

## STUDY OF GERMINATION INDICATIVES OF *CALENDULA OFFICINALIS* L. SEEDS

Cristina ZEPA-CORADINI<sup>1</sup>, Vasile TABĂRĂ<sup>1</sup>, Irina PETRESCU<sup>1</sup>,  
Camelia GIUCHICI<sup>2</sup>, Lavinia MICU<sup>1</sup>

E-mail: cristina.coradini@yahoo.com

### Abstract

To identify MMB and germinal capacity, were study 15 local populations of *Calendula* from different localities of Caras-Severin district.

Results obtained through viability testing and monitoring seeds to *Calendula* species allowed to identify some germination indicatives of biologic material.

Taking in view the fact that germination tests of spontaneous flora were very complexe, it was considered that a part of seeds couldn't be, however, taken from germinal break.

From the investigations made in Sacu, Tincova, Prisaca, Jupa, Caransebes, Iaz, Obreja, Glimboca, Otelu Rosu, Zavoi, Valea Bistrei, Voislova, Vama Marga, Bautar, Bucova localities on *Calendula* seeds it was determined MMB and bordered in limits admitted by specialists.

Laboratory germination, reported to germinal seeds number, had significantly varied among localities and had the limits between 3.3- 90.0%.

In case of germinal energy value the collected samples from Caras-Severin district reported to seed category varied between 3.3- 86.6% for small and medium seeds, respectively 6.6-90.0% for seeds of big category.

**Key words:** *Calendula officinalis* L., heterocarpy, MMB, germinal capacity

Medical plants of our country represented a great natural abundance and an important factor that could contribute to the restructuring of rural space.

Original from Mediterranean regions and western of Asia, *Calendula officinalis* L. species bore just about in all Europe as medical and ornamental plant. In Romania it was cultivated in all the agricultural regions.

Marigolds contained mineral substances 10%, volatil oil 0.2%, triterpenical soponoside, glicuronic acid, glucose and galactose; the extracts from those flowers had anti-viral properties and anti-inflammatory.

Marigolds were usually cultivated from seeds, very adaptable to the weather conditions.

*Calendula* seeds possessed some distinctly particularities concerning germination.

Germination indicators were the energy and germinal faculty.

Germinal energy showed the germination rapidity and uniformity, and the germinal faculty had been influenced by the way of feeding and attendance of mother-plant, by the forming conditions of seeds, its age, the seeds blanket.

Investigations concerning in that domain were made by: Posso P., (1996); Musteață, G., Brânzilă I., Vornicu Z., (1997); Nakagawa J., (1999); Ming L.C., Dias M.C., Ventrella M.C., (1999); Musteață G., Brânzilă I., (2002), Brânzilă I., (2002); Vârban D.I., Vârban Rodica, Albert I., (2005); Froment M., Mastebroek D., Van Gorp K., (2006); Brânzilă I., (2007); Muntean L.S., Tămaș M., Muntean S., Muntean L., Duda M.M., Vârban D.I., Florian S., (2007).

### MATERIAL AND METHOD

Investigations concerning the energy establishment and germinal faculty of *Calendula* seeds were made to Territorial Inspectorate for Seeds Quality and Seed Material of Timis district.

In quality of biologic material was used marigolds' seed collected from Sacu, Tincova, Prisaca, Jupa, Caransebes, Iaz, Obreja, Glimboca, Otelu-Rosu, Zavoi, Valea Bistrei, Voislova, Vama Marga, Bautar, Bucova.

It was investigated the energy and germinal faculty of big, medium and small seeds. Also, it was calculated MMB to every category of seeds, through balancing KERN-EG.

<sup>1</sup> University of Agricultural Sciences and Veterinary Medicine of Banat Timișoara

<sup>2</sup> Inspectorate for quality seed and planting material Timis, Loc. Timisoara

Concerning the energy determination and germinal faculty was used the method BP (the roll). The seeds were lied among the strips of filter paper rolled (germination bedding), with PH of 6.0-7.5 bedding preliminary with free water of organic and inorganic, after that it were covered with another paper for humidity maintenance and it were introduced in carrier- bags.

