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## REPRODUCTION, AGROTECHNICS AND PROTECTION OF *JACARANDA MIMOSIFOLIA* D. DON (*JACARANDA* JUSS.) IN ABSHERON CONDITIONS

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## РАЗМНОЖЕНИЕ, АГРОТЕХНИКА И ОХРАНА *JACARANDA MIMOSIFOLIA* D. DON (*JACARANDA* JUSS.) В УСЛОВИЯХ АПСШЕРОНА

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*Abstract.* In research work have been extensively studied morphological aspects of seedlings on a scientific basis, propagation by seeds and cutting methods on the Absheron Peninsula species of *Jacaranda mimosifolia* belonging to the genus of *Jacaranda* Juss. of the family Bignoniaceae. The research analyzed the sowing period of seeds, soil characteristics, sowing depth, initial germination period, morphological features, agrotechnics, disease and pest control measures. Studies have shown that *Jacaranda mimosifolia* has the ability to adapt to open and greenhouse conditions in Absheron — in the autumn began to appear the first seedlings in the first decade of October from the seeds sown in the second decade of September in a greenhouse condition, were obtained 4.6% of seedlings at the end of the growing season. In the spring began to appear the first seedlings in the third decade of April from the seeds sown in the first decade of April, were obtained 5.2% of seedlings at the end of the growing season. In the second decade of May 20–30 cm tall plants were transplanted to open fields. At the end of the growing season the length of the compound leaves of annual plants reached 14×15 cm. Plant height reached 1.2 m in height, 1.2–1.5 mm in diameter, stalks reached 16 cm in length, 0.2 cm in width. There are 20 leafstalks on 1 leaf. Keeping the temperature in the greenhouse at 22–24 °C from April to the second decade of October had a positive effect on plant productivity. As a result of the research, it was found that in Absheron conditions the plant shed their leaves in the greenhouse at a temperature below 14 °C. As a result of the research, it was found that *Jacaranda mimosifolia* has the ability to adapt to open and greenhouse conditions in Absheron, it is profitable to use such an ornamental plant in the construction of parks and gardens, in decoration of offices and interiors.

*Аннотация.* В работе были изучены морфологические аспекты рассады, размножение семенами и способы срезки вида *Jacaranda mimosifolia*, принадлежащего к роду *Jacaranda* Juss. семейства Bignoniaceae на Апшеронском полуострове. В ходе исследования проанализированы сроки посева семян, характеристики почвы, глубина сева, начальный период прорастания, морфологические особенности, агротехнические меры, меры борьбы с болезнями и вредителями. Исследования показали, что *Jacaranda mimosifolia* обладает способностью адаптироваться к открытым и тепличным условиям на Апшероне — осенью начали появляться первые всходы в первой декаде октября из семян, посеянных во второй

декаде сентября в тепличных условиях. В конце вегетации получено 4,6% всходов. Весной стали появляться первые всходы в третьей декаде апреля из семян, посеянных в первой декаде апреля, было получено 5,2% всходов в конце вегетационного периода. Во второй декаде мая растения высотой 20–30 см пересаживали в открытые поля. В конце вегетации длина сложных листьев однолетних растений достигала 14×15 см. Высота растений достигала 1,2 м в высоту, 1,2–1,5 мм в диаметре, стебли достигали 16 см длины, 0,2 см ширины. На 1 листе — 20 черешков. Поддержание температуры в теплице 22–24 °С с апреля по вторую декаду октября положительно сказалось на урожайности растений. В результате исследований было установлено, что в условиях Апшерона растения сбрасывают листья в теплице при температуре ниже 14 °С. В результате исследований было установлено, что *Jacaranda mimosifolia* обладает способностью адаптироваться к открытым и тепличным условиям на Апшероне, такое декоративное растение выгодно использовать при возведении парков и садов, в отделке офисов и интерьеров.

*Keywords:* *Jacaranda mimosifolia*, ornamental plants, vegetation, seeds.

*Ключевые слова:* жакаранда мимозолистная, декоративные растения, вегетация, семена.

#### *Introduction*

Decorative plants are widely used in the reconstruction and landscaping work carried out in our country in recent years. The vast majority of these plants are imported from foreign flora. From these plants are very rare used in landscaping the genus and species of Bignoniaceae family. However, most of the species included in this family have a decorative appearance. For the first time has been conducted research in our country on the reproduction of species of *Jacaranda mimosifolia* belonging to genus of *Jacaranda* Juss. of family of Bignoniaceae.

*Jacaranda mimosifolia* species is widely used in modern landscaping around the world as an exotic plant. Species of *Tecoma* Juss. and *Catalpa* Scopoli genera are found in parks and gardens in our Azerbaijan in cultural conditions. Other genus and species are still not found in landscaping. For this purpose, has been studied on a scientific basis reproduction of *Jacaranda mimosifolia* D. Don species belonging to *Jacaranda* Juss. genus by seeds and cutting methods on the Absheron Peninsula.

