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PECULIARITIES OF GROWING *CALLISTEPHUS CHINENSIS* (L.) NEES. IN THE RIGHT-BANK FOREST-STEPPE OF UKRAINE

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Influence of cultivation methods on the growth, development and seed production of the cultivars Callistephus chinensis (L.) Nees. in Right-Bank Forest-Steppe of Ukraine have been researched. It's found that without seedling way in these conditions can be grown early and middle cultivars, seed sowing late with high quality can be obtained only in the seedling culture.

Keywords: *Callistephus chinensis, technology of growing without seedling, seedling growing, cultivars, Right-Bank Forest-Steppe of Ukraine.*

Statement of the problem. Due to the changing needs and the expansion of consumer demand issues enrichment and renewal of assortment of ornamental plants is always important for floriculture. One of the leading places in the modern ornamental gardening holds annual aster (*Callistephus shinensis*). Due to the large varietal diversity, undemanding to growing conditions this culture is widely used for cultivation on landscape sites. The successful use of *C. chinensis* in gardening requires a significant amount of high quality seeds.

Analysis of recent researches and publications. The year-old asters are grown using the methods of seedlings and without seedlings growing. Seedlings method ensures desired plant density and promotes the maturation of seeds as the duration of the growing season is extended for 40-55 days [1, 3]. However, the growing asters year-old in this way involve certain costs, so important to reduce manual labor and reduce the cost of production of seed shall without seedling growing technology.

The aim of researches – to experience the growing of *C. chinensis*, to determine their effects on plant growth and development, seed varietal characteristics and performance in Right-Bank Forest-Steppe of Ukraine.

Research Methodology. The study was conducted at educational and research areas of ornamental nursery Bilotserkivskyi National Agrarian University in the period 2010-2012. Soils fields where research was conducted are sod-podzolic middle loam.

The reaction of soil solution is acidic, nutrient supply - the average. [4]. The climatic conditions of the region studies are: warm summers with average July temperature is 18-19º C and adequate hydration rate [5]. Soil and climatic conditions are favorable research area for cultivation of these crops.

Technology of without seedling cultivation and planting asters year-old using direct sowing of seeds in the soil worked out in eight cultivars of domestic and foreign selection. Among them - 'Rubin Stars', 'Riyenzi', 'Mother's Gift' – early life flowering, 'Yabluneva' and 'Harsmil' – medium term flowering 'Veresnevaya', 'Marchi', 'Peter' – sort of late flowering period.

For seedlings seeds were sown in the greenhouse shelving at a temperature +16-20° C in the second or third decade of March (15-25). Dive was carried out in the soil warm greenhouses (+14-16° C). Care was in regular loosening, weeding, watering. In the open ground seedlings planted in the second week of May, when the threat of frost passed. Sowing seeds of asters year-old performed in open ground on April 15-20, which enabled to use the stock of soil moisture that accumulated after the winter. In a carefully crafted finished performing soil to a depth of 2-3 cm planting scheme 30 × 20 sm seeding rate of 2 kg / ha. The elite seeds were used for sowing. Before sowing the seeds were prevented by 0.25 % solution of trace elements. Phenological observations of plants was carried out according to guidelines I.M. Beydeman (1974) [2] and "Methods of phenological observations in the Botanical Gardens USSR " (1979) [7]. To study the sowing qualities of seeds followed the rules and methods for determining the quality of seeds according to state standards - GOST 12260-81 [8] and the rules of international seed analysis [6].

Results and discussion. During the seedling method of cultivation the period "stair-flowering" was longer in all the studied varieties than in the form of sowing in the open ground. Under this system of cultivation was observed in terms of reducing the gap between early flowering and late varieties, by increasing the duration of the period "and the beginning of flowering shoots" in the early grades. Yes, this time in the early grades in seedling culture was longer for 23-26 days, and later – 17-19 days (Table 1).

1. Influence of cultivation methods on the length of the "ladder-early flowering" *C. chinensis* (number of days)

Method of cultivation	Sort							
	'Rubin Stars'	'Riyenzi'	'Mother's Gift'	'Yablu-neva'	'Hars-mil'	'Veres-nevaya'	'Marchi'	'Peter'
	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$
Seedlings	125±3	152±5	137±4	128±6	143±2	141±3	127±5	147±5
Without seedlings	102±4	133±7	116±4	104±5	138±3	135±5	101±4	130±6

The results showed that the biometric parameters in seedlings and plants without seedling cultures, on average, were not significantly different (Table 2).

2. Dynamics of morphometric traits varietal *C. chinensis* according to the methods of cultivation

Method of cultivation	Plant		Floscule	
	height, sm	diameter, sm	diameter, sm	number on plant
	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$	$\bar{x} \pm S_{\bar{x}}$
'Rubin Stars'				
Seedlings	61,6± 1,7	22,4±1,0	10,4±0,2	10,1±0,7
Without seedlings	60,1±1,2	20,3±0,9	10,3±0,1	8,7±0,9
'Riyenzi'				
Seedlings	50,4±1,4	43,5±1,7	10,6±0,2	7,1±0,6
Without seedlings	48,2±1,7	40,8±1,2	10,4±0,1	4,2±0,4
'Mother's Gift'				
Seedlings	54,4±1,5	28,2±1,3	11,1±0,2	4,5±0,4
Without seedlings	52,7±1,2	26,7±1,1	11,0±0,1	3,8±0,2
'Yabluneva'				
Seedlings	60,9±1,6	36,8±2,0	11,8±0,1	7,0±0,4
Without seedlings	58,5±1,5	35,3±1,6	11,6±0,2	5,6±0,7
'Harsmil'				
Seedlings	64,1±1,6	38,4±1,2	11,4±0,1	5,5±0,5
Without seedlings	65,1±1,2	37,1±1,5	11,3±0,2	5,1±0,6
'Veresnevaya'				
Seedlings	60,6±1,7	34,5±1,5	8,8±0,1	8,1±0,5
Without seedlings	58,8±1,4	32,1±1,2	8,7±0,2	7,0±0,2
'Marchi'				
Seedlings	60,3±1,8	33,4±0,9	7,6±0,1	7,6±0,5
Without seedlings	60,0±1,7	32,5±1,1	7,6±0,1	4,2±0,3
'Peter'				
Seedlings	47,6±1,4	42,1±1,0	8,4±0,1	7,8±0,6
Without seedlings	45,1±1,2	40,8±1,6	8,1±0,2	5,0±0,4

