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Phenology and Application of *Maclura Aurantiaca* Nutt Species in Absheron Conditions

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Abstract: Phenological observations at different phases of vegetation on the species *Maclura aurantiaca* Nutt. introduced in Absheron and cultivated in cultural conditions (beginning of new shoots, budding phase (beginning, end), flowering phase (beginning, mass, end), fruit and maturation), the directions of use of the species were studied. The species *Maclura aurantiaca* Nutt., belonging to the genus *Maclura*, which has a multifaceted economic significance, decorative features and resistance to environmental factors, is widely used in the protection of greenery (laying fences and protective forest strips) in the dry subtropical climate of Absheron. The fruits of mackerel are rich in alkaloids, glucosides, morin, rutin, flavonoids containing quercetin, sugar, pectin, protein, fat, resinous substances, organic acids, vitamin C. Vitamin C was also found in the leaves. In folk medicine, an ointment is prepared from the fruits of the orange macula for therapeutic purposes and is used in the treatment of some diseases (gout, salt diseases, rheumatic pains, ankylosis). The infusion of the fruit as a tea is used in hypertension, and the juice is used in various skin diseases.

Keywords: *Maclura aurantiaca* nutt., Absheron, Fruit, Juice, Phenology, Application

Introduction

In today's world, environmental protection is a pressing issue. Therefore, along with the development of the economy, raising the socio-cultural level of the population, the protection and rehabilitation of nature is always in the focus of the state. In solving such issues, it is important to improve the environment of residential areas and industrial enterprises, to build new recreation areas. In carrying out landscaping works, evergreen and deciduous trees and shrubs are widely used in accordance with local soil and climatic conditions, attracting attention with their decorative and exotic beauty. One of such plants is *Maclura aurantica* Nutt., which has a special place in the flora of Azerbaijan.

Named after the American naturalist Maclure, *Maclura* is known as a monkey apple, monkey bread. On the other hand, according to legend, when Adam wanted to eat this fruit, it remained in his throat, and therefore it was called "Adam's apple". The fruit is sometimes called a poisonous orange because it looks like an orange (Ibadli et al., 2009).

The fruits of mackerel are rich in alkaloids, glucosides, morin, rutin, flavonoids containing quercetin, sugar, pectin, protein, fat, resinous substances, organic acids, vitamin C (Gasimov et al., 2014). Vitamin C was also found in the leaves. In folk medicine, an ointment is prepared from the fruits of the orange macula for therapeutic purposes and is used in the treatment of some diseases (gout, salt diseases, rheumatic pains, ankylosis). The infusion of the fruit as a tea is used in hypertension, and the juice is used in various skin diseases. According to some sources, ointments made from the fruit have a good effect in the treatment of

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malignant tumors. The juice, fruits and seeds of mackerel have a bitter taste. However, in some cases it is used as food (leaves as food for silkworms). It is a long-lived, powerful plant that produces more oxygen. It can be considered a valuable dye plant.

It contains alkaloids, glycosites, sugars, organic acids, resinous substances, etc. is rich. Fruits are rich in vitamin C. It is widely used in folk medicine, orange mackerel has anti-carcinogenic and sclerotic effects, strengthens the immune system, cardiovascular system, relieves fatigue, has a beneficial effect on the liver and spleen. The leaves of these species are used for medicinal purposes. It is considered suitable for collecting and using the leaves when the diameter of the fruits on the tree is 5-6 cm. For treatment, the leaves of the species are collected, washed and chopped and pour water soaked in glass at a temperature of 60°C and keep for about 10-15 days. Then the leaves and water are taken in a ratio of 5: 1. The resulting solution is mixed with water in a ratio of 1: 2 and used. This solution is used for treatment of rheumatism, radiculitis, knee, back, bone, muscle, etc. used in pain. In addition, it is used externally for skin diseases - dermatitis, eczema, skin ulcers and wounds.

In folk medicine, an extract is made from the fruits of *Maclura aurantiaca* Nutt. for therapeutic purposes. To prepare the ore, clean, non-rotten fruits of the plant are collected and dried for 10-15 days in a dark, ventilated room at a temperature of 25-30°C. After drying, it is cut into 1-2 cm thick pieces, collected in a glass jar, 95% alcohol is poured on it, the lid is tightly closed and stored for 8-10 months. The resulting thickened, yellow solution is mixed with water in a ratio of 1: 2. The ore prepared by this method can be used in the treatment of diseases such as hypertension, joint diseases (salinity), fibroids, polyarthritis, mastopathy, gout, vascular occlusion, cerebral hemorrhage, etc.