Seeds were came to heel during 4 days to a treatment for germination induction such as desuperheating – to a temperature of 10 degree C.

After desuperheating, the carrier-bags with samples were put in BINDER germinator in vertical position to a temperature of 20 degree C-16 h- 30 degree C- 8 h using thermo-recorder for reading and automatically displaying of diagram temperatures.

Marigolds' seed was kept in germination apparatus during 4-12 days with an embryos appreciation intermediate to 7 days.

## RESULTS AND DISCUSSIONS

For investigations made on germinal faculty and energy of *Calendula officinalis* L., the samples to analyze were collected from Caras- Severin district.

Before to be put in germination it was calculated MMB for every category of seed. Thus, to collected samples, to big seeds of MMB was between 15.00-18.00 g, to the medium seeds between 10.00-13.66 g, and to the small seeds was 4.66-8.00 g. (tab. 1).

Table 1

**MMB of *Calendula officinalis* L. seeds – Caraș-Severin district**

No. crt.	Local population (Caraș-Severin district)	Category of seeds		
		Small seeds (g)	Medium seeds (g)	Big seeds (g)
1.	Sacu	6.33	10.66	16.33
2.	Tincova	5.66	10.33	15.66
3.	Prisaca	7.66	12.66	17.00
4.	Jupa	4.66	12.00	17.66
5.	Caransebeș	8.00	13.66	18.00
6.	Iaz	6.00	10.00	15.66
7.	Obreja	6.00	10.33	15.66
8.	Glimboca	7.66	12.66	17.00
9.	Oțelu Roșu	7.33	11.66	17.00
10.	Zăvoi	5.66	11.00	16.33
11.	Valea Bistrei	7.66	12.33	16.33
12.	Voislova	6.66	11.00	15.66
13.	Vama Marga	7.00	10.66	16.00
14.	Băuțar	7.00	11.00	16.66
15.	Bucova	5.33	10.00	15.00

In case of small seeds, the smallest MMB registered in Jupa locality (4.66 g), and the biggest in Caransebes locality (8.00 g).

To the categories of medium and big seed the smallest number of MMB found to samples collected from Bucova locality (10.00 g,

respectively 15.00 g), and the biggest to ones collected from Caransebes locality (13.66 g, respectively 18.00 g).

From table 2 it could observed the variation of germination indicators in laboratory conditions to *Calendula officinalis* L. species.

Table 2

**Germination indicators of *Calendula officinalis* L. seeds collected from Caraș-Severin district**

No. crt.	Local population	Category of seeds					
		Small seeds		Medium seeds		Big seeds	
		Germination indicators					
		(E G %)	(FG%)	(E G %)	(FG%)	(E G %)	(FG%)
1.	Sacu	43.3	46.6	50.0	50.0	53.3	56.6
2.	Tincova	56.6	70.0	56.6	76.6	63.3	80.0
3.	Prisaca	20.0	40.0	23.3	33.3	23.3	46.6
4.	Jupa	46.6	60.0	56.6	76.6	73.3	80.0
5.	Caransebeș	86.6	86.6	86.6	86.6	90.0	96.6
6.	Iaz	20.0	33.3	30.0	40.0	30.0	46.6
7.	Obreja	10.0	20.0	26.6	33.3	26.6	46.6
8.	Glimboca	23.3	46.6	33.3	53.3	40.0	60.0
9.	Oțelu Roșu	6.6	6.6	10.0	36.6	16.6	56.6
10.	Zăvoi	33.3	56.6	46.6	66.6	53.3	76.6
11.	Valea Bistrei	23.3	46.6	30.0	53.3	33.3	53.3
12.	Voislova	30.0	33.3	46.6	53.3	46.6	66.6
13.	Vama Marga	53.3	56.6	53.3	56.6	63.3	80.0
14.	Băuțar	66.6	76.6	70.0	80.0	86.6	86.6
15.	Bucova	3.3	3.3	3.3	3.3	6.6	10.0

The samples collected from Caransebes locality had the highest germinal energy, that means a percentage of 86.6 % both to small seeds and medium seeds, and to the big seeds the germinal energy was of 90.0 %.

