# Evaluation of Different Lotus Varieties in Agro-climatic Condition of Prayagraj, Uttar Pradesh

**ABSTRACT**

The experiment entitled "Evaluation of different Lotus varieties in agro climatic condition of Prayagraj, Uttar Pradesh" was carried out from November, 2023 to May, 2024 under in Horticulture Research Field, Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj. The experiment was conducted in completely Randomized Design (CRD), with 7 varieties which have been replicated for 4 times. The varieties are: 108, Akhila, Fong Hu, Sai Thung Sui, Super Lotus 14, Allahabad Local Lotus -1, and Allahabad Local Louts - 2. The varieties showed significant variations in all the parameters studied. The variety Akhila reported performed better in terms of plant height (28.12cm), plant spread (96.34 cm), flower diameter (12.30cm), total number of flowers per plant (10.21), total number of flowers per hectare (402500). The variety Akhila reported more numbers of leaves (10.21). The variety Super Lotus 14 reported flower bud takes more time to open than other varieties (18.10). The longer duration of flowering reported in Akhila (10.39) followed by Sai Thung Sui (9.98) in days. The longest vase life was observed in the variety Super Lotus 14 (7.14) followed by Akhila (6.91) in days. Based on the findings, Akhila, Super Lotus 14, Sai Thong Sui varieties performed the best in Prayagraj agro climatic conditions.

***Keywords****:* Lotus, varieties, akhila, better performance, prayagraj

## INTRODUCTION

Lotus (*Nelumbo nucifera G.*) is also known as sacred lotus, kamala. It is an aquatic perennial flower with one aquatic genus Nelumbo which accommodates *Nelumbo nucifera* (Cultivated) and *Nelumbo lutea* (Wild) species (4). Indian culture may have given birth to the Nelumbo.The water plant species *Nelumbo nucifera*, also referred to as the lotus, is still alive and belongs to the Nelumbonaceae family. Indian culture may have given birth to the Nelumbo. The Nelumbo is a location in Sri Lanka, South India; this may explain the notion that this plant originated their Greek mythology describes a plant whose berries caused daydreaming and made people reluctance to go.

A lotus is typically used for decorative purposes. The roots, on the other hand, are flavorful, sweet, and packed with vitamins and starch. You can consume them in a variety of ways, including raw, dried, preserved, powdered, cooked into soups, brewed into teas, mixed into salads, and raw. There are additional edible portions of the lotus plant. The lotus flower has various meanings depending on its color, including A representation of purity, grace, and beauty is the white lotus plant. It can also connote power, procreation, riches, tranquilly, knowledge, and faith in oneself. Spiritual ascension is symbolized by a yellow lotus. The essence of Buddha is symbolized by a pink lotus. A red lotus stands for compassion and love. Lotus flowers are renowned for their ability to resist pollution and even clean the water. Lotus is a large perennial erect aquatic herb with big round floating leaves of size 20-80 cm. The flowers are generally pink or white with numerous sepals and petals and have a sacred importance. Young leaves, petioles, and flowers are used as food or medicine. The species is of religious significance in South East Asia; its seeds and leaves are also eaten in this region. Each part of lotus is commercial useful: flowers on auspicious occasions, the rhizome and tender leaves are used as vegetables, seed as medicine, thalamus as fruit, leaves as plates, stalks as pickle and petals for color extraction [9].

The subject chosen for the study project **"**Evaluation of different lotus varieties in agro climatic conditions of Prayagraj." Our national flower is lotus, which has a wide range of variants that are unknown to farmers. Everyone expects their work to be completed faster as the world is becoming increasingly digitalized. Farmers of Lotus must put forth a lot of effort to grow Lotus. The genus Nelumbo contains just two species: *Nelumbo nucifera* G, found in Asia and Oceania, and N. late Wild, found in North and South America. *Nelumbo nucifera* G is a perennial rhizomatous aquatic plant that is widely cultivated in China, India, Japan, and

Australia. For higher returns, it is crucial to introduce new varieties to the farmers. The goal of the study to evaluate the performance of several varieties.

## MATERIALS AND METHODS

The present investigation entitled “Evaluation of different Lotus varieties in agro climatic condition of Prayagraj, Uttar Pradesh” was undertaken to find out the best performing varieties of Lotus for the region. The experiment was conducted in Completely Randomized Design with seven varieties; each have four replicates. The varieties were allocated randomly to a unit plot (tub) in each replication. The varieties are: 108, Akhila, Fong Hu, Sai Thung Sui, Super Lotus 14, Allahabad Local Lotus -1, Allahabad Local Louts - 2. The observations were recorded with respect to 30 days after planting to know the morphological characters of lotus.

