

RESULTS OF SEED SIZE ON PLANT SPECIES WITH MULTIPLE USES

Duda M. Marcel^{*}, Fălticeanu Marcela^{**}, Vaida Simona^{*}

^{*}University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, 3-5 Manastur St., 400372 Cluj-Napoca; Romania, e-mail: marcel.duda@gmail.com

^{**}Vegetable Research-Development Station Bacău, 220 Calea Barladului St., 600388 Bacău, RO, falticeanu_marcela@yahoo.com

Abstract

*In the research on conventional and unconventional introduction to the culture of certain varieties of perennial species with multiple uses have led MMB (Mass of 1000 seeds) to 50 varieties of 38 species from 22 sorts. Counting has been done with an electronic seed counter type Sadkiewicz. Between species and even varieties there is a great variability regarding the MMB of seeds. So the largest MMB occurred 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 MMB of these was 27,2 g, with amplitude of $\pm 12,7$ g.*

Key words: varieties, plants with multiple uses, *Echinacea*, Mass of 1000 seeds, counting of seeds.

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.

The value MMB (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 MMB is an indication of seed size and represents an element for the varietal characterization.

MATERIAL AND METHODS

In this experiment we made the determination MMB to 50 varieties of 38 species from 22 sorts. The seeds were received from the Research-Development Station Bacău in a research project of type PN 2 coordinated 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 MMB 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 MMB – if it exceeded 25 g - or 10% if the MMB was less than 25 g.

RESULTS AND DISCUSSION

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

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

Between the two species of *Agastache* (*A. mexicana* and *A. foeniculum*) 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 MMB is close, averaging 9,35 g and the two species have much higher MMB, of 19,1 g.

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

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

From the *Nepeta* sort we've obtained the MMB results of 4 species (*N. transcaucasica*, *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.

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.

Table 1

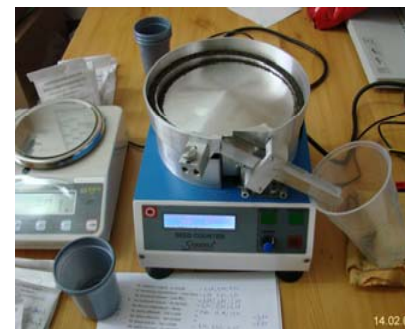
Determination MMB for the seed studied (Cluj-N., 11.02.2008)

Variety	MMB, g									
	R1	R2	R3	R4	R5	R6	R7	R8	Media	MMB
1	2	3	4	5	6	7	8	9	10	11
1. <i>Allium schoenoprasum</i> - Linie Bacău	1,24	1,26	1,24	1,25	1,23	1,26	1,27	1,22	1,25	12,5
2. <i>Achillea millefolium</i> - Linia R/2006	0,23	0,21	0,24	0,25	0,22	0,26	0,20	0,21	0,22	2,2
3. <i>Agastache mexicana</i> - Ag -X/25	0,52	0,51	0,53	0,50	0,52	0,54	0,50	0,53	1,51	15,1
4. <i>Agastache foeniculum</i> - Af pop	0,44	0,48	0,43	0,46	0,42	0,43	0,44	0,47	0,44	4,4
5. <i>Agastache scrophulariaefolia</i>	0,97	0,95	0,94	0,92	0,90	0,88	0,94	0,92	0,92	9,2
6. <i>Allium schoenoprasum</i> -As -1/2006	0,26	0,24	0,27	0,23	0,28	0,22	0,27	0,26	0,26	2,6
7. <i>Aquilegia vulgaris</i> - Linie Bacău	1,49	1,53	1,32	1,50	1,45	1,37	1,42	1,31	4,34	43,4
8. <i>Carum carvi</i>	1,18	1,20	1,17	1,21	1,19	1,17	1,23	1,17	1,42	14,2
9. <i>Chrysanthemum leucanthemum</i>	1,21	1,19	1,20	1,23	1,18	1,22	1,24	1,17	1,1	11,0
10. <i>Chrysanthemum leucanthemum</i>	0,86	0,89	0,90	0,85	0,87	0,74	0,89	0,91	0,77	7,7
11. <i>Chrysanthemum coronarium</i>	1,94	1,88	1,88	1,90	1,95	1,92	1,89	1,94	1,91	19,1
12. <i>Coriandrum sativum</i>	7,24	7,20	7,23	7,29	7,25	7,21	7,24	7,22	7,23	72,3
13. <i>Digitalis purpurea</i> - Dp-20/06	0,14	0,17	0,18	0,13	0,16	0,19	0,12	0,15	0,16	1,6
14. <i>Echinacea pallida</i> - Epa-200/98	3,06	3,05	3,04	3,02	3,05	3,07	3,03	3,05	3,42	34,2
15. <i>Echinacea simulata</i> - Es-300/24	2,85	2,84	2,86	2,83	2,87	2,82	2,88	2,85	2,85	28,5
16. <i>Echinacea simulata</i> - Es-300/23	2,38	2,36	2,34	2,38	2,35	2,32	2,39	2,37	2,36	23,6
17. <i>Euphorbia mellifera</i> - Eu-81/06	4,80	4,50	4,55	4,62	4,56	4,74	4,78	4,61	4,64	46,4
18. <i>Foeniculum vulgare</i> - Pop Bacău	3,71	3,83	3,78	3,76	3,77	3,73	3,81	3,70	30,1	301
19. <i>Hyssopus officinalis</i> - Hy-pop	1,41	1,47	1,37	1,36	1,35	1,37	1,34	1,47	1,39	13,9
20. <i>Hyssopus officinalis</i> - Hy-4/2006	0,20	0,21	0,22	0,19	0,17	0,24	0,25	0,22	0,21	21,0
21. <i>Hyssopus officinalis</i> - Hy-3/2006	0,64	0,65	0,60	0,67	0,66	0,62	0,63	0,59	0,63	63,0
22. <i>Hypericum perforatum</i> - L. Bacău	0,21	0,19	0,23	0,22	0,24	0,18	0,21	0,23	0,21	21,0
23. <i>Lavandula angustifolia</i> Lan-44/07	1,09	1,03	1,10	1,05	1,03	1,07	1,08	1,02	1,05	10,5
24. <i>Lupinus polyphyllus</i> - L. Bacău	24,27	24,29	24,21	24,30	24,23	24,31	24,24	24,22	24,25	242,5
25. <i>Mellisa officinalis</i> - Mell-87/2007	1,07	1,07	1,08	1,02	1,06	1,03	1,01	1,05	1,04	10,4
26. <i>Nepeta transcaucazica</i>	0,49	0,50	0,48	0,51	0,44	0,49	0,47	0,52	0,48	4,8
27. <i>Nepeta grandiflora</i>	0,52	0,53	0,55	0,50	0,51	0,56	0,54	0,55	0,46	4,6
28. <i>Nepeta clarkei</i>	0,41	0,43	0,40	0,45	0,44	0,40	0,43	0,38	0,41	4,1
29. <i>Nepeta pannonica</i>	0,79	0,78	0,80	0,81	0,77	0,83	0,78	0,80	0,79	7,9

