

RESEARCH REGARDING THE INFLUENCE OF GENOTYPE AND EPOCH OF SOWING ON SEEDS YIELD AT *RICINUS COMMUNIS* L. (CASTOR) IN THE PEDOCLIMATIC CONDITIONS FROM THE CENTRAL OF MOLDOVA

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Abstract

The researches were organized in 2018-2019 at the Moldoveni Agricultural Society, Neamt County. In the agricultural year 2018, the genotypes experienced did not show a high adaptability to the pedoclimatic conditions of the area, obtaining yields below 1500 kg/ha. Compared to 2018, the yields obtained in 2019 were higher, this was due to the excess of precipitation registered in May of approximately 30 mm. The yields varied between 1297 kg/ha (Teleorman variety) and 1548 kg/ha (Cristian variety). During in the period under study, the highest yield increases (38 kg/ha, respectively 127 kg/ha), compared to the control (average experience) were obtained for the variants sown in the first and second epochs, which results that the castor being favorable for sowing until the second half of April.

Key words: genotype, castor, epoch of sowing

Castor is an important non-edible oil seed crop grown throughout the world (Radhamani T. *et al.*, 2012). It is used primarily in traditional medicine but its main interest is for biofuel production to reduce dependency on fossil fuel (Nahar K., 2013).

Ricinus communis L. has been a therapeutic agent for 4 000 years, used as a herbal medicine for treating many different diseases, disorders and also many infections. Leaves, root, bark and various parts of the castor have been used for medicinal purposes. It has been used as a laxative for 2 500 years in Greece and Rome (Scarpa A., Guerci A., 1982). Due to the large quantity of oil extracted from *Ricinus communis* L. seeds, it has been known as castor oil plant (Chan A.P. *et al.*, 2010). This oil is of great application in various perspectives (Scarpa A. and Guerci A., 1982). The various phytochemicals which are found in castor are steroids, terpenoids, saponins, alkaloids, flavonoids, and glycosides (Alugah C.I. and Ibraheem O., 2014; Vermeer C.P. *et al.*, 2003; Jeyam M. *et al.*, 2014). Lectins of castor bean are also used prominently in the treatment of some diseases, especially tumour (Ohishi K. *et al.*, 2014).

Sowing crop at optimum time along with other agronomic factors is the key feature to get maximum production of any crop. Determining suitable planting date plays an important role in

conformation of plant growth stages with desirable environmental conditions which results in maximum yield (Siadata S.A. and Hemayatib S.S., 2009). Scientific works are needed to determine the proper sowing date in a particular zone for optimising the seeds production obtained at castor bean.

MATERIAL AND METHOD

A factorial experiment was organized in 2018-2019 at the Moldoveni Agricultural Society, Neamt County, using a randomized blocks in three replications. The experiments aimed to identify the genotype with the highest adaptability to climatic conditions in the area of influence and establish the optimal time to sow. In the first experiment, four genotypes were researched, namely: Dragon, Rivlas, Cristian and Teleorman. In the second experience we experimented four sowing epochs:

V1 - Epoch I, sowing in the first decade of April);

V2 - Epoch II, sowing in the second decade of April;

V3 - Epoch III, sowing in the last decade of April;

V4 – sowing in the first decade of May.

The obtained results were processed and interpreted statistically according to the method of analysis of variance.

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RESULTS AND DISCUSSIONS

In 2018 the experienced genotypes did not show a high adaptability to the pedoclimatic conditions of the area, obtaining yields below 1500 kg/ha. The influence of the genotype on the production of seeds obtained from castor, in 2018, materialized by obtaining fluctuating productions, between 1175 kg/ha (Rivlas) and 1441 kg/ha (Teleorman) (*table 1*).

Comparing the yields obtained with the average experience (control), we notice that the Teleorman variety (142 kg/ha) obtained a statistically assured production increase and interpret positive very significant. The Rivlas variety achieved a production difference (-124 kg/ha) ensured statistically and interpreted as very significant negative (*table 1*).

Compared to 2018, the yields obtained in the agricultural year 2019 were higher, this was due to the excess rainfall recorded in May, which led to a

more uniform emergence of castor in the spring. Productions varied between 1297 kg/ha (Teleorman variety) and 1548 kg/ha (Cristian variety) (*table 2*).

Dragon and Cristian varieties stood out with production increases of 44 kg/ha, respectively 70 kg/ha, distinctly significant and very significant compared to the average experience (control). The differences in production recorded by the Rivlas and Teleorman varieties were very significant negative compared to the average experience (control) (*table 2*).

The average of the two years, not very favorable to the castor culture, indicates the fact that the Cristian variety has the greatest adaptability to the conditions of the area. Compared to the control variant (average experience), this variety achieved a distinctly significant increase in production (52 kg/ha) (*table 3*).

