INFLUENCE OF FERTILIZERS ON THE LEVEL AND QUALITY OF SOYBEAN PRODUCTION

INFLUENȚA ÎNGRĂȘĂMINTELOR ASUPRA NIVELULUI ŞI CALITĂȚII PRODUCȚIEI DE SOIA

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Abstract. *Scientific research and practice shows that the use of fertilizers, in that condition and influence the level and quality of production is a technological sequence with an important role in intensive technology. Many researches show that the climatic conditions of Romania react very differently to the application of soybean fertilizer and fertilization following problem must be solved and addressed the conditions where the culture.*
Key word: fertilizers, level, quality, technology

Rezumat. *Cercetarea ştiinţifică şi practica arată că utilizarea îngrăşămintelor, prin faptul că condiţionează şi influenţează nivelul şi calitatea producţiei, devine o secvenţă tehnologică cu rol deosebit într-o tehnologie intensivă. Numeroase cercetări efectuate arată că în condiţiile pedoclimatice ale României, soia reacţionează foarte diferit la aplicarea îngrăşămintelor şi ca urmare problema fertilizării trebuie rezolvată şi abordată în funcţie de condiţiile unde se află cultura.*
Cuvinte cheie: îngrăşăminte, nivel, calitate, tehnologie

INTRODUCTION

Soy is a legume crop that can satisfy a necessary part of nitrogen through symbiotic bacteria, however, how fertilization can contribute to raising the quality and quantity of production. Hereinafter referred to fazial applied nitrogen is used best when it is incorporated into the soil to the start of flowering plants (Borlan Z., Hera Cr. et al., 1994), with the execution of mechanical breed lines. Research on the influence of nitrogen and phosphorus fertilizers (Davidescu D., Davidescu Velicica, 1999) have on the production of soy have been conducted on a chernozem soil cambic the Romanian Plain (SCDA Teleorman). Other sequences in the technology culture technology has been recommended for growing soybeans.

MATERIAL AND METHOD

For the soybean crop cultivation technology has been respected, the experimental factors as nitrogen and phosphorus. Method of settlement of the experience is two-factor method subdivided parcels in six repetitions, experience and twenty-five variants including the application of nitrogen and phosphorus.

Factor A - PHOSPHORUS (kg P2O5/ha): a1 = 0kg/ha; a2 = 40kg/ha; a3 = 80kg/ha; a4 = 120kg/ha; a5 =160 kg/ha

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Factor B = NITROGEN (kg N / ha): b1 = 0 kg / ha; b2 = 25 kg / ha; b3 = 50 kg / ha; b4 = 75 kg / ha; b5 = 100 kg / ha.

Were analyzed and interpreted a total of 25 variations on unilateral and increasing doses of nitrogen (V2 - V5), increasing doses of phosphorus (V6 - V9) and combinations of these two factors (V10 - V25) in crop year 2007 Variant V1 was considered unfertilized control variant. Based on technical data recorded by research stations have done in assessing the economic, energy and the various ways and combinations of fertilizers, using an appropriate system of indicators, which allowed broadening interpretation.

RESULTS AND DISCUSSIONS

Under the technical aspect, to witness the unfertilized (V1), increasing doses of nitrogen (25 - 100 kg N as/ha) led to increased production by 10-29% compared to the control, while increasing doses of unilateral action phosphorus resulted in production increases of 10-20% compared to the control. The combined application of both fertilizer production increases ranging from 21% to 48% in V10 and V20, so soy has responded well to the combination of nitrogen and phosphorus fertilizers in 2007, extremely dry year.

