RESEARCH ON VALUES OF 1000 SEEDS WEIGHT IN SOME MEDICINAL PLANTS

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Abstract: *Research aimed at the evaluation and selection of biological material, genetically valuable for several species of perennial medicinal herbs. Advanced research is being identified as varieties to be studied. The method by which the WSD (Weight of 1000 seeds) is then working is the national seed quality control (INCS). We determined the WTS (Weight of 1000 seeds) to 50 varieties of 38 species from 22 sorts. Counting has been done with an electronic seed counter type Sadkiewicz. The WTS was obtained by multiplying with 10 the arithmetic mean of the 8 repetitions, if the repetition is not a difference of more than 6% of the WTS – if it exceeded 25 g - or 10% if the WTS is less than 25 g. Between species and even varieties there is a great variability regarding the WTS of seeds. So the largest WTS occured in Lupinus pollyphyllus – L. Bacău (242.5 g), and the smallest in the species Digitalis purpurea - Dp–20/06 (1.6 g). In studies Echinacea purpurea dominated with 10 varieties. The average WTS of these was 27.2 g, with an amplitude of ±12.7 g. Some varieties of Echinacea purpurea, the largest MMB occurred in E. purpurea2 Ep 1 (39.9 g) and lowest in E. purpurea U-25 elite 25 (14.4 g). Hyssopus officinalis species in the 3 varieties have a large variation of WSD, between 13.9 and 63.0 g. WSD seed size gives us clues on how to determine the germination (TP, BP and S) and how to determine their depth of sowing. The novelty is high. From our information there has never been such a study in our country. In our research we limited to a few species of which we had biological material. The results had practical implications for promoting varieties with higher potential production and quality. The work of medicinal and aromatic plants is original and very important.*

Key words**:** *Weight of 1000 seeds, perennial medicinal herbs, seed counter, Echinacea purpurea, yssopus officinalis.*

INTRODUCTION

The results presented in this paper are part of the results of research on conventional and unconventional introduction to the culture of certain varieties of perennial species with multiple uses (medicinal, aromatic, ornamental etc.) using methods and techniques to improve programs, biodiversity conservation and multiplication (Fălticeanu and Munteanu, 2006).

The value MTG (Mass of 1000 grains) is important in plant cultivation technology in order to calculate the amount of seeds needed to sow and to determine the biological production and also for the evaluation of seed production per hectare which is also one of the biological factors of plant productivity. Moreover, the MTG is an indication of seed size and represents an element for the variety characterization (Duda et al., 2003).

MATERIAL AND METHODS

In this experiment we made the determination MTG to 50 varieties of 38 species from 22 sorts. The seeds were recieved from the Research-Development Station Bacau in a research project of PN 2 type coordonated by the resort.

Counting has been done with an electronic seed counter type Sadkiewicz (Fig. 1).There were 8 repetitions of 100 seeds that were weighted separately, each repetition with a precision of 2 decimals, as provided by the technique of Seed Testing Laboratories.

The MTG was obtained by multiplying with 10 the arithmetic mean of the 8 repetitions, if the repetition was not a difference of more than 6% of the MTG – if it exceeded 25 g - or 10% if the MTG was less than 25 g.

Figure 1. Issues during the determination of seed MMB

RESULTS AND DISCUSSIONS

Results regarding the determination of seed varieties MTG experimental studies are given in Table 1.

At the 2 species of *Allium schoenoprasum* mass differences were very large: 12,5-2,6 = 9,9 g.

Between the two species of *Agastache* (*A. mexicana* and *A. foeniculum*) there were also major differences of 10,7 g.

For the genus *Chrysanthemum* we studied 2 species (*Chr. leucanthemum* and *Chr. coronarium*). In the first species of seed MTG is close, averaging 9,35 g and the two species have much higher MTG, of 19,1 g.

The MTG average of the 10 species of *Echinacea purpurea* is 27,2 g, with an amplitude of ±12,7 g. Regarding *Echinacea simulata* we've determined the MTG of 2 of its varieties, the result being close to the average of the former species. The *Echinacea pallida* has a MTG of 34,2 g.

Among the *Hyssopus officinalis* species there are 3 varieties with a big MTG variation, between 13,9 g and 63 g.

From the *Nepeta* sort we've obtained the MTG results of 4 species (*N. transcaucazica, N. grandiflora, N.clarkei* and *N. pannonica*). The values are very close at the first 3 species (between 4,1 g and 4,8 g), but it gets almost doubled at the 4th species (7,9 g).

There are 2 varieties at the *Origanum vulgare* species, which differ a lot in the weight of the seeds: 2,9 g and 7,3 g.

