

## GLIPTOSTROBUS SIMON METASEQUOYA: HISTORY, CHARACTERISTICS, GROWTH CONDITIONS, AND USE IN LANDSCAPE DESIGN

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### ABSTRACT

This article is dedicated to the "Gliptostrobus-like Metasequoia" (*Metasequoia glyptostroboides*), providing information on its historical significance, biological characteristics, and growth conditions. This plant was accidentally discovered in the mountainous regions of China in 1948, and was considered extinct for the past 40 million years. The article focuses on the geographic distribution, natural habitat, growth conditions, features, flowers, and fruits of the metasequoia. Additionally, the article provides information on its reproductive characteristics, reproduction conditions, root system, and ecological environment requirements. The role of metasequoia in plant habitats and its potential use in landscape design, particularly its adaptability to Uzbekistan's climate, is also discussed. Based on this, the article highlights the ecological role of Gliptostrobus-like Metasequoia and its significance in the environment.

**Keywords:** Gliptostrobus-like Metasequoia, *Metasequoia glyptostroboides*, historical significance, biological characteristics, growth conditions, geographic distribution, natural habitat, conifers, flowers and fruits, reproduction, root system, landscape design, Uzbekistan climate, ecological requirements, nature conservation.

### INTRODUCTION

Gliptostrobus-like Metasequoia (*Metasequoia glyptostroboides*) is one of the most remarkable representatives of the plant world. This plant was thought to have been extinct for many years but was unexpectedly rediscovered in the mountainous regions of China in 1948. Along with this, the plant's biological characteristics and history are of great interest for research. Scientific literature on Metasequoia serves as a valuable resource for naturalists and landscape designers.

### MATERIALS AND RESEARCH METHODS

#### Materials:

##### 1. Collection of plant samples:

- Samples of Metasequoia plants are collected from the Tashkent Botanical Garden or other suitable regions.
- Measurement tools: rulers, diameter gauges.

**2. Climate and ecological conditions:**

- Measuring climate parameters: temperature, humidity, rainfall, soil moisture.
- Soil analysis: composition and pH.

**3. Laboratory analyses:**

- Planting seeds and monitoring their growth.
- Microscopic analysis: studying the root system and growth forms.

**4. Ecological observation:**

- Observing ecological factors (soil, climate, plant interactions).

**5. Experimental plots:**

- Observing plant growth dynamics under different climatic conditions, soil types, and planting methods.

**Research Methods:****1. Experimental method:**

- Seed propagation and vegetative propagation experiments.

**2. Plot study method:**

- Measurements, soil analysis, and observation of climate factors.

**3. Statistical analysis:**

- Analyzing growth indicators based on measurements and performing regression analysis.

**4. Visual observation:**

- Documenting plants and their growth processes through visual means.

**5. Landscape design:**

- Studying the role of Metasequoia in landscape design and its ecological impact.

**6. Modeling and simulation:**

- Simulating growth conditions and modeling responses to soil and climate changes.

**RESEARCH RESULTS**

**History and Geographic Distribution of Gliptostrobus-like Metasequoia.** Gliptostrobus-like Metasequoia is the only plant species belonging to the Metasequoia genus and was widespread in North Eurasia and North America since the Late Cretaceous period. It grew as the main forest of Arctic-Subarctic plants but almost became extinct during the glacial period. Around 40 million years ago, the last genetic changes of this plant occurred, and its distribution rapidly decreased in a short period.

The Metasequoia trees, accidentally discovered by a group of foresters in China in 1948, are among the oldest plants that have been preserved in the evolutionary process. These trees

grow in the mountainous regions of central and southwestern China, in the provinces of Hubei, Sichuan, and Hunan. Thus, Metasequoia is the only plant species that has preserved its natural habitat.

**Growth Conditions and Ecological Requirements.** Metasequoia stands out with its growth conditions. This plant grows in mountainous areas at an elevation of 700-1400 meters above sea level. It requires moist, well-drained soils and prefers areas with stable water conditions. The soil should be sandy or loamy because the plant is resistant to temperature changes and cold climates.

Metasequoia can also grow well in the shade, but it thrives better in open, sunny areas. This plant is cold-resistant, withstanding temperatures as low as  $-30^{\circ}\text{C}$ , though in harsh winters, it may experience slight freezing. Young leaves can be damaged by cold, which is why young Metasequoia trees do not fully exhibit their cold resistance.

**Appearance and Characteristics of Metasequoia.** The appearance of Metasequoia is distinctive and attractive, with features that make the tree easily identifiable in nature.

