the conditions for the growth and development of plants is achieved by placing them according to the biological requirements regarding temperature, water, light and soil.

Figure 1 shows the average monthly temperatures and the deviations from the multi-year averages, recorded during the 2020-2022 experimentation period, data taken from the Lovrin Meteorological Station.



Fig. 1. Monthly average temperatures (0C) compared to multiannual averages, recorded at the Lovrin Meteorological Station, during 2020-2022

As can be seen, during the entire experimental period, and especially during the vegetation months, the average monthly temperatures exceeded the multiannual averages, the highest values during the vegetation period being recorded between June and September in all three experimental years. This fact had an impact on the production of plant biomass obtained, but caused the accumulation of active principles such as essential oils.

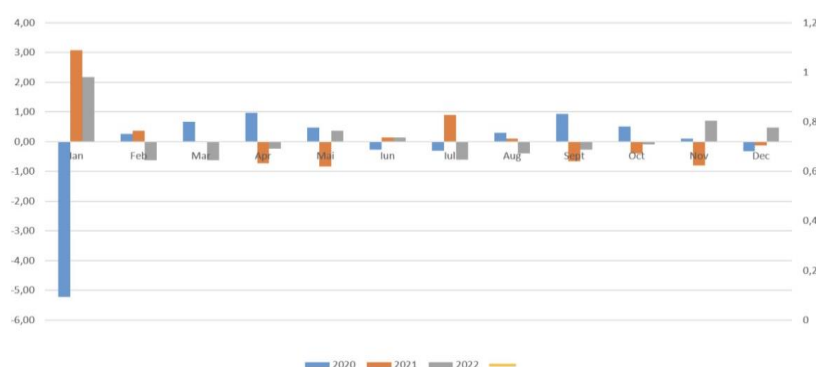
The data related to the soil temperature at a depth of 10 cm from the experimental period are presented in figure 2.

Soil temperature can affect plant growth, as both soil nutrients and beneficial soil organisms need certain temperature values for optimal development. Immediately after crop establishment, because the root system is immature and nutrients from soil organic matter are

not available to plants, low soil temperatures inhibit the activity of microorganisms and reduce the release of nutrients to the roots.

Analyzing the recorded values, due to climate changes and especially the increase in average temperatures, it is found that the soil temperature at a depth of 10 cm has increased. This aspect is favorable for the growth of plants and especially for the start of vegetation, but only in conditions of adequate soil supply with water.

	Ian	Feb	Mar	Apr	Mai	Iun	Iul	Aug	Sept	Oct	Nov	Dec
2020	-1,3	6,3	7,7	10,3	13	15,6	18,6	20,5	19,6	16,1	12,5	8,2
2021	7	6,4	7	8,6	11,7	16	19,8	20,3	18	15,2	11,6	8,4
2022	6,1	5,4	6,4	9,1	12,9	16	18,3	19,8	18,4	15,5	13,1	9
medie multianuala	3,93	6,03	7,03	9,33	12,53	15,87	18,90	20,20	18,67	15,60	12,40	8,53