Table 1

Determination MTG* for the seed studied (Cluj-N., 11.02.2008)

	Variety	MTG*, g									
		R1	R2	R3	R4	R5	R6	R7	R8	Media	MMB
1.	*Allium schoenoprasum* – L. Bacău	1,24	1,26	1,24	1,25	1,23	1,26	1,27	1,22	1,25	**12,5**
2.	*Achillea millefolium* – Linia R/2006	0,23	0,21	0,24	0,25	0,22	0,26	0,20	0,21	0,22	**2,2**
3.	*Agastache mexicana* – Ag –X/25	0,52	0,51	0,53	0,50	0,52	0,54	0,50	0,53	1,51	**15,1**
4.	*Agastache foeniculum* – Af pop	0,44	0,48	0,43	0,46	0,42	0,43	0,44	0,47	0,44	**4,4**
5.	*Agastache scrophulariaefolia*	0,97	0,95	0,94	0,92	0,90	0,88	0,94	0,92	0,92	**9,2**
6.	*Allium schoenoprasum* –As-1/2006	0,26	0,24	0,27	0,23	0,28	0,22	0,27	0,26	0,26	**2,6**
7.	*Aquilegia vulgaris* – L. Bacău	1,49	1,53	1,32	1,50	1,45	1,37	1,42	1,31	4,34	**43,4**
8.	*Carum carvi*	1,18	1,20	1,17	1,21	1,19	1,17	1,23	1,17	1,42	**14,2**
9.	*Chrysanthemum leucanthemum*	1,21	1,19	1,20	1,23	1,18	1,22	1,24	1,17	1,1	**11,0**
10.	*Chrysanthemum leucanthemum*	0,86	0,89	0,90	0,85	0,87	0,74	0,89	0,91	0,77	**7,7**
11.	*Chrysanthemum coronarium*	1,94	1,88	1,88	1,90	1,95	1,92	1,89	1,94	1,91	**19,1**
12.	*Coriandrum sativum*	7,24	7,20	7,23	7,29	7,25	7,21	7,24	7,22	7,23	**72,3**
13.	*Digitalis purpurea* - Dp–20/06	0,14	0,17	0,18	0,13	0,16	0,19	0,12	0,15	0,16	**1,6**
14.	*Echinacea pallida* – Epa-200/98	3,06	3,05	3,04	3,02	3,05	3,07	3,03	3,05	3,42	**34,2**
15.	*Echinacea simulata* – Es-300/24	2,85	2,84	2,86	2,83	2,87	2,82	2,88	2,85	2,85	**28,5**
16.	*Echinacea simulata* – Es-300/23	2,38	2,36	2,34	2,38	2,35	2,32	2,39	2,37	2,36	**23,6**
17.	*Euphorbia mellifera* – Eu-81/06	4,80	4,50	4,55	4,62	4,56	4,74	4,78	4,61	4,64	**46,4**
18.	*Foeniculum vulgare* – Pop Bacău	3,71	3,83	3,78	3,76	3,77	3,73	3,81	3,70	30,1	**301**
19.	*Hyssopus officinalis* – Hy–pop	1,41	1,47	1,37	1,36	1,35	1,37	1,34	1,47	1,39	**13,9**
20.	*Hyssopus officinalis* - Hy-4/2006	0,20	0,21	0,22	0,19	0,17	0,24	0,25	0,22	0,21	**21,0**
21.	*Hyssopus officinalis* - Hy-3/2006	0,64	0,65	0,60	0,67	0,66	0,62	0,63	0,59	0,63	**63,0**
22.	*Hypericum perforatum* – L. Bacău	0,21	0,19	0,23	0,22	0,24	0,18	0,21	0,23	0,21	**21,0**
23.	*Lavandula angustifolia* Lan-44/07	1,09	1,03	1,10	1,05	1,03	1,07	1,08	1,02	1,05	**10,5**
24.	*Lupinus pollyphyllus* – L. Bacău	24,27	24,29	24,21	24,30	24,23	24,31	24,24	24,22	24,25	**242,5**
25.	*Mellisa officinalis* – Mell–87/2007	1,07	1,07	1,08	1,02	1,06	1,03	1,01	1,05	1,04	**10,4**
26.	*Nepeta transcaucazica*	0,49	0,50	0,48	0,51	0,44	0,49	0,47	0,52	0,48	**4,8**
27.	*Nepeta grandiflora*	0,52	0,53	0,55	0,50	0,51	0,56	0,54	0,55	0,46	**4,6**
28.	*Nepeta clarkei*	0,41	0,43	0,40	0,45	0,44	0,40	0,43	0,38	0,41	**4,1**
29.	*Nepeta pannonica*	0,79	0,78	0,80	0,81	0,77	0,83	0,78	0,80	0,79	**7,9**
30.	*Origanum vulgare* – O-1/4	0,80	0,61	0,79	0,82	0,67	0,74	0,65	0,78	0,73	**7,3**
31.	*Origanum vulgare* - O–212/05	0,27	0,30	0,39	0,25	0,29	0,33	0,30	0,25	0,29	**2,9**
32.	*Pyrethrum cinerariifolium*	0,82	0,83	0,84	0,85	0,78	0,77	0,84	0,83	0,82	**8,2**
33.	*Pyrethrum roseum* – LiniaOl/5	1,54	1,72	1,70	1,65	1,68	1,59	1,62	1,66	1,64	**16,4**
34.	*Pyrethrum roseum* - Pr-Ol/2005	2,20	2,22	2,38	2,30	2,35	2,36	2,30	2,20	2,28	**22,8**
35.	*Rheum rhabarbarum* – Bacău	11,20	11,10	12,01	11,05	11,13	11,15	11,09	11,32	11,25	**112,5**
36.	*Salvia officinalis* – Sof-1/2006	3,73	3,70	3,69	3,62	3,71	3,65	3,75	3,70	3,69	**36,9**
37.	*Salvia officinalis* – Sof-2/2006	8,75	8,74	8,72	8,22	8,70	8,65	8,48	8,71	8,62	**86,2**
38.	*Salvia sclarea* – Ssc-1/2006	3,41	3,43	3,45	3,44	3,40	3,43	3,46	3,44	3,43	**34,3**
39.	*Salvia coccinea* – Sc-28/2007	0,96	0,98	0,97	0,95	0,96	0,99	0,98	0,94	0,96	**9,6**
40.	*Centranthus ruber* – Linie Bacău	1,97	1,95	1,96	1,94	1,98	1,88	1,90	1,95	1,94	**19,4**
41.	*Echinacea purpurea* Ep-P/22	3,60	3,75	3,72	3,68	3,74	3,61	3,65	3,73	3,68	**36,8**
42.	*E purpurea*_2 Ep-1 Elita 1	4,00	3,98	3,99	4,01	3,95	3,98	4,03	4,01	3,99	**39,9**
43.	*E. purpurea* Ep-8 Elita 81	3,32	3,33	3,36	3,30	3,28	3,34	3,33	3,35	3,32	**33,2**
44.	*E. purpurea* Ep-9 Elita 9 Ligulele	3,52	3,55	3,46	3,44	3,57	3,54	3,56	3,49	3,51	**35,1**
45.	*E. purpurea* Ep-10 Elita 10 Talia	3,3	3,1	3,5	3,1	3,4	3,5	3,1	3,3	3,28	**32,8**
46.	*E. purpurea* Ep-18 Elita 18	3,5	3,4	3,9	3,2	3,4	3,6	3,8	3,1	3,48	**34,8**
47.	*E. purpurea* Ep-25 Elita 25	1,45	1,44	1,47	1,42	1,49	1,46	1,45	1,40	1,44	**14,4**
48.	*E. purpurea* Ep-42 Elita 42	1,51	1,49	1,55	1,50	1,48	1,53	1,52	1,54	1,51	**15,1**
49.	*E. purpurea* Ep-14 Elita 14	1,52	1,54	1,50	1,55	1,49	1,55	1,51	1,52	1,52	**15,2**
50.	*E. purpurea* Ep-B/28 Elita B/28	1,47	1,45	1,44	1,47	1,42	1,43	1,48	1,45	1,46	**14,6**

