RESEARCH CONCERNING THE IMPACT OF SOWING TIM EON YIELD IN SEVERAL NEW LINES OF SAFFLOWER (*CARTHAMUS TINCTORIUS* L.) IN THE CONDITIONS OF TIMIŞOARA IN 2007

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Abstract: *Safflower (Carthamus tinctorius L.), as an oil plant, has been known since ancient times. It is cultivated in U.S.A., Israel, Morocco, Spain, Italy, France, Pakistan, Tunisia, India, and Australia. Safflower has been cultivated mainly for the edible oil obtained from its seeds. It is mentioned that safflower oil has wide uses in the pharmaceutical industry, due to its purgative and anti-rheumatism effects. It does not result in an increase of the cholesterol level in the blood. Safflower flowers have atonic properties in cough. Pigments of safflower flowers are particularly important because they leave no toxic residues in coloured products. Pigments are synthesised in the root where, during vegetation, they migrate towards leading tissues towards the petals. Carthamine is one of the most valuable non-toxic compounds used in the food industry or in the textiles industry. Results obtained recently in China concern the use of safflower flowers-based medicines with good effects on coronary diseases and on angina pectoris, curing 75.6% of the total patients treated. The incidence of re-occurrence of cardiac crises as well as of side-effects is rarer than in the case of nitro-glycerine-based medicines. In order to reach the goals of our research, we used 12 safflower lines obtained through individual selection from a population of Timişoara preserved in the didactic field of the Plant Cultivation Technologies department. To emphasise the yielding capacity of some new lines of safflower (Carthamus tinctorius L.) under study, we organised, in 2007, a bi-factorial experiment in which experimental factors were as follows: Factor A – sowing time: - 1st time MARCH ; - 2nd time APRIL; - 3rd time MAY; Factor B – safflower lines: Population of Timişoara , - T 5, - T 6, - T 9, - T 10, - T 27, - T 33, - T 36, - T 40, - T 41, - T 100, - T 40 short. The experiment was set after the randomised block method. The experimental variants were set with three replications with randomisation of the Factor B (safflower lines). Research carried out pointed out the impact of sowing time on yield as a result of testing new lines of safflower. The best production of safflower achenes in the 1st time (March) was in the T.33 line – 2,186 kg/ha, i.e. an increase of 220 kg/ha compared to the control (Population of Timişoara). In the 2nd time (April), we noted the T.27 line characterised by a longer size, and in which we obtained an increase in yield of 507 kg/ha compared to the local Population of Timişoara. The line we noted in the 3rd time (May) for the highest yield of achenes was the T10 line with 520 kg/ha. We could note that the highest yields of achenes in safflower were in the 1st time in 2007 in the conditions of Timişoara.*

Key words: *safflower, cultivars, yield*

INTRODUCTION

Safflower (Carthamus tinctorius L.) is important as oil plant in Asia, North and Central America and in dry areas with poor soils. Due to its rich fruit oil: 30-35% was introduced in our country in human nutrition, dietetics and food but reducing the amount of cholesterol in the blood. The fruits and flowers are also used in medicine since they have hydrogogue purging and anticough properties. Due to the content of pigments in the petals (20% yellow pigments and 0.5% red pigments), they can be used to produce natural colouring agents for the food, textile, pharmaceutical, and cosmetics industry.

MATERIALS AND METHODS

Experimental field was located on a wet soil type mold bill (Gleize weak), weak decarbonat on lösoide deposits, clay argilo-prăfos/luto-argilos.

Experience has been placed in the field after bifactorială method in which experimental factors were:

Factor A – sowing time

- 1st time ***MARCH***
- 2nd time ***APRIL***
- 3rd time ***MAY***

Factor B – safflower lines

- Population of Timişoara - T 33,
- T 5, - T 36,
- T 6, - T 40
- T 9, - T 41,
- T 10, - T 100,
- T 27, - T 40 short

Settlement field experience was the method blocks with plots randomized.

Experimental variants were placed in three repetitions with randomisation factor B (safflower lines). Production results were calculated and interpreted by analysis of variance method and the biometric features were calculated and interpreted by the method of variation of the string.

Except when sowing which was established in factor experienced safflower technology applied to culture was the high culture specific. Plant prior to culture was safflower winter wheat.

Fertilization culture was made using complex fertilizers such N15P15K15 the amount of 450 kg / ha complex which meant 70 kg / ha to of each N, P and K. Basic plowing to 20-22 cm depth was performed. Germinative bed was processed and uniform through the combinatorial work in the fall. In the spring two-three days before sowing, to work with combinatorial to break the crust and destroying weeds east.In the first decade of March, the distance between rows of 50cm was used. During the growing season were carried out density correction in turn.

