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# THE BEHAVIOR OF SOME SOYBEAN GENOTYPES FROM SCDA TURDA ON THE STAGNOGLEIZED PRELUVOSOL FROM SCDA LIVADA

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## ABSTRACT

*Increasing the areas cultivated with soybeans in order to develop vegetable protein resources requires the research and knowledge of new genotypes in different pedoclimatic conditions.The type of soil at Livada on which the "preluvosol stagnogley" was experimented is representative of the north-west of Romania and is characterized by a very low potential fertility due to unfavorable physical, hydrophysical and chemical properties as well as a poor supply of nutrients and a reduced microbiological activities (Ștefan 2000)***.**

## INTRODUCTION

Soybean (*Glycine max* L.) among legumes, is classified as an oil plant, recognized for its high protein content as well as its high oil content (Mondici & Fritea 2016, Mondici S. 2016).

Soy is the most important source of vegetable protein known to mankind; it is also one of the cheapest and most readily available sources of protein available, especially in developing countries (Mondici et al. 2017, Sugar et al. 2021). Interest in this crop is motivated by the high nutritional value of soybeans (Ciobanu & Domuţa 2003, Mondici et al. 2016, Muntean et al. 2011).

At the European level, in recent years, there has been an increase in interest in the conventional soybean culture in the conditions where it is desired to develop and secure the European resource of vegetable protein by increasing the cultivated areas (Vagelas & Sugar 2020, Varga et al. 1998).

## MATERIAL AND METHODS

The research was carried out at SCDA Livada on a stagnogleyized preluvosol with a pH of 5.1, a clay content of 20.9% and a humus content of 1.8%.

The experiment was placed in a randomized block, 25 variants in three repetitions, the surface of the plot being 12 square meters.

In this experience, the behavior of the soybean genotypes under the conditions at the Livada Agricultural Development Research Station was followed.

The multiannual average temperature recorded at the Livada station in the last 58 years is 9.7˚C, and the multiannual average precipitation reaches 742 mm with an uneven and capricious distribution during the growing season.

Table 1

Soybean genotypes from SCDA Turda tested at SCDA Livada

| Nr. crt. | Genotypes | Group of maturity | Purity % | Germination % | MMB gr. |
|---|---|---|---|---|---|
| 1 | Onix | 00 | 99,5 | 95 | 129 |
| 2 | Eugen | 00 | 99,9 | 90 | 157 |
| 3 | Felix | 00 | 99,8 | 90 | 158 |
| 4 | Darina TD | 00 | 99,5 | 96 | 150 |
| 5 | Cristina TD | 00 | 99,9 | 97 | 152 |
| 6 | Malina TD | 00 | 99,8 | 98 | 125 |
| 7 | CarlaTD | 00 | 99,8 | 97 | 164 |
| 8 | Larisa | 00 | 99,8 | 99 | 164 |
| 9 | Caro TD | 00 | 99,6 | 98 | 133 |
| 10 | Ilinca TD | 00 | 99,7 | 99 | 151 |
| 11 | Bia TD | 00 | 99,0 | 100 | 138 |
| 12 | Ada TD | 00 | 99,5 | 100 | 150 |
| 13 | Teo TD | 00 | 99,4 | 99 | 145 |
| 14 | Miruna TD | 00 | 99,6 | 98 | 164 |
| 15 | Nicola TD | 00 | 99,0 | 99 | 160 |
| 16 | Felicia TD | 00 | 99,9 | 100 | 157 |
| 17 | T 12 – 252 | 00 | 99,0 | 98 | 165 |
| 18 | T10 – 3157 | 00 | 99,1 | 99 | 166 |
| 19 | T 12 – 161 | 00 | 99,5 | 97 | 167 |
| 20 | T26 – 6126 | 00 | 99,5 | 95 | 158 |
| 21 | T26 – 6117 | 00 | 99,3 | 95 | 159 |
| 22 | T27 – 160 | 00 | 99,7 | 98 | 184 |
| 23 | T27 – 166 | 00 | 99,9 | 97 | 156 |
| 24 | T12 – 165 | 00 | 99,4 | 99 | 169 |
| 25 | T12 - 295 | 00 | 99,9 | 100 | 208 |

Soybean genotypes sown in the experimental field are shown in Table 1.

