

STUDIES REGARDING THE INFLUENCE OF THE PLANTING TIMES IN THE GROWTH AND DEVELOPMENT OF *ALLIUM* 'PURPLE RAIN'

STUDII PRIVIND INFLUENȚA EPOCILOR DE PLANTARE ASUPRA CREȘTERII ȘI DEZVOLTĂRII LA *ALLIUM* 'PURPLE RAIN'

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Abstract. *The study presents some results regarding the influence of different bulbs planting times of the Allium 'Purple Rain' ornamental onion cultivar. The bulbs were planted in three different times: August 2015 (V₁), October 2015 (V₂) and March 2016 (V₃). The plants were studied during the 2016 season. They were evaluated regarding the morpho-decorative characters, like leaves length, flowering stem height, inflorescence diameter and regarding the phenological aspects, like emergence time and flowering period. The aim of this study was to identify the planting time which favors the growth and development suitable for the studied cultivar. Compared with the experiment average, the results from every variant registred statistically ensured differences, for the most of the analysed characters. The most favorable planting times were the autumn and the end of the summer (V₂ and V₁). The spring planting time (V₃) is less recommended, regarding the decrease of the plants ornamental effect and the flowering delay.*

Key words: *Allium 'Purple Rain'*, planting times, ornamental characters

Rezumat. *Lucrarea prezintă rezultate privind influența diferitelor epoci de plantare a bulbilor de la cultivarul de ceapă ornamentală Allium 'Purple Rain'. Bulbii au fost plantați în trei epoci diferite: august 2015 (V₁), octombrie 2015 (V₂) și martie 2016 (V₃). Plantele au fost studiate pe parcursul sezonului de vegetație din anul 2016. Plantele au fost evaluate atât din punct de vedere al unor caractere morfologice ornamentale (lungimea frunzelor, înălțimea tijeii florifere, diametrul înflorescențelor), cât și din punct de vedere fenologic, analizând data pornirii în vegetație și perioada de înflorire. Scopul lucrării a fost acela de a identifica la cultivarul luat în studiu perioada de plantare care favorizează creșterea și dezvoltarea corespunzătoare a plantelor. Comparate cu media experienței, rezultatele obținute la fiecare variantă au înregistrat diferențe asigurate statistic, la majoritatea caracterelor analizate. Cele mai favorabile epoci de plantat s-au evidențiat a fi toamna și la sfârșitul verii (V₂ și V₁). Epoca de primăvară (V₃) se recomandă mai puțin, având în vedere diminuarea efectului ornamental al plantelor și întârzierea înfloririi.*

Cuvinte cheie: *Allium 'Purple Rain'*, epoci de plantare, caractere ornamentale

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INTRODUCTION

Allium is one of the most important crops all over the world. Most for the well known vegetables, and in the last decades also for the remarkable ornamental plants, which belongs to this gender. They became very popular worldwide like garden plants, they decorate from spring to autumn, because of the various species and cultivars of this gender. The ornamental *Alliums* are very hardy plants to the pests, diseases and also to the different environmental conditions (Frish and Frisen, 2002; Harding, 2004).

Even if they are so decorative and hardy, Davis (1992), talks about very few fallowers of the ornamental *Alliums*. Thus, it became very important to carry out in the establishment of a cultivation technology, adapted to wide areas, where these plants can be grown.

In Romania there are many wildly growing *Alliums* with ornamental qualities (*A. paniculatum* L., *A. ursinum* L., *A. saxatile* M. Bieb., *A. atrovioleaceum* Boiss), some of them studied and introduced in the ornamental plant culture and in the ornamental plants catalogs of the great markets (Frish, 2015).

Concerning the climatic changes from the last years, many late frosts can affect the early emergent plants, planted from late summer or autumn. So, this study aims to establish the bulbs planting date that can ensure the right growth and development of the plants and how the spring planting can influence the plants.

