

## Variability of some *Allium sativum* L. landraces from Romania cultivated *ex situ*

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**Abstract** The garlic plants are included in the *Liliaceae* family and belong to the *Allium* species, in our country it is grown widely, the edible part of the plants may be the bulb, false strain carrier or the green leaves.(2) In order to offer the plants the possibility to grow and develop in some way, for example to produce bulbs or seeds, there must be provided with a certain sequence of the life conditions, for the entire vegetative period. So, for the plants to react in a usual way, we have to assure the usual sequence of the life conditions which was repeated from one generation to another in the latter part of filogenesis. Therefore we took in the study 16 landraces from three Romanian counties (Timis, Arad and Hunedoara), cultivating them in Timisoara and Cenad. The repeating of the usual sequence of the plants life conditions was done during 4 years, next we did the statistic interpretation of the morphological characters. The data obtained from the landraces studies were analyzed comparing with the data obtained from the studies of the morphological characters of the same landraces from Cenad, which was used as a control variety. If the usual sequence of the life conditions changes in some way and in some point during the plants life - then the usual sequence of the vital possibilities is also changing, the plants will show in a total different way.

### Key words

garlic, landraces, morphological traits

Plant genetic resources are one of the most valuable natural resources (4), providing the genetic diversity necessary for both farmers and breeders to obtain new cultivars either with high yield, or better quality. The most different garlic species can be found in the north India, Afganistan and Central Asia. (5) Generally, garlic (*Allium sativum* L.) is characterized by a vegetative reproduction through adventives bulbs. In classic breeding methods there is still a practice to use garlic seeds. The yield capacity of the cultivated vegetal species can be fully valued only in a whole favorable life conditions, maintained in entire vegetative period (3). In order to offer the garlic plants the possibility to grow and to develop in a specific way, for example for developing bulbs or to produce seeds, there must be assured a specific sequence of the life conditions, not for a short periods of their lifetime, but for the entire vegetative period.(1). Therefore, for the plants to show in a usual way, we have to assure the usual sequence of the life conditions, that one that was repeated from one

generation to another one during the last period of the filogenesis.

### Biological Material

Biological material consisted from 3 autumn garlic landraces (*Allium sativum* L.) collected from Timis, Arad and Hunedoara County and 13 spring landraces. (Table 1).

Vegetative reproduction *ex situ* was established as follows: The garlic culture has been initiated on a sunny field, fertilized with compost and the sowing was done manually in autumn (Timisoara location,) and in Cenad location at a distance of 25 cm between rows and 15 cm inside the row at a 3 cm depth. During vegetation the garlic culture has been removed from weeds and irrigated at need. At the first signs of plant raising, first of November field data collection started and have been registered continuously. For statistical coverage we made use of Statistica7/Windows.

Table 1

**General characteristics of *Allium sativum* L. landraces at *in situ* collection**

No	Collection site	Observations
1	Mărăuș, jud. AR	autumn garlic
2	Șeitin, jud. AR	autumn garlic
3	Căpâlnaș, jud. AR	autumn garlic
4	Sebiș, jud AR	spring garlic
5	Sălăjeni, jud. AR	spring garlic
6	Sebiș, jud AR	spring garlic
7	Sebiș, jud AR	spring garlic
8	Cenad, jud TM	spring garlic
9	Chizătău, jud TM	spring garlic
10	Căpăt, jud. TM	spring garlic
11	Valcani, jud TM	spring garlic
12	Curechiu, jud HD	spring garlic
13	Băcăia, jud.HD	spring garlic
14	Poiana, jud. HD	spring garlic
15	Poienița, jud. HD	spring garlic
16	Oprișești, jud.HD	spring garlic

## Results and Discussions

Regarding the weights of the garlic heads, the Arad landraces shows a significant higher values, followed by the Hunedoara ones, with a emphasized individual variability, and last ones the Timis garlic landraces. The Sebis landraces shows high values:

17,19±3,63g values obtained in Timisoara (table 2), and in the Cenad were obtained average values 16,27±3,30gr(table 2) and high productivity not depending of the cultivation conditions. Also, the Hunedoara and Timis garlic landraces had a constant evolution during all the 4 years.

Table.2

**Biometrics means of characters examined, depending on landraces and location (average 2005-2008)**

No	Landraces	Bulb weight/Timișoara			Bulb weight/Cenad		
		Means	Ab.std.	V%	Means	Ab.std.	V%
1	Mărăuș	12,60	2,65	7,01	10,73	2,20	4,84
2	Căpâlnaș	15,71	3,18	10,13	15,06	2,69	7,22
3	Șeitin	15,02	3,36	11,31	16,48	2,58	6,68
4	Sălăjeni	11,13	2,40	5,74	11,76	1,78	3,16
5	Sebiș 2	15,32	3,54	12,50	15,12	3,15	9,91
6	Sebiș 3	17,19	3,63	13,21	16,27	3,30	10,87
7	Sebiș 1	14,89	4,38	19,18	15,93	3,10	9,61
8	Curechiu	7,06	2,22	4,91	7,77	1,40	1,97
9	Poiana	11,21	4,79	22,94	10,22	1,93	3,72
10	Poienita	8,82	2,02	4,09	8,17	2,07	4,28
11	Oprișești	7,02	1,45	2,10	8,02	1,63	2,65
12	Băcăia	7,02	1,31	1,70	7,61	1,14	1,29
13	Chizătău	6,25	1,28	1,64	5,93	1,08	1,16
14	Căpăt	5,43	1,51	2,27	5,62	1,03	1,07
15	Valcani	7,34	1,56	2,42	5,57	1,15	1,31
16	Cenad C	6,55	1,73	2,98	6,07	1,51	2,27

