



FLOWER PHENOLOGY AND FLORAL MORPHOLOGY OF *BAUHINIA ACUMINATA* L. GROWING AT GORAKHPUR DISTRICT OF EASTERN UTTAR PRADESH

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Abstract

The current study focuses on the flowering phenology and floral morphology of *Bauhinia acuminata*, a member of the Fabaceae family that grows in Gorakhpur, Uttar Pradesh, India. In Hindi, it's called Safed Kachnar, and it's also known as Cow's Paw or White Orchid Tree. It is grown as a medicinal and ornament plant throughout the tropical and subtropical climates. The leaves are alternating and 2-4 cm long, with butterfly-shaped leaves as a frequent feature. Flowering peaks in February to April and mid-August to September, with troughs in mid-October to November and December, as well as May to June. The flowering open between 9 and 10 a.m. Flowers are bisexual, complete, aromatic, and spectacular, with a diameter of 6-10 cm and a pedicle of 8-12 cm. Five free petals make up the corolla, which is 4-6 cm long. 3-4 cm long pubescent spathaceous calyx. The stamens are ten, the pistil is one and about 4-5 cm long, the stigma is peltate and bilobed, the style is hollow or solid, and the ovary is stipitate. The goal of this study was to offer vital information on flower phenology and morphology of *B. acuminata*.

Keyword: *Bauhinia Acuminata*, Floral morphology, Phenology, Safed Kachnar.

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Introduction

Flowering phenology is critical for understanding any plant species' reproductive ecology. The study of floral elements such as petals, sepals, pistils, and anthers, as well as breeding methods, is critical for plant species improvement, conservation, and dispersion (Ollerton & Lack, 1998; IUCN, 2013). Flowering phenology of plants may reveal patterns in which plant sexual and asexual cycles are influenced by environmental factors like as seasonal weather in a given place (Tannus *et al.*, 2006). Flowering and fruiting are critical stages in the life cycle of plants species, with the ecological and evolutionary implications (Sakai, 2001). Flowers are the reproductive unit of angiosperms, and their structures are designed to attract pollinators. The core of angiosperm reproductive success is inflorescence production, in which the total flowers are apportioned between the spacing, arrangement, size, and phenology of inflorescence units (Fishbein and Venable, 1996). Plant morphological data is required for taxonomic descriptions and comparisons within species. Phenological research in general, and blooming phenology in particular, are useful in developing conservation strategies and establishing methods for largescale cultivation of such species (Bernardello *et al.*, 2001).

B. acuminata (Kachnar) is a medium-sized shrub in the Fabaceae family. In many mild temperate and subtropical countries, it was used as a decorative plant in gardens, parks, and along roadsides. There are more than 200 species of flowering plants in the *Bauhinia* genus, which belongs to the Caesalpinoideae subfamily of the major flowering plant family Fabaceae, with a pan-tropical distribution (Akhter,

2012; Samant *et al.*, 2014) and fifteen species of *Bauhinia* genus reported in India (Akhter, 2012; Samant *et al.*, 2014). (Kirtikar and Basu, 1999). It is native to tropical Southeast Asia and can be found in states such as Uttar Pradesh, Bihar, Delhi, Madhya Pradesh, Jammu and Kashmir, Meghalaya, Karnataka, Manipur, Punjab, Nagaland, Orissa, Mizoram, Pondicherry, Rajasthan, Tamil Nadu, Tripura, West Bengal, Sikkim, and many others states (Space *et al.*, 2003). Trees, vines, and shrubs in this genus are commonly planted for their colorful flowers and beautiful leaves. *Bauhinia* is derived from the newly coined Latin word 'Bauhin', 'Dwarf white orchid tree' is a synonym for *Bauhinia*. Traditional medicines have used bark, leaves, stems, blossoms, and roots (Akhter, 2012, Sebastian and Sophy, 2020). The Bauhin brothers, Swiss-French botanists Jean (1541–1612) and Gaspard Bauhin (1560–1624), were named after the genus (*Bauhinia*, 2009). The *Bauhinia* flower features on the Hong Kong flag, and airlines use 'Bauhinia' as their radio call sign in air traffic communication (Sebastian and Sophy, 2020). The buds of *Bauhinia variegata* are traditionally used to make pickles because they are high in antioxidants, total carbohydrates, crude proteins, fats, crude fibres, and moisture. The flowers of *Bauhinia variegata* contain digestible carbohydrates, a significant amount of protein, fat, and other nutrients, as well as a high energy value (Verma *et al.*, 2012; Sharma *et al.*, 2020).

