CROP RESULTS ON THE CAMBIC CHERNOZEM FROM TIMIŞOARA IN SPRING-SEEDED *CAMELINA SATIVA* L.

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Abstract. *The needs of mankind for cooking oils are increasing. Cameline (Rom. lubiţa) (Camelina sativa Crantz) of the Cruciferous family has been cultivated for its seeds (30-35% oil) for more than 2,000 years. Researches on fertilisation have been carried on in the Timisoara area on a cambic, phreatic moist (low gleyed) decarbonated chernozem formed on loess-like deposits. Nitrogen and Phosphorus fertilisation has had a good influence on spring-seeded cameline crop. Spring-seeded cameline represents a future oil crop for the area under study.*

Keywords: spring-seeded, *Camelina sativa* L

INTRODUCTION

These last years, oil from the seeds of this species has been of great interest as biofuel necessary for jet planes due to the European regulations regarding pollution by increasing flight rates. These regulations ask that, by 2020, 10% of the fuel used in transports come from renewable resources and that, by 2050, CO_2 emission be cut down to 50%. At present, pollution caused by flights represents 2% of the total CO_2 emissions on Earth (Duda Marcel, 2012).

MATERIAL AND METHOD

Research regarding crop fertilisation was carried out on a cambic, moist phreatic (poorly gleyed), decarbonated chernozem formed on loess-like deposits at the Didactic Station from Timişoara.

The experiment was a bifactorial one, set after the subdivided plot method, with the following factor graduations:

Factor A – phosphorus rate ($a_1 – P_0$; a_2 – 40 kg/ha P_2O_5; a_3 – 60 kg/ha P_2O_5);

Factor B – nitrogen rate ($b_1 – N_0$; $b_2 – N_{50}$; $b_3 – N_{100}$).

Potassium fertilisers were applied evenly at rates of 40 kg/ha K_2O.

Soil works consisted in spring tillage 20-23 cm deep in the soil, with an aggregate of plough and star harrow, during the same decade as wheat harvesting and straw removal from the field.

Phosphorus fertilisers applied as superphosphates and potassium fertilisers applied as potassium salt were incorporated under the spring till and nitrogen fertilisers applied as ammonia nitrate were incorporated in the spring during the preparation of the germination bed.

RESULTS AND DISCUSSION

Yield results depending on fertilisation in spring-seeded cameline on the cambic chernozem at the Didactic Station of Timişoara are shown in Table 1 below.

Table 1

Yield results in spring-seeded *Camelina sativa* L. in 2014 in Timişoara

Factor A Phosphorus rate	Factor B – Nitrogen rate			Means of Factor A			
	N_0	N_{50}	N_{100}	Yield (kg/ha)	%	Difference (kg/ha)	Significance
P_0	780	934	1236	983	100		
P_{40}	842	1130	1432	1134	115	151	xx
P_{60}	967	1340	1440	1249	127	266	xxx

DL 5% = 87 kg/ha;
DL 1% = 136 kg/ha;
DL 0.1% = 259 kg/ha

Yield (kg/ha)	863	1134	1369
%	100	131	158
Difference (kg/ha)		271	506
Significance	-	xxx	xxx

DL 5% = 78 kg/ha; DL 1% = 131 kg/ha; DL 0.1% = 202 kg/ha

To note that yields ranged between 780 kg/ha (in the variant N_0P_0) and 1,440 kg/ha (in the variant $N_{100}P_{60}$).

On the average for the three fertilisation levels, on the on the soil fertilised with P_0 the yield reached 983 kg/ha, on the soil fertilised with P_{40} the yield increased with 15% reaching 1,134 kg/ha, and on the soil fertilised with P_{60} the yield was 27% higher, the difference of 266 kg/ha being statistically ensured as very significant.

Nitrogen fertilisers, on the average for the three levels of phosphorus fertilisation, increased the yield with 31% when fertilised with N_{50} and with 58% when fertilised with N_{100}.

The differences in yield of 271 kg/ha (N_{50}) and 506 kg/ha (N_{100}) are ensured statistically as very significant.

The influence of fertilisers on the number of branches is shown in Figure 1 below.

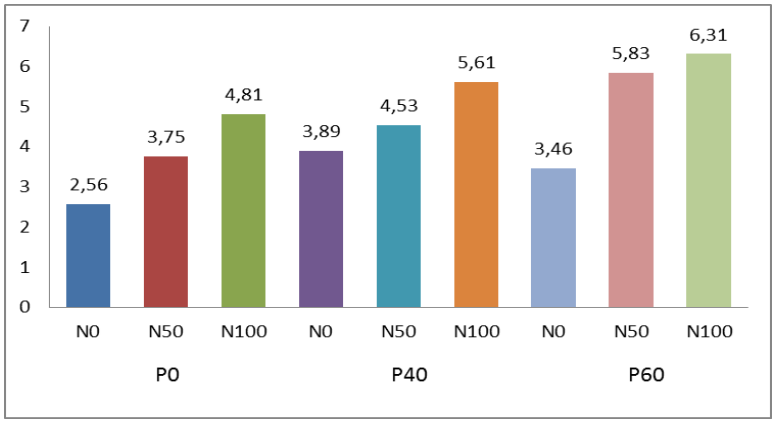

Fig. 1. Number of ramifications depending on nitrogen and phosphorus rates

We can see that, through fertilisation, the branching rate increased under the influence of both nitrogen and phosphorus fertilisers. The largest number of branches was when fertilised with P_{60} and, when fertilised with N_{100}, of 6.31. When fertilised with P_{40} and P_{60}, the number of branches in the experimental nitrogen rates was superior to that of the soil not fertilised with phosphorus.