The work was performed when plants reached the 2-5 leaf stage plants were left each other at a distance of 8-10 cm.

RESULTS AND DISCUSSION

Yields were obtained by harvesting the three epochs. Highest production was recorded at 1st time. Obtained at each post-harvest production was cleaned of impurities and eighed. Calculation and the result was interpretation variance analysis method (N.N. Saulescu 1967).

PRODUCTION RESULTS OBTAINED FROM SAFFLOWER SOWN IN MARCH IN 2007

Production obtained in each experimental variant was weighed, calculated and interpreted by analysis of variance method (NN Saulescu 1967). Table 5.1. and Figure 5.1. are presented in safflower seed yields obtained by sowing in the month of March 2007. Analysis results show that the T33 line received the highest production - 2186 kg / ha, which means an increase of 220 kg / ha to the production of the witness population of Timisoara. Growth is assured as statistically significant.

The T9 line showed the small production, resulting in a difference of 58 kg / ha compared to yields from the population of Timis. Overall it is found that for sowing in March,

nine of the 11 lines (T5, T6, T10, T27, T33, T36, T40 tj., T41, T100) are superior in terms of production population Timisoara.

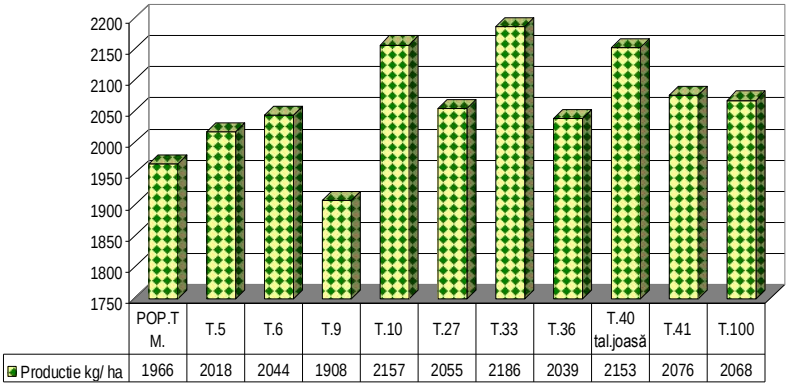

Figure 1. Variation production in safflower by sowing in March to E.D.S. Timişoara

Table1.

Summary of seed production in safflower sown in March to SDETimişoara in 2007

Nr.crt.	Liniile	Recolta kg/ ha	%	Diferența kg/ ha	Semnificația
1.	**POP.TM.**	1966	100	-	
2.	**T.5**	2018	103	52	
3.	**T.6**	2044	104	78	
4.	**T.9**	1908	97	- 58	
5.	**T.10**	2157	108	191	x
6.	**T.27**	2055	105	89	
7.	**T.33**	2186	111	220	x
8.	**T.36**	2039	104	73	
9.	**T.40 tal.joasă**	2153	110	187	
10.	**T.41**	2076	106	110	
11.	**T.100**	2068	105	102	
12.	**T.40**	2103	107	137	

DL 5%= 189 kg/ha; DL 1% = 257kg/ha; DL 0,1% = 346kg/ha

The analysis of results shows that two lines have a superiority in terms of production to the production by the population of Timisoara. These lines T10 and T33.

RESULTS OBTAINED BY SOWING SAFFLOWER HARVEST TO THE MONTHS APRIL 2007

Regarding the results obtained by sowing in April 2007 shows that production is much lower than that achieved by sowing in March. This being due to less favorable conditions germination and plant dawn of safflower.

In these conditions noted line T-27 is characterized by a higher class who achieved a production increase to the population of Timisoara from 507 kg / ha and T-9 line with an increase production of 398 kg / ha compared production control. Figure .2. production levels achieved is highlighted safflower lines compared with the population of Timisoara output produced. It outlines the extremely low level of yields obtained by sowing safflower in April. The population of Timisoara is obtained at 632 kg / ha by sowing in April compared to 1966 kg / ha by sowing in March..