## RESULTS AND DISCUSSION

Evaluation of different Lotus varieties in agro climatic condition of Prayagraj, Uttar Pradesh” was undertaken to evaluate the growth, flower output, quality, vase-life of different lotus varieties were presented in Tables 2, 3, and 4 respectively.

## VEGETATIVE PARAMETERS

### PLANT HEIGHT

At 120 days after transplanting (DAT), the variety Akhila (28.12 cm) was recorded the highest plant height, followed by the variety Allahabad Local Lotus - 1 (24.32 cm). Whereas the minimum plant height was recorded in the variety Allahabad Local Lotus -2 (2.40 cm). $GA_3$ influencing the increased vegetative growth by increasing cell division and cell elongation is the reason behind the production of more number of leaves per plant.

The different plant height of the varieties may be due to their intrinsic character and vigor controlled by their genetic makeup. Similar differences in plant height in different varieties of lotus also reported by *Pinto et.al.* (2009), *Sahu et al.* (2017), Srijika (2024).

### PLANT SPREAD

At 120 days after transplanting (DAT), Among all varieties, the variety Akhila (96.34 cm) was recorded the highest number of plants spread (cm), followed by the variety Sai Thung Sui (88.29 cm). Whereas the minimum number of plants spread (cm) were recorded in the variety Allahabad Local Lotus – 2 (80.39 cm).

The plants spread (cm) in lotus plants can vary due to genetic factors, environmental conditions, developmental stages, and nutrition of the plant. Different varieties may have evolved to produce varying plants spread as an adaptation to their specific habitats and ecological niches.

Similar results were also reported in Lotus by *Sahu et al. (2017).*

**NUMBER OF LEAVES**

At 120 days after transplanting (DAT), Among all varieties, the variety Akhila (29.32) was recorded the highest number of leaves per plant, followed by the variety Super Lotus 14 (26.78). Whereas the minimum number of leaves were recorded in the variety Allahabad Local Lotus -2 (21.69).

The number of leaves in lotus plants can vary due to genetic factors, environmental conditions, developmental stages, and nutrition of the plant, prevailing temperature during the growing period. Different varieties may have evolved to produce varying numbers of leaves as an adaptation to their specific habitats and ecological niches.

Similar results were also reported in Lotus by *Sahu et al.* (2017), *Mehbib et.al.* (2020)

**FLORAL PARAMETERS**

**NUMBER OF FLOWERS PER PLANT**

Among all five varieties that took maximum number of the flower per plant was Akhila (10.21), followed by the variety Allahabad Local Lotus -1 (9.51). Minimum number of the flower per plant seen in the variety Allahabad Local Lotus -2 (5.67).

The number of flowers produced by different varieties of lotus can vary due to genetic factors, environmental conditions, and cultivation practices. Genetic differences among lotus varieties play a significant role in determining their flower production potential. Additionally, factors such as sunlight, water quality, temperature, soil nutrients, and care practices can influence flower production in lotus plants. Some varieties may naturally produce more flowers under optimal conditions, while others may require specific care to reach their full flowering potential.

These results are supported by the findings were recorded by Sahu (2017).

**NUMBER OF DAYS FOR EMERGENCE OF FLOWER BUDS**

Among the five varieties the maximum number of days for emergence of flower recorded in Akhila (26.72), followed by the variety Fong Hu (25.98). Minimum number of days for emergence of flower buds seen in the variety Allahabad Local Lotus -2 (23.76).

The number of days for emergence of flower bud of different lotus varieties flower can vary due to factors like genetics, environmental conditions, and cultivation techniques. Different lotus varieties may have been selectively bred for certain traits, including flower size, over time. Additionally, factors like sunlight, water quality, and nutrient availability can influence flower size in lotus plants.

These results are supported by Shubha Shree et.al. (2015), Sahu et al. (2017).

**NUMBER OF DAYS TO OPEN BUDS**

Among the five varieties the maximum number of days to open the buds are recorded in Super Lotus 14 (18.10), followed by the variety Sai Thung Sui (17.79). Minimum number of days to open the buds seen in the variety Allahabad Local Lotus -2 (10.89).

