Original Research Article

Development of new *Hibiscusrosa-sinensis* cultivar Acharya Jagadish Chandra Bose in West Bengal, India

Abstract

*Hibiscus*has a unique and wide range of colors ranging from brown, purple, white, pink, red, orange, yellow, etc.Many cultivars introduced from various countries were adapted to Indian conditions, of which suitable elegant cultivars *Hibiscus rosa- sinensis* L. 'Valentine's Day' (Female pod parent) and *Hibiscus rosa- sinensis* L. 'Moorea Memory of July' (Male pollen parent) were selected and hybridized. Hybrid seeds from the female parent were collected, germinated, and grown to the flowering stage. The developed cultivar was named after a great Indian ScientistAcharyaJagadish Chandra Bose (*H. rosa-sinensis* cv. Acharya Jagadish Chandra Bose). Detaileddevelopment of the new cultivar with photographs is discussed.

Keywords: Cultivar, Acharya Jagadish Chandra Bose, *Hibiscus*,Moorea Memory of July, Valentine's Day,West Bengal

1. INTRODUCTION

The improvement of ornamental *Hibiscus* through breeding in India is mainly done in tropical areas like southern states like Karnataka, Tamil Nadu, and Kerala where the environmental conditions are congenial for seed setting in some of the species/cultivars.Many cultivars were introduced to India from Hawaii during 1961-64 at Lalbagh Botanical Garden Bengaluru [1] for breeding. Then the hybrids developed through inter-varietal hybridization more than 25 promising hybrids of *H. rosa sinensis* have been released by IIHR, Bengaluru, Lalbagh Botanical Garden, Bengaluru, and TNAU [1,2]. Although many species have improved in one way or another, they have yet to achieve the wide range of flower shapes and colours that would come as a result of more intense hybridization in the 20th century.

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Early hibiscus cultivars were first cultivated on the island of Hawaii in the first decade of the 20th century. ~~Now~~, Kew Botanical Garden, London, UK, hasconserved several types of ~~the~~hibiscus mother species/hybridsin their field gene bank and besides this, some reputed institutes and commercial houses like Hidden Valley *Hibiscus*maintained all mother cultivars of present-day hibiscus [3]. In India, it has more than 389 and the state of West Bengal has more than 300 registered cultivars [4,5,6,7], of which more than 75 cultivars have been maintained at AJC Bose Indian Botanic Garden, Howrah.

But nowadays it has been extended to other parts of India like West Bengal. Hibiscus breeding has a huge scope in West Bengal as it is no longer only used as an offering to the Hindu Goddess/Gods but ~~it~~is considered highly significant as an ornamental and aesthetic plant due to its wide range of colours. The main aim of this study is to develop new cultivars/varietiesof *Hibiscus* through selection, hybridization, and to improve the overall aspects of the ideal plant[5,6,7].

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2. MATERIALS AND METHODS

2.1.Parents selection

To conduct the hybridization, the authors have~~been~~selected ‘Valentine's Day’ (Female parent) from USA California which was developed by Black Charles, and ‘Moorea Memory of July’ (Male parent) from French Polynesia which created by Atiu Charles. Before cross-pollination, authors were cross-checked, on how genetic traits of parent plants have come into play and how they tend to pass genes to progeny[5,6,7,8]. To track the lineage of *Hibiscus* cultivars, authors have consulted the cultivar genealogy tree of the International Hibiscus Society Database (2023).

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2.2.Hybridisation

During winter in 2021, the designated female parent wasidentified one day before pollination, while the flower was at the full balloon stage the petals & pollen will be removed to expose the stigma and this will be covered with a piece of packet to avoid pollen contamination. The detailed methodology described by Chakraborty et al.[5,6] and Swamy et al.[7]has been followed.