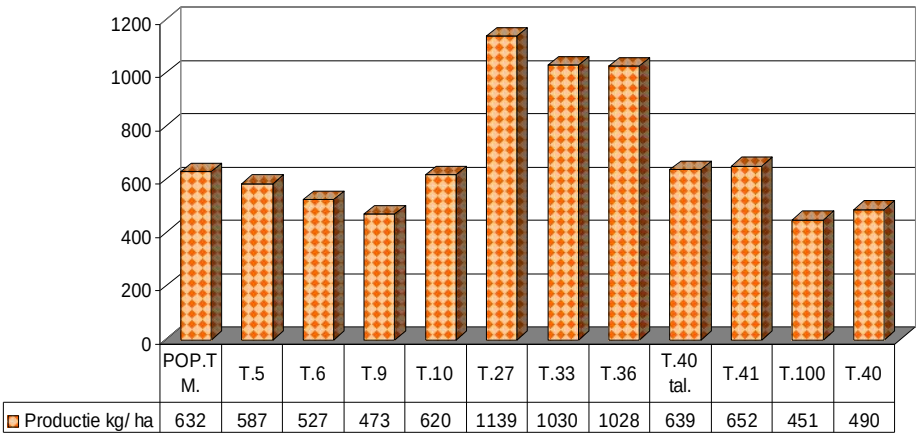

Figure 2. Variation of production in April of 2007

Table 2.

Seed production in safflower obtained by sowing in April in 2007 in Timisoara

Nr.crt.	Liniile	Recolta kg/ ha	%	Diferența kg/ ha	Semnificația
1.	**POP.TM.**	632	100	-	
2.	**T.5**	587	93	- 45	
3.	**T.6**	527	83	- 105	
4.	**T.9**	473	75	- 159	
5.	**T.10**	620	98	- 12	
6.	**T.27**	1139	180	507	
7.	**T.33**	1030	163	398	
8.	**T.36**	1028	162	396	
9.	**T.40 talie joasă**	639	101	7	
10.	**T.41**	652	103	20	
11.	**T.100**	451	71	- 181	
12.	**T.40**	490	78	- 142	

DL 5%= 617 kg/ha; DL 1% = 840kg/ha; DL 0,1% = 1129kg/ha

With safflower sowing in April compared with those achieved by sowing in March are lower. The best behavior in terms of production lines have a T27 with a yield of 1139 kg / ha, T33 with a yield of 1,030 kg / ha and T36 with a yield of 1028 kg / ha. Analysis results show that five of the 11 lines of safflower considered superior to those achieved by ensuring production of Timisoara population (Table 2).

RESULTS OBTAINED FROM SAFFLOWER CROP SOWN IN MAY IN TIMISOARA IN 2007

From the analysis results are found by sowing in May, the yields obtained range from 335 kg / ha in the T33 line and 520 kg / ha in the T10 line. At the same time it is found that late sowing in safflower lead to sharp decrease in production of safflower. In Fig.3. production results are represented in 11 new lines of safflower and the population of Timisoara sown in May of 2007. Graphical representation shows lines T10 and T5.

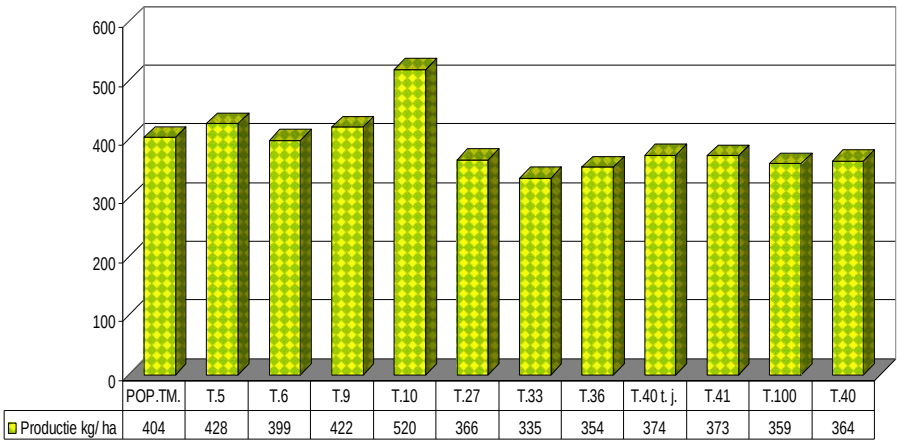

Figure 3. Changes in production in safflower sown in May in Timisoara in 2007 EDS

Table3.