Table 1

Influence of nitrogen fertilizer on soybean production and technical and economic consequences – 2007

Specification	U.M.	V1 Mt	V2 N-25	V3 N-50	V4 N-75	V5 N-100
Production	Kg/ha	1560	1720	1880	2010	1930
	%	100	110	121	129	124
Total growth	Kg/ha	-	160	320	450	370
	%	-	10	21	29	24
Average gain	Kg/kg s.a.	-	6,4	6,4	6	3,7
Production value	lei	1404,00	1548,00	1692,00	1809,00	1737,00
Total expenditure	lei	1279,99	1336,96	1456,36	1547,56	1635,42
Chemical fertilizers	lei	0	53	106	159	212
Gross profit	lei	124,01	211,04	235,64	261,44	101,58
Gross profit rate	%	9,68	15,78	16,18	16,89	6,21
Cost of production	lei/kg	0,820	0,777	0,774	0,769	0,847
Estimated price recovery	lei/kg	0,900	0,900	0,900	0,900	0,900

Economically, the use of fertilizers in increasing amounts of technology spending increases. Elevations vary between 1336 and 1635 lei/ha for nitrogen fertilizers applied unilaterally, between 1332 and 1534 lei/ha for phosphorus fertilizers and between 1433 and 1935 lei/ha for N and P combinations analyzed. In the technological expenditure reveals a progressive increase in material costs with higher doses of fertilizers. Technical efficiency of nitrogen and phosphorus (Alecu I. et al., 2001) factors investigated is the average gain per kg to applied to express the

technical conversion of these factors investigated. The unilateral application of nitrogen (table 1) conditions is a reduction of the average gain of 6.4 kg to 3.7 kg soybeans / kg N was applied. If an average gain of phosphorus application (table 2) ranged between 3.8 and 1.6 kg soybean / kg P to applied.

Table 2

Influence of phosphorus fertilizer on soybean production and technical and economic consequences – 2007

Specification	U.M.	V1 Mt	V6 P-40	V7 P-80	V8 P-	V9 P-
Production	Kg/ha	1560	1710	1870	1800	1800
	%	100	110	120	115	115
Total growth	Kg/ha	-	150	310	240	240
	%	-	10	20	15	15
Average gain	Kg/kg s.a.	-	3,7	3,8	2	1,6
Production value	lei	1404	1539	1683	1620	1620
Total expenditure	lei	1279,99	1332,28	1407,15	1472,23	1534,48
Chemical fertilizers	lei	0	58,80	117,60	176,40	235,20
Gross profit	lei	124,01	206,72	275,85	147,77	85,52
Gross profit rate	%	9,68	15,51	19,60	10,03	5,57
Cost of production	lei/kg	0,820	0,779	0,752	0,817	0,852
Estimated price	lei/kg	0,900	0,900	0,900	0,900	0,900

Combinations of nitrogen and phosphorus researched and analyzed average gain is reduced from 5.60 kg to 2.15 kg soy V11 / kg to V25 applied (table 3). Economic efficiency of technological options is fertilized following: reducing the cost of production is recorded in most variants unilaterally fertilized with nitrogen (V2 - V4), the most one-sided variants fertilized with phosphorus (V6 - V8) and the combined fertilized variants except V13, V21, V22, V23, V24 and V25 (bigger even than the production cost recovery). The production cost is higher than in variant V5 version control unilaterally fertilized with nitrogen - 0.847 lei / kg, the V9 variant unilaterally fertilized with phosphorus - 0.852 Euro / kg gross profit ranged from 70.33 lei / ha and variant V21 394 lei / ha in variant V15, has been a net loss of 27.70 V25 lei / ha rate of return ranged from -1.43% to 24.15% for V25 and V15. Energy produced additional increases from 867 kWh / ha in the 4219 V6 kWh / ha in V16, so about 47% more than in unfertilized witness. Extra energy consumption varies between 226 kWh / ha in the V6 and 3474 kWh / ha in V25, an increase of over 15 times. Energy balance is positive except V5 variants (for N 100 kg) and V25 (for P and 160 kg N 100 kg).