The influence of genotype on seed production at *Ricinus communis* L., in 2018

Table 1

Variety	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
Dragon	1274	98,07	-25	
Rivlas	1175	90,45	-124	ooo
Cristian	1301	100,15	2	
Teleorman	1441	110,93	142	***
Average	1299	100	Ct.	
LSD 5%=		25,98 kg/ha		
1%=		39,34 kg/ha		
0,1%=		63,19 kg/ha		

The influence of genotype on seed production at *Ricinus communis* L., in 2019

Table 2

Variety	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
Dragon	1522	102,98	44	**
Rivlas	1422	96,21	-56	ooo
Cristian	1548	104,74	70	***
Teleorman	1297	87,75	-181	ooo
Average	1478	100	Ct.	
LSD 5%=		22,51 kg/ha		
1%=		34,09 kg/ha		
0,1%=		54,76 kg/ha		

The influence of genotype on seed production at *Ricinus communis* L., average years

Table 3

Variety	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
Dragon	1398	101,82	25	*
Rivlas	1298	94,54	-75	ooo
Cristian	1425	103,79	52	**
Teleorman	1370	99,78	-3	
Average	1373	100	Ct.	
LSD 5%=		24,24 kg/ha		
1%=		36,71 kg/ha		
0,1%=		58,97 kg/ha		

The second sowing season positively influenced the seed production, and its level was influenced by the climatic conditions recorded in the analyzed period. In the agricultural year 2018, the production fluctuations were quite large, the yields obtained varied from 1144 kg/ha (the four epoch of sowing) to 1426 kg/ha (the second epoch of sowing). From a statistical point of view, compared to the control (average of experience) the variant sown in the fourth epoch achieved a very significant negative production difference (-155 kg/ha). However, the variants sown in the first and the second epoch obtained significant and very significant production increases (37 - 127 kg/ha) compared to the control (table 4). In the second year of experimentation (2019), the yields obtained were higher and between 1289 kg/ha (the four epoch of sowing) and 1699 kg/ha (the second epoch of sowing). Compared to the control

(average of experience) the variants sown in the second and the four epoch achieved very significant negative production differences (-39 kg/ha, 189 kg/ha), the variant sown in the second epoch achieved a very significant increase in production (221 kg/ha) (table 5).

During the study period (2018-2019), the highest production increases (38 kg/ha, respectively 127 kg/ha), compared to the control were obtained for the varieties sown in the first and second epoch, resulting in castor bean responding favorably for sowing by the second half of April. In the variant sown in the four epoch, a very significant production deficit of 158 kg / ha was obtained, compared to the witness of the experience, which we deduce that it is necessary to sow the castor no later than the second decade of April, because the grains do not reach maturity (table 6).

Table 4

The influence of sowing epoch on seed production at *Ricinus communis* L., 2018

Epoch of sowing	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
1st epoch	1336	102,85	37	*
2nd epoch	1426	109,78	127	***
3rd epoch	1288	99,15	-11	
4th epoch	1144	88,07	-155	ooo
Average	1299	100	Ct.	
LSD 5%=		34,89 kg/ha		
1%=		46,55 kg/ha		
0,1%=		60,84 kg/ha		

Table 5

The influence of sowing epoch on seed production at *Ricinus communis* L., 2019

Epoch of sowing	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
1st epoch	1485	100,47	7	
2nd epoch	1699	114,95	221	***
3rd epoch	1439	97,36	-39	ooo
4th epoch	1289	87,21	-189	ooo
Average	1478	100	Mt.	
LSD 5%=		19,62 kg/ha		
1%=		26,09 kg/ha		
0,1%=		33,94 kg/ha		

Table 6

The influence of sowing epoch on seed production at *Ricinus communis* L., average years

Epoch of sowing	Production (kg/ha)	% compared to control	Diff (kg/ha)	Sign.
1st epoch	1411	102,77	38	**
2dn epoch	1500	109,25	127	***
3rd epoch	1365	99,42	-8	
4th epoch	1215	88,49	-158	ooo
Average	1373	100	Mt.	
LSD 5%=		27,25 kg/ha		
1%=		36,32 kg/ha		
0,1%=		47,39 kg/ha		

CONCLUSIONS

The natural environment of the Moldoveni Agricultural Society is favorable for field crops, where in normal years as temperatures high yields are obtained for all crops established within the company, the future of which is also the castor crop.

The average of the two years, not very favorable to the castor culture, indicates the fact that the Cristian variety has the greatest adaptability to the conditions of the area.

During the study period (2018-2019), the highest production increases (38 kg/ha, respectively 127 kg/ha), compared to the control were obtained for the varieties sown in the first and second epoch, which means that castor oil is favorable for sowing until the second half of April.

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