

**Full Length Research Paper**

# Liquidambar styraciflua L. Physiological-Biological-Chemical Peculiarities of Pollination, Flowering and Fruitfulness

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**Article history**

Received: 25-05-2017

Revised: 05-06-2017

Accepted: 16-06-2017

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**Abstract**

We have already studied the medical decorative tree-plant *Liquidambar styraciflua* L. (Hamamelidaceae) and its physiological-biological-chemical peculiarities of pollination, flowering and fruitfulness/fertilization originated from the North America to Adjara the Black Sea coast consisting introduced flavonoids. As well, the dynamics consisting flavonoids and its development in different phases. The research established the fact that in the moment of opening anther shells, the fertility of pollen grains is 50-60%. The optimal percentage of pollen grain flaring for the artificial nourishment is 1% and 10-15% the mixture of sucrose and agar-agar. The flowering process lasts two weeks and the fruitfulness – 6-7 months. The repining seeds don't need any stratification. The sprouting skill of grains in the moment of scattering out from fruits is about 96%. The length of one-year seed and sapling is 10-12 centimeters and the consistence of flavonoids in new-defoliated leaves is 6,8%. From one-year tree we can get 10kg leaves and the reserve of raw materials is 10tones.

**Key words:** flavonoids, pollen grain, nourishment area, seed.

**Introduction**

In sea-shore Adjara there are introduced 176 medical plants (Атлас1983, Papunidze.2007), in which 15 types consist flavonoids (Bandiukova 1968, 1968, 1969, 1969, 1972, 1973, 1973). Flavonoids are one of the most essential secondary metabolite in a plant cell. They are distinguished from others by pharmacological activity, are used as the elasticity for the blood vessel walls, as well as against the diseases of cancer, urethra organs (Baraboi 1984). One of the most important plants with flavonoids is *Liquidambar styraciflua* L. which is used for greening the streets and parks. The study of its physiological-biological-chemical peculiarities of pollination, flowering and fruitfulness as well as the dynamics of flavonoids is one of the actual problems. *Liquidambar styraciflua* L. is 25-30m in length and leaf-falling tree (Metreveli 2006). In Adjara conditions, it flowers at the beginning of May and the fruit ripens in October-November. The content of flavonoids changes according to the development phases.

**Materials and Methods**

*Study area* was City Park of Batumi sea side Adjara and Batumi Botanical Garden were is introduced plants *Liquidambar styraciflua* L.

**Data collection methods**

The survey was conducted 2014-2016 years. The object of research were the medical plants consisting flavonoids introduced in sea-shore Adjara from which we studied *Liquidambar styraciflua* L. and its physiological-biological-chemical peculiarities of pollination, flowering and fruitfulness, the development of rhythm, pollen grain flaring, productivity according to the flavonoid content dynamics. We made phenological observation by using the Shennikov method (1964). As for the pollen grain animating we studied by using the Trankovsky method (Golubinsky1971), the dynamics of flowering and fruitfulness by the Ponomariov method (1996), the productivity by the Borisov and Shreter methods (1980), flavonoid content by using the Bandiukova and Kataeva methods.

**Results**

In sea-shore Adjara, one of the most essential introduced plant is *Liquidambar styraciflua* L. which is 25-30centimeters tall, a bot monoecious, leaf-falling plant. In Adjara conditions, it flowers at the beginning of May; it ripens in October-November. The fertility of dust pollen is 50-60%. The optimum for the grain flaring on the nourishment area is 1% with the mixture of agar-agar and 10-15% sucrose. The anther drains start developing after the sowing process in 10-12hours. The pollen grain preserves the flaring skill in 3 days. So, for the successful fulfillment of artificial pollination for plant may be used the pollen grains after 3 days of ripening. The plant is characterized by the cross-pollination. The flowering process lasts during 2 weeks and the ripen seeds don't need any stratification. The sprouting skill in the moment of scattering the seeds from the fruit is 96%, after 2 months – 90-94%, after 4 months – 73%, after 8 months – 54% and after 1 year – 50%. The length of one-year seed-sapling is 10-12centimeters.

**Conclusion**

*Liquidambar styraciflua* L is a significant medical decorative tree-plant of 25-30cm in length which contains flavonoids. The leaves are recognized as medical raw materials which, during the flowering process, the content of flavonoids in leaves is 13%, 1%, 12% at the beginning of fruitfulness/fertilization, 8,4% at the beginning of leaf-falling and 6,8% in new fallen leaves. From one 20year-old tree we can get 10kg leaves. The general stock of raw materials in sea-shore Adjara is 10tones. The fertility of plant pollen grain is 50-60%. The optimal quantity of pollen grain flaring in artificial nourishment area is 1% of agar-agar and 10-15% sucrose mixture. The flowering process lasts 2 weeks. The fertilization process lasts 6-7 months. The ripen seeds don't need any stratification. The skill of sprouting grains is 96%. And the length of one-year seed-plants is 10-12cm.

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