- **Crown Shape and Height:** Metasequoia can grow up to 40 meters tall, with a trunk diameter reaching up to 3.5 meters. As the tree ages, its conical shape gradually transforms into a spherical shape, enhancing its aesthetic appeal. The crown is wide and tall, making the tree bright and visually striking.
- **Bark:** The bark is dark brown and twisted, forming new layers every year. The bark of young trees is white-brown or yellow-brown, and over time, it turns dark brown.
- **Needles:** The needles are flat and soft, measuring 3-5 cm in length and up to 3 mm in width. The needles are arranged in a spiral form on long shoots and in two rows in a pinnate arrangement on short shoots. In summer, the needles are dark green, while in autumn, they turn dark yellow.
- **Trunk and Buds:** The trunk of young trees is cylindrical and can reach up to 2.5 meters in diameter. Longitudinal lines or scales are found on the lower part of the trunk. The buds are delicate, soft, and colored in light red or white-violet hues.

**Flowers and Fruits.** The flowers and fruits of Metasequoia are unique. The flowers bloom in April-May and vary in color from yellow to pale pink, red, and reddish-brown. Male flowers are small and round, grouped in several pieces at the tip of the terminal shoot.

The fruits are round, drop-shaped, and can reach a length of 4.5 cm. When ripe, they turn light brown. The fruits consist of several wide, scaly, cone-like structures, with the seeds being winged and compressed. The seeds ripen in November-December, and new generations of the plant emerge after that.

**Reproduction and Growth Indicators.** Metasequoia reproduces by seeds. The seeds almost have a 100% germination rate, but only seeds from trees older than 15 years will germinate. The root system is wide and shallow, allowing the plants to anchor well in the soil. In the Tashkent Botanical Garden, the growth results of the Gliptostrobus-like Metasequoia were very positive. Within 6 years, the plants reached a height of 2.2 meters, with a diameter



of 3.5 cm. Over the course of 10 years, these indicators increased to 5.3 meters in height and 9.8 cm in diameter. This, in turn, demonstrates that the plant has adapted well to the climate of Uzbekistan.

**Use in Landscape Design.** Metasequoia is one of the ideal plants used in landscape design. Its height and beauty create a stunning view in gardens, parks, and public spaces. It grows well near streams, ponds, and in open sunny areas, making it visually striking. Gliptostrobus-like Metasequoia also contributes to the conservation of natural environments by being planted in gardens or in nature.

## CONCLUSION

Gliptostrobus-like Metasequoia is an important plant not only biologically but also in landscape design. Its historical significance and ecological characteristics, as well as its age and formation, make it an interesting phenomenon that requires further study. With its beautiful and aromatic appearance, Metasequoia can enrich nature and has high value in ecological and landscape projects.

## REFERENCES

1. Bakhtiyarullaevich, Ubaidullaev Farkhod, and Majidov Abdulaziz Norqobilovich. "Vegetative propagation of black mulberry (*Morus, nigra* L) recommended for landscaping roads and city streets." *Texas Journal of Agriculture and Biological Sciences* 12 (2023): 37-40.
2. Bakhtiyarullaevich, Ubaydullaev Farkhod, Xaitov Farhod Djuraevich, and Ubaydullayev Abbosjon Azimjon Ogli. "TOSHKENT SHAHAR MIRZO ULUG'BEK TUMANIIDAGI DAHALARNI KO'KALAMZORLASHTIRISHDA DARAXTLARNING SANITAR GIGIENIK VA XUSUSIYATLARI." *Conferencea* (2023): 149-153.
3. Ubaidullaev, F. B., A. N. Majidov, and S. K. Khudaybergenov. "AGROTECHNICS OF CULTIVATION AND USE OF MULBERRY SEEDLINGS FOR PICTURESQUE LANDSCAPING OF HIGHWAYS." *GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ) ISSN (E):* 363-370.
4. Bakhtiyarullaevich, Ubaidullaev Farkhod, Majidov Abdulaziz Norqobilovich, and Khudaybergenov Sardor Kamaraddinovich. "Agrotechnics of cultivation and use of mulberry seedlings for picturesque landscaping of highways." *Galaxy International Interdisciplinary Research Journal* 11.1 (2023): 363-370.
5. Bakhtiyarullaevich, Ubaidullaev Farkhod, and Ubaydullayev Abbosjon Azimjon OGLi. "SANITARY-HYGIENIC PECULIARITIES OF GREENING OF STREETS AND AUTOMOBILE STATIONS AND NATIONAL POINTS." *Galaxy International Interdisciplinary Research Journal* 11.2 (2023): 53-58.
6. Убайдуллаев, Ф. Б. "Влияние стимуляторов на рост сеянцев конского каштана." *Актуальные проблемы современной науки* 3 (2018): 115-119.
7. Bakhtiyarullaevich, Ubaydullaev Farkhod, et al. "LANDSCAPE COMPOSITIONS BASED ON EVERGREEN SHRUBS IN THE LANDSCAPING OF CITY STREETS." *American Journal of Research in Humanities and Social Sciences* 10 (2023): 40-43.
8. Убайдуллаев, Фарход Бахтияруллаевич, and Фарход Джураевич Хайтов. "TYPES OF ORNAMENTAL PLANTS RECOMMENDED FOR BALANCE AND LANDSCAPING OF

