Scientific Papers, UASVM Bucharest, Series A, Vol. LIV, 2011, ISSN 1222-5339

PHOSPHORUS SPRING FERTILIZATION IN THE OIL SEED RAPE

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Keywords: *oil seed rape, phosphorus, pod number*

Abstract

The purpose of this experimentation is to find a solution to the situations in which, for various reasons, there was no phosphorus fertilisation before sowing. The experiment was conducted in Murgeanca village, Ialomita district, in the S.C Farmnet S.R.L. exploitation. The methodology used was the one described in the CETIOM brochure, "Guide de l'expérimentateur colza". By applying 250 kg/ha of complex fertilisers containing 10% N, 20% P_2O_5 and 30% SO_3, the number of pods has increased significantly with 45%, reaching up to 5000 pods/m^2. In the literature, this is considered the threshold from which satisfactory productions can be obtained. Also, the sole application of nitrogen determined the non significant growth in the number of pods, but in this case, the number of pods slightly exceeded 4000 pods/m^2.

INTRODUCTION

The purpose of this experimentation is to find a solution to the situations in which, for various reasons, there was no phosphorus fertilisation before sowing. We verified the following hypothesis: in the case of oilseed rape, the application of phosphorus in spring as a complex fertiliser can determine significant production increase.

Economic Framework**.** High prices of oilseed rape yield, the rise of chemical fertilisers' price and the care for pollution avoidance, have determined many specialists to lay a greater emphasis on the fertilisation optimisation for this crop. For this reason, there have been many fertilisation plans that take into account the soil analyses or the images taken by satellites.

In the last few years, the oilseed rape has been very profitable for many farmers [1 ,2]. There have also been happy exceptions when, in the first years of cultivation in an exploitation/parcel, large yields have been obtained, using low inputs technologies (small amount of fertilisers and few crop protection treatments). Jean Nicolas Simon, a French expert, an employee of Roullier Group (fertilisers producer), says that this phenomenon has been noticed in many places: after the first oilseed rape reseeding on the same parcel, the yields tends to decrease slightly, if the same level/quality of inputs is maintained. In order to obtain yields larger than 3 t/ha, the oilseed rape plants must absorb over 200 kg N/ha. On the other

hand, from the remarks we have made until now, the doses exceeding 150 kg N/ha have not determined the production growth because of climatic limitations (lack of humidity and high temperatures in the flowering/grains development period) [3, 4]

Fertilisation is one of the key elements of technical ways, being able to determine growths up to 40-50% [5].

Phosphorus Fertilisation Optimization. The oilseed rape is a crop that has high demands for phosphorus supply. For this reason, plants react to phosphorus application even when the soil is well supplied with mobile phosphorus. This is one of the explanations for which, on soils rich in phosphorus, French experts recommend the application of superphosphate in spring, when the fertilisation could not be done in autumn, as oilseed rape plants require phosphorus (particularly) in April and May [6].

British specialists also consider that phosphorus fertilisers can be applied anytime, in order to maintain a high level of mobile phosphorus in the soil [1].

In most cases, it is recommended that phosphorus fertilisation to be done before sowing. For soils with a low content of phosphorus, French specialists even recommend the application of fertilisers on the tillage for the oilseed rape seedlings to find very quickly the phosphorus in the superficial layers, following the preparation of the seedbed. If they would have been applied before ploughing, fertilisers would have been placed too deep for the young plants, therefore being inaccessible in the first stages of vegetation. The lack of fertilisation with phosphorus (particularly on the low supplied soils), affects the production [3, 4].

In the case of oilseed rape phosphorus deficiency is often easily noticed. In the last years the symptoms of phosphorus deficiency on large surfaces have been observed. They can appear in the first stages of vegetation even from the second week following the emergence as the phosphorus from the grain reserve is used in the first 7 days. The insufficient absorption_of phosphorus is often manifested in young plants, after prolonged periods of cold weather [1, 3, 4].

MATERIAL AND METHODS

The experiment was conducted in Murgeanca village, Ialomita district, in the S.C Farmnet S.R.L. exploitation.

The methodology used was the one described in the CETIOM brochure, “Guide de l'expérimentateur colza” [7].

During winter, fertilisation was done using 200 kg/ha complex fertilisers 28:28:0 and 200 kg/ha ammonium nitrate. Plants’ density after winter was of 45 plants/m². We used 4 replications which were set up in blocks. The harvested surface was of 30 m² (1.5 m x 20 m). During vegetation period, samples were taken from the surface of 4 m² (1 m²/replication).

We used the following treatments:

T1 - Control – fertilisation in February with 80 kg N/ha.

T2 - Supplementary fertilisation on 10th of March, using 25 kg N/ha as ammonium nitrate.

T3 - Supplementary fertilisation on 10th of March, using 250 kg of Euro Cereal, complex fertilisers, produced by Timac Agro Romania. The composition was the following: 10% N, 20% P_2O_5 and 30% SO_3.

Comparisons were made using the Duncan test.

RESULTS AND DISCUSSION

Oilseed rape plants have accumulated dry matter differently, according to the treatment applied (Table 1).

On 29th of April, the plants were weighing 1706 g/m². Until 10th of June, the plants biomass increased with 668 g/m² at the Control (139%), with 856 g/m² at the supplementary fertilisation with ammonium nitrate (150%) and with 1138 g/m² at the application of complex fertilisers (167%).

Table 1

Fertilisers influence on plant dry weight and pod number per m^2

Treatment	Control	N	N +P +S
Plant dry weight on 10.03.2009 (g)	885	910	860
Plant dry weight on 10.03.2009 (g)	2374 (c)	2562 (b)	2844 (a)
Differences in plant dry weight (g)	1489	1652	1984
Differences in plant dry weight %	100	108	120
Pod number/m^2	340 (c)	4011 (b)	5004 (a)
Pod number/m^2 (%)	100	117	145

Means in the same line followed by the same letter do not differ significantly P (>0.05).

The number of pods/m² varied from 3440 (Control), to 4011 for supplementary fertilisation with ammonium nitrate and to 5004 at complex fertilisers application, the increase being of 17% for nitrogen and of 45% for complex fertilisers.

CONCLUSIONS

1. In this work, we have studied the effect of fertilisers applied in spring to the oilseed rape plants, which have not been fertilised before sowing. Oilseed rape reacts favourable to the late application of phosphorus through the increase of plant's biomass and the number of pods, regardless the mobile phosphorus content in the soil.
2. By applying 250 kg/ha of complex fertilisers containing 10% N, 20% P_2O_5 and 30% SO_3, the number of pods has increased significantly with 45%, reaching up to 5000 pods/m^2. In the literature, this is considered to be the threshold from which satisfactory productions can be obtained.

3. Also, the sole application of nitrogen has determined the non significant growth in the number of pods, but in this case, the number of pods slightly exceeded 4000 pods/m^2.

ACKNOWLEDGEMENTS

Partnerships in priority areas Grant no. 22138/2008 TINOCIP financially supported this study.

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