Local population with the smallest germinal energy was Bucova, 3.3 % in case of medium and small seeds, and 6.6 % in case of big ones.

The same thing it could observe also to germinal faculty; that was, Caransebes' local population had the highest germinal faculty (96.6%), and the smallest percentage of that had registered to collected samples from Bucova locality (10.00 %).

Germinal energy of laboratory significantly varied between local populations, being between 3.3- 90.0%. (fig. 1.).

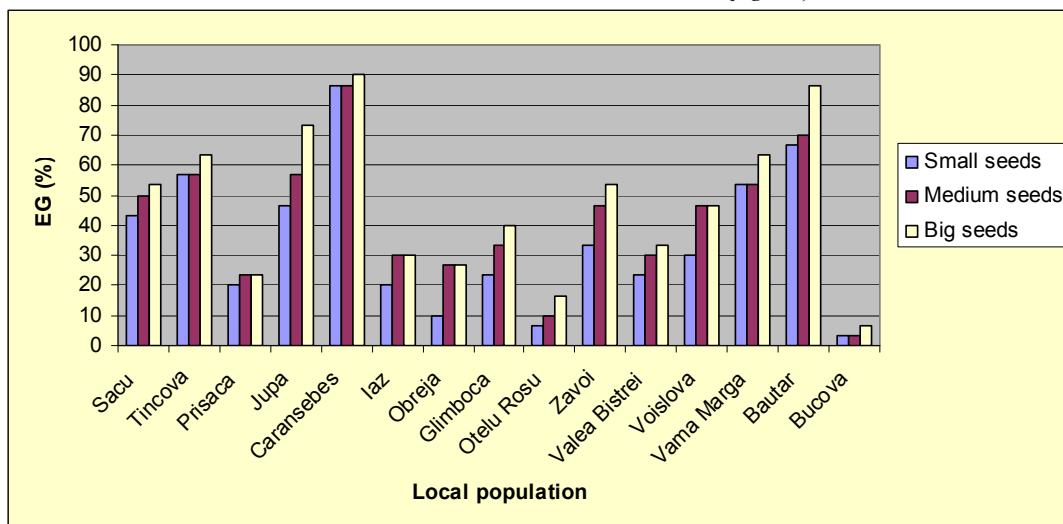


Figure 1 The value of germinal energy-*Calendula officinalis* L.-Caraș-Severin district

During the investigation period the germinal faculty of marigolds was different for every local

population being contained between 10.0-96.6%. (fig. 2).