The planting dates can have very important impact over the growth and development of *Allium* species and cultivars. El-Helaly and Karan (2012), shown that the late autumn or winter planting can have a worse effect over the onion seed yield.

Regarding the flower production, many bulbous plants were tested by Armitage and Laushman, in 1990, to different planting times, for trying to extend the flowering period. The results have shown that the late planting can determine a later flowering period, but the plants will not develop properly.

MATERIAL AND METHOD

The experiment was conducted in the period August 2015 – June 2016, in the field of Floriculture discipline, from the University of Agricultural Sciences and Veterinary Medicine of Iași, Romania.

The material was represented by a cultivar of ornamental onion, *Allium* 'Purple Rain'. This cultivar decorates thru its deep purple, star shaped flowers, grouped in simple spherical umbels. The leaves are wide, grown around the stem base. The stem can grow to about 60-80 cm height. The plants have formed every year new bulbs, which can be separated and replanted. This ornamental onion, flourish between April and June (fig. 1). The *Allium* 'Purple Rain' bulbs were planted in open field, in three different planting times, as **V₁ – August 2015**, **V₂ - October 2015** and **V₃ - March 2016**. The bulbs wich were planted in the spring were kept during the winter in about 15⁰C temperature conditions. The experiment was

organized in randomized blocs design, with three replications. A plot has a surface of 3.00 m² and it was planted with 30 bulbs.

Before planting, the bulbs were disinfected with Kaptan (1%) and Topsin (0.7%) solutions and during the frosty season the plots were mulched with hay and straw.



Fig. 1 *Allium* 'Purple Rain' – general aspect (original photo)

The plants were studied through the biometric measurements and determinations, regarding the main morpho-decorative characters, like leaves length, flower stem height, umbel diameter and regarding the phenological aspects, like the emergence time and flowering period. The experimental data was processed using analysis of variance, which established limits of probability for each planting time, compared with the control (average of experiment for each character). The significance of the differences was assessed by taking into account the LSD test (Săulescu and Săulescu, 1967).

RESULTS AND DISCUSSIONS

The different planting times resulted to have a very important influence over the growing and development of the ornamental onion studied cultivar. The vegetation emergence and blooming period differences, between the variants (planting times), can guide the blooming time setting.

The results obtained by Armitage and Laushman (1990), at *Allium sphaerocephalon* L., show that late planting time can determine a later flowering, with positive effect on scaling flower production, but can have negative influence upon the ornamental characters of the plants. The planting time can influence not only the emergence and the blooming date, but also the morpho-decorative characters of the plants (leaves length, stem height and inflorescence diameter).

The vegetation emergence date was different between the three planting times. The first variant (August planting time) determined the most early vegetation emergence (mid-February) and the earliest blooming period (end of April) (tab. 1). The bulbs planted in October (V_2), registered the vegetation emergence with around 5 days later than the previous planting time (August) and flourished with around 3 days later (tab.1). The bulbs planted in March (V_3) registered the latest vegetation emergence, with 45 days later, than V_1 (August) and with 40 days later than V_2 (October). The same trend was observed regarding the blooming period. The plants from V_3 (March) bloomed with 19 days later than V_1 (August) and with 17 days later than V_2 (October) (tab. 1).

Table 1

The influence of planting time on the emergence and blooming period

Planting time	Emergence date	Number of days from planting to vegetation emergence	Blooming period
V_1 (09 August 2015)	15.02.2016	190 days	28.04-02.06.2016
V_2 (20 October 2015)	20.02.2016	123 days	01.05-04.06.2016
V_3 (20 March 2016)	01.04.2016	12 days	17.05-08.06.2016

Regarding the leaves length, the V_2 (October planting time) got the highest value (49.83 cm long leaves), a very significant positive results reported to the experiment average (control). The V_1 (August planting time) got shorter leaves than V_2 (47 cm), the result being distinctly significant positive (tab. 2).

