

VARIABILITY OF CHARACTERISTICS AND TRAITS IN SOME GENOTYPES OF FOREIGN PEANUTS GROWN ON THE SANDY SOILS OF SOUTHERN OLTENIA

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ABSTRACT

Peanuts are considered one of the most important food plants in the tropical and subtropical regions. Due to their high protein and fat content, they are very valuable and varied in use.

The study of the variability of the quantitative characters was performed on 5 genotypes of foreign peanuts grown at RDSPCS Dabuleni using biometric measurements and observations during the vegetation period on the plant's waist, the number of shoots per plant, and in the laboratory determinations were made on pods and grains. Analyzing some characters of the stem, we observed a small variability regarding the length of the stem with values of $s\% = 3.07-4.5\%$, and the number of stems / plant with higher values of $s\% = 4.0-6, 73\%$. The number of grains in the pods and the mass of 1000 grains show good stability in all genotypes.

INTRODUCTION

The use of sandy soils from southern Oltenia implies a specific, rational and integrated agricultural system, with plants less demanding for soil fertility and tolerant to stress factors that ensure profitability and environmental protection (Marinica Gh., 2003,). In order to promote a sustainable agricultural system on these lands, the choice of species and varieties with high adaptability to climatic and soil conditions, it is necessary to obtain a high, safe and stable production in the areas affected by drought (Reta Draghici et al., 2016) . In this respect, it is necessary to maintain the genetic structure and biological value at the initial level of the varieties permanently.

In the context of the growth of the surfaces and of the production of peanuts and of the valorization of the areas of maximum favorability, we act in the direction of diversifying the assortment of cultivation with drought resistant genotypes, with potential for adaptability to the stress conditions.

In the area of sandy soils in southern Oltenia, peanuts find favorable

ecopedological conditions for growth and fruiting, conditions that allow the cultivation with good results of this species (Mitrea, I., 1993)

Peanuts (*Arachis hypogaea* L.) as an oil species ranks fourth in size in the world and grown in more than 100 countries, with annual production of 35.5 million tonnes (FAO, 2009).

Peanuts are considered one of the most important food plants in the tropical and subtropical regions. Due to their high protein and fat content, they are very valuable and varied in use.

Peanut kernels can be used directly for fresh or fried food, representing basic food in the subtropical regions of the globe. They contain 40-60% oil, 20-40% protein and 10-20% carbohydrates. From 100 g of grains, 564 kcal of energy is obtained (Jambunathan, 1991).

Oil from peanuts can be extracted from oil that is used for roasting (Singh and Diwakar, 1993), or for the manufacture of margarine, butter, bread, chocolate, a very good quality halva (40-50% protein). Recently, it has also been used as a substitute for milk used in the preparation

of "makiyato" in Ethiopia (Chala et al.,2012).

The turtles and the sips resulting from the oil extraction are rich in proteins, constituting a concentrated fodder that is particularly valuable for the feeding of the animals, unlike the poultry (Venkatanarayana 1952).

The quality of legumes gives them the opportunity to obtain the necessary nitrogen symbiotically, contributing substantially to improving soil fertility traits within a sustainable agricultural system in semi-arid areas (Upadhyaya et al.,(2006).

The existing peanut germplasm at RDSPCS Dabuleni offers the possibility to study certain characters and traits, then followed in the process of improvement to obtain new peanut genotypes.

MATERIAL AND METHOD

The experiment was located in the experimental field on sandy soil with low nitrogen content (0.06%), well supplied in extractable phosphorus (79.5 ppm), medium supplied in exchangeable potassium (67 ppm), and reduced in humus (0.55%), with a pH of 6.72 showing a moderately acid reaction.

The purpose of the paper is to highlight the phenotypic and genotypic variability of some of foreign peanuts under the sandy soil conditions in Dabuleni.

The biological material used in this study was represented by 5 genotypes of foreign peanuts to the Romanian variety *Dabuleni* used as a control, which were initially studied in the comparative

competition culture. The experience was established according to the method of randomized blocks, between 2015-2017.

The study of the variability of the quantitative characters was done using biometric measurements and observations during the vegetation period on the height of the plant, the number of branches per plant, and in the laboratory determinations were made on the pods and grains. The obtained research results were processed using the variation string method.

RESULTS OBTAINED

From the data presented in table 1 it is observed that the studied genotypes show little variability in the length of the strain, with uniform, homogeneous individuals. The size of the plants showed average values between 25.5 cm in the *Provenance China 1* variety and 42.3 cm in the *Brazilian Begici* variety. The values of the coefficient of variability are between 3.07% and 4.5%.

Regarding the number of branches per plant, this character is variable, their number varying on average, between 5.1 in the *Henan Province* variety and 7.0 in the *Brazilian Begici* variety. The values of the coefficient of variability are between 4.0% and 6.73%. The *Brazilian Begici* variety that had the largest waist showed the highest number of branches on the plant.

