



GROWTH AND DEVELOPMENT OF PAEONIA LACTIFLORA IN TASHKENT CONDITION

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Abstract: In this article, the growth and development process, bioecological characteristics and phenological characteristics of *Paeonia lactiflora* two varieties under Tashkent climate and environmental conditions were studied, so as to provide a theoretical reference for the introduction of *Paeonia lactiflora* in Tashkent, Uzbekistan.

Keywords: *Paeonia lactiflora*, virginal stage, juvenile stage, virginyl stage, budding stage, flowering stage, fertilization stage, phenology.

Introduction

The growth and development of *Paeonia lactiflora* in Tashkent was studied during the 2023-2025 year, and phenological observations were conducted throughout its growing season. Phenological periods refer to the response of plant growth, development, activities, and other patterns to changes in biological phases. The phenological period of plants is a comprehensive response of plants to the environment, which can be used to assess the adaptability of plants to the environment. Phenological observations are one of the important bases for evaluating the success of plant introduction [1]. The main climatic factors affecting plant phenological periods include temperature, precipitation, relative humidity, frost and wind, and sunlight [2].

Material and methods

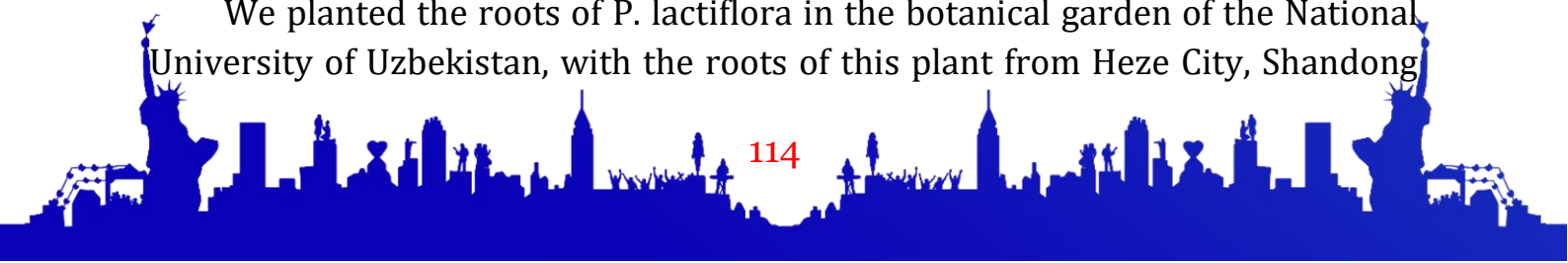
The biomorphological characteristics of plants and the stages of ontogenesis were studied based on the methods of T.A. Rabotnov[3], I.G. Serebryakov[4,5], A.A. Uranov[6,7], L.A. Zhukova[8], and the root system of P.K. Krasilnikov[9].

In studying the seasonal development of plants, the methods of I.V. Borisova [10] and I.N. Beydeman [11] were used.

The methods of A.N. Ponomaryov [12] and Z.G. Bespalova [13] were used in studying the flowering biology of plants and their seasonal dynamics.

Results

We planted the roots of *P. lactiflora* in the botanical garden of the National University of Uzbekistan, with the roots of this plant from Heze City, Shandong





Province, China. *P. lactiflora* was planted in late September 2023, and this plant has been growing in the botanical garden from 2023 to 2024.

Virginal stage (v). In 2023, we planted two varieties of *P. lactiflora* in the botanical garden in autumn, namely "Angel Cheek", "Zi Feng Chao Yang". Throughout the autumn, the plants are in a dormant state.

Until the spring of 2024, in March, *P. lactiflora* begin to sprout. Different varieties have different growth rates. After 14 days in March "Angel Cheek", one bud begins to sprout. After a 5-day interval, two buds sprout. After 15 days in March "Zi Feng Chao Yang", two buds sprouted. After a 3-day interval, four buds sprout. The buds are mostly purplish-red. At this time, the average air temperature is + 9.8-15.3°C, the relative humidity is 62%, the average soil temperature is + 8-12°C, and the soil moisture is 23.9-24.0 %.

In April, *P. lactiflora* "Angel Cheek" has a relatively fast growth rate. After 5 days of germination, one of the buds significantly grew in height, with a stem height of about 16 cm and a stem diameter of about 4 mm. After 3 days, one plant grew significantly taller, with a stem height of about 30 cm. Each plant has a total of 6-8 leaves.