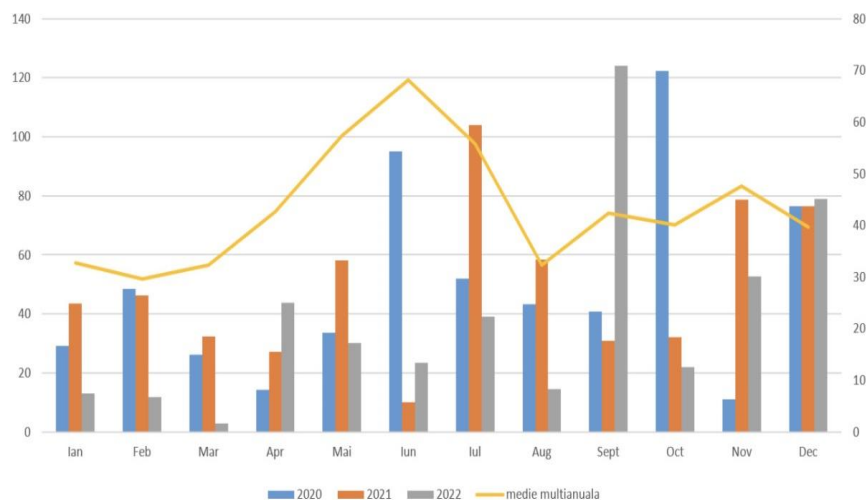
Abaterea (+/-)	Ian	Feb	Mar	Apr	Mai	Iun	Iul	Aug	Sept	Oct	Nov	Dec
2020	-5,23	0,27	0,67	0,97	0,47	-0,27	-0,30	0,30	0,93	0,50	0,10	-0,33
2021	3,07	0,37	-0,03	-0,73	-0,83	0,13	0,90	0,10	-0,67	-0,40	-0,80	-0,13
2022	2,17	-0,63	-0,63	-0,23	0,37	0,13	-0,60	-0,40	-0,27	-0,10	0,70	0,47

Fig. 2. Soil temperature at 10 cm depth (°C), recorded in the experimental field at SCDA Lovrin, during 2020-2022

The next climatic factor analyzed with a determining role in the growth of plants and obtaining an appropriate amount of plant biomass, is represented by the amount of precipitation accumulated during the experimentation period.

The monthly precipitation values recorded in the 2020-2022 interval, according to the data provided by the Meteorological Station at SCDA Lovrin, are presented in figure 3.

Analyzing the data obtained, it can be observed that over the entire 3-year experimental cycle, in terms of the amount of accumulated precipitation and its distribution over the course of a year, the values are far below the values of the multi-year averages, a fact that had an impact on the size of the plants and implicitly on the amount of plant biomass harvested. The highest values of the deviations in terms of the amount of accumulated precipitation were recorded during the vegetation period, respectively the months of March-September.



Abaterea (+/-)	Ian	Feb	Mar	Apr	Mai	Iun	Iul	Aug	Sept	Oct	Nov	Dec
2020	-3,5	19	-6,1	-28,5	-23,7	26,9	-3,8	10,9	-1,6	82,3	-36,4	36,7
2021	10,9	16,6	0	-15,5	0,9	-58,1	48,2	26,1	-11,6	-7,9	31,2	36,7
2022	-19,7	-17,8	-29,3	1,1	-27,1	-44,7	-16,8	-17,7	81,6	-18,1	5	39,3

Fig. 3. Monthly rainfall (mm) compared to multi-annual averages recorded at the Lovrin Meteorological Station in 2020-2022

Air humidity, in addition to the influence of temperature and the production of precipitation, acts directly in the vital processes of plants. The relative air humidity values recorded in the period 2020-2022 are shown in figure 4. These values during the vegetation period, due to the long periods without precipitation and the temperatures well above the multi-year averages, recorded values of even 47%.

In order to ensure the most favorable environment for plant culture, shortly after the establishment of the resort, in order to influence the microclimate in the experimental fields, protective curtains were planted, the action being extended by the Romanian Agricultural Research Institute (ICAR) at that time.

The beneficial effect of protective curtains consists in: reducing wind speed, reducing evaporation in the space between the curtains, stopping snow and increasing the water supply in the soil. In Lovrin the protective curtains were oriented cardinal NS, although the dominant wind direction is not always constant. The forest species used belong to the genera Robinia, Fraxinus, Maclura and Ulmus, the dominant species being the acacia.

CONCLUSIONS

The area under analysis from the point of view of soil fertility and climatic conditions, with all the deviations observed during the three years analyzed, offers favorable climatic conditions for the hyssop culture. However, the growers of medicinal plants in the area must adapt cultivation technologies, adapting certain elements of culture in order to mitigate the negative effects produced by these disturbances.



Fig. 4. Relative air humidity values recorded between 2020 and 2022

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