Materials and Methods

Plant of *B. acuminata* L. (Kachnar) was planted in the Pt. Gobind Ballabh Pant garden, in front of Deen Dayal Upadhyay University in Gorakhpur, eastern Uttar Pradesh and was marked for present observation in the year 2021.

Ten plants were chosen for studies of flowering phenology (Time of initiation of flower and duration). During the flowering period, the number of flowers on marked plants was counted on a regular basis to study flowering phenology. The morphology of 10 flowers/plants was recorded using a random sample of ten flowers/plants. During the flowering period, the length and size of new fully open flowers, the number of petals, sepals, pistil, stamen, and anthers were measured on graph paper or with a hand lance. The type of inflorescence was also documented and chosen at random, and indicated at the start of blossoming. A Nikon Coolpix digital camera was used to snap images of floral components. Searching electronic resources such as Science Direct, PubMed, Springer Link, and Research Gate yielded significant scientific information about *Bauhinia variegata* (Kachnar).

Result and Discussion

Bauhinia acuminata L. commonly known as Safed Kachnar or white orchid-tree is a cultivated popular sun-loving flowering shrub plant growing up to five meters long in Pt. Gobind Ballabh Panth garden, Gorakhpur (Figure 1A). Leaves are alternate, 2-4 cm long, base cordate to rounded, and have commonly characteristic like butterfly shaped

leaves. Stem is smooth cream in color, woody, short trunk with hairy slender lateral branched. Flowering was occurred throughout the year with maximum flowering recorded in February - April when the average temperature range between 20.0-35.6°C and mid of August-September when temperature range between 26.5-33.5°C, while the minimum flowering were recorded in the mid of October - November and December and May - June. The flowers open at 9 AM to 10 AM. Inflorescence was axillary racemes, the inflorescence is elongated in structure having large number of the flowers. 4-12 flowers were observed on one inflorescence. Flowers are bisexual, complete, perfumed, showy, 6-10 cm in diameter in size, creams-green having 8-12 cm long pedicle, white flowers look like snowflakes hanging on the branches (Figure 1B). Corolla is also consisting five white free petals, hypanthium, 4-6 cm long (Figure 1C). Calyx pubescent, spatheaceous, 3-4 cm long, attached with 3-5 cm long pods, sub falcate (Figure 1D). Stamens ten, filaments strigose at base (Figure 1E). Pistil is one about 4-5 cm long, divided into stigma style and ovary, stigma peltate, bilobed, ovary stipitate, style is more or less hollow or sometimes solid (Figure 1F). Yellow-tipped stamens having anther with 3.4 cm long filaments (Figure 1G).



Figure 1. A: Entire plant of *Bauhinia acuminata*, B: Flower, C: Petals, D: Sepals with pods, E: Stamens, F: Pistil, G: Anther with filaments

For taxonomic descriptions and comparisons within species, flower morphological information is required. Plant morphological features can be used to measure, compare, and contrast differences and similarities in plant taxa that are used to identify plants, describe them, and classify them (Amitha & Joseph, 2019). The floral morphology and flowering phenology of *Bauhinia acuminata* were examined in this study. Anil and Srivastava (2018) published a paper in *Bauhinia variegata* L. on several aspects of flowering phenology and morphological investigations. Sebastian and Sophy (2020) reported a similar finding and studied the phytochemistry and pharmacology of *Bauhinia variegata*. Similar findings were also found in *Bauhinia variegata* of the Fabaceae family by Akhter *et al.* (2012).

Conclusion

Bauhinia acuminata commonly known as Kachnar, is a deciduous, fast-growing, sun-loving, blooming plant with a medium stature. It is a traditional herb that is used to treat a wide range of ailments at the local level. Flowers' morphological information is required for taxonomic descriptions and comparisons within species. The goal of this study is to offer thorough morphological information on flowers of *Bauhinia acuminata*, a member of the Fabaceae family, that are now planted in various locations throughout Gorakhpur city, Uttar Pradesh. This information could be a useful tool for morphological information and plant species identification.

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