

## CHAPTER 23

# Classification of Ornamental Hibiscus based on Flower Pattern

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### Abstract

Hibiscus has an extensive array of flower colors and patterns. Due to its elegant blooms, it has been widely used as an ornamental plant and also used in landscaping. It also holds great cultural significance in various traditions around the world. The flower patterns help in differentiation of hybrids from its parents. While describing the form of a bloom, always there was a great confusion to determine and describe a bloom. To avoid confusion on flower patterns and clear understanding the flower patterns in identification of hybrids, an attempt has been made to develop a new classification system for Indian Hibiscus hybrids based on the flower patterns. The present classification will help in determining the hybrids and also helpful for the selection of new parents in further breeding program.

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**Keywords:** Bloom, Cultivar, Classification, Flower form, *Hibiscus*

## Introduction

One of the notable plant species that contributes to biodiversity is the *Hibiscus* and it belongs to the mallow family (Malvaceae). The genus *Hibiscus* is widely distributed in warm temperate, tropical and subtropical regions of the world. The genus comprises approximately 432 species, including trees, shrubs, herbs and lianas, with over 24,000 registered cultivars worldwide (Chakraborty et al., 2023a, b, c; Swamy et al., 2023). Ancient Indian classical literature showed that it was not limited to offering to God but was an integral part of social, religious and traditional culture in herbal medicine. Hibiscus flowers are highly sought after in various countries, sparking intense competition among breeders striving to create superior cultivars and hybrids. Numerous cultivars have emerged from diverse agro-climatic regions worldwide, including the USA, Australia, French Polynesia, and Taiwan, where extensive breeding programs have been implemented. Registration of the hibiscus cultivars in International Hibiscus Society as on 2024 reveals that the USA registered/developed over 10,000 cultivars, followed by 4,946 in French Polynesia, 2,328 in Australia, and 1,088 in Taiwan and many other countries have developed fewer than 500 cultivars each. India has registered over 400 cultivars in the International Hibiscus Society, yet it remains significantly behind in the production of new hibiscus hybrids.

Flower characters are most important for identification and characterization of different hybrids or cultivars of hibiscus. Different types of flowering patterns like Single Regular, Single Cartwheel, Single Crested, Single Windmill, Double, Semi Double Crested Cup and Saucer, Fluted, Ruffled, Tufted etc. were used to differentiate the cultivars. Huang (n.d.) stated that flower forms are vital to distinguish the characters of cultivars. The flower patterns help in differentiation of hybrids from its parents. Keeping the importance of flower patterns in identification of hybrids an attempt has been made to develop a new classification system for Indian Hibiscus hybrids based on the flower patterns.

## Materials and Methods

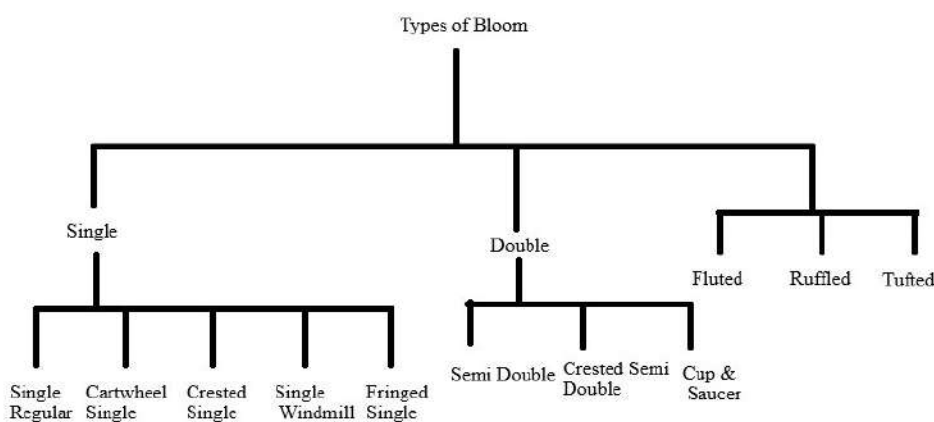
The present study has been carried out at Hibiscus experimental section of AJC Bose Indian Botanic Garden. About 54 hibiscus cultivars of three species (*Hibiscus rosa-sinensis* L., *Hibiscus syriacus* L. and *Hibiscus schizopetalous* (Mast.) Hook.f.) have been selected for bloom differentiation and classification. The cultivars and species are *Hibiscus rosa-sinensis* L.: Abhinandan, Sentenarya, Rainbow, Bengal Moonrise, Indian Velvet, Janaki Ammal, Silver Memory, Saffron, Shiva, Red Giant, Queen of Winter, Apple Pie, Sudarsan Chakra, Bengal Sunrise, RN Tagore, Best Friend, Candy Manners, Harvest Moon, EL Capitolio, Lion in Winter, Versicolour Pinwheel, Satellite, Ruby Rose, Athene, Tiny Tina, Indian Bride, Fragile Moments, Red Dragon, Monte Carloy, Celia, D J O'brien, Full Moon, Devendra, Pride of Hankins, Agni, Vivekananda, Elephant Ears, Peach Blow, Isobel Beard, Gold Rain, Psyche, Dainty Pink, Sylvia Goodman, EL Capitolio, Taiwan Starburst, Dark Mother of Bengal, Bo Den Dark Phoenix, Cherry Appaloosa, White Diamond × Allure, Catwalk, Mothers touch Singur, Chi's Garden Lavender Frosting; *Hibiscus syriacus* L. and *Hibiscus schizopetalous* (Mast.) Hook.f. The hibiscus