Seed production in safflower obtained by sowing in May in Timisoara in 2007

Nr.crt.	Liniile	Recolta kg/ ha	%	Diferența kg/ ha	Semnificația
1.	**POP.TM.**	404	100	-	
2.	**T.5**	428	106	24	
3.	**T.6**	399	99	- 5	
4.	**T.9**	422	104	18	
5.	**T.10**	520	129	116	xxx
6.	**T.27**	366	91	- 38	
7.	**T.33**	335	83	- 69	0
8.	**T.36**	354	88	- 50	
9.	**T.40tal. joasa**	374	93	- 30	
10.	**T.41**	373	92	- 31	
11.	**T.100**	359	89	- 45	
12.	**T.40**	364	90	- 40	

DL 5%= 61 kg/ha; DL 1% = 82kg/ha; DL 0,1% = 111kg/ha

It is important to realize that by seeding in May, 3 of 11 safflower lines give higher yields witness Timisoara population. Of the 11 lines studied eight production lines give witness in production (Table 3). Population of higher production lines that are Timisoara T5 - 425 kg / ha, T9 - 422 kg / ha and T10 with a production of 520 kg / ha. With delayed sowing, population of Timisoara achieved an average production of 404 kg / ha. It is noted that production growth from the average of the population of Timisoara 116 kg / ha achieved in line T10 is very secured as more significant statistically.

Table.4.

Safflower production results from the influence of sowing time in 2007

Factorul A momentul semănatului	Factorul B – Linii noi de şofrănel												Prod medie kg/ha	Prod.relativă %	Diferența +/- kg/ha	semnificația
	Pop. Tm	T.5	T.6	T.9	T.10	T.27	T.33	T.36	T.40 tal.j	T.41	T.100	T.40				
a1 martie	1966	2018	2044	1908	2157	2055	2186	2039	2153	2076	2068	2103	2064	100	-	
a2 aprilie	632	587	527	473	620	1139	1030	1028	639	652	451	490	690	33	-1374	000
a3 mai	404	428	399	422	520	366	335	354	374	373	359	364	392	20	-1672	000

DL 5% = 306 kg/ha;
DL 1% = 416 kg/ha;
DL 0,1% = 620 kg/ha

Average production factor B

Prod medie kg/ha	Linii											
	Pop. Tm	T.5	T.6	T.9	T.10	T.27	T.33	T.36	T.40 tal.j	T.41	T.100	T.40
	1001	1011	990	934	1099	1187	1184	1140	1055	1034	959	986
%	100	101	99	93	110	119	118	114	105	1032	96	96
Diferența	-	10	11	-67	98	186	183	139	54	33	-42	-15
Semnificația												

DL 5% = 289 kg/ha; DL 1% = 393 kg/ha; DL 0,1% = 529 kg/ha

Production results obtained in 2007 from the interaction of experimental factors under study are presented in Table 4. And in terms of 2007 shows that late sowing will reduce production by 33% at sowing in April and 20% by sowing in May. It should be noted that the average yields (Table 4) lines in the study is over 2000 kg / ha which shows that new lines have good production potential. This attests lines T5, T6, T10, T27, T33, T40 low waist, T100 and T40 which yields achenes exceed 2000 kg / ha. It is noted that all lines studied in terms of production exceed production conducted in population Timisoara (1966kg/ha). If we look at the average production of safflower oil made from new lines studied under the influence of three planting dates found that these products is affected by sowing time in that late sowing very significant decrease in production, differences of 137 kg / ha sowing in April and 1672 kg / ha at sowing in May is provided statistically very significant. Of the 11 lines studied in seven safflower achenes production is higher than the population of Timisoara, differences or production increases achieved in 2007 towards the production of Timisoara Population statistics are uninsured.

CONCLUSIONS

On safflower yields are strongly influenced both by the conditions of experimental time of sowing and less than safflower line.

Analyzing the experimental results since 2007 for the three times of sowing (March, April, May) finds some crucial elements of cultivation technology for production of safflower achenes.

The results show that production in safflower achenes is strongly influenced by climatic conditions, because this average yields of safflower are different from one era to another, so explain the different level of production of the three experimental periods. At times I (March), analysis results show that the T33 line received the highest production - 2186 kg / ha, which means an increase of 220 kg / ha to witness the production population of Timisoara.

T9 line production has been lower, resulting in a difference of 58 kg / ha to the production obtained is Timis population.

With safflower sowing in April (EPCA II) compared with those achieved by sowing in March are lower.

T-27 line was observed characterized by a higher class who achieved a production increase to the population of Timisoara of 507 kg / ha.

The analysis results are found by sowing in May, yields obtained range from 335 kg / ha in the T33 line and 520 kg / ha in line T10. while it appears that the delay in sowing safflower drastic decrease in production of safflower.

Drought followed by heavy rains during the summer resulted in low yields from - 2nd time and - 3nd time of sowing.

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