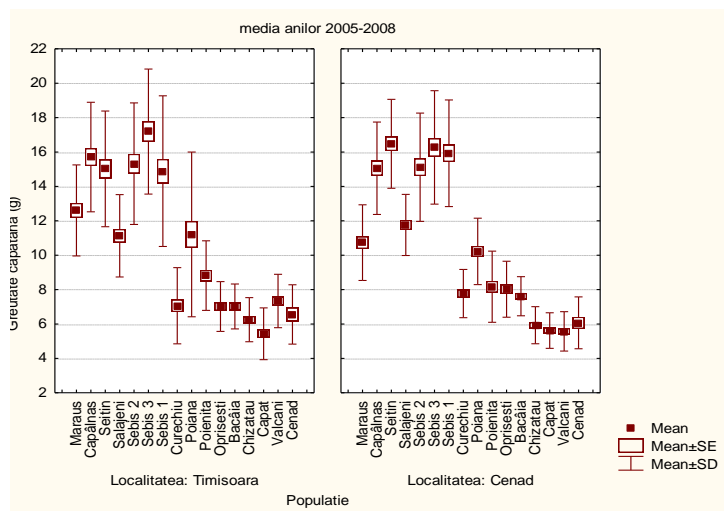


Fig.1 The average of the bulb (g) for four years (2005-2008) of cultivation, represented in the two locations (Timișoara and Cenad)

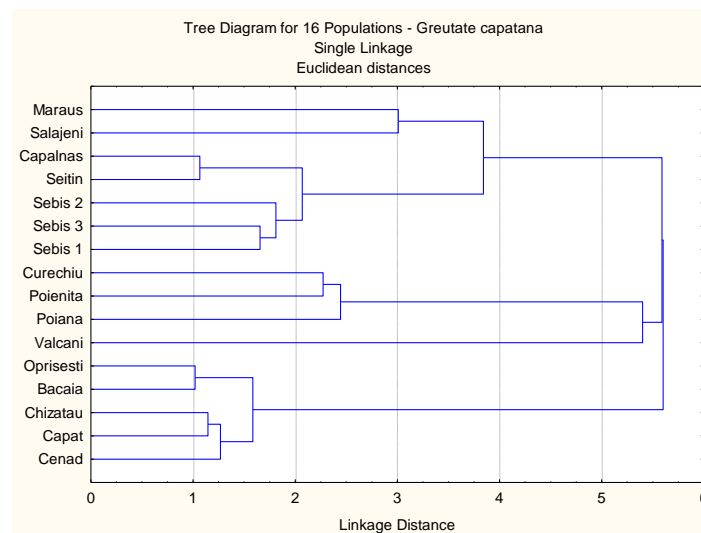


Fig. 2. Dendrogram obtained from the analysis of the bulb weight of the landraces of *Allium sativum* L.

We can observe a clear difference inside of the 16 analyzed landraces, depending of the source areas by counties. On the obtained dendrogram for the head weight character there is a cluster that shows the distances enough short between the garlic landraces, having a tendency of distribution by the geographic area, also the data obtained for the same character shows the same group as the analysis of the weight head average, again for the Arad landraces.

## Conclusions

The garlic landraces evaluated during 4 years in the *ex situ* cultivating conditions, regarding the heads weight, a character valued for market, shows on the Arad landraces, with a clear evidence of the landrace performance for the Sebis 3 garlic landraces. We

consider that for the productivity characters the value of the Arad garlic landraces is indisputable higher and it impose for production value.

## References

1. Ciofu Ruxandra, Nistor S., Popescu V., Pelaghia Chilom, Aphahidean S., Horgoș A., Berar V., Lauer K. F., Atanasiu N., 2003 - *Tratat de legumicultură*, Ed. Ceres, București, pg. 328 – 333;
2. Kamenetsky R., Rabinowitch H.D., 2006 – *The genus Allium: A developmental and horticultural analysis*. Horticultural Reviews, 32:329 – 378;
3. Kik C., R. Kahane & R. Gebhardt 2001 – *Garlic and health. Nutrition Metabolism and Cardiovascular Diseases*, pg.57 – 65;

4. Ramanatha R, Hodgkin T., 2002 - Genetic diversity and conservation and utilization of plant genetic resources. *Plant Cell Tissue Organ Cult.* 68:1-19;

5. Simon P.W., Jenderek M. 2004 – Flowering, seed production and the genesis of garlic breeding. *Plant Breeding Review*, pg. 211 – 244;