COMPARATIVE STUDY OF GERMINATION IN AN ASSORTMENT OF *CAMELINA SATIVA* VARIETIES

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Abstract. *The main causes of decrease in agricultural production by up to 70% are determined abiotic stress factors, such as draught and temperature variantions. If these occur during the first phases of vegetaion, they may cause problems in terms of culture springing and uniformity. In the current context of climate change, with a growing number of periods of draught during the sowing phase, studying germination has become not only necessary, but also well appreciated by farmers, especially in plants with small seeds. Camelina is considered to have low requirements regarding soil and climate, as well as a seeding depth of only 1 cm, especially for autumn cultures, however problems may occur with the seeds" germination and even springing. This study covers the results obtained in the laboratory research phase on a selection of two varieties (Madalina, created by the Universiry of Agricultural Sciences and Veterinary Sciences of Bucharest and Calena, with Austrian origins) and a local population by BUASVM Timisoara regarding germinative energy and capacity. The results have shown higher germination energy and capacity in the Madalina and Calena varieties, compared to the local population. Another important aspect is that of the considerable differences between results obtained in optimal conditions, in the laboratory, and those obtained in the field, in much lower temperatures.*

Key words*: germination, abiotic stress c, Camelina sativa (L.) Crantz ,*

INTRODUCTION

In spite of its Central Asian and Mediterranean origins, camelina is consideredundemanding in terms of climate conditions due ot ist frost resistance (KIRALY ET AL, 2014). Another advantage of this plant is its relatively short vegetation period (90-120 days), which allows it to easily fit within crop rotations Bonjean A., LE GOFFIC F. 1999); DOBRE ET AL., 2011). The autumn twinning must take place before the first frost (end of October through early November) and the soli must be well prepared – this mught be problematic in droughty autumns in terms of emergence, as the optimal sowing depth is 1 cm (IVANOIU ET AL, 2014). For autumn camelina cultures, an optimal sowing time frame allows uniform growth and a relatively quick development of the plant before winter (6-8 leaves). This stage of development allows the plants to survive the frosty weeks throughout winter.

MATERIALS AND METHODS

The biological materials used in our research are the Madalina variety (belonging to the UASVM Bucharest), the Calena variety (from Austria) and the local variety (UASVM Timisoara). The research took place in the "Seed quality control" laboratory of the Faculty of Agriculture. Filter paper was used as a germinative layer, which was moistened with the cotton wicks from the "RUMED" germinator.

Thermal stability was ensured with the help of the machine's thermoregulator. The experimental variants are:

V1 – control – temperature 20ºC (because the temperature is 20ºC-30ºC for all the species listed under "Technical conditions for the determination of germination" in specialized literature)

V2 – temperature 10ºC

V3 – temperature 5ºC

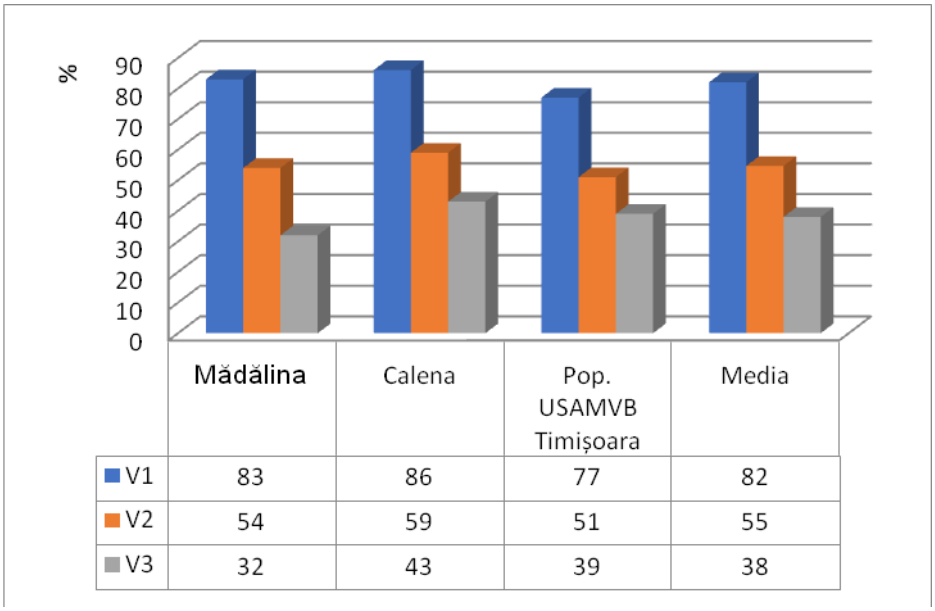
The readings to determine germinative energy were made after 4 days and those to determine germinative faculty after 7 days.