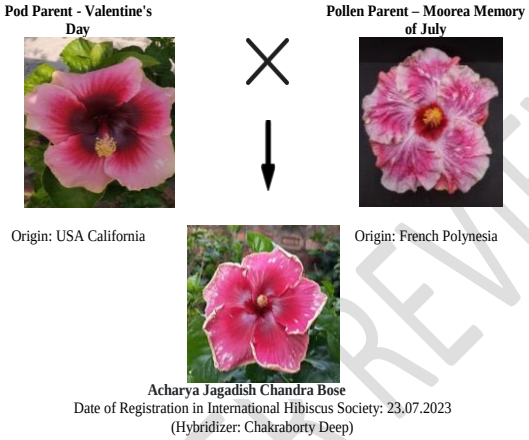

Figure 1. *Hibiscus rosa-sinensis*cv. Acharya Jagadish Chandra Bose and it's *H. rosa-sinensis*pod parent (Valentine's Day) and male parent (Moorea Memory of July).

3. RESULD AND DISCUSSION

DEVELOPMENT OF NEW CULTIVAR

After successful hybridization, hybrid seeds were collected from the female parent, germinated, and grown characterized at AJC Bose Indian Botanic Garden, Botanical Survey of India, Howrah. The developed new cultivar started to produce flowers ~~attaining~~at the age of 1 year old. The fully developed cultivar branches were collected for cuttings, grafting, and budding for clonal propagation and multiplications.The propagated saplings were used to check/stabilize the characters. High quality, bush development, propagation, disease resistance power, ability to bloom and bloom size have been observed in the newly developed cultivar. The developed *Hibiscus* cultivar is named after a great Indian Scientist

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AcharyaJagadish Chandra Bose. The newly developed cultivar was registered in the International Hibiscus Society and accepted by the same society on 23.07.2023(Fig. 1). The cultivar *Hibiscus rosa-sinensis* cv. Acharya Jagadish Chandra Bose is characterised by bright pink flowers with large red centred and white strips at the margin when it is in full bloom and a longer flowering period (more than two days in winter and one day in summer).

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4.1. **Taxonomy of *Hibiscus rosa-sinensis* L. cv. Acharya Jagadish Chandra Bose** (Fig. 2)

Shrubs up to 60 cm high; branches densely spreading, green; internodal portion 2-3 cm long. Leaves simple, petiolate; petiole 4.8-5 long, 0.2-0.3 cm wide; blades broadly ovate, 8-9 cm long, 8-8.5 cm wide, cordate base, crenate along the margin, acute to acuminate at apex, dark green above, light green below, 6-7 nerved from the base. Stipules linear, 0.8-1 × 0.1-0.2 cm. Inflorescence axillary, solitary; peduncle 5-5.3 × 0.1-0.2 cm; pedicel 1.4-1.7 × 0.3-0.4 cm; flower bud pale yellow, 3.6-4 × 0.2-0.3 cm. Flowers pinkish red with white strips, 16.5-17 cm in diameter. Epicalyx 2.5-2.8 × 2.5-2.7 cm, linear, 10-lobed; each lobe 1-1.3 × 0.2-0.4 cm. Sepals united below the half, 2.7-3 × 5-5.5 cm; tube 1.3-1.5 × 0.9-1 cm, 5-lobed; lobes ovate-lanceolate, 1.2-1.5 × 0.8-0.9 cm, acute apex. Petals 8.5-9 × 8.6-7 cm, polypetalous, 5, obovate, cuneate to unequal at the base, entire to undulate along the margin, rounded at apex, upper surface creamy pink with red eye zone and white strips, pale yellow along the margin, lower surface creamy yellow; veins prominently raised beneath, creamy. Staminal column red, 7-7.3 cm long, 0.3-0.4 cm wide; naked zone 5-5.5 cm long, 0.3-0.5 cm wide; anther zone 1.6-1.7 cm long, 1-1.1 cm wide, kidney shaped, yellow; filaments 0.3-0.6 cm long. Pistil 7-7.5 cm long; ovary cylindrical, 0.8-0.9 cm long, 0.4-0.5 cm wide; style 4.5-5 cm long, 0.1-0.2 cm wide, hairy at base; stigma orange, 0.3-0.4 cm long, 0.4-0.5 cm wide; lobes unequal, densely hairy.

Flowering: Throughout the year. Usually, flowers open early in the morning and close after one day of its opening.

Propagation: It can be done by cutting, air layering, grafting, budding, etc.

