RESEARCH REGARDING THE INFLUENCE OF BANAT CLIMATE CONDITIONS ON RAPESEED PRODUCTION

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Abstract. *The aim of the research was to establish the sowing period and its influence on the harvest and the optimization of mineral fertilization, under the influence of microclimatic conditions of three villages from Timis county, Romania. The biological material used was the Astronomer rapeseed hybrid, approved for cultivation in our country and which in recent years occupies an important segment of the market due to the increased demand on industrial vegetal oil. The research was being conducted in three different locations: Jebel, Stamora Română and Duboz. The experiences were bifactorial ones, according to the method of subdivided plots, in three repetitions and the results are presented as means. The results show that the level of seed production was influenced to a very large extent by the very low percentage of sprouting time, due to the lack of precipitation and the unevenness of their distribution at the level of the experimental zone. In terms of the period of the beginning of the crop, in all three locations, the highest harvests were obtained in E1 and E2, intervals in which both the percentage at sprouting time and the behavior until the entry into winter were close to optimal. Due to the problems encountered in the establishment of crops, the results regarding the capacity of the hybrid and the influence of the type of fertilizer cannot be considered conclusive and as a result it is necessary to continue the experiments in the following years. The highest harvests were registered at Jebel (3772 ka/ha, established culture in E1) and Duboz (3848 kg/ha, established in E2). Regarding the type of fertilizer used and the influence on production, one may notice that the highest harvest of 4288 kg/ha was recorded by fertilization with Duo MPPA10:24:0 + 0.1Zn + 0.1Br +20 SO3, harvest obtained in the Jebel experimental field.*

Keywords*: rapeseed, technology, pedoclimatic conditions*

INTRODUCTION

Colza rapeseed is considered to be one of the most important oil seed crop and the plant with the highest content of oil from the Cruciferae family. Lately, the colza rapeseed gained advantage as an oil crop due to the scientifical progress in its oil chemical composition and in the higher oil content of its seeds which varies between 42-48%.

Nowadays, the scientifical research is focused on vegetable oils due to their suitability for biofuels.

J. TEMMER (1996) enumerates 4 advantages for using vegetable oils as alternative fuel: 1 – renewable energy, 2- side product in agriculture, 3 – non-toxic fuel; biodegradable, 4 – CO2 cycle enclosure.

This research aimed to identify the optimal mineral fertilisation scheme for a rapeseed hybrid called Astromer under the influence of sowing period and pedoclimatic conditions. The research was conducted in three different locations: Jebel, Stamora Română and Duboz; all three locations are in Timiș County.

MATERIAL AND METHODS

The research carried out in the period 2018-2019 aimed to specify the peculiarities of some elements of technology, important for the autumn rapeseed, specific to the Banat area, as follows:

- the establishment of the sowing period and its influence on the harvest;

- research on the optimization of mineral fertilisation, with effects on the harvest.

The experiences were bifactorial, organized according to the method of subdivided plots, in three repetitions, with the following graduation of experimental factors:

Factor A- sowing age, with three gradations:

a1- 10-20 VIII
a2- 21-31 VIII
a3- 01-10 IX

Factor B- type of fertilization:

b1 – NPK 20:20:0
b2 – DAP 18:46:0
B3 - Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3

The biological material was the Astronom hybrid, the main attributes of which are rendered in the following:

-Very good tolerance to low temperatures.

-High-waisted plants with a very high branching power, with large numbers of siliques and grains per m2.

-Intensive hybrid with very high production potential, up to 5.7 tons/ha, recommended to be grown in the areas of rapeseed culture in Romania.

-MMB 4,6 – 4,8 g.

-Recommended density: 40 – 60 b.g./m.p.