These determinations were made in 4 sets of 100 seeds each and the results were obtained by calculationg the mean value. In the species where the sets did not fit into the intervals imposed by STAS, the germinative faculty was obtained by calculating the mean value of the three remaining sets.

In order to be considered normal germs, all the seeds had to have: a well developed radicula, an intact hypocotyl and plumula, one small green leaf. Also, the seeds with infections caused by contamination from other nearby seeds were also considered normal.

RESULTS AND DISCUSSIONS

Figure 1 shows the germinative energy for each temperature in the two foreign varieties and in our local population.

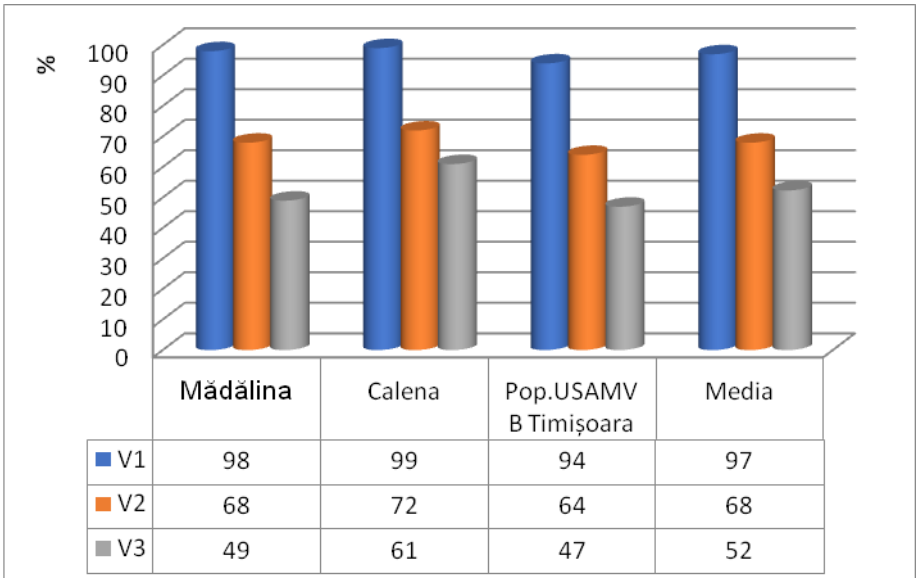


	Mădălina	Calena	Pop. USAMVB Timișoara	Media
V1	83	86	77	82
V2	54	59	51	55
V3	32	43	39	38

Figure.1 Germinative energy values (%) depending on soil and tempearture

The best values for germinative energy were found at 20ºC in the Calena variety (86%), followed by Madalina (83%) and the local variety from Timisoara (82%). In the other experimental temperatures (5ºC, 10ºC) the same order was maintained. However, when comparing the mean values, there was a 44% difference between V1 (20ºC) and V3 (5ºC), respectively 27% between V1 (20ºC) and V3 (10ºC).

Figure 2 shows the germinative faculty for each temperature in the two foreign varieties and in our local population. When analysing the results, one can notice the same trends as for germinative energy. Therefore, the highest values for germinative faculty were obtained in the same varieties as for germinative energy (V1 – 99% for Calena, 98% for Madalina, 97% for the local variety). Comparing these values in different temperatures, the average was 97% for V1 (20ºC), followed by 68% for V2 (10ºC) and a mere 52% for V3 (5ºC), bearing in mind the fact that these measurements were made after 7 days.



	Mădălina	Calena	Pop.USAMV B Timișoara	Media
V1	98	99	94	97
V2	68	72	64	68
V3	49	61	47	52

Figure.2 Germinative faculty values (%) depending on soil and tempearture

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CONCLUSIONS

Considering the significant differences for germinative energy and germinative faculty, it is recommended that farmers pay close attention to optimal sowing intervals, depending on the temperatures each year. Delayed sowing increases the risk of having fewer emerged plants. Should there, for any reason, occur a delay in sowing, it is recommended to use a higher quantity and a higher density of seeds, in order to avoid a crop with low density.

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