PARKING AREAS ON HIGHWAYS AND WALKS IN CITY STREETS FOR TASHKENT OASIS." *Science and Innovation* 1.4 (2022): 95-100.

9. Khatamovich, Yuldashov Yakubjon, Ubaydullaev Farkhod Bakhtiyarullaevich, and Khatamov Bakhramjon Yakubjanovich. "FEATURES OF PRODUCTIVITY, RIPENING AND GERMINATION OF JUNIPER SEEDS." *American Journal of Pedagogical and Educational Research* 10 (2023): 85-92.

10. Bakhtiyarullaevich, Ubaydullaev Farkhod, Ubaydullayev Abbosjon Azimjon Ogli, and Aripov Xojiakmal Xojiakbarovich. "CHARACTERISTICS OF DECORATIVE AND POISONOUS GAS- RESISTANT TREES FOR THE STREETS OF TASHKENT." *Open Access Repository* 4.02 (2023): 85-94.

11. Убайдуллаев, Фарход Бахтияруллаевич, et al. "АВТОМОБИЛЬ ЙЎЛЛАРИ ВА ШАҲАР КЎЧАЛАРИДАГИ САЙИЛГОҲ ҲУДУДИНИНГ ТОШКЕНТ ВОҲАСИ УЧУН БАЛАНСИ ВА ЯШИЛ ЭКИНЗОРЛАРИГА ТАВСИЯ ЭТИЛАЁТГАН МАНЗАРАЛИ ЎСИМЛИК ТУРЛАРИ." *UIF-2022* 8: 95-100.

12. Ubaydullaev, Farxod, et al. "Irrigation regime Influence on the growth and seedlings development of common fake chestnut (*Aesculus hippocastanum* L.) and Japanese safflower (*Sophora japonica* L.) in the highways landscaping." *E3S Web of Conferences*. Vol. 264. EDP Sciences, 2021.

13. Ubaydullayev, F., and Sh Gaffarov. "Selection of prosperous varieties of rosehips (*rosa* L.) And their seed productivity in Tashkent oasis, Uzbekistan." *E3S Web of Conferences*. Vol. 258. EDP Sciences, 2021.

14. Ubaydullaev, Farxod, Bakhramjon Khatamov, and Abdulaziz Majidov. "AVTOMOBIL YO'LLARINI KO'KALAMZORLASHTIRISHDA TUT (*MORUS, NIGRA* L) KO'CHATLARINI PARVARISHLASHDA MINERAL O'G'ITLARNI QO'LLASH VA SUG'ORISH ME'YORLARI." *Евразийский журнал академических исследований* 3.4 (2023): 75-81.

15. Baxtiyarullaevich, Ubaydullaev Farxod. "CHINORBARGLI ZARANG (*Acer platanoides* L.) va SEMENOV ZARANGI (*Acer semenovii* Rgl. Et Herd.) TURLARINING BIOEKOLOGIK XUSUSIYATLARI, MANZARAVIYLIGI VA KO 'CHATLARINI YETISHTIRISH TEXNOLOGIYASI." *Science Promotion* 1.1 (2023): 36-39.

16. Baxtiyarullaevich, Ubaydullaev Farxod, and Rafiqov Rustamjon Azamjon-o'g'li. "Toshkent shahri Uchtepa tumani mahalliy ahamiyatdagi "Farxod" ko'chasida harakat xavfsizligini oshirish." *Science Promotion* 1.1 (2023): 28-31.

17. Baxtiyarullaevich, Ubaydullaev Farxod, and Abduraximov Muhammadali Muhammadibroxim o'g'li. "Pensilvaniya shumtoli (*Fraxinus pennsylvanica* Marsh.) tur va shakllarining bioekologik xususiyatlari, manzaraviyligi va ko 'chatlarini yetishtirish." *Science Promotion* 1.1 (2023): 32-35.