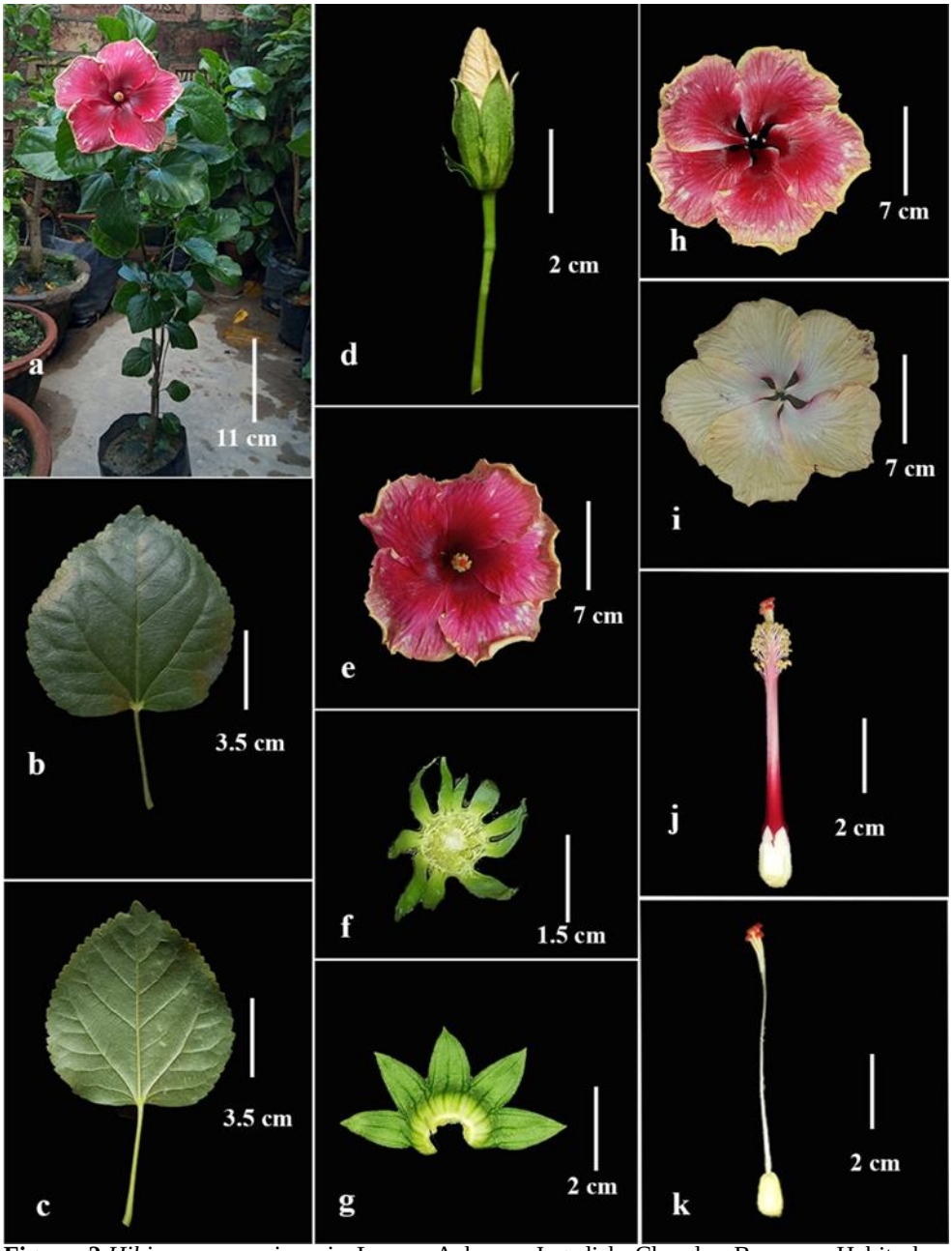

Figure 2.*Hibiscus rosa-sinensis* L. cv. Acharya Jagadish Chandra Bose: a. Habit; b-c. Leaves; d. Flower bud; e. Flower; f. Epicalyx; g. Calyx; h. Corolla (upper surface); i. Corolla(lower surface); j. A staminal column with pistil; k. Pistil.

5. CONCLUSION

The developed new cultivar hasvery much ornamental potential, and cultural significance due to its unique flowers, which will be used in breeding work for further development of new cultivars/hybrids and also useful in landscaping. The present work is also useful to enhance the income of farmers by its propagation/cultivation.

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