The influence of fertilisation on the number of siliques/plant is shown in Figure 2.

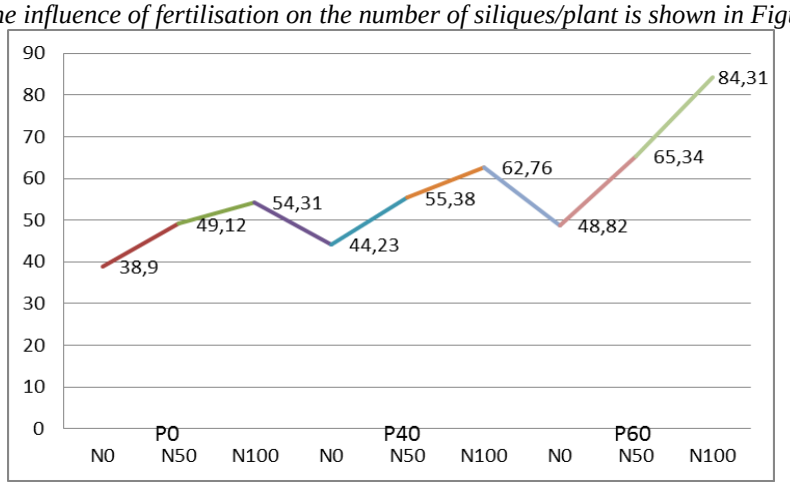

Fig. 2. Number of siliques per plant depending on nitrogen and phosphorus rates in Timişoara

We can see that, in the studied field, the number of siliques ranged between 38.9 (N_0P_0) and 84.31 ($N_{100}P_{60}$). Nitrogen and phosphorus fertilisers influenced favourably the number of siliques/plant. On the soil fertilised with P_{60}, in all nitrogen rate graduations, there was the largest number of siliques per plant.

The influence of fertilisation on 1000-seed weight is shown in Figure 3.

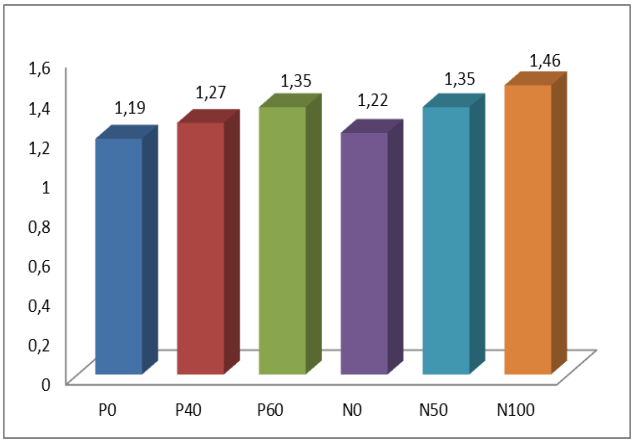

Fig. 3. Influence of fertilisation on 1000-seed weight

Phosphorus fertilisers increased the 1000-seed weight from 1.19 g when fertilised with P_0 to 1.27 when fertilised with P_{40} and 1.35 g when fertilised with P_{60}.

Nitrogen fertilisers on the average for the three phosphorus fertilisation levels increased the 1000-seed weight from 1.22 g when fertilised with N_0, to 1.35 g when fertilised with N_{50} and 1.46 g when fertilised with N_{100}.

In conclusion, fertilisation can have a positive influence on the 1000-seed weight and it can also increase seed yield.

CONCLUSIONS

Nitrogen and phosphorus fertilisation influenced favourably the yield of spring-seeded cameline.

Phosphorus fertilisers applied at rates of P_{40}-P_{60} increased the yield with 15% (when fertilised with P_{40}) and 27% (when fertilised with P_{60}).

Nitrogen fertilisers increased the yield with 31% (when fertilised with N_{50}) and 58% (when fertilised with N_{100}).

Depending on the fertiliser rate, the number of branches ranged between 2.56 (when fertilised with N_0P_0) and 6.31 (when fertilised with $N_{100}P_{60}$).

The number of siliques per plant varied between 38.9 (when fertilised with N_0P_0) and 84.31 (when fertilised with $N_{100}P_{60}$).

The 1000-seed weight varied, depending on fertilisation, on the average per experimental cycle, between 1.19 g (when fertilised with P_0) and 1.35 (when fertilised with P_{60}), and 1.22 (when fertilised with N_0) and 1.46 (when fertilised with N_{100}).

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