#### *Material and methods*

Seeds of *Jacaranda mimosifolia* were brought from Brazil and the Botanical Garden of the Akdeniz University of Antalya of the Republic of Turkey. The research was conducted in the experimental field of the Institute of Dendrology of Azerbaijan NAS. In the morphological analysis of seedlings were used methods of the great Russian scientist I. G. Serebryakova (1952) and I. T. Vasilchenko (1962). Sowing of seeds, morphological features, dynamic development and annual growth of 1-year plants was carried out according by the research methods of A. A. Molchanov and V. V. Smirnov.

#### *Analysis and discussion*

The genus and species belonging to the family *Bignoniaceae* consist of trees, shrubs, lianas and very rarely grasses are widespread mainly in tropical countries. The family includes 850 species of about 100 genera. Species belonging to the genus are mainly distributed in tropical and subtropical countries.

The species is sometimes popularly referred to as the violet tree because of its purple flowers. *Jacaranda mimosifolia* D. Don species — translated from Hindi means “pleasant smell”. The species was first named *Jacaranda mimosifolia* in 1753 in honor of Chambers. *Jacaranda mimosifolia* D. Don is found naturally in coastal areas mainly in Brazil, Bolivia and North America. It is cultivated in Mexico, India, Portugal and Turkey [1].

*Jakaranda mimosifolia* D. Don is a favorite plant of people due to its height, beautiful leaves, purple flowers and decorative features, and in its homeland it is called a “giant tree”. Mexicans welcome the arrival of spring with the flowering of the *Jacaranda* tree. Due to its decorative view *Jacaranda mimosifolia* D. Don species is reminiscent of the arched tunnel created in landscaping as if you have fallen into the world of fairy tales [2].

*Jacaranda mimosifolia* species has 2 delta and Magdalena varieties. In many countries’ species belonging to *Jacaranda* genus are also cultivated as roomplants. It is a plant that loves heat, light and moisture and can withstand  $-7^{\circ}\text{C}$ . It grows well in rich soils.

*Jacaranda mimosifolia* species reaches a height of 20–25 m in the homeland and it has a wide branched umbrella. The body is soft. The smooth branches reach 40–50 cm long and have red umbrella view. Each branch has 32–36 compound leaves, up to 51–55 small, stalkless bright green leaves arranged opposite each other, resembling a fern leaf. The leaves are broad, double-feathered, opposite, up to 40–50 cm long. Leaf laminas reach a length of 1.6–0.6 cm. The young leaves are 2.3–2.5 cm long and lanceolate. About 30 purple clusters of flowers on one branch completely cover the trunk.

The flower clusters of the tree are purple-blue, 3–5 in number hanging, large, broom-like. There are white spots on the edges of the flowers. The flower calyx is small, 5-toothed, curved, with a bell-shaped flower crown. The flowers are 4.5–5.0 cm long, 2.5–3.0 cm wide, have 5 petals, and are slightly hairy at the top. The thin tube of the plant’s flower corona narrows at the base. In its homeland, *Jacaranda mimosifolia* sometimes blooms twice a year: in April–May of spring (more abundant) and in September–October of autumn. It blooms in July–August in the open air in the Antalya region of Turkey. In room conditions it reaches a height of 3 m, but it does not bloom. At the end of flowering fruits appear on the branches [3].

#### Reproduction

The fruits of *Jacaranda mimosifolia* D. Don species are large, round, very firm, woody, two-layered, smooth box, up to 7.5 cm long. One box contains more than 30 seeds, 0.8-1 cm long and 0.5-0.7 cm wide. The wings are semi-transparent, brown. The seeds are brown. It is advisable to use seeds collected in the same year for propagation (Figure 1).



Figure 1. Appearance of seeds of *Jacaranda mimosifolia* D. Don species

Propagation by seeds of *Jacaranda mimosifolia* D. Don After the fruits collected in the current year are dried, the winged seeds are separated from the husk. The collected seeds were soaked in fresh water and kept at room temperature for 24 hours. In greenhouse conditions, seeds were sown in autumn in the second decade of September, in spring in the third decade of April in the soil at a depth of 1.0–1.2 cm, rich in special extracts (Table 1).

Table 1.