Cro protection treatments applied:

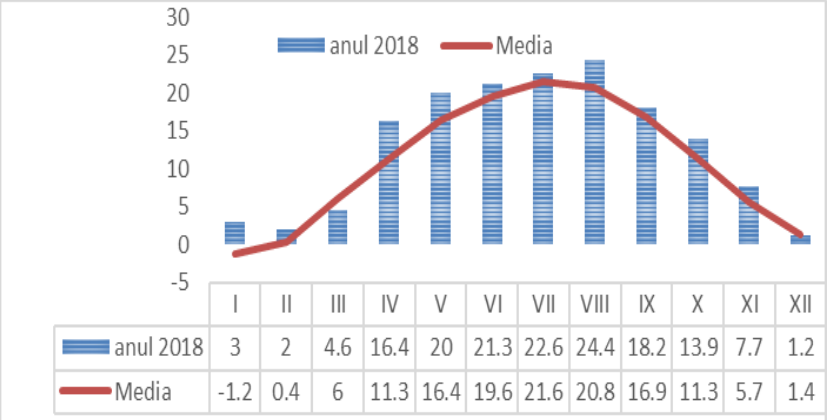
Herbicided on 18.09.2018 : SULTAN 1.5 l/ha + KALIF 480 EC 0.2l/ha

On 18.04.2019 before flowering was applied 1l/ha Boratec (15% boron)

In the spring when the rapeseed reached the floral button, 2 passes were made with insecticide NEVERELLA to combat Glossy bug (Meligethes aeneus F).

RESULTS AND DISCUSSIONS

Climate change from the last period also produces a negative influence on rapeseed production, especially in very dry autumns when the percentage of plants rising is very low.



	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
anul 2018	3	2	4.6	16.4	20	21.3	22.6	24.4	18.2	13.9	7.7	1.2
Media	-1.2	0.4	6	11.3	16.4	19.6	21.6	20.8	16.9	11.3	5.7	1.4

Figure 1. Average monthly temperatures compared to multiannual averages recorded at the Timișoara Meteorological Station

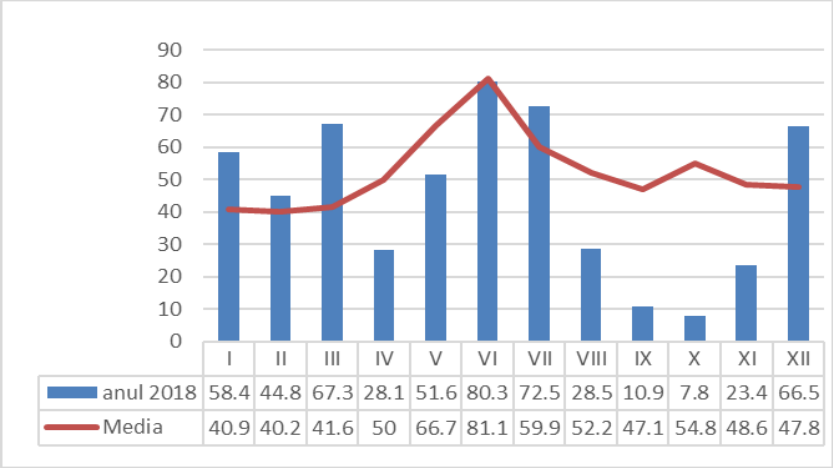


Figure 2. Monthly rainfall compared to multiannual averages recorded at the Timișoara Meteorological Station

This situation also occurred in the autumn of 2018, when between July and September, average monthly temperatures were higher than 2 0C higher than the multiannual average (Figure 1), and rainfall (Figure 2) recorded a deficit of 47.3 l/ha, which caused the sprouting percentage to be around 40%. As regards the behaviour of the rape crop according to the sowing period and the type of fertilisation, the results are presented by location in Tables 1, 2 and 3.

Table 1

Harvest results obtained according to the sowing and fertilization period in 2019 at Jebel

Sowing period	Average Factor B- Type of fertilization			Factor A means			
	NPK 20:20 :0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3	Crop kg/h a	%	Differenc e kg/ha	Significan ce
E1 -10-20 VIII	3420	3608	4288	3772	100		
E2-21-31 VIII	3180	3253	3328	3254	86	-518	000
E3-01-10 IX	1750	1802	1841	1798	47	-1974	000

Dl 5%= 98 kg/ha; Dl1% = 130 kg/ha; Dl 0.1% = 171 kg/ha.