## RESULTS AND DISCUSSIONS

Through the analysis of the variance of the production differences achieved within the 25 genotypes, the existence of positive statistically ensured differences is noted in a number of eight variants compared to the experience average of 29.15q/ha. The highest production was achieved by the Onix variety, an increase of 7.44 q/ha, variant in which the increase in production is very significant. Distinctly significant positive production differences were given by the varieties:

Eugen, Caro TD, T26 – 6126, T12 – 165, T12 – 295. Significant production increases were also recorded in the case of the Darina TD and Cristina TD varieties. At the same time, there were statistically guaranteed negative differences in production for a number of six varieties (Tab. 2).

Tabelul 2

Yield and humidity in soybean genotypes

| Nr. crt. | Genotypes | Pro-duc-tion q/ha | The diffe-rence to $\bar{x}$ q/ha | The mea-ning to $\bar{x}$ q/ha | Umiditate % | The diffe-rence to $\bar{x}$ % | The mea-ning to $\bar{x}$ % |
|---|---|---|---|---|---|---|---|
| 1 | Onix | 36,67 | 7,44 | xxx | 13,83 | -1,28 | - |
| 2 | Eugen | 34,67 | 5,44 | xx | 15,63 | 0,52 | - |
| 3 | Felix | 28,17 | -1,06 | - | 13,17 | -1,94 | 0 |
| 4 | Darina TD | 33,00 | 3,77 | x | 13,07 | -2,04 | 0 |
| 5 | Cristina TD | 32,67 | 3,44 | x | 12,83 | -2,28 | 0 |
| 6 | Malina TD | 27,00 | -2,23 | - | 15,43 | 0,32 | - |
| 7 | CarlaTD | 24,17 | -5,06 | 00 | 14,77 | -0,34 | - |
| 8 | Larisa | 25,33 | -3,90 | 0 | 14,87 | -0,24 | - |
| 9 | Caro TD | 33,83 | 4,60 | xx | 15,37 | 0,26 | - |
| 10 | Ilinca TD | 31,33 | 2,10 | - | 14,87 | -0,24 | - |
| 11 | Bia TD | 27,00 | -2,23 | - | 14,17 | -0,94 | - |
| 12 | Ada TD | 25,00 | -4,23 | 0 | 15,83 | 0,72 | - |
| 13 | Teo TD | 22,50 | -6,73 | 000 | 16,40 | 1,29 | - |
| 14 | Miruna TD | 30,33 | 1,10 | - | 16,27 | 1,16 | - |
| 15 | Nicola TD | 28,50 | -0,73 | - | 16,93 | 1,82 | - |
| 16 | Felicia TD | 20,50 | -8,73 | 000 | 13,80 | -1,31 | - |
| 17 | T 12 – 252 | 28,83 | -0,40 | - | 14,77 | -0,34 | - |
| 18 | T10 –3157 | 21,50 | -7,73 | 000 | 16,67 | 1,56 | - |
| 19 | T 12 – 161 | 27,00 | -2,23 | - | 18,53 | 3,42 | xxx |
| 20 | T26 –6126 | 34,17 | 4,94 | xx | 18,93 | 3,82 | xxx |
| 21 | T26 –6117 | 29,83 | 0,60 | - | 13,73 | -1,38 | - |
| 22 | T27 – 160 | 29,33 | 0,10 | - | 15,80 | 0,69 | - |
| 23 | T27 – 166 | 29,67 | 0,44 | - | 13,17 | -1,94 | 0 |
| 24 | T12 – 165 | 34,00 | 4,77 | xx | 14,13 | -0,98 | - |
| 25 | T12 - 295 | 33,83 | 4,60 | xx | 14,77 | -0,34 | - |
| Media | | 29,15 | | | 15,11 | | |

Yield: DL 5% = 3,36 q/ha 1% = 4,48 q/ha 0,1% = 5,84 q/ha
Humidity: DL 5% = 1,84 % 1% = 2,45 % 0,1% = 3,20 %

One of the essential elements in wetlands is the moisture content of the grain at harvest. At an average level of 15.11% humidity, significantly negative differences were recorded in a number of four varieties with minus percentages of 1.94 - 2.28%. The genotypes T12 - 161 and T26 - 6126 had a high humidity of 18.53% and 18.33% respectively, the difference being very significant (Tab.2).