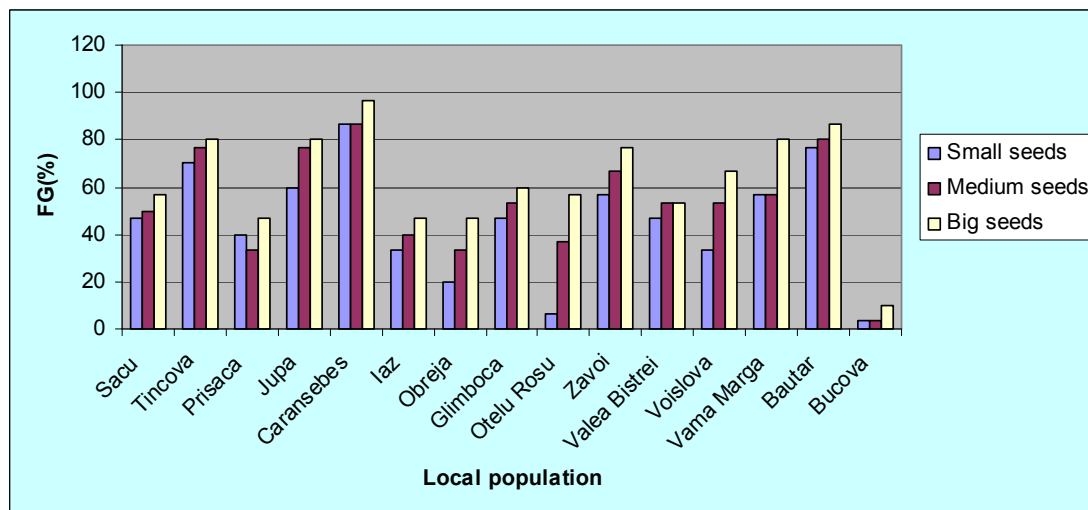


Figure 2 The value of germinal faculty-*Calendula officinalis* L.- Caraș-Severin district

During the investigation period the germinal faculty of marigolds was different for every local population being contained between 10.0-96.6%.

### CONCLUSIONS

After investigations made on MMB it observed to small seeds a weight of those contained between 4.66-8.00 g, to seeds of medium

category 10.00-13.66 g, and the ones of big category had a weight between 15.00-18.00 g.

The biggest MMB registered to all the three categories of seeds collected from Caransebes locality, and the smallest MMB had found to samples that appertained to Bucova' local population.

Germination indicators (energy and germinal faculty of laboratory), the highest to all the three categories of seed taken in study (small,

medium, big) had registered to samples collected from Caransebes locality and the smallest percentage of those determined to seeds collected from Bucova locality.

The seeds of big category had a germinal capacity higher than the ones of medium and small category.

### ACKNOWLEDGEMENTS

This work was published during the project "POSTDOCTORAL SCHOOL OF AGRICULTURE AND VETERINARY MEDICINE", POSDRU /89/ 1.5/ SI/ 62371, co-financed by the European Social Fund through the Sectorial Operational Programme for the Human Resources Development 2007-2013.

### BIBLIOGRAPHY

- Brânzilă, I., 2002** - *The influence of the seed vigorousness on pot marigold (Calendula officinalis L.)*, c. 301-302.
- Brânzilă, I., 2007**- *Capacitatea germinativă de câmp a semințelor de gălbenele (Calendula officinalis L.)*, Mediul ambient, 1(31), 1-2.
- Froment, M., Mastebroek, D., Van Gorp, K., 2006** - *A Growers Manual for Calendula officinalis L.*, <http://www.defra.gov.uk/farm/crops/industrial/research/reports/Calendula%20Manual.pdf>.
- Ming, L.C., Dias, M.C., Ventrella, M.C., 1999** - *Effect of five substrates and three seed types on Calendula officinalis (Asteraceae) germination and seedling development*, ISHS Acta Horticulturae 502: II Wocmap Congress Medicinal and Aromatic Plants, Part 3: Agricultural Production, Post Harvest Techniques, Biotechnology, 502:99-104.
- Muntean, L.S., Tămaș, M., Muntean, S., Muntean, L., Duda, M.M., Vârban, D.I., Florian S., 2007** - *Tratat de plante medicinale cultivate și spontane*, Ed. Risoprint Cluj-Napoca.
- Musteață, G. Brânzilă, I. 2002** - *Plante medicinale pentru sănătatea dumneavoastră.*, Chișinău: TC., 30 p.
- Musteață, G. Brânzilă, I. Vornicu, Z., 1997** - *Gălbenelele -Calendula officinalis L. - sursă de sănătate (descriere, cultivare, folosire).*, Chișinău: SCPAUE., 32 p.
- Nakagawa, J., 1999** - *Testes de vigor baseados no desempenho das plântulas*, In: Krzyzanowski, F.C.; Vieira, R.D.; Franca Neto, J.B. (Ed.) *Vigor de sementes: conceitos e testes*. Londrina: Abrates, p.2-1 - 2-24.
- Posso, P., 1996** - *Plantas aromáticas y medicinales: una alternativa de producción*. Gobernación del Valle del Cauca. Distrito Agropecuario No. 2. Palmira. Colombia. 60.
- Vârban, D.I., Rodica, Vârban, Albert, I., 2005** - *Plante medicinale cultivate și din flora spontană*, Ed. Risoprint.