Depending on weather conditions during the studies varied number of inflorescences per plant in the early grades in without seedling culture. Thus, in 2010-2011, there were more than 2012. Obviously, this can be attributed to favorable growing conditions during the laying of flower buds (first 46-53 days). Rainfall during this period in 2010 dropped 124 mm, in 2011 – 122 mm, and in 2012 – only 67 mm. There were not significant differences in medium cultivars in the number of inflorescences per plant.

Performance Indicators seed cultivars and sowing qualities of early and mid-term flowering on average was higher than seedling method of cultivation (Table 3).

3. Effect of methods of cultivation on crop quality and seed production *C. chinensis*

Method of cultivation	Weight of 1000 seeds, g	Vigor,%	Laboratory germination, %	Seed productivity, g
'Rubin Stars'				
Seedlings	1,74±0,01	75,92±3,41	92,13±2,40	2,63±0,44
Without seedling $HIP_{0,05}$	1,18±0,10 0,14	60,04±1,93 1,25	88,21±2,20 2,82	2,03±0,36 1,59
'Riyenzi'				
Seedlings	1,50±0,12	71,56±2,61	86,53±2,11	1,98±0,30
Without seedling $HIP_{0,05}$	1,08±0,04 0,18	42,10±2,64 2,12	49,21±3,15 2,62	1,19±0,27 1,42
'Mother's Gift'				
Seedlings	1,92±0,11	74,05±3,50	84,81±2,94	1,71±0,32
Without seedling $HIP_{0,05}$	1,13±0,14 0,09	62,51±3,19 4,62	71,3±3,1 4,10	1,20±0,2 1,28
'Yabluneva'				
Seedlings	1,23±0,12	68,44±1,20	83,40±2,61	2,44±0,42
Without seedling $HIP_{0,05}$	0,86±0,14 0,17	59,30±2,82 4,23	70,10±2,70 3,75	1,90±0,36 1,31
'Harsmil'				
Seedlings	1,03±0,14	71,50±1,91	86,40±1,06	3,40±0,53
Without seedling $HIP_{0,05}$	0,74±0,16 0,20	66,11±2,13 2,90	77,0±1,60 3,14	2,95±0,41 0,91
'Veresnevaya'				
Seedlings	0,87±0,09	70,10±2,51	85,81±2,43	2,49±0,31
Without seedling $HIP_{0,05}$	0,64±0,08 0,17	60,81±2,40 3,82	76,80±2,03 2,18	2,12±0,20 0,72
'Marchi'				

Seedlings	1,90±0,12	68,40±1,54	86,70±1,66	2,78±0,51
Without seedling $HIP_{0,05}$	1,27±0,14 0,21	61,45±2,80 2,41	78,50±1,61 2,82	2,46±0,41 0,80
'Peter'				
Seedlings	1,82±0,10	64,44±3,26	72,70±2,70	1,07±0,21
Without seedling $HIP_{0,05}$	0,89±0,04 0,11	49,15±2,51 2,77	51,30±2,31 3,08	0,60±0,18 1,12

However, depending on weather conditions, these rates were not significantly higher than in seedling form. Especially significant difference between the performances of late grades 'Veresnevaya', 'Peter' and varieties sorts Art - 'Mother's Gift' and 'Riyenzi'. Germination of seeds and seed production of these varieties were significantly lower than in the case of seedlings growing through. During without seedling method of growing in late cultivars shoots second order were not formed.

Conclusions. Thus, the study carried out showed that in the Right-Bank Forest-Steppe of Ukraine without seedling method is more effective for growing cultivars *C. chinensis* early flowering and medium terms. Seeds of late varieties with high sowing qualities of these conditions can only be obtained in seedling culture.

Literature:

1. Алексєєва Н. М. Насінництво айстри / Н. М. Алексєєва // Квіти України. – 1999. – № 3. – С. 7.

2. Бейдеман И. Н. Методика изучения фенологии растений растительных сообществ. – Новосибирск : Наука, 1974. – 155 с.

3. Котов В. В. Создание сортов и обоснование технологии безрассадного выращивания семян астры однолетней для Центрально-Черноземной зоны России: автореф. дис. на соискание учен. степени канд. с.-х. наук: спец. 06.01.05 «Селекция и семеноводство» / В. В. Котов. – М., 2003. – 13 с.

4. Крикунов В. Г. Почвы УССР, их плодородие / В. Г. Крикунов, Н. И. Полупан. – К. : Вища школа, 1987. – 320 с.

5. Ліпінський В. М. Клімат України / В. М. Ліпінський, В. А. Дячук, В. М. Бабіченко, З. С. Бондаренко, С. Ф. Рудішина. – К. : Вид-во Раєвського, 2003. – 342 с.

6. Международные правила анализа семян: пер. с англ. – М. : Колос, 1984. – 309 с.

7. Методика фенологических наблюдений в ботанических садах СССР // Бюллетень Главного ботанического сада. – 1979. – Вып. 113. – С. 3–8.

8. Семена однолетних и двулетних цветочных культур. Посевные качества. ГОСТ 12260-81.