The main goal is to study the possibility of using the species *Maclura aurantiaca* Nutt., belonging to the genus *Maclura*, which has a multidisciplinary economic significance, decorative features and durability of environmental factors in the protection of greenery in the dry subtropical climate of Absheron. The purpose of the study: to study the phenology and application of the species *Maclura aurantiaca* Nutt..



Figure 1. General view of *Maclura aurantiaca* Nutt

Method

The research was conducted in the experimental field of the Institute of Dendrology on the species Orange mackerel (*Maclura aurantiaca* Nutt.). In our study, the taxonomic composition of the orange mackerel species was referred to A. Engler-Prantl and the APG IV (Angiosperm Phylogeny Group IV) systems adopted in 2016. Phenological observations on the species under study were studied with reference to standard methods used in botanical gardens (Methods of phenological observations in botanical gardens of the USSR, 1979). During the observations, the beginning of the formation of new shoots, the phase of budding (beginning, end), the phase of flowering (beginning, mass, end), the formation and ripening of fruits, the end of vegetation were recorded. The revised scale of Iskandarov (1993) was used to determine the perspective of introduction of the studied species in cultural conditions.

Results and Discussion

Maclura aurantiaca Nutt. is a tree belonging to the genus *Moraceae Gaudich*, growing up to 15-20 m in height. Sometimes it is found in the form of a bush 2-3 m high. It is a dicotyledonous plant. Its population zone is North America, China. The orange mackerel was brought to Azerbaijan from Europe. It is widespread in Absheron and many regions of the republic, especially in the Kur-Araz plain. Its body is dark gray and has shallow cracks. Its umbrella is densely branched, spherical, growing up to 1 m. The leaves are arranged in a spiral on a branch, 5-10 cm long and 3.5 cm wide, the tip is scaly. In most cases, the shape of the leaf is ovate, and sometimes semicircular, scissor-shaped. The leaves are grayish-green on the upper side, covered with small hairs.

Flowering occurs in June-July. The stamens are greenish, in the form of earrings or balloons, and are located in a group of cluster flowers. The flowers also look like mulberry flowers and have a mulberry-like appearance between the leaves. The fruits ripen in October-November, weigh 300-400 grams, are located on the flower axis, golden-yellow, 10-15 cm in diameter, spherical. It is propagated by seeds, rootstocks, cuttings and pollinated by insects and wind.



Figure 2. Appearance of fruits and seeds of *Maclura aurantiaca* nutt. species

Phenological observations were made on the studied species at different phases of vegetation and the obtained indicators are reflected in Table 1.

Table 1. Phases of development of *Maclura aurantiaca* nutt. at different times of vegetation

Species	Budding	Flowering		Seed ripening	Vegetation period	The growth of the plant
		Beginning	Ending			
<i>Maclura aurantiaca</i> Nutt.	10.05.2021	20.05.2021	05.06.2021	25.09.2021	200-220	15-20

Phenological observations of the *Maclura aurantiaca* Nutt. species show that the vegetation period of this species in Absheron conditions lasts 200-220 days. Thus, in the open field, the budding phase lasts in May, the flowering phase lasts from May to June, and the fruit formation phase lasts from June to September. The fruits ripen in late September, after which a period of relative calm in their growth and development begins. It is a very powerful plant that produces oxygen. It is resistant to drought, cold, wind. It grows best in fertile soils. It lives up to 100 years. The fruits and leaves are very decorative in appearance and can be shaped well when pruned. It is used in the construction of fences and protective forest strips.

Conclusion

Maclura aurantiaca Nutt. is a very strong, long-lived plant. The composition of the fruits of this species is very rich, which allows it to be used in medicine for medicinal purposes. When branched, the tree can be shaped well. It is a valuable dye plant. As a result of scientific research, it became clear that the orange mackle type develops normally when provided with agro-technical care in the conditions of Absheron. Therefore, it is expedient to widely use the species *Maclura aurantiaca* Nutt., belonging to the genus *Maclura*, which has important economic diversity, decorative features and resistance to environmental factors, in the protection of greenery (laying fences and protective forest strips) in the dry subtropical climate of Absheron.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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