Similar results were obtained by Khangura and Sandhu (1973) and Yadav et al. (2014).

Table 1

Morphological aspects of some peanut genotypes studied at RDSPCS Dabuleni

Variety	The height of the plants (cm)			Number of branches / plant		
	X	S _x	S%	X	S _x	S%
<i>Dabuleni(control)</i>	30.3	1.14	3.76	6.8	0.31	4.55
<i>Brazilian Begici</i>	42.3	1.30	3.07	7.0	0.28	4.0
<i>Velican</i>	38.7.	1.36	3.51	6.2	0.31	5.0
<i>HYY3</i>	28.1.	1.08	3.84	6.4	0.30	4.68
<i>Provenance China1</i>	25.5	1.14	4.47	5.2	0.35	6.73
<i>Henan Province</i>	26.2	1.18	4.5	5.1	0.3	5.88

X- the arithmetic mean

S_x- the standard deviation of the arithmetic mean, S% - the coefficient of variation

The number of pods that are formed on the plant is an element of the production, and of these an important role is played by mature pods. The highest number of mature pods per plant was recorded in the *Provenance China 1* variety, which averaged 45.5 mature pods per plant, and the smallest number of mature pods per plant was recorded at the *Velican* variety, which averaged 26.3 mature pods per plant. Compared with the *Dabuleni* (control) variety, a higher number of mature pods per plant (37.5-39.3 mature

pods / plant) was recorded in three genotypes of peanuts. The coefficient of variability has values between 3.07 % and 5.14%. A similar finding was reported by Khan et al. 2000. Regarding the number of grains in the pod, this character is highly variable with values of the coefficient of variability between 30.0% and 37.6%. In the *HYY 3* and *Henan Province* varieties the coefficient of variability is 0, with uniform, homogeneous individuals.

Table 2

Variability of the coefficient of variability on the number of mature pods per plant and the number of pods in some peanut genotypes

Variety	Number mature pods/plant			Number of grains in the pods		
	X	S _x	S%	X	S _x	S%
<i>Dabuleni</i> (control)	35.0	1.8	5.14	2.2	0.78	35.4
<i>Brazilian Begici</i>	39.3	1.7	4.32	2.5	0.75	30.0
<i>Velican</i>	26.3	0.81	3.07	2.2	0.80	36.3
<i>HYY3</i>	37.5	1.5	4.0	2.0	0	0
<i>Provenance China 1</i>	45.5	1.8	3.95	2.1	0.79	37.6
<i>Henan Province</i>	38.2	1.6	4.18	2.0	0	0

X- the arithmetic mean

S_x- the standard deviation of the arithmetic mean

S% - the coefficient of variation

Analyzing the variability of the productivity of the plant, from the point of view of the production of pods, the mass of 1000 grains shows that there is a better stability of the mass of 1000 grains (s% = 0.69-1.08) and of the number of mature pods per plant (s % = 3.07-5.14) compared to the production of pods obtained (s% = 5.48-12,8). Similar observations were made by Nath and Alam 2002, Yadlapalli 2014, Khote et al.

(2009). The average grain production fluctuated within the limits of 1844- 2768 kg / ha of pods, with an increase compared to that of the *Dabuleni* variety (2159 kg / ha), of 489-576 kg / ha in the *Henan Province*, *Provenance China 1* variety, but with better stability in the *Henan Province* variety, with the lowest standard deviation of the arithmetic mean (S_x = 145) and the lowest coefficient of variation (s% = 5.48).

Table 3

Productivity variability in some peanut genotypes studied at RDSPCS Dabuleni

Variety	Mass of 1000 grains (g)			Yield of pods (kg/ha)		
	X	S _x	S%	X	S _x	S%
<i>Dabuleni</i> (control)	475.3	5.06	1.06	2159	232.6	10.77
<i>Brazilian Begici</i>	425	4.6	1.08	1844	182.3	9.89
<i>Velican</i>	501	5.0	1.0	1906	202.6	10.63
<i>HYY3</i>	624.1	5.8	0.93	2768	350.1	12.65
<i>Provenance China 1</i>	613	4.2	0.69	2735	350.2	12.8
<i>Henan Province</i>	654	5.3	0.81	2648	145	5.48

X- the arithmetic mean

S_x- the standard deviation of the arithmetic mean

S% - the coefficient of variation

CONCLUSION

The genotypes of peanuts studied are highly diversified and allow the choice of valuable forms used in the breeding process.

Analyzing some characters of the stem, we observed a small variability regarding the length of the stem with values of $s\% = 3.07-4.5\%$, and the number of stems / plant with higher values of $s\% = 4.0-6.73\%$.

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The number of grains in the pods and the mass of 1000 grains show good stability in all genotypes.

Compared with the *Dabuleni* variety, which achieved 2159 kg / ha of pods, the *HYY 3*, *Provenance China 1* variety and *Henan Province* variety recorded production increases of 609kg/ha, 576kg/ha, respectively 489 kg/ha of pods.