STUDIES ON GENETIC STRUCTURE VARIABILITY AT "MARILENA", *LACTUCA SATIVA* L. VARIETY

STUDII PRIVIND VARIABILITATEA STRUCTURII GENETICE A SOIULUI DE SALATĂ (*LACTUCA SATIVA* L.) MARILENA

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Abstract *This paper presents a study on the variability of the main traits and significance for selection works at "MARILENA" variety of Lactuca sativa L., created and patented at Vegetable Research and Development Station, Bacau. Maintaining of quantitative and qualitative features of variety, annually within their variability in purpose to ensure the identity, uniformity and stability is achieved by the conservative selection works. Our undertaken studies show that studied variability of different traits, is: low at shape's index, head's height, medium at head diameter and head weight and high at weight of seed / plant (g). Data presented in this study reveal that the variety of lettuce – 'MARILENA' is properly maintained in conservative selection process, and the limits of variability are normal.*
Key words: *population, gene, genotype, coefficient of variability*

Abstract *Soiul de salată 'MARILENA' a fost creat la SCDL BACĂU. Lucrarea are ca scop prezentarea unui studiu asupra variabilităţii principalelor caractere şi semnificaţia pentru lucrările de selecţie. Menţinerea anuală a caracterelor cantitative şi calitative ale soiului în limitele proprii de variabilitate, respective asigurarea identităţii uniformităţii şi stabilităţii acestuia se realizează prin lucrări de selecţie conservativă. Studiile intreprinse relevă faptul că variabilitatea caracterelor studiate diferă: este mică la "indicele de formă" şi "înălţimea căpăţânii", s% ≤ 10, mijlocie la "diametrul şi greutatea căpăţânii" (s% cuprins între 10-20) şi mare la "greutatea semințelor/plantă" (s% ≥ 20). Datele prezentate în lucrare scot în evidenţă faptul că soiul de salată 'MARILENA', este corect menţinut în procesul selecţiei conservative, limitele de variabilitate fiind cele normale. Soiul este distinct şi uniform.*
Cuvinte cheie: *populatie, gene, genotip, coeficient de variabilitate*

INTRODUCTION

Lettuce (*Lactuca sativa*) is the most important crop in the group of leafy vegetables. It is characterized by considerable morphological and genetic variation. (Brezeanu, 2010). The crop comprises seven main groups of cultivars (including oilseed lettuce) differing phenotypically; they are usually described as morphotypes. Lettuce breeding is primarily focused on various morphological features and resistance against diseases and pests. (Křístková, 2008)

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The study of genetic structure and determination of population are crucial for estimating the value of population (type of genes and genotypes) from genetic and plant breeding view point, in order to investigate ways how genes and genotypes can be included in that population, as of how plant population can be kept within certain variability. Genetic analysis of quantitative characters (plant height, head diameter, shape index, the amount of seed produces by a plant) have importance in conservative selection of lettuce varieties. (Ambarus, 2010).

It is known the fact that any biological population is characterized by a frequency of genes and genotypes. A lots of evolution's factors (mutation, migration and selection) are acting on natural populations and tend to modify its structure. At artificial populations (varieties) of plants, in addition to evolutionary factors, genetic drift is acting and the original structure of the variety may be soon changed. (Mureşan, 1986)

Changing the frequency of genes and genotypes led to changes of the average population characteristics and therefore of variety characteristics. For this reason the variety's structure must be known, and after each cycle of selection, must be verified with the original structure. To reduce genetic drift action is necessary to work with large populations of plants.

MATERIAL AND METHOD

The experiments were conducted in condition of an alluvial soil, medium evaluated and sandy loam developed texture, pH value between 6.2 and 6.7 and humus content 2.5-2.7 %. Studies were accomplished on biological homogenized material form field of progenies study of *Lactuca sativa* L. variety, named "MARILENA". The mass selection was the selection method.

There were accomplished phenological observations and biometrical measurements: phenophases duration, rain and temperature regime, head's height (cm), head's diameter (cm), index's shape, head's weight (g), weight of seed / plant.

There were marked elites and we kept only the seeds from the plants whose values of studied characters were within the limits of variation of variety.

The limits of variation results from the calculation of statistical data from measurements made on a sample of 100 individuals (sample survey) taken at random on the diagonal field.

RESULTS AND DISCUSSIONS

The goal of our work is to develop adapted lettuce cultivars and associated germplasm with increased yield potential; while lowering production input and minimizing the impact on the surrounding environment. Conventional and modern breeding methods are providing new cultivars well tailored for the specific needs of producers and consumers.

Daily phenological observations were registered.

The regime of temperature (sum of degrees of temperature) and rainfall was settled for each phenophase (Table 1).