The number of days to open the flower bud of different lotus varieties flower can vary due to factors like genetics, environmental conditions, and cultivation techniques. Different lotus varieties may have been selectively bred for certain traits, including flower size, over time. Additionally, factors like sunlight, water quality, and nutrient availability can influence flower size in lotus plants.

These results are supported by the findings of *Sahu et al*. (2017), *Ashoka et al.* (2023)

**FLOWER DIAMETER (cm)**

Among the five varieties the maximum flower diameter (cm) recorded in Akhila (12.30 cm), followed by the variety Super Lotus 14 (11.75 cm). Minimum Flower Diameter (cm) seen in the variety Allahabad Local Lotus -2 (9.38 cm).

The diameter of different lotus varieties flower can vary due to factors like genetics, environmental conditions, and cultivation techniques. Different lotus varieties may have been selectively bred for certain traits, including flower size, over time. Additionally, factors like sunlight, water quality, and nutrient availability can influence flower size in lotus plants.

These results are supported by the findings of *Sahu et al.* (2017).

**FLOWER LENGTH (cm)**

Among the five varieties the maximum flower length (cm) recorded in Akhila (24.69 cm), followed by the variety Allahabad Local Lotus -1 (22.68 cm). Minimum Flower Length (cm) seen in the variety Allahabad Local Lotus -2 (18.41 cm).

The length of different lotus varieties flower can vary due to factors like genetics, environmental conditions, and cultivation techniques. Different lotus varieties may have been selectively bred for certain traits, including flower size, over time. Additionally, factors like sunlight, water quality, and nutrient availability can influence flower size in lotus plants.

These results are supported by the findings of Sahu *et al*. (2017), Srijika (2024).

**DURATION OF FLOWER (days)**

Among all tested five varieties the maximum duration of flowering (days) recorded in Akhila (10.39), followed by the variety Sai Thung Sui (9.98). Minimum duration of flower (days) recorded in the variety Allahabad Local Lotus -2 (6.93). The flowering duration of lotus varieties can vary due to factors such as genetics, environmental conditions, and cultivation practices.

Some varieties may have been bred to bloom for longer periods, while others may have natural variations in their flowering cycles. Environmental factors like temperature, sunlight, and water quality can also influence flowering duration.

These results are supported by the findings of *Gokul et al*. (2022)**,** Srijika (2024).

**SHELF-LIFE (days)**

Among all five varieties the maximum shelf life (days) of flowers was recorded in Super Lotus 14 (7.14), followed by the variety Akhila (6.91). Minimum shelf life (days) seen in the variety Allahabad Local Lotus -2 (5.34).

The shelf life of lotus flower of different varieties can differ due to various factors such as genetic differences, environmental conditions during growth and harvest, and post-harvest handling practices along with the nutrition of the flowers. Some varieties may naturally have longer-lasting blooms or sturdier stems, while others might be more delicate or sensitive to environmental stressors.

These results are supported by the findings of *Netlak et al*. (2016), Sahu (2018), *Salaemae et al*. (2018).

**YIELD PARAMETERS**

**YIELD OF FLOWER PER TUB**

Among all five varieties that took maximum number of the flower per Tub was Akhila (40.25), followed by the variety Fong Hu (38.35). Minimum number of the flower per hectare seen in the variety Allahabad Local Lotus -2 (19.27).

The number of flowers produced by different varieties of lotus can vary due to genetic factors, environmental conditions, and cultivation practices. Genetic differences among lotus varieties play a significant role in determining their flower production potential. Additionally, factors such as sunlight, water quality, temperature, soil nutrients, and care practices can influence flower production in lotus plants. Some varieties may naturally produce more flowers under optimal conditions, while others may require specific care to reach their full flowering potential.

These results are supported by the findings of Sahu (2017), Srijika (2024).