Tabelul 3

MMB- at harvest

| Nr. crt. | Genotypes | MMB g | The difference to $\overline{x}$ g | The meaning to $\overline{x}$ g |
|---|---|---|---|---|
| 1 | Onix | 128,67 | -27,64 | 000 |
| 2 | Eugen | 156,00 | -0,31 | - |
| 3 | Felix | 157,00 | 0,69 | - |
| 4 | Darina TD | 149,67 | -6,64 | 000 |
| 5 | Cristina TD | 152,00 | -4,31 | 00 |
| 6 | Malina TD | 125,00 | -31,31 | 000 |
| 7 | CarlaTD | 163,00 | 6,69 | xxx |
| 8 | Larisa | 163,67 | 7,36 | xxx |
| 9 | Caro TD | 131,67 | -24,64 | 000 |
| 10 | Ilinca TD | 151,33 | -4,98 | 000 |
| 11 | Bia TD | 136,33 | -19,98 | 000 |
| 12 | Ada TD | 150,00 | -6,31 | 000 |
| 13 | Teo TD | 143,33 | -12,98 | 000 |
| 14 | Miruna TD | 163,00 | 6,69 | xxx |
| 15 | Nicola TD | 159,67 | 3,36 | xx |
| 16 | Felicia TD | 156,00 | -0,31 | - |
| 17 | T 12 – 252 | 164,00 | 7,69 | xxx |
| 18 | T10 – 3157 | 164,67 | 8,36 | xxx |
| 19 | T 12 – 161 | 166,00 | 9,69 | xxx |
| 20 | T26 – 6126 | 157,00 | 0,69 | - |
| 21 | T26 – 6117 | 159,00 | 2,69 | x |
| 22 | T27 – 160 | 183,33 | 27,02 | xxx |
| 23 | T27 – 166 | 155,33 | -0,98 | - |
| 24 | T12 – 165 | 168,00 | 11,69 | xxx |
| 25 | T12 - 295 | 204,00 | 47,69 | xxx |
| Media | | 156,31 | | |

DL 5% = 2,49 g 1% = 3,32g 0,1% = 4,32g

The mass of one thousand berries (MMB) had values between 125g (Malina TD) and 204g (T12 - 295). Compared to the average of the experience of 156.31g, a number of nine genotypes were registered whose difference is positively very significant, one variety (Nicola TD) with a distinctly significant

positive difference and a genotype T26 – 6117 with a positive significant difference. Very significant MMB differences were recorded for a number of eight genotypes and distinctly significant negative differences for only one variant (Cristina TD) (Tab. 3).

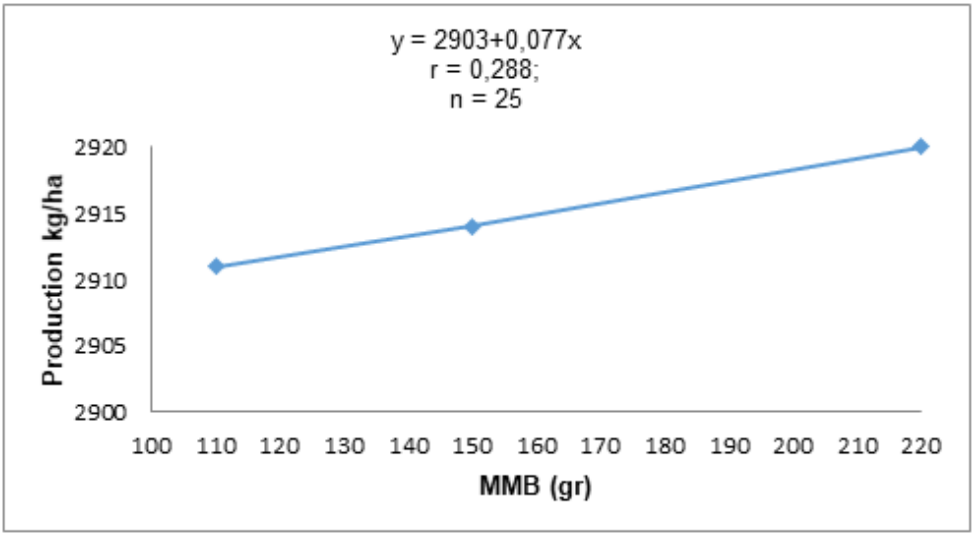


Figure 1. Regression of soybean yield on MMB

The regression coefficient of 0.077 shows a positive trend of production according to the increase of 1 g of MMB, the production increases by 0.077kg/ha. (Fig. 1).

## CONCLUSIONS

The production results from the experiences regarding the behavior of 25 soybean genotypes from SCDA Turda on poorly fertile soils, of the "stagnoglazed preluvosol" type, show a wide ecological plasticity with the possibility of obtaining productions of over 3000 kg/ha (3667 kg/ha the variety ONYX).

At a 40% protein content, the protein production potential reaches values of 1300-1500 kg/ha protein, surpassing any crop in this pedoclimatic area.

The genotypes with the most favorable features in terms of harvesting and keeping production are those from the "early" maturity group and determined growth that does not require desiccation.

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