REPRODUCTION OF SEEDS OF *JACARANDA MIMOSIFOLIA* D. DON SPECIES  
 IN THE TERRITORY OF THE DENDROLOGICAL PARK

The amount of seeds sown	Date			The period (days) from sowing to the emergence of the first seedlings	Germination, in %
	Sowing	Formation of primary seedlings	Formation of mass seedlings		
<i>In open ground conditions</i>					
100	21.09.19	12. 10.17	24.10.17	21	3,2±0,18
100	24.04.20	15.05.18	26.04.1819		4,3±0,20
<i>In indoor conditions</i>					
50	17.09.19	04.10.17	18.11.17	17	4,6±0,15
50	10.04.20	25.04.18	06.05.18	15	5,2±0,19

The field was on time agro-technical care. To retain moisture in the seeds after sowing the seeds covered with cellophane. Table 1 shows the number of seeds per 1 m<sup>2</sup> and the percentage of germination. When the temperature was 22–24 °C, the seeds began to germinate. Seed germination lasted for 2–3 weeks in both cases (Figure 2).



Figure 2. Appearance of first germinations of *Jacaranda mimosifolia* D. Don species

When the seeds are germinating try to keep the area well lit. From the seeds sown in spring, the germination rate of the plant reached 3.2–3.4% at the end of the vegetation season. From the seeds sown in autumn, the first seedlings began to appear in the second decade of October, the germination rate was 4.3%.

From the seeds sown in the second decade of September in the greenhouse conditions were obtained 4.6% of seedlings at the end of the vegetation, when the first seedlings began to appear in the first decade of October. From the seeds sown in spring in the first decade of April were obtained 5.2% of seedlings at the end of the vegetation and seedlings began to appear in the third decade of April. In the second decade of May 20–30 cm tall plants were transplanted to open fields.

Peat, bird droppings and tree bark were added to the bottom of the newly planted plant for

good plant growth. At the end of the vegetation, the length of the compound leaves of annual plants reached 14×15 cm. Plant height 1.2 m, diameter 1.2–1.5 mm, the stalk reached 16 cm long and 0.2 cm wide. There are 20 leafstalks on 1 leaf (Table 2.).

The leaves are lined up in a row. The small leaf stalks on the branches have 40–50 petals facing each other. It should be noted that in the first year in the second decade of July due to temperature rise, the decrease in relative humidity and lack of nutrients the leaves of some plants grown in the open air may fade and caused burns on the tips of the leaves. To prevent this the plant was given superphosphate Amophos fertilizers and some solutions of Cornevin and heteroauxin.

Table 2.  
MORPHOLOGICAL CHARACTERISTICS OF PLANTS AT THE END OF VEGETATION

The name of the species	Plant height, m	Leaf length, cm	Body diameter, mm	Stalk, cm		The number of stalks on the leaf
				Length	Width	
<i>Jacaranda mimosifolia</i> D. Don	1,2	14×15	1.2–1.5	16	0.2	20

#### *Propagation by method of cuttings*

Tip cuttings have been used in propagation of cuttings of *Jacaranda mimosifolia* species. In the spring the cuttings are taken from half-timbered shoots. These cuttings were kept in heteroauxin solution in the dark for several days. Cuttings are cleaned of lower double leaves before planting when the stem roots appear.

Cuttings are planted in light conditions in a peat-rich soil layer at an angle of 45 degrees with a length of about 20 cm, covered with cellophane.

The study found that cuttings planted in greenhouses grow better on east and west windows. Cuttings planted on the south side of the greenhouse suffered from the scorching sun in the afternoon, planted in the center were not exposed to sunburn because they were exposed to direct sunlight. It should be noted that on such hot summer days the umbrellas of young plants are deformed, they have lost their decorative properties. With the beginning of the second vegetation period in August, the umbrellas of the plants were restored (Figure 3). Maintaining a temperature of 22–24 °C in greenhouse conditions from April to the second decade of October had a positive effect on plant productivity. In the course of the research, it was found out that in Absheron conditions, plants shed their leaves in a greenhouse at a temperature below 14 °C.

Irrigation of *Jacaranda mimosifolia* D. Don species should be from time to time when the topsoil dries. In Absheron conditions, irrigation should be reduced in the period of leaf change, in spring (March–April), autumn (September–October) [4]. It should be noted that in the area where *Jacaranda mimosifolia* is grown in a greenhouse the water should be soft and kept for a day before watering. *Jacaranda mimosifolia* is grown in tropical conditions, so air humidity should be high. When transplanting plants to the open area, it is advisable to give expanded clay and peat to the lower part for better ventilation of the root system. It is better to plant the seedlings in 9–11 cm pots 1–2 months before transplanting. Once the plant is fully recovered in the pot, move it to the selected area.

It is advisable to use spraying method for watering of annual seedlings. *Jacaranda mimosifolia* should be fed periodically and provided with complex mineral fertilizers. Fertilization is stopped in winter and autumn, when the first sprouts of leaves are formed. In the open area, it gradually sheds its leaves in winter and early autumn and re-enters the leafing phase in spring. Cultivation of the species in a well-lit place allows more young leaves to form. The age of the plant

does not affect its beauty. However, in the lower parts of older samples the leaves fall off quickly. In the pruning of the species, it is possible to give different shapes by pruning its beautiful umbrellas and developed shoots of leaf edges. Nevertheless, the plant recovers quickly. For transplanting the plant drainage soil, sand, peat and compost should be prepared in the area. The plant grows well in this area and adapts quickly to this area. Pruning is carried out in the spring.