18. Bakhtiyarullaevich, Ubaydullayev Farkhod, and Gulamkhodjaeva Shakhnoza Fakhritdinovna. "EFFECT OF IRRIGATION ON GROWING TWO-YEAR-OLD MULBERRY SEEDLINGS USED IN HIGHWAY LANDSCAPING." *British Journal of Global Ecology and Sustainable Development* 25 (2024): 33-38.

19. Bakhtiyarullaevich, Ubaydullayev Farkhod, and Khomidova Nargiza Isaqulovna. "THE STANDARD OF DIFFERENT WATERING REGIMES OF MULBERRY SEEDLINGS

EFFECT ON SEEDLING EMERGENCE." American Journal of Interdisciplinary Research and Development 25 (2024): 220-225.

20. Baxtiyarullaevich, Ubaydullaev Farxod, and Rafiqov Rustamjon Azamjon-o'g'li. "Toshkent shahridagi M39 yo'lidagi M39b" Toshkent xalqa yo'li" shahobcha avtomobil yo'lining 12-22 km bo'lagini ko'klamzorlashtirishda bir yillik va ko'p yillik gullardan klumbalar barpo etish." Science Promotion 1.1 (2023): 40-44.

21. Bakhtiyarullaevich, Ubaydullaev Farkhod, Khomidov Jalaliddin Oktamkhoja ogli, and Abdurakhimov Muhammadali Muhammadibrokhim ogli. "BIO-ECOLOGICAL CHARACTERISTICS, ORNAMENTAL FEATURES AND TECHNOLOGY OF GROWING SEEDLINGS OF MAPLE (ACER PLATANOIDES L.), MAPLE (ACER SEMENOVII RGL. ET HERD.) AND PENNSYLVANIA ASH (FRAXINUS PENNSYLVANICA MARSH)." American Journal of Pedagogical and Educational Research 15 (2023): 173-186.

22. Kuchkarovich, Kasimkhodjaev Bokhodir, Ubaydullaev Farkhod Bakhtiyarullaevich, and Nishonov Umid Toir ogli. "THE USE OF GABIONS IN THE LANDSCAPE DESIGN OF HIGHWAYS AND CITY STREETS." American Journal of Technology and Applied Sciences 11 (2023): 11-17.

23. Isan ogli, Alisher Kholikov, Kasimkhodjaev Bokhodir Kuchkarovich, and Ubaydullaev Farkhod Bakhtiyarullaevich. "DETERMINING THE INFLUENCE OF CHANGES IN THE QUANTITY, SPEED AND COMPOSITION OF VEHICLES AND HIGHWAYS IN THE CITY AND THE DISTRIBUTION OF TRANSPORT." American Journal of Pedagogical and Educational Research 10 (2023): 167-174.

24. Убайдуллаев, Фарход Бахтияруллаевич, et al. "АВТОМОБИЛЬ ЙЎЛЛАРИ ВА ШАҲАР КЎЧАЛАРИДАГИ САЙИЛГОҲ ХУДУДИНИНГ ТОШКЕНТ ВОҲАСИ УЧУН БАЛАНСИ ВА ЯШИЛ ЭКИНЗОРЛАРИГА ТАВСИЯ ЭТИЛАЁТГАН МАНЗАРАЛИ ЎСИМЛИК ТУРЛАРИ." UIF-2022 8: 95-100.

25. Bakhtiyarullaevich, Ubaidullaev Farkhod, and Majidov Abdulaziz Norqobilovich. "Vegetative propagation of black mulberry (Morus, nigra L) recommended for landscaping roads and city streets." Texas Journal of Agriculture and Biological Sciences 12 (2023): 37-40.

26. Bakhtiyarullaevich, Ubaydullayev Farkhod. "EFFECT OF IRRIGATION ON ONE-YEAR GROWTH OF MULBERRY SEEDLINGS USED IN HIGHWAY LANDSCAPING." American Journal of Interdisciplinary Research and Development 25 (2024): 214-219.

27. Bakhtiyarullaevich, Ubaydullaev Farkhod, and Aripov Xojiakmal Xojiakbarovich. "STUDY OF THE STRUCTURAL COMPOSITION OF GABIONS IN LANDSCAPE DECORATION OF AUTOMOBILE ROADS AND CITY STREETS." British Journal of Global Ecology and Sustainable Development 25 (2024): 70-80.

28. Milyaeva A. Metasequoia - a living legend / J Floriculture, №1, Voronezh, 2005.

29. Xamidova N.I. Jo'raqulov J.O., Ekologicheskoye voprosi soxraneniya, vosstanovleniya i oxrani biologicheskogo raznoobraziya yujnogo Priaralya Nukus, 2018 "Gliptostrobussimon metasekvoyaning biologik va ekologik xususiyatlari" 253-255 betlar.