*Note: MTG = Mass of 1000 grains.

At the 3 species from the *Pyrethrum* sort there is also a big variability in the seeds' weight, between 8,2 g and 22,8 g.

From the *Salvia* sort we've studied 4 varieties from 3 species. Only at *Salvia officinalis* we have 2 varieties with a big difference in weight (36,9 g and 86,2 g). *Salvia coccinea's* seeds are smaller, 9,6 g.

CONCLUSIONS

Among the 50 varieties that we've studied, the highest MMB was stated at the *Lupinus pollyphyllus* species – L. Bacău (242,5 g) and the lowest MMB at the *Digitalis purpurea* species - Dp–20/06 (1,6 g).

Among the 10 varieties of *Echinacea purpurea*, the highest MMB was stated at the *E. purpurea* 2 Ep-1 Elita 1 (39,9 g) and the lowest at the *E. purpurea* Ep-25 Elita 25 (14,4 g).

The MMB of the seeds also offers us clues on the method of their germinating determination (TP, BP or S) and on the enstablishment of their sowing depth.

Through the determination of the MMB at the seeds produced at SCDL Bacău, there have been enstablished weight parameters obtained in those agroclimatic conditions. In comparison, at the harvest of the seeds which were produced in Cluj-Napoca we can enstablish the corelations between MMB and the production conditions.

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