1	2	3	4	5	6	7	8	9	10	11
30. <i>Origanum vulgare</i> – O-1/4	0,80	0,61	0,79	0,82	0,67	0,74	0,65	0,78	0,73	7,3
31. <i>Origanum vulgare</i> - O-212/05	0,27	0,30	0,39	0,25	0,29	0,33	0,30	0,25	0,29	2,9
32. <i>Pyrethrum cinerariifolium</i>	0,82	0,83	0,84	0,85	0,78	0,77	0,84	0,83	0,82	8,2
33. <i>Pyrethrum roseum</i> – LiniaOI/5	1,54	1,72	1,70	1,65	1,68	1,59	1,62	1,66	1,64	16,4
34. <i>Pyrethrum roseum</i> - Pr-OI/2005	2,20	2,22	2,38	2,30	2,35	2,36	2,30	2,20	2,28	22,8
35. <i>Rheum rhabarbarum</i> – Bacău	11,20	11,10	12,01	11,05	11,13	11,15	11,09	11,32	11,25	112,5
36. <i>Salvia officinalis</i> – Sof-1/2006	3,73	3,70	3,69	3,62	3,71	3,65	3,75	3,70	3,69	36,9
37. <i>Salvia officinalis</i> – Sof-2/2006	8,75	8,74	8,72	8,22	8,70	8,65	8,48	8,71	8,62	86,2
38. <i>Salvia sclarea</i> – Ssc-1/2006	3,41	3,43	3,45	3,44	3,40	3,43	3,46	3,44	3,43	34,3
39. <i>Salvia coccinea</i> – Sc-28/2007	0,96	0,98	0,97	0,95	0,96	0,99	0,98	0,94	0,96	9,6
40. <i>Centranthus ruber</i> – Linie Bacău	1,97	1,95	1,96	1,94	1,98	1,88	1,90	1,95	1,94	19,4
41. <i>Echinacea purpurea</i> Ep-P/22	3,60	3,75	3,72	3,68	3,74	3,61	3,65	3,73	3,68	36,8
42. <i>E. purpurea</i> 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. <i>E. purpurea</i> Ep-8 Elita 8I	3,32	3,33	3,36	3,30	3,28	3,34	3,33	3,35	3,32	33,2
44. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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. <i>E. purpurea</i> 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



Fig. 1. Issues during the determination of seed MMB



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 establishment of their sowing depth.

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

Acknowledgments

Our research was supported by the Ministry of Education, Research and Innovation, through the PN 2 no. 51-061/2007 grant, coordinated by Dr. Marcela Fălticeanu from Vegetable Research-Development Station Bacău.

REFERENCES

1. Duda M.M., D.I. Vârban, S. Muntean, 2003, Fitotehnie – Îndrumător de lucrări practice. Partea I. Ed. AcademicPres, 236 p., ISBN 973-7950-02-X.
2. Fălticeanu M., N. Munteanu, 2006. Plante utile pentru grădina dumneavoastră. Editura Tipo Moldova, ISBN 973-8900-18-2.