Factor B means			
Specification	NPK 20:20:0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3
Crop kg/ha	2783	2888	3152
%	100	104	113
Difference kg/ha		104	369
Significance			Xx

Dl 5%= 240 kg/ha; Dl1% = 320 kg/ha; Dl 0.1% = 421 kg/ha

It should be noted that the level of seed production was influenced to a very large extent by the very low percentage of sprouting, and in this context the best sowing period proved to be epoch 1, between 10-20 August, for the Jebel area, the second epoch 20-30 August for Duboz and Stamora Roman). The explanation is given by the fact that depending on the distribution of precipitation, sprouting conditions were ensured.

Table 2

Harvest results obtained according to the sowing and fertilization period in 2019 at Duboz

Sowing period	Average Factor B- Type of fertilization			Factor A means			
	NPK 20:20 :0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3	Crop kg/ha	%	Difference kg/ha	Significance
E1 -10-20 VIII	3430	3421	3565	3472	100		
E2-21-31 VIII	3802	3841	3900	3848	111	376	xxx
E3-01-10 IX	2061	2065	2190	2105	61	-1367	000

Dl 5%= 68 kg/ha; Dl1% = 91 kg/ha; Dl 0,1% = 120 kg/ha.

Factor B means			
Specification	NPK 20:20:0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3
Crop kg/ha	3098	3109	3218
%	100	100	104
Difference kg/ha		11	121
Significance			

Dl 5%= 168 kg/ha; Dl1% = 224 kg/ha; Dl 0,1% = 294 kg/ha

In the Stamora Română area, the lack of rainfall almost caused the compromise of the crop established in Epoch 1, the percentage of plants rising being less than 20%, which was also highlighted in the level of production obtained.

Although climatic conditions were not the most conducive to rapeseed cultivation, in autumn 2018, the value of the hybrid and the level of fertilization led to productions ranging from 3500-3800 kg/ha.

Table 3

Harvest results obtained according to the sowing and fertilization period in 2019 at Stamora Română

Sowing period	Average Factor B- Type of fertilization			Factor A means			
	NPK 20:20 :0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3	Crop kg/ha	%	Difference kg/ha	Significance
E1 -10-20 VIII	655	721	730	702	100		
E2-21-31 VIII	2100	2227	2328	2218	316	1516	xxx
E3-01-10 IX	1061	1019	1041	1040	148	338	xxxx

Dl 5%= 100 kg/ha; Dl1% = 133 kg/ha; Dl 0,1% = 175 kg/ha.

Factor B means			
Specification	NPK 20:20:0	DAP 18:46:0	Duo MPPA 10:24:0 + 0,1Zn + 0,1Br +20 SO3
Crop kg/ha	1272	1322	1366
%	100	104	107
Difference kg/ha		50	94
Significance			

Dl 5%= 173 kg/ha; Dl1% = 231 kg/ha; Dl 0,1% = 304 kg/ha

The highest harvests were recorded in Jebel (3772 ka/ha, established culture in E1) and Duboz (3848 kg/ha, established culture in E2). As regards the type of fertilizer used and the influence on production, it is noted that the highest harvest of 4288 kg/ha was recorded by fertilization with Duo MPPA10:24:0 + 0.1Zn + 0.1Br +20 SO3, the harvest obtained in the Jebel experimental field, where the best rise was obtained.

CONCLUSIONS

The production of seeds has been influenced to a very large extent by the very low percentage of sprouting , due to the lack of precipitation and the unevenness of their distribution at the level of the experimental zone.

In terms of the period of the beginning of the crop, in all three locations, the highest harvests were obtained in E1 and E2, intervals in which both the percentage at sunrise and the behavior until the entry into winter were close to optimal.

Due to the problems encountered in the establishment of crops, the results regarding the capacity of the hybrid and the influence of the type of fertilizer cannot be considered conclusive and as a result it is necessary to continue the experiments in the years to come.

The highest harvests were registered at Jebel (3772 ka/ha, established culture in E1) and Duboz (3848 kg/ha, established in E2). As regards the type of fertilizer used and the influence on production, it is noted that the highest harvest of 4288 kg/ha was recorded by fertilisation with Duo MPPA10:24:0 + 0.1Zn + 0.1Br +20 SO3, harvest obtained in the Jebel experimental field.

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