**Table 1. Variety details**

| SL. NO | VARIETY NAME | VARIETY COLOUR | VARIETIES |
|---|---|---|---|
| 1. | **108** | Pink | V1 |
| 2. | **AKHILA** | White color with pink strip at the Border | V2 |
| 3. | **FONG HU** | Light pink | V3 |
| 4. | **SAI THUNG SUI** | Dark pink | V4 |
| 5. | **SUPER LOTUS 14** | Red | V5 |
| 6. | **ALLAHABAD LOCAL LOTUS -1** | Pink | V6 |
| 7. | **ALLAHABAD LOCAL LOTUS -2** | White | V7 |

**Table 2. Evaluation of Different Lotus Varieties on Vegetative parameters**

| Variety | Plant height (cm) | Plant spread (cm) | Number of leaves |
|---|---|---|---|
| **V1 - 108** | 23.36 | 83.02 | 22.46 |
| **V2 - Akhila** | 28.12 | 96.34 | 29.32 |
| **V3 - Fong Hu** | 23.18 | 81.26 | 23.46 |
| **V4 – Sai Thung Sui** | 23.26 | 88.29 | 24.41 |
| **V5 – Super Lotus 14** | 24.22 | 86.22 | 26.78 |
| **V6 – Allahabad Local Lotus -1** | 24.32 | 83.98 | 23.00 |
| **V7 – Allahabad Local Lotus - 2** | 22.40 | 80.39 | 21.19 |
| **F – TEST** | S | S | S |
| **SE. d** | 0.62 | 0.70 | 0.25 |
| **SD AT 5 %** | 1.35 | 1.53 | 0.55 |
| **CV** | 3.14 | 1.00 | 1.27 |

**Table 3. Evaluation of Different Lotus Varieties on floral parameters**

| Variety | Number of flowers per plant | Number of days for the emergence of flower bud | Number of days to open the buds | Flower diameter (cm) | Flower length (cm) | Duration of flower (days) | Shelf life (days) |
|---|---|---|---|---|---|---|---|
| **V1 – 108** | 6.28 | 24.01 | 10.98 | 9.51 | 19.10 | 7.39 | 6.85 |
| **V2 – Akhila** | 10.21 | 26.72 | 14.71 | 12.30 | 24.69 | 10.39 | 6.91 |
| **V3 – Fong Hu** | 7.31 | 25.98 | 16.37 | 9.77 | 22.01 | 7.96 | 6.24 |
| **V4 – Sai Thung Sui** | 8.41 | 25.33 | 17.79 | 10.92 | 20.22 | 9.98 | 5.77 |
| **V5 – Super Lotus 14** | 6.20 | 25.81 | 18.10 | 11.75 | 18.96 | 9.15 | 7.14 |
| **V6 – Allahabad Local Lotus - 1** | 9.51 | 24.83 | 15.90 | 11.46 | 22.68 | 8.83 | 5.57 |
| **V7 – Allahabad Local Lotus - 2** | 5.67 | 23.76 | 10.89 | 9.38 | 18.41 | 6.93 | 5.34 |
| **F – TEST** | S | S | S | S | S | S | S |
| **SE. d** | 0.16 | 0.27 | 0.33 | 0.21 | 0.28 | 0.25 | 0.05 |
| **SD AT 5 %** | 0.35 | 0.59 | 0.72 | 0.46 | 0.61 | 0.55 | 0.11 |
| **CV** | 2.58 | 1.31 | 2.70 | 2.39 | 1.65 | 3.60 | 0.97 |

**Table 4. Evaluation of Different Lotus Varieties on Yield aspects**

| Variety | Yield of flower per tub |
|---|---|
| **V1** | 30.43 |
| **V1 – 108** | 40.25 |
| **V2 – Akhila** | 38.35 |
| **V3 – Fong Hu** | 25.85 |
| **V4 – Sai Thung Sui** | 32.91 |
| **V5 – Super Lotus 14** | 20.29 |
| **V6 – Allahabad Local Lotus -1** | 19.27 |
| **V7 – Allahabad Local Lotus -2** | S |
| **SE. d** | 0.09 |
| **SD AT 5 %** | 0.20 |
| **CV** | 0.37 |

## CONCLUSION

From the present investigation, it is concluded that among the different varieties, The Variety V2 found superior in terms of Plant height (28.12cm), Plant spread (96.34 cm),No. of Leaves (29.42), leaf length (38.28), Leaf width ( 62.50 cm), No. of flowers (10.21), Bud initiation (26.72), flower diameter (12.30), Flower length (24.69), Duration of flowering (10.39), Yield of flowers per Tub (40.25) . Among the different variety Highest Gross return (3264000 Rs/ha), Net return (2372500 Rs/ha), Benefit cost ratio (2.37) was found in V2- Akhila. Whereas for Vase life found superior in V5- Super Lotus 14 (7.14). Hence Variety Akhila was found best in Prayagraj climatic condition.

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