

THE PECULIARITIES OF GROWTH, DEVELOPMENT AND CULTIVATION OF *PRINSEPIA SINENSIS* (OLIV.) KOM. UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract: The bioecological peculiarities of growth, development and cultivation of *Prinsepia sinensis* (Oliv.) Kom. have been studied and described. This shrub multiplies generatively and vegetatively – by lignified cuttings and by division. The optimal and most cost-effective method of multiplication was sowing fresh seeds, in early autumn, at a depth of 2-3 cm. The germination capacity of the seeds sown in autumn varied in the research years and was on average 60-70%, and of those sown in spring after stratification – only 40-50% depending on the weather conditions and the techniques applied during the growing season. The researched species is appreciated for its ornamental qualities, particularly in early spring, when it produces numerous bright yellow flowers of unique beauty, and in early autumn – with hanging branches full of dark red fruits.

Key words: *Prinsepia sinensis* (Oliv.) Kom., fruits, growth, development, cultivation.

INTRODUCTION

The practical value of plant introduction is determined by the selection of the most precious taxa, which fit the current requirements, from the native and non-native biodiversity. The potential possibilities of many plant species or cultivars can manifest only if they are introduced and cultivated for a longer time. The implementation of the Global Biodiversity Strategy has a series of priorities, one of them being to enrich and diversify the plant gene pool in green spaces. Green spaces provide a pleasant environment for living and working, provide additional aesthetic value to urban environments, help improve the microclimate, improve air quality by filtering dust and pollutants, produce oxygen, at the same time, they provide recreational opportunities and have a beneficial impact on the physical and mental health of people. One of the plant species that is perfect for being planted in urban green spaces is *Prinsepia sinensis* (Oliv.) Kom., which offers a spectacular view in early spring thanks to its beautiful flowers, in summer – due to its specific foliage and in late autumn – due to the hanging branches full of dark red fruits. Rationally placed in the foreground, it would complement almost any landscape, so, it can be planted next to buildings or in parks, making different types of architectural ensembles more pleasing aesthetically.

Prinsepia sinensis (Oliv.) Kom. is a species in the genus *Prinsepia* Royle, subfamily *Prinsepioideae*, family *Rosaceae* Juss. The genus *Prinsepia* Royle includes three species, occurring in the Far East, China and Himalayan Mountains (Palancean et Comanici 2009). In the “Alexandru Ciubotaru” National Botanical Garden (Institute), two species have been introduced: *Prinsepia sinensis* (Oliv.) Kom – cherry prinsepia and *Prinsepia uniflora* Batal. – hedge prinsepia. *Prinsepia sinensis* is used as an ornamental and honey plant (Gutnicova 1947). Recent research has revealed that *Prinsepia sinensis* has high potential to be cultivated for its edible fruits, which contain high amounts of

vitamin C (92.4 mg %). According to the dry matter content, *Prinsepia sinensis* exceeds 2.5-4 times some varieties of currant, cherry and apple, and according to the content of organic acids, it is at the same level as the cherry, red and black currant cultivated in the Moscow Botanical Garden (Socolova et al. 1990).

Our goal has been to study the bioecological peculiarities of growth, propagation and cultivation of *Prinsepia sinensis* (Oliv.) Kom. under the climatic conditions of the Republic of Moldova.

MATERIAL AND METHODS

The research was done in 2017-2020, in the plant nursery of the Dendrology Laboratory of NBGI, in the framework of the project 20.80009.7007.19 “The introduction and development of technologies for propagation and cultivation of new species of woody plants by conventional techniques and tissue culture”. Mature plants that grew in the collection of the NBGI, from which fruits and cuttings were taken, served as research subjects. The freshly extracted and cleaned seeds were divided into two groups. Some of the seeds were sown in autumn directly in crates, into a mixture of soil, sand and fermented plant waste, by 100 seeds in each variant. The rest of the seeds were stratified and sown in spring, according to the methodology (Iiescu 2002, Palancean 2013). Morphological parameters were determined for 100 fruits and seeds of each group. *Prinsepia sinensis* was also propagated by conventional vegetative methods – by division and by lignified and semi-lignified cuttings (Iiescu 2002, Hromova 1980). The fresh seeds were cleaned and then incorporated into loose soil in late autumn, or – in spring, after being stratified for 90-150 days. The phenological observations were made according to the method elaborated at the Moscow Botanical Garden (Metodica fenologhiceshih nabliudenii v botaniceshih sadah SSSR 1979) and perfected by Dr. hab. A. Palancean (Palancean 2013). The seedlings obtained generatively and vegetatively were planted in containers for hardening.