cultivars of AJC Bose Indian Botanic Garden have been identified based on the cultivar genealogy tree of the International Hibiscus Society Database

([https://internationalhibiscussociety.org/searchive/genealogy\\_tree](https://internationalhibiscussociety.org/searchive/genealogy_tree)), Australian Hibiscus Society (<https://www.hibiscusworld.com/BeersBook/11-Varieties.htm>) and (Choudhury et al., 2022).

Huang (n.d.) developed a bloom pattern for *Hibiscus* in his “Bloom Characteristics (Learn to describe your Hibiscus)” based on flower characteristics, arrangement and descriptions of the flowers, which are very important for describing the characters of hybrid of hibiscus flowers. The types flower blooms are presented in chart 1 and Bloom Characteristics and descriptions are presented in table 2. The detailed methodology for present classification has been followed by Huang (n.d.), Beers and Howie (1990), and (Magdalita et al., 2022).

**Chart 1:** Types of blooms in Hibiscus



**Table 2:** Bloom characteristics and descriptions of Hibiscus

Sr. No.	Types of Bloom characteristics	Brief characteristics/exact description after Beers et al. (1990) and Huang (n.d.)
1	Single Regular	The petals are separated for less than half the distance from the outer edge, creating a regular scalloped appearance along the edge.
2	Cartwheel Single	The tips of the petals are fully overlapping, creating a smooth, regular, rounded appearance.
3	Crested Single	The basic type can be any type of single flower, but the typical bloom displays petaloid structures at the tip of staminal column, creating a perfect crest.
4	Single Windmill	The petals are slender and separated for almost their entire length.

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5	Fringed Single	The margins of the petals are split and fringed. The staminal column is at times elongated and pendulous.
6	Double	Numerous petals and petaloids are closely imbricate each other and create a ball appearance on top of flat circle of petals.
7	Semi Double	The loose petals grow from the base of the bloom and that are twisted and quilled to create an almost ball like appearance.
8	Crested Semi Double	A loose double appearance due to the petaloids, which are arising from staminal column; stigmas usually present.
9	Cup & Saucer	Outside guard petals follow in a single form; all center tuft of petaloids arises from middle and are distinctly separated from guard petals.
10	Fluted	The petals are soft on edges, wavy soft.
11	Ruffled	Frippy, ruffled edges on petals.
12	Tufted	Small upstanding creases on inside edge of petals.

### Result and Discussion

Fifty-four (54) hibiscus cultivars of three species (*Hibiscus rosa-sinensis* L., *Hibiscus syriacus* L. and *Hibiscus schizopetalous* (Mast.) Hook.f.) of AJC Bose Indian Botanic Garden has been classified into twelve (12) different flower patterns. The twelve (12) different bloom types are Single Regular (Type-1), Single Cartwheel (Type-2), Single Crested (Type-3), Single Windmill (Type-4), Fringed Single (Type-5), Double (Type-6), Semi Double (Type-7), Crested Semi Double (Type-8), Cup and Saucer (Type-9), Fluted (Type-10), Ruffled (Type-11), Tufted (Type-12). The details flower patterns are given in type 1-12.

### Type-1. Single Regular

In this type, the petals are separated for less than half the distance from the outer edge, creating a regular scalloped appearance along the edge.



**Plate1. Single Regular:** Fig-1. Abhinandan, Fig-2. Sentenarya, Fig-3. Rainbow, Fig-4. Bengal Moonrise, Fig-5. Indian Velvet, Fig-6. Janaki Ammal, Fig-7. Silver Memory, Fig-8. Saffron.

### Type-2. Cartwheel Single

The tips of the petals are fully overlapping, creating a smooth, regular, rounded appearance.



**Plate 2. Cartwheel Single:** Fig-9. Shiva, Fig-10. Red Giant, Fig-11. Queen of Winter, Fig-12. Apple Pie, Fig-13. Sudarsan Chakra, Fig-14. Bengal Sunrise, Fig-15. RN Tagore, Fig-16. Best Friend

### Type-3. Crested Single

The basic type can be any type of single flower, but the typical bloom displays petaloid structures at the tip of staminal column, creating a perfect crest.



Fig-17



Fig-18



Fig-19



Fig-20

**Plate 3. Crested Single:** Fig-17. Candy Manners, Fig-18. Harvest Moon, Fig-19. EL Capitolio, Fig-20. Lion in Winter

### Type-4. Single Windmill

The petals are slender and separated for almost their entire length.