Figure 3. Appearance of planting-stocks of *Jacaranda mimosifolia* D. Don. species obtained from cuttings (A — in greenhouse conditions; B — in open ground)

*Jacaranda* is characterized as a plant resistant to diseases and pests, but in the conditions of Absheron, the following problems are observed when agro-technical rules are not followed: The sun's rays from the south burn the plant's leaves. The leaves turn yellow due to iron deficiency.

In physiological processes, due to lack of nutrients, the leaves turn yellow and fall off, the roots rot and are exposed to pests.

To prevent the plant from fading, it is necessary to react quickly to any change in appearance. If the leaves are yellowed or twisted, it is necessary to determine the presence of the pest. In this case, the plant should be washed with insecticide, if the leaves fall off during the winter, it is a natural seasonal process. But when there is another time may be caused by sudden changes in temperature or drying of the soil. As a result of the research, it was found that the use of well water and stiff water in the conditions of Absheron causes reduction of the growth dynamics, development of the plant and become thinner in the umbrella.

It is resistant to fungal diseases. *Jacaranda mimosifolia* D. Don species suffer from chlorosis in the leaves as a result of environmental influences, due to high calcium in the soil, lack of moisture, lack of magnesium, sulfur, zinc and iron in the plant. As a result, the leaves turn yellow, and growth is weakening. During this period, the plant should be transplanted to well-lit areas rich in nutrients.

### Results

Studies have shown that *Jacaranda mimosifolia* has the ability to adapt to open and greenhouse conditions in Absheron — in the autumn began to appear the first seedlings in the first decade of October from the seeds sown in the second decade of September in a greenhouse condition, were obtained 4.6% of seedlings at the end of the growing season. In the spring began to appear the first seedlings in the third decade of April from the seeds sown in the first decade of April, were obtained 5.2% of seedlings at the end of the growing season. In the second decade of May 20–30 cm tall plants were transplanted to open fields. At the end of the growing season the

length of the compound leaves of annual plants reached 14×15 cm. Plant height reached 1.2 m in height, 1.2–1.5 mm in diameter, stalks reached 16 cm in length, 0.2 cm in width. There are 20 leafstalks on 1 leaf. Keeping the temperature in the greenhouse at 22–24 °C from April to the second decade of October had a positive effect on plant productivity. As a result of the research, it was found that in Absheron conditions the plant shed their leaves in the greenhouse at a temperature below 14 °C. As a result of the research, it was found that *Jacaranda mimosifolia* has the ability to adapt to open and greenhouse conditions in Absheron, it is profitable to use such an ornamental plant in the construction of parks and gardens, in decoration of offices and interiors. *Jacaranda mimosifolia* characterized although as a disease and pest resistant plant, but in the conditions of Absheron, some problems are observed in the species if the agro-technical rules are not followed: due to the lack of iron, the leaves turn yellow, and the sun's rays from the south burn the leaves of the plant. In physiological processes, due to lack of nutrients, the leaves turn yellow and fall off, the roots rot and are exposed to pests.

#### References:

1. Hills, R. (2020). *Jacaranda mimosifolia*. The IUCN Red List of Threatened Species 2020: e.T32027A68135641. <https://doi.org/10.2305/IUCN.UK.2020-3.RLTS.T32027A68135641.en>
2. Gilman, E. F., & Watson, D. G. (1993). *Jacaranda mimosifolia*. *Fact Sheet ST-317*. Environmental Horticulture Department, Gainesville, University of Florida.
3. Gachet, M. S., & Schühly, W. (2009). *Jacaranda* - an ethnopharmacological and phytochemical review. *Journal of Ethnopharmacology*, 121(1), 14-27. <https://doi.org/10.1016/j.jep.2008.10.015>
4. Mamedov, T. S. (2010). *Derev'ya i kustarniki Apsherona*. Baku.

#### Список литературы:

1. Hills R. *Jacaranda mimosifolia*. The IUCN Red List of Threatened Species 2020: e.T32027A68135641. <https://doi.org/10.2305/IUCN.UK.2020-3.RLTS.T32027A68135641.en>
2. Gilman E. F., Watson D. G. *Jacaranda mimosifolia* // Fact Sheet ST-317. Environmental Horticulture Department. Gainesville: University of Florida, 1993.
3. Gachet M. S., Schühly W. *Jacaranda* - an ethnopharmacological and phytochemical review // *Journal of Ethnopharmacology*. 2009. V. 121. №1. P. 14-27. <https://doi.org/10.1016/j.jep.2008.10.015>
4. Мамедов Т. С. *Деревья и кустарники Апшерона*. Баку, 2010.

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