The V_3 variant (March planting time), had the worst influence on the leaves length of the studied cultivar. The leaves achieved only an average of 25.53 cm length, the result being very significant negative, reported to the control (average of the experiment) (tab. 2).

Table 2

The influence of planting time on the leaves length

Variants	Leaves length (cm)		d (\pm)	Significance of differences
	Absolute value	Relative value (%)		
V_1	47.00	115.3	6.22	**
V_2	49.83	122.2	9.06	***
V_3	25.53	62.5	-15.28	000
Average (control)	40.78	100.0	-	-

LSD 5% = 2.58 cm

LSD 1% = 4.25 cm

LSD 0.1% = 7.95 cm

The next studied character was the flower stem height. This one registered a decreasing trend of the values, from V_2 to V_3 . So, V_1 (August planting time), achieved in average a 49.33 cm long stem, not significant result reported to the control (experiment average), V_2 (October planting time), registered an average of 54.17 cm long stem, the result being positive significant and V_3 (March planting time) got the lowest result, 33.33 cm long stem, a distinctly significant negative result, reported to the experiment average (control) (tab. 3).

Table 3

**The influence of planting time on the
flower stem height**

Variants	Flower stem height (cm)		d (\pm)	Significance of differences
	Absolute value	Relative value (%)		
V_1	49.33	108.2	3.72	ns
V_2	54.17	118.8	8.56	*
V_3	33.33	73.1	-12.28	oo
Average (control)	45.61	100.0	-	-

LSD 5% = 6.26 cm

LSD 1% = 10.36 cm

LSD 0.1% = 19.39 cm

Concerning the inflorescence diameter, the planting time has determined very large differences between the variants. The most valuable results were obtained in case of V_1 (August planting time), an average of 24.33 cm diameter, a distinctly positive significant result, reported to the control (experiment average) (tab. 4).

Table 4

**The influence of planting time on the
inflorescences diameter**

Variants	Inflorescences diameter (cm)		d (\pm)	Significance of differences
	Absolute value	Relative value (%)		
V_1	24.33	111.2	2.44	**
V_2	24.00	109.6	2.11	*
V_3	17.33	79.2	-4.56	ooo
Average (control)	21.89	100.0	-	-

LSD 5% = 1.28 cm

LSD 1% = 2.12 cm

LSD 0.1% = 3.97 cm

The October planting time (V_2), registered a significant value reported to the control (experiment average), but the difference to V_1 (24 cm) was very low. In case of V_3 (March planting time), the registered values were very significant negatives reported to the experiment average, the inflorescences got only 17.33 cm diameter, very low value, than the other two variants.

CONCLUSIONS

1. The growth and development of *Allium* 'Purple Rain' cultivar varied in large limits between the three planting times. Both vegetation emergence and blooming period were earlier in case of V₁ (August planting time) and V₂ (October planting time) and later for the V₃ (March planting time).

3. Regarding the leaves length, V₂ (October planting time) got the highest value (49.83 cm long leaves), V₁ (August planting time) got shorter leaves than V₂, (47 cm) and V₃ variant (March planting time) got only an average of 25.53 cm length leaves.

4. For the flower stem height, V₁ (August planting time) got in average 49.33 cm long stem, V₂ (October planting time) registered 54.17 cm and V₃ (March planting time) got the lowest result, 33.33 cm long stem.

5. The inflorescence diameter was also influenced by the planting time, as, V₁ (August planting time) got an average of 24.33 cm, the October planting time (V₂) registered a 24 cm diameter and V₃ (March planting time) got only 17.33 cm diameter inflorescence.

6. Based on the results obtained in this study, it can be recommended for the cultivar *Allium* 'Purple Rain', in the N-E Romania, to be planted in late summer or autumn, without damages because of the late frosts in the spring. The spring planting can determine the faulty growth and development of the plants, but can extend in the same time the blooming period.

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