Fig-21



Fig-22



Fig-23



Fig-24



Fig-25



Fig-26

**Plate 4. Single Windmill:** Fig-21. (Versicolour Pinwheel), Fig-22. (Satellite), Fig-23. (Ruby Rose), Fig-24. (*Hibiscus syriacus* L.), Fig-25. (Athene), Fig-26. (Tiny Tina).

### Type-5. Fringed Single

The margins of the petals are split and fringed. The staminal column is at times elongated and pendulous.

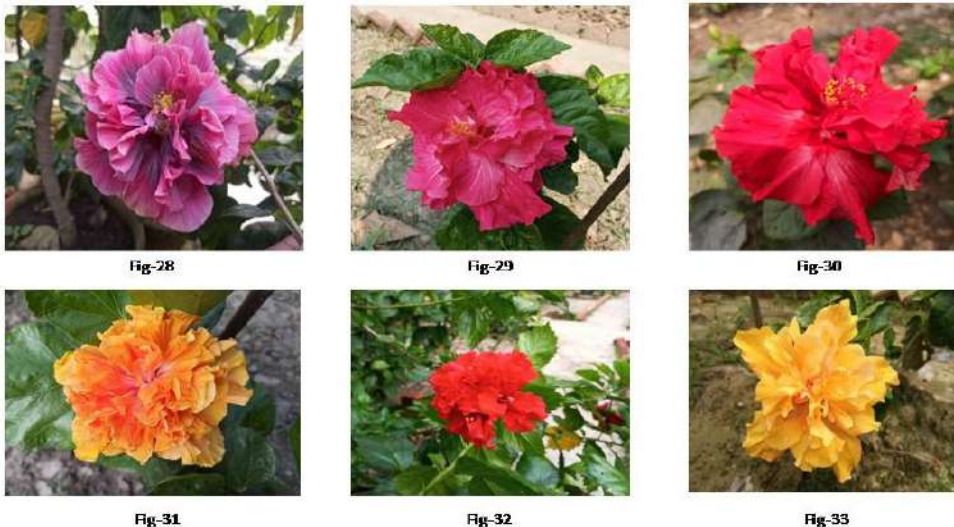


Fig-27.

**Plate 5. Fringed Single:** Fig- 27. *Hibiscus schizopetalous* (Mast.) Hook.f.

### Type-6. Double

Numerous petals and petaloids are closely imbricate each other and create a ball appearance on top of flat circle of petals.



**Plate 6. Double:** Fig-28. Indian Bride, Fig-29. Fragile Moments, Fig-30. Red Dragon, Fig-31. Monte Carloy, Fig-32. Celia, Fig-33. D J O'brien

### Type-7. Semi Double

The loose petals grow from the base of the bloom and that are twisted and quilled to create an almost ball like appearance.



Fig-34



Fig-36



Fig-37



Fig-35



Fig-38

**Plate 7. Semi Double:** Fig-34. Full Moon, Fig-35. Devendra, Fig-36. Pride of Hankins, Fig-37. Agni, Fig-38. Vivekananda.

### Type-8. Crested Semi Double

A loose double appearance due to the petaloids, which are arising from staminal column; stigmas usually present.



Fig-39



Fig-40



Fig-41

**Plate 8. Crested Semi Double:** Fig-39. Elephant Ears, Fig-40. Peach Blow, Fig-41. Isobel Beard



### Type-9. Cup & Saucer

Outside guard petals follow in a single form; all center tuft of petaloides arises from middle and are distinctly separated from guard petals.



Fig-42

Plate 9. Cup & Saucer: Fig-42. Gold Rain

### Type-10. Fluted

The petals may be single or double and are soft on edges and the edges are wavy soft.



Fig-43



Fig-44



Fig-46



Fig-45

Plate 10. Fluted: Fig-43. Psyche, Fig-44. Dainty Pink, Fig-45. EL Capitolio, Fig-46. Sylvia Goodman

**Type-11. Ruffled**

In this type, petals are frilly and ruffled on edges.



Fig-47



Fig-48



Fig-49



Fig-50

**Plate 11. Ruffled:** Fig-47. Taiwan Starburst, Fig-48. Dark Mother of Bengal, Fig-49. Cherry Appaloosa. Fig-50. Bo Den Dark Phoenix

**Type-12. Tufted**

In this type, small upstanding creases on inside edge of petals are present.



Fig-51



Fig-52



Fig-54



Fig-53

**Plate 12. Tufted:** Fig-51. White Diamond × Allure, Fig-52. Catwalk, Fig-53. Chi's Garden Lavender Frosting, Fig-54. Mothers touch Singur

## Conclusion

In conclusion, this article provides different types of flowering pattern of *Hibiscus* cultivars, which help in determining a new breeding variety or cultivars and also helpful for the selection of new parents in further breeding program.

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