# Researches on the Behaviour of Certain Genotypes of *Citrullus lanatus* (Thunb.) Mansf. at the Thermic and Hydric Stress Conditions

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**Abstract**

Seven genotypes of *Citrullus lanatus* ('De Dăbuleni', 'Dulce de Dăbuleni', 'Oltenia', 'Dochița', 'L-276', 'L-170' and 'Georgel'), in three technological variants (V1- irrigated according plant needs for normal growth and development; V2- 50% of standard irrigation; V3- not irrigated), were tested for the resistance to the thermic and hydric stress, at RDIVFG Vidra. Drought tolerance is determined by anatamo – morphological characteristics of the species (strong root system, leaf sections covered with hairs). In order to obtain rich quality productions watermelon must be cultivated in irrigation conditions in all phenological phases of plants (Ciofu *et al*., 2003). The yielding capacity of the *Citrullus lanatus* is influenced by the genotype and the technological conditions (Dumitru *et al*., 1997). The extreme weather conditions of 2012 created the conditions for genotypes' testing towards the thermal and hydric stress. In these conditions, the phenological phases of plants, yielding capacity and fruits' quality (the soluble dry matter content) were influenced by the technological variant, for all seven genotypes of *Citrullus lanatus*.

**Keywords:** *Citrullus lanatus*, genotypes, stress conditions.

## Introduction

Watermelon (*Citrullus lanatus*) is appreciated for its juicy fruit with sweet and refreshing taste, rich in sugars (7-11%). Drought tolerance is determined by anatamo – morphological characteristics of the species (strong root system, leaf sections covered with hairs). In order to obtain rich quality productions watermelon must be cultivated in irrigation conditions in all phenological phases of plants (Ciofu *et al*., 2003). Although it is known as thermophilic species, high temperatures (above $35^0$C) affect plant growth and development. The water quantity consumed by the vegetable plants during the vegetation period is determined first of all by the level of the perspiration coefficient, by the perspiration productivity, by the water balance and by the consumed water utilization coefficient (Voican V. *et al*., 1994). The yielding capacity of the *Citrullus lanatus* is influenced by the genotype and the technological conditions (Dumitru *et al*., 1997).

## Aims

The paper aims at testing the resistance to the thermic and hydric stress, for seven genotypes of *Citrullus lanatus* at RDIVFG Vidra.

## Materials and Methods

For assessing the behaviour of the *Citrulus lanatus* to the abiotic factors, seven genotypes: De Dăbuleni, Dulce de Dăbuleni, Oltenia, Dochița, L-276, L-170 and Georgel. Were studied in three technological variants: V1- irrigated according plant needs for normal growth and development; V2- 50% of standard irrigation; V3- not irrigated. The crop was planted by seedlings on May 11, 2012. For testing the genotypes at thermic and hydric stress the following observations and

determinations were made: occurrence of male and female flowers, occurrence of first fruits, yielding capacity and fruits' quality. The results obtained represent average values and the interpretation of the differences' significance was made following the multiple comparison method-Duncan test (Ciulca, 2002).

## Results and Discussion

The climate conditions of 2012 had a special evolution, the levels of precipitations recorded being very different from the normal levels for the southern part of the country. The big quantity of precipitations recorded in May (174.5 l/ $m^2$), exceeded by far the multi-annual average of this month which is of 81 l/$m^2$. In the same period the temperatures suddenly decreased, being with 8-10 $^0$C lower than the multi-annual average of this month. In June the precipitations were of only 21.5 l/$m^2$, distributed in the first part of the month, while in July there were no precipitations. Regarding the temperature higher and higher values were recorded from one month to another. During June the maximum values of temperature was over 34$^0$C, and during July over 35-38$^0$C at shade and more then 55$^0$C under the sun. Following of high level of precipitation during the May the establishing of seedlings was very high (100%). The low quantity of precipitations from June-July, doubled by excessively high temperatures, enhanced the drought effect, triggering a significant decrease in the production of variants V2 and V3. In these circumstances, the seven *Citrullus lanatus* genotypes were influenced by technological inputs. Concerning the date of appearance of the male flowers there weren't significant differences between the variants under study. For the appearance of the female flowers there weren't significant differences between variants V1 and V2, but between these two variants and variant V3 the differences were significant. The results are show in table 1.

**Tab.1.**The influence of irrigation on the yielding capacity and earliness of watermelon

| Genotype/ technological variant | | Yielding capacity (t/ha) | Signification* | Date of first harvesting |
|---|---|---|---|---|
| De Dăbuleni | $V_1$ | 60.2 | a | August 2 |
| | $V_2$ | 32.3 | b | August 10 |
| | $V_3$ | 10.5 | c | September 1 |
| Dulce de Dăbuleni | $V_1$ | 54.5 | a | August 2 |
| | $V_2$ | 31.5 | b | August 10 |
| | $V_3$ | 12.0 | c | September 1 |
| Oltenia | $V_1$ | 49.6 | a | July 30 |
| | $V_2$ | 29.5 | b | August 7 |
| | $V_3$ | 10.5 | c | August 25 |
| Dochița | $V_1$ | 51.0 | a | July 15 |
| | $V_2$ | 30.1 | b | July 25 |
| | $V_3$ | 11.5 | c | August 17 |
| L-276 | $V_1$ | 53.4 | a | July 15 |
| | $V_2$ | 30.5 | b | July 25 |
| | $V_3$ | 12.5 | c | August 17 |
| L-170 | $V_1$ | 48.1 | a | July 18 |
| | $V_2$ | 23.2 | b | July 26 |
| | $V_3$ | 9.3 | c | August 18 |
| Georgel | $V_1$ | 55.4 | a | July 20 |
| | $V_2$ | 33.4 | b | July 26 |
| | $V_3$ | 11.5 | c | August |

The content of soluble dry matter of the fruits was also influenced by the technological variant, for all genotypes, being of 11% at variant V1, of 9.7% at variant V2 and 6.3% at variant V3 of De Dăbuleni genotype.

## Conclusion

The extreme weather conditions of 2012 created the conditions for genotypes' testing towards the thermal and hydric stress. In these conditions, the phenological phases of plants, yielding capacity and fruits' quality (the soluble dry matter content) were influenced by the technological variant, for all seven genotypes of *Citrullus lanatus*.

## REFERENCES

1. Ciofu R, Stan N, Popescu V, Pelaghia Chilom, Apahidean S, Horgoș A, Berar V. Lauer KF, Atanasiu N (2003). Vegetable treaty. Editura Ceres. București.
2. Ciulca S (2002). Experimental tehnique. Editura Mirton. Timișoara.
3. Dumitru M, Diaconescu C (1994). Comparative study of domestic and foreign sources to develop a modern program of improvement watermelon (Citrullus lanatus (Thunb.) onsf.), Analele ICLF Vidra, Vol. XIV, 147-156.
4. 4.Voican,V, Scurtu I, Mirghiș R, Buzescu D (1994). Peculiarities state of drought and its consequences of growing vegetables. Analele ICDLF vol. XIII.