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Nameeta: A Newly Developed *Hibiscus rosa-sinensis* L. Cultivar from AJC Bose Indian Botanic Garden, West Bengal, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present communication deals about the newly developed Hibiscus cultivar 'Nameeta' by crossing the female parent 'Mothers touch Singur, and male parent 'Durga' and having the distinguished characters like upright, fast growing shrubs with gorgeous single, regular, ruffled and tufted type of flowers made up with velvety brown ring with vibrant reddish eye zone. The same has been described here in detail along with its breeding process and also photomicrographs are given to facilitate its easy identification. This newly developed cultivar will also help the local farmers to enhance their economy.

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Keywords: Cultivar; Nameeta; Hibiscus; Mothers touch Singur; durga; West Bengal; India.

1. INTRODUCTION

Our world is endowed with captivating scenic beauty and manifested by rich diversity. One of the notable plant species that contributes to biodiversity is the hibiscus. *Hibiscus* is a genus of numerous species of herbs, shrubs, and trees in the mallow family (Malvaceae), native to warm temperate and tropical regions. Several species are cultivated as ornamentals for their showy flowers, and few species are valued as fiber plants. Ancient Indian classical literature shows that hibiscus was not limited to offering to Gods but is an integral part of social, religious and traditional culture in herbal medicine. It is native to China, Hawaiian Islands, Mauritius, Madagascar in Africa, and Fiji. The Hibiscus flower holds various symbolic meanings across different cultures in the world. *Hibiscus rosa-sinensis* L. was designated as the national flower of Malaysia on July 28, 1960 (Ahmad 2012). *Hibiscus* flower is a symbol of sought freedom (Kaboré 2013). The red colour of the petals symbolizes the courage, life, and rapid growth of the Malaysian people, and the five petals represent the five Rukun Negara of Malaysia. The flower can be found imprinted on the notes and coins of the Malaysian ringgit. it serves as a national symbol in Haiti (Chawdhuri et al. 2022).

The *Hibiscus rosa-sinensis* L. is well-known by various names, such as China rose, Chinese hibiscus or Rose of China, Rose mallow, Hawaiian hibiscus or Blacking plant, Shoe flower, etc. It thrives in hot and warm climates, earning the title "Queen of Tropics" (Janakiram and Patil 2017), etc. The genus *Hibiscus* L. comprises about 432 species (POWO 2024) and more than 24,000 registered cultivars (International Hibiscus Society 2024) in the world and is naturally distributed in tropical, subtropical, and warm-temperate regions of the world. In India, the *Hibiscus* is represented by 27 species including the infraspecific taxa (Pramanick et al. 2020) and more than 477 registered cultivars (International Hibiscus Society 2024).

Hibiscus rosa-sinensis L. has been designated as a denomination class. A cultivar epithet may not be repeated in that species, it may be used once in the remainder of the genus which forms a second denomination class. A denomination class under the provisions of this Code is a single genus or hybrid genus unless a special denomination class has been determined by the ISHS Special Commission for Cultivar Registration. Such as the International Hibiscus Society, INC. ICRA: *Hibiscus rosa-sinensis* L. and its hybrids (2013) which was published in article 6 (International Code of Nomenclature for Cultivated Plants – Ninth Edition) (Brickell et al. 2016). *Hibiscus* cultivars are genetically polyploid and they have two complete sets of chromosomes. A side effect of polyploidy condition, the phenotype character of the offspring may be quite different from the parent, or indeed any ancestor, essentially allowing possibly random expression of all or any of the characteristics of all the generations that they have gone before (Magdalita and San 2022).

The new cultivar was named after Ms. Nameeta Prasad, Joint Secretary, Ministry of Environment, Forest and Climate Change, New Delhi in recognition of her significant contributions to the development and conservation of floral diversity specially in the gardens through the Botanical Survey of India. It has been developed from the cross breeding of *Hibiscus rosa-sinensis* L. cultivars 'Mothers touch Singur' (Female parent) and 'Durga' (Male parent). The new cultivar registration was accepted by the International Hibiscus Society on 08.05.2024. The new cultivar characterised by upright, fast growing shrubs with gorgeous single, regular, ruffled and tufted type of flowers made up with velvety brown ring with vibrant reddish eye zone.

2. MATERIALS AND METHODS

2.1 Parents Selection

The prime aim of authors to develop new cultivar of *Hibiscus* through selection, hybridization, to increase the number of flowers per plant, ability to bloom size and colour, rapid bush development, flowers availability throughout the year, increase propagation rate, disease and stress resistance power etc. and the overall aspects of the ideal plant, standardization of techniques for mass propagation for farmers of the country to improve their individual economy.

To conduct the hybridization, authors have been selected native Indian parent cultivars 'Mothers touch Singur' as a female parent and 'Durga' as a male parent for their morphological characters. Before cross pollination, breeder cross checked that, how genetic traits of parent plants have come into play and how they tend to pass genes to progeny (Magdalita et al. 2016, Chakraborty et

al. 2023, Chakraborty et al. 2023a Chakraborty et al. 2023b, Swamy et al. 2023). To track the lineage of *Hibiscus* cultivars, authors have been consulted cultivar genealogy tree of International Hibiscus Society database.

2.2 Hybridization

During winter in 2022, the designated female parent was identified one day before pollination, while the flower was at the full balloon stage and the petals and anthers were removed to expose the stigma. The exposed stigma was covered with a piece of packet to avoid pollen contamination. The detailed methodology of Magdalita et al. (Magdalita et al. 2016), Chakraborty et al. (2023, 2023a, 2023b), and Swamy et al. (2023) have been followed.

3. RESULTS AND DISCUSSION

The newly developed hybrid is allied to its parents but it is clearly differentiated by its cordate leaf shape, brownish red colour flower. Detailed comparison with its parents is given in Table 1. The newly developed hybrid *Hibiscus rosa-sinensis* L. cv. Nameeta flowered at AJC Bose Indian Botanic Garden when it was attained one year old (25/11/2023). The fully developed cultivar branches were collected for grafting, budding for clonal propagation and multiplications. The propagated saplings were used to check/stabilise the characters. High quality, bush development, propagation, disease resistance power, ability to bloom and bloom size has been observed in the newly developed cultivars.

Table 1. Morphological comparison of cultivar Nameeta with its parents

SL. No	Characters	Pod parent (Mothers touch Singur)	Pollen parent (Durga)	New cultivar (Nameeta)
1	Stem	Upright to spreading	Spreading	Upright
2	Leaf shape	Elliptic	Broadly ovate	Cordate
3	Flower size (Diameter)	15-15.5 cm	16-17 cm	15-16 cm
4	Flowering pattern	Horizontal	Upright	Upright
5	Flower colour	Brownish yellow	Deep brown	Brownish red
6	Colour of eye zone	Red with white	Blackish red	Blackish red
7	Flower bud	Yellowish brown	Pale yellow	Creamy
8	Propagation	Cutting, grafting, budding and seeds	Grafting, budding and seeds	Cutting, grafting and budding

Crossing of 'Nameeta' Cultivar:

Pod parent–
Mothers touch Singur

Origin: India

Nameeta

Pollen parent –
Durga

Origin: India

Date of Registration in International Hibiscus Society: 8.5.2024
(Hybridizer: Deep Chakraborty)

Fig. 1. The *Hibiscus rosa-sinensis* L. Cultivar 'Nameeta' and it's female parent 'Mothers touch Singur' and male parent 'Durga'

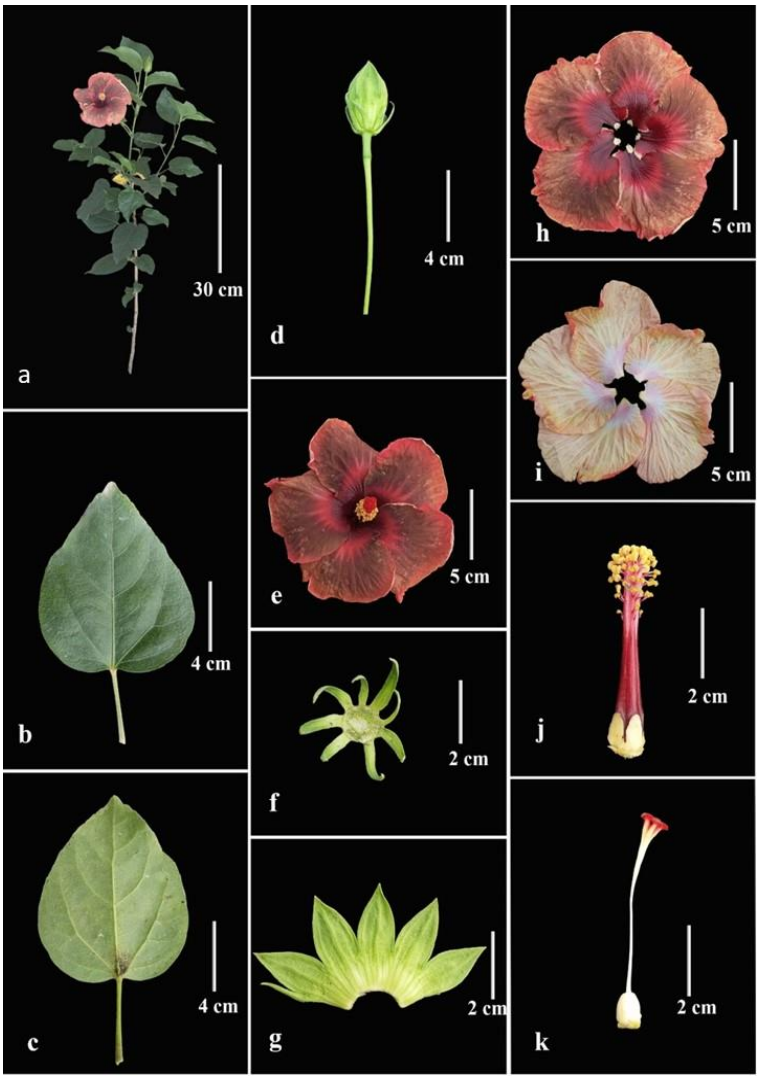

Fig. 2. Nameeta: a. Habit; b,c. Leaves; d. Flower bud; e. A flower; f. Epicalyx; g. Calyx; h. Corolla (upper surface); i. The same lower surface; j. Staminal column with pistil; k. Pistil

3.1 Taxonomy of *Hibiscus rosa-sinensis* L. cv. 'Nameeta'

Shrubs, up to 100 cm long; branches upright, green; inter nodal portion 3.5-4 cm long. Leaves simple, petiolate; petiole 4-4.2 cm long, 0.3-0.4 cm wide; blades 9-10 × 8-8.2 cm, ovate, rounded to cordate at base, entire to undulate along margin up to the middle and entire-crenate above the half, acute to acuminate at apex, green on upper surface, pale green lower surface, 6-7 nerved from the base. Stipules linear, 0.5-0.7 × 0.1 cm. Inflorescence axillary, solitary; peduncle 9-9.4 × 0.2-0.3 cm; pedicel 1.5-1.7 × 0.3-0.4 cm; flower bud brownish yellow, 3.5-4 × 1.6-1.8 cm. Flowers brownish-red, 15-16 cm in diameter. Epicalyx 2-3 cm in diameter, linear to lanceolate, 8-9 lobed; each lobe 1-1.5 × 0.1-0.2 cm. Sepals united below the half, 3-4 × 5.5-6.5 cm; tube 1-1.3 × 1-1.1 cm, 5-lobed; lobes ovate-lanceolate, 2-2.5 × 1-1.5 cm, acute to acuminate at apex. Petals 7.6-8 × 8-8.5 cm, polypetalous, 5; obovate, cuneate to unequal at base, entire to undulate along margin, rounded at apex, upper surface reddish brown with and red centred, lower surface light orange with yellowish tinged; veins prominently raised beneath, creamy yellow. Staminal column velvety red, 5-5.1 × 0.3-0.5 cm; naked zone 3-3.2 cm long; anther zone 1.8-2 × 1.2-1.3 cm; anthers 0.1 × 0.1-0.2 cm, kidney shaped, yellow; filaments 0.2 - 0.4 cm long. Pistil 6-6.2 cm long; ovary cylindrical, 1-1.1 × 0.7 cm; style 4-4.3 cm long, linear; stigma red, 0.9-1 × 0.7-1 cm, 5-lobed; lobes 0.1-0.2 × 0.3-0.4 cm, unequal, densely hairy.

Flowering: Round the year. Usually, flowers open early in the morning and close after one day of its opening in summer and two days in winter.

Propagation: Cutting, grafting and budding.

4. CONCLUSION

The current breeding work has led to the development of new hibiscus cultivar 'Nameeta', which has a high propagation rate through cuttings, budding, grafting and other methods, as well as good resistance to diseases and stress. The plant produces an abundance of gorgeous flowers, and has gained significant ornamental value and cultural importance. This new hybrid is also suitable for pot culture and landscaping. This work will assist local farmers in boosting their economic opportunities within the country.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that no generative AI models and text to image generators have been used during writing and editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Ahmad Nazarudin, M. (2012). Plant growth retardants effect on growth and flowering of potted *Hibiscus rosa-sinensis* L. *Journal of Tropical Plant Physiology*, 4, 29–40.

Brickell, C. D., Alexander, C., Cubey, J. J., David, J. C., Hoffmann, M. H. A., Leslie, A. C., Malécot, V., & Jin, X. B. (2016). *International Code of Nomenclature for Cultivated Plants*. Executive Director of ISHS: Ir. J. Van Assche, ISHS Secretariat.

Chakraborty, D., Swamy, J., & Singh, D. (2023). Development and characterisation of new *Hibiscus rosa-sinensis* cultivar ('Janaki Ammal') from India. *International Journal of Horticulture and Food Science*, 5(1), 77–80. https://doi.org/10.33545/26631067.2023.v5.i1b.161

Chakraborty, D., Swamy, J., & Singh, D. (2023a). Development and characterisation of a new *Hibiscus rosa-sinensis* L. cultivar ('Krishna's Radiance') from India. *Journal of Experimental Agriculture International*, 45(9), 188–194. https://doi.org/10.9734/jeai/2023/v45i92191

Chakraborty, D., Swamy, J., & Singh, D. (2023b). Development of new *Hibiscus rosa-sinensis* L. cultivar Acharya Jagadish Chandra Bose in West Bengal, India. *Journal of Experimental Agriculture International*, 45(12), 155–159. https://doi.org/10.9734/jeai/2023/v45i122273

Chawdhuri, T. K., Chakraborty, D., Sadhukhan, R., & Mondal, S. (eds.). (2022). *Hibiscus*. In: *Textbook on Floriculture* (pp. 514–560). Jaya Publication House.

International Hibiscus Society. (2024). The Official ICRA Nomenclature database of all registered *Hibiscus* hybrids. Available at: https://internationalhibiscussociety.org/searchive/index (Acceded on 10/06/2024).

Janakiram, T., & Patil, M. S. (2017). Breeding in *Hibiscus*: A review. *Indian Journal of Agricultural Sciences*, 87(2), 159–166.

Kaboré, A. (2013). The symbolic use of palm, figurines and *Hibiscus* in Adichie's *Purple Hibiscus*. *Linguistics and Literature Studies*, 1(1), 32–36.

Magdalita, P. M., & San Pascual, A. O. (2022). *Hibiscus* (*Hibiscus rosa-sinensis*): Importance and classification. In: S. K. Datta & Y. C. Gupta (eds.), *Floriculture and Ornamental Plants* (pp. 483–522). Springer Nature. https://doi.org/10.1007/978-981-15-3518-5_18

Magdalita, P. M., Cayaban, M. F. H., Gregorio, M. T., & Silverio, J. V. (2016). Development and characterization of nine new *Hibiscus* hybrids. *Philippine Journal of Crop Science*, 41(2), 31–45.

Plants of the World Online. (2024). Facilitated by the Royal Botanic Gardens, Kew. Available:http://www.plantsoftheworldonline.org/ (Accessed on 03.10.2024).

Pramanick, D. C., Dash, S. S., Mastakar, V. K., & Paul, T. K. (2020). *Malvaceae*. In: A. A.

Mao & S. S. Dash (eds.), *Flowering Plants of India* (pp. 165–175). Botanical Survey of India.

Swamy, J., Chakraborty, D., & Singh, D. (2023). Development and characterisation of new *Hibiscus rosa-sinensis* L. cultivar ('AA Mao') from India. *International Journal of Agriculture Innovations and Research*, 11(6), 135–139.

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