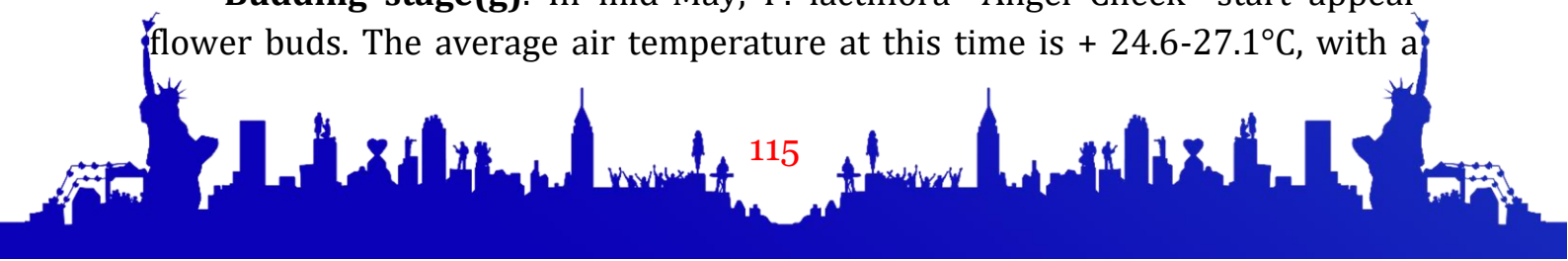
After the four buds of "Zi Feng Chao Yang" sprouted, one of them was significantly taller, with a stem height of about 10 cm and a stem diameter of about 2 mm. After a 7-day interval, all four buds significantly increased in height, and the leaves no longer curled up and began to extend. The stem heights were 26 cm, 15 cm, 13 cm, and 9 cm respectively, and the stem diameter was about 3 mm, 3mm, 2mm. Afterwards, it was measured every two days and the stem grew significantly taller.

In April, the average temperature is + 16.9-22.6°C, air relative humidity is 59%, average soil temperature is + 19-22°C, and soil moisture reaches 21.9-22.0%.

In early May, the growth rate of *P. lactiflora* "Angel Cheek" noticeably accelerated, with stems reaching a height of 36 cm, and the leaves expanded and increased in size, totaling 51 leaves. At this time, the average air temperature is +20.8-27.1°C, the relative humidity of the air is 56%, the average soil temperature is +23-26°C, and the soil moisture is 20.0-21.0%.

P. lactiflora "Zi Feng Chao Yang" stem height is 29,17,16,12 cm, the stem diameter is 4,4,3, and 2 mm, and the branches are 5,3, 3, and 2 respectively. The total number of leaves is 44.

Budding stage(g). In mid-May, *P. lactiflora* "Angel Cheek" start appear flower buds. The average air temperature at this time is + 24.6-27.1°C, with a





relative humidity of 55%, an average soil temperature of + 24-26°C, and a soil moisture content of 20.0-21.0%. The plant height is 36 cm, with 5 branches, the leaves are pinnate with twice-compound leaflets. **The flowering stage** starts in late May, with flowers often borne terminally or in the axils. The flower diameter is about 10 cm, with a pink color, single-petaled, approximately 10 petals, and the edges are slightly wavy. The stamens are numerous and golden yellow in color. The flowering stage can last 7-10 days. The average air temperature during flowering stage is +28.8-30.5°C, relative humidity of the air is 54%, average soil temperature is +23-25°C, and soil moisture is 19.0-20.0%. **The fertilization stage** starts in early June and lasts until mid-August. The fructification is often follicle, oval in shape, splits open when mature, containing spherical seeds that are black and shiny, with a hard seed coat.

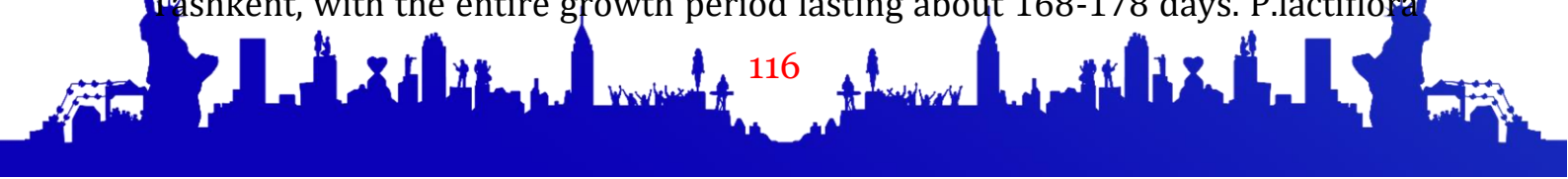
P. lactiflora 'Zi Feng Chao Yang' has a slow growth rate and a weaker adaptability to the environment, with no observed bud or bloom periods under wild conditions.



Figure 1 The morphological appearance of *Paeonia lactiflora* “Angel Cheek” at different stages of growth and development

Conclusion

In summary, by planting two varieties of *P. lactiflora* at the same time in the autumn of 2023, *P. lactiflora* "Angel Cheek" will grow smoothly in all stages of its development in 2024 and will be able to adapt to the wild environment in Tashkent, with the entire growth period lasting about 168-178 days. *P. lactiflora*





"Zi Feng Chao Yang" also sprouted and grew, but it grew slowly and did not bloom. Therefore, it is further confirmed that different varieties of *Paeonia lactiflora* have different adaptability to the environment. Whether these two varieties can fully adapt to the climate of Tashkent and whether the growing period can continue to be extended will need to be further planted and observed in 2025 for further research.

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