Table 3

Influence of nitrogen and phosphorus fertilizer on soybean production and technical and economic consequences – 2007

Specification	U.M.	V1 Mt	V10 P40N25	V11 P40N50	V12 P40N75	V13 P40N100
Production	Kg/ha	1560	1890	2070	2180	2100
	%	100	121	133	140	135
Total growth	Kg/ha	-	330	510	620	540
	%	-	21	33	40	35
Average gain	Kg/kg s.a.	-	5,0	5,6	5,4	3,8
Production value	lei	1404	1701	1863	1962	1890
Total expenditure	lei	1279,99	1433,59	1554,00	1646,65	1734,57
Chemical fertilizers	lei	0	111,8	164,8	217,8	270,8
Gross profit	lei	124,01	267,41	309,00	315,35	155,43
Gross profit rate	%	9,68	18,65	19,88	19,15	8,96
Cost of production	lei/kg	0,820	0,758	0,750	0,755	0,825
Estimated price recovery	lei/kg	0,900	0,900	0,900	0,900	0,900

Table 3 (continuation)

Specification	U.M.	V14 P80N25	V15 P80N50	V16 P80N75	V17 P80N100	V18 P120N25	V19 P120N50
Production	Kg/ha	2000	2250	2290	2220	1990	2150
	%	128	144	147	142	128	138
Total growth	Kg/ha	440	690	730	660	430	590
	%	28	44	47	42	28	38
Average gain	Kg/kg s.a.	4,1	5,3	4,7	3,66	2,96	3,47
Production value	lei	1800	2025	2061	1998	1791	1935
Total expenditure	lei	1509,91	1630,98	1721,95	1811,19	1574,48	1695,77
Chemical fertilizers	lei	170,6	223,6	276,6	329,6	229,4	282,4
Gross profit	lei	290,09	394,02	339,05	186,81	216,52	239,23
Gross profit rate	%	19,21	24,15	19,68	10,31	13,75	14,10
Cost of production	lei/kg	0,754	0,724	0,751	0,815	0,791	0,788
Estimated price recovery	lei/kg	0,900	0,900	0,900	0,900	0,900	0,900

Table 3 (continuation)

Specification	U.M.	V20 P120 N75	V21 P120N100	V22 P160N25	V23 P160N50	V24 P160N75	V25 P160N100
Production	Kg/ha	2240	2160	1980	2110	2140	2120
	%	148	138	127	135	137	136
Total growth	Kg/ha	680	600	420	550	580	560
	%	44	38	27	35	37	36
Average gain	Kg/kg s.a.	3,48	2,72	2,27	2,61	2,46	2,15
Production value	lei	2016	1944	1782	1899	1926	1908
Total expenditure	lei	1786,60	1873,67	1636,73	1765,35	1850,07	1935,70
Chemical fertilizers	lei	335,4	388,4	288,2	341,2	394,2	447,2
Gross profit	lei	229,4	70,33	145,27	133,65	75,93	- 27,70
Gross profit rate	%	12,84	3,75	8,87	7,57	4,10	- 1,43
Cost of production	lei/kg	0,797	0,867	0,826	0,836	0,864	0,913
Estimated price recovery	lei/kg	0,900	0,900	0,900	0,900	0,900	0,900

CONCLUSIONS

1. Given the multiple uses of the soybean plant it is considered the golden future of humanity or plant designed to solve the world protein deficit. Soy protein not only provides good quality but also oil and soybean in the current situation offers improved nitrogen balance, thus soil fertility.

2. Soy is a legume crop that can satisfy a necessary part of nitrogen through symbiotic bacteria, however, how fertilization can contribute to raising the quality and quantity production. The climatic conditions of our country, soybean react differently to the application of fertilizers and fertilization so the problem must be addressed in the conditions where the culture.

3. Research results show that doses P80 and P120 in combination with increasing doses of nitrogen are most suitable for obtaining the background of increased economic and technical efficiency. Influence of nitrogen on substrate P80 is manifested through production to achieve the highest dose was 75 kg N / ha.

4. Regarding the influence of increasing doses of nitrogen on the substrate P120 and P160, there is a decrease in production of 50-150 kg / ha, the highest output is obtained practically the same dose of nitrogen (75 kg N as / ha), as for agro P80. We believe that phosphorus doses P80 and P120 are the most likely to obtain an efficient production in the technical, economic and energy.

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