Table 1

Maine phenophase at - *Lactuca sativa* L. variety "MARILENA"

No	Phenophase	Period	Days /phenophase	Sum of (^{0}C) degree	Rainfall (mm)
1	sowing - springing	16.09-21.09	6	-	-
2	resume vegetation	20.03-21.03	-	-	-
3	resume vegetation - head issuing	22.03-22.05	30	385.20	72.10
4	formation of head – floriferous steam issuing	22.05-12.06	21	481.15	110.10
5	floriferous steam issuing - flowering	12.06-26.07	44	909.60	68,70
6	flowering – seeds maturation	26.07-29.08	33	758.90	10.60

Statistical and mathematical processing of data drawn from the measurements, showed the following ranges of variation of lettuce variety "MARILENA" (table 2).

Table 2

Variability study of some traits at "MARILENA" lettuce variety

No	Features	X	s	s%	Limits of variation	Signification %
1.	head's height (cm)	10,46	1,03	9,80	9.43-11.49	<10
2.	head's diameter (cm)	23,45	1,03	15,95	18.00 -28.90	10-20
3.	index shape	0,45	0,06	5,36	1.06-1.18	<10
4.	head's weight (g)	206,42	26,25	12,12	180.17-232.67	10-20
5.	weight of seed /plant (g)	10,37	2,12	20,44	8.25-12.49	>20

- <10 - low level of variability
- 10-20 - medium level of variability
- >20 - high level of variability

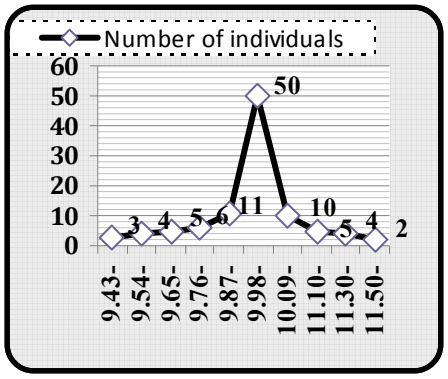

Fig. 1 - Histogram of head's height variation (cm)

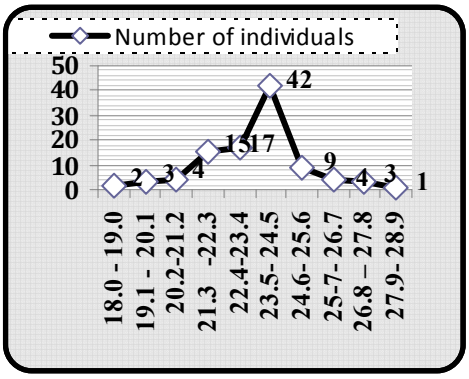

Fig. 2 - Histogram of head's diameter variation (c**m)**

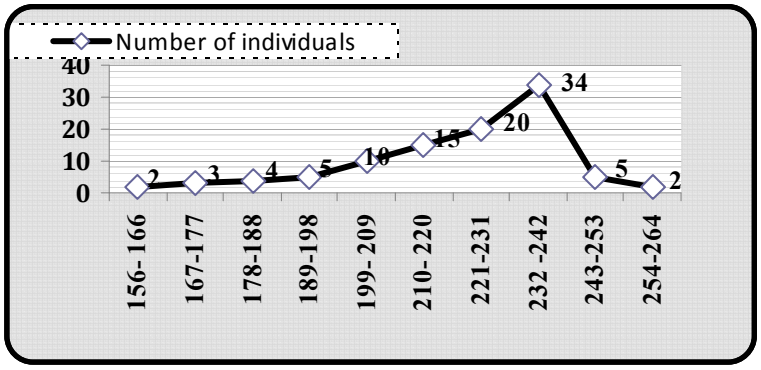

Fig. 3 - Histogram of head's weight variation (g**)**

CONCLUSIONS

"MARILENA" variety was within the normal range of variation. The variability of features like: index shape, head's height, weight of seed / plant, head's weight and head's diameter: low, at index shape, head's height, medium, at head's diameter and head's weight, high, at weight of seed / plant (g).

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REFERENCES

1. **Ambarus S., Brezeanu C, Brezeanu PM, 2010** *Producerea semințelor şi a materialului săditor la speciile legumicole*. Ed. Alma Mater, ISBN 978-606-527-094-7
2. **Brezeanu C., Ambarus S., Brezeanu PM, 2010** - *Resurse genetice legumicole cultivate in Romania* Ed. Alma Mater, ISBN 978-606-527-092-3
3. **Křístková E., Doležalová I., Lebeda A., Vinter V., Novotná A., 2008** - *Description of morphological characters of lettuce (Lactuca sativa L.) genetic resources* Hort. Sci. (Prague), *35*, (3), p. 113–129
4. **Mureşan, T., Pană, N.P., Cseresnyes, Z., 1986** - *Producerea şi controlul calității semințelor agricole*, Bucureşti