RESULTS AND DISCUSSIONS

Prinsepia sinensis (Oliv.) Kom – cherry prinsepia – is a shrub native to China. Under the climatic conditions of the Republic of Moldova, it grows up to 2 m tall. The branches are thin, thorny, arched, bent down, forming a globular bush. The leaves are oblong-ovate or lanceolate, acuminate, with entire or slightly crenate edges, petiolate, 5-8 cm long, with subulate stipules. The plants put out leaves at the same time as they bloom, usually between March 10 and April 15. The leaves change colour in September and fall off at the end of September or the first half of October, depending on the weather conditions. The aromatic yellow flowers are 15 mm in diameter and the inflorescences are 1-4-flowered axillary fascicles (Fig. 1). In the flowering stage, bees and other pollinating insects frequently visit the flowers. It blooms regularly from the age of five, but bears fruit starting with the seventh growing season, depending on the weather conditions, in early spring. The fruits are round or ovoid drupes, fleshy, sour in taste, red, with a bright red mesocarp, reaching a maximum diameter of 15-20 mm (Fig. 2, 3a). The seeds are ovoid, 10-12 mm in diameter, with ridged surface and very hard seed coat (Fig. 3b). The fruits ripen from early August to early September.



Fig. 1. *Prinsepia sinensis* in the flowering stage



Fig. 2. *Prinsepia sinensis* in the fruit ripening stage

In the research years, the average weight of 1000 fresh fruits was 1358 g (with a maximum value of 1525 g), and of 1000 seeds – 560-610 g (Figure 5), the share of the mesocarps in the total yield being was 50.1-62.9% (Fig. 6). The length of the peduncle varied between 12 and 17 mm, the average being 14.3 mm. In the research years, the percentage of fructification was 48-65% and it correlated directly with the weather conditions during flowering (Table 1).



a



b

Fig. 3. The shape and size of fruits (a) and seeds (b)

The analysis of biomorphological parameters in *Prinsepia sinensis* fruits allows us to conclude that some features (diameter of fruits, seeds) in the research years varied less, the impact of weather conditions on them was insignificant, but other features (the average weight of fruits, seeds, the share of the mesocarp, the percentage of fructification) were characterized by a greater amplitude of variation and correlated directly with the weather conditions during the period of fruit ontomorphogenesis (Table 1, Fig. 5).

Due to the high content of vitamin C in fruits, *Prinsepia sinensis* is of interest as a fruit-bearing plant and due to the early flowering – as a honey plant. The taste of these fruits indicates that their acidity is almost identical to that of blackcurrant, redcurrant and some cherry varieties.

Table 1

Bio-morphological parameters of the fruits of *Prinsepia sinensis* (Oliv.) Kom.

Research years	Average weight of 1000 fruits / seeds, g		Average diameter, mm		Share, %	
	fruits	seeds	fruits	seeds	of the mesocarp	of fructification
2017	1200	600	12,1	10,0	50,1	48,0
2018	1350	610	13,2	10,5	54,8	50,1
2019	1525	560	13,4	11,2	62,9	64,9
Average	1358	590	12,9	10,6	55,9	54,3



Fig. 4. Three-year old seedling in container culture

The research on the chemical composition of the fruits of this shrub has established that the amount of dry matter in the fruits of cherry prinsepia grown in the Moscow Botanical Garden was 2.5-4 times higher than in the fruits of currants, cherries and apples (Socolova et al. 1990).

Prinsepia sinensis is drought and frost hardy and shade tolerates. It grows best on loose, rich soils with sufficient moisture. Cherry prinsepia is one of the first plants to start the growing season and also finishes it early. Its flowering period is long lasting. It has high potential as an ornamental plant. *Prinsepia sinensis* is recommended for cultivation in pure groups or mixed with other species on lawns, at the edges of groups of other woody plants or in hedges. It is used in all dendrological regions of the Republic of Moldova as an ornamental, honey or fruit plant.

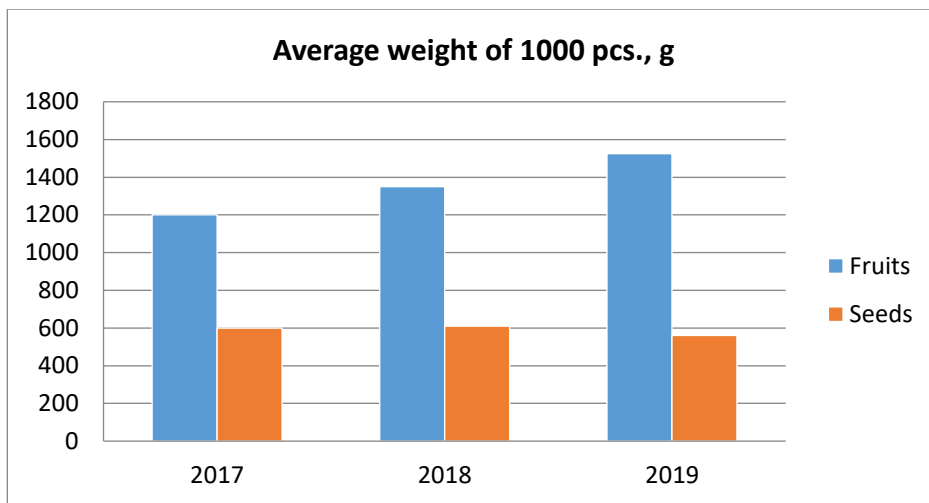


Fig. 5. Average weight of 1000 fruits / seeds, g

Prinsepia sinensis has been propagated by vegetative methods – division, lignified and semi-lignified cuttings (Iliescu 2002, Hromova 1980). The generative methods of propagation applied consisted in incorporating fresh and clean seeds into loose soil in late autumn, or in spring, after being stratified. The germination capacity of the seeds sown in autumn varied in the research years and was on average 60-70%, but of those sown in spring after stratification – only 40-50%, depending on the weather conditions and the techniques applied. The seedlings obtained from sowing in autumn were more vigorous as compared with those obtained from sowing in spring. The height of the plants obtained from cuttings in the first growing season varied between 36 and 50 cm, the average being 45 cm, and of the seedlings obtained generatively – 23-30 cm, the average being 28.5 cm. The seedlings obtained vegetatively are distinguished from generative ones by a more expanded root system. The plants obtained generatively differ from those obtained vegetatively in the length the first order root, which is by 25% longer, but at transplantation, the main root is shortened. Only 20-25% of the semi-lignified cuttings took roots, depending on the weather conditions during rhizogenesis and the observance of technology throughout the growing season. The generative and vegetative seedlings were planted in containers for hardening (Fig. 4).

CONCLUSIONS

Cherry prinsepia is a honey, fruit-bearing and ornamental shrub, with colourful, exquisitely beautiful and fragrant flowers, and abundant flowering and fruiting. The flowering stage under the climatic conditions of the Republic of Moldova lasts 25-30 days, depending on the weather conditions in that period.

The studied shrub is resistant to drought, frost, diseases and pests, does not require special care, except for pruning the damaged branches. It is recommended for cultivation in all dendrological regions of the Republic of Moldova in pure groups or mixed with other species on lawns, at the edges of groups of other woody plants or in hedges.

It can be successfully propagated both by generative and vegetative methods – by semi-lignified cuttings and by division. The optimal and the most effective method is a generative one, with freshly cleaned seeds and sown in autumn, at a depth of 2-3 cm. The germination capacity of the seeds sown in autumn constituted, in the research years, 60-70%, but of those incorporated in spring after stratification – only 40-50%, depending on the weather conditions and the observance of the technology.

In landscaping, cherry prinsepia can be used in pure or mixed groups, preferably in the foreground.

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