Original Research Article

Development and characterisation of a new *Hibiscus rosa-sinensis* L. cultivar ('Krishna's Radiance') from India

Abstract

A new significant cultivar *Hibiscus rosa-sinensis* L. cv. 'Krishna's Radiance' has been developed from the cross pollination of *H. rosa-sinensis* L. cv. 'Houdini' (Female pod parent) and *Hibiscus rosa-sinensis* L. cv. 'HVH Rain Drop' (Male pollen parent). Detailed hybridization and characterisation of the new cultivar with photographs is provided to facilitate identification.

Keywords: Cultivar, 'Krishna's Radiance', *Hibiscus,* West Bengal, 'Houdini', 'HVH Rain Drop'

1. INTRODUCTION

The genus *Hibiscus* L. belongs to the flowering plants family Malvaceae. It comprises about 432 species [1,2,3] and more than 23306 registered cultivars [4] 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 taxa belonging to 23 species, one subspecies and three varieties [5] and has 372 registered cultivars [4]. The state West Bengal is represented by 300 cultivars of *Hibiscus* [2,3], which are using in landscape development and also as ornamental plant.

While working in the Hibiscus section, Acharya Jagadish Chandra Bose Indian Botanic Garden, Botanical Survey of India, Howrah. The authors have been developed a new cultivar of *Hibiscus* by cross pollination between the *Hibiscus rosa- sinensis* L. cv. 'Houdini'

(Female pod parent) and *Hibiscus rosa- sinensis* L. cv. 'HVH Rain Drop' (Male pollen parent). The cultivars were procured from plant nurseries of West Bengal which were imported from Texas and USA California respectively. The newly developed cultivar easily recognised by its blue flower with whitish eye zone and white veins radiating from centre. The blue colour of the flower symbolises to 'Lord Sri Krishna' to and the spreading of white veins on the petals from eye zone is symbolises to the radiance of peacock feather on his head. Hence, the new hybrid seedlings were named as 'Krishna's Radiance'. Detailed hybridisation process and characterisation of the new cultivar with photographs is provided to facilitate identification.

2. MATERIALS AND METHODS

2.1. Selection of parents

Selection of parent plants are very important to develop and improve plant quality, bloom presentment, ability to bloom, bloom size and other aspects of ideal new *H. rosa-sinensis* cultivars [2,3,6,7]. Before cross pollination, authors randomly cross checked that, how genetic traits of parent plants has come into play and how they tend to pass genes to progeny. To track the lineage of *Hibiscus* cultivars, authors have been consulted cultivar genealogy tree of International Hibiscus Society database and the National Gardening Association. Based on the genealogy of Hibiscus, the authors obtained female parent (Houdini) and male parent (HVH Rain Drop) from nurseries of West Bengal which were imported from Texas and USA California respectively.

2.2. **Hybridisation**

During winter (December, 2021), the designated female parent was identified one day before pollination, while the flower is at the full balloon stage [2,3,6,7]. The petals were removed to

expose the stigma and this was covered with a piece of packet to avoid pollen contamination. For Hibiscus breeding, we have collected pollens from a designated male parent through brush methods then it was transferred manually into the previously covered stigma of the chosen female parent during day time at 10:03 am (10-12-2021). After crossing, the crossed flowers were covered with paper bag to avoid contamination from pollinators. The pollinated flowers were labelled, which is indicating that the parents were involved in crossing. After a week of crossing, the bags are removed and the young capsules were allowed to develop under natural conditions. After 60 days of its successful pollination, about 15 seeds were collected from the matured capsules in February 2022. At the end of March, 2022, the collected seeds were carefully cut round with a sharp sterilised blade to open hard shells and were soaked overnight in water. Soaked seeds covered with tissue paper and shifted to an airtight container and maintained 25-30°C temperature. The seeds were sprouted within 7-8 days. The sprouted seeds were transferred to a media bed which is consisting of coco peat. Seedlings were gradually acclimatized in to natural conditions, after sprouting of 2-3-leaves from the growth media bed. Undeveloped or poorly developed and die back diseased seedlings were discarded. After the examination of seedlings, found that few seedlings were obviously different from the previous registered hibiscus cultivars. After six months healthy seedlings were shifted experimental garden of AJC Bose Indian Botanic Garden, Howrah for further characterisation. For the hybridisation, development and characterisation, the methodology described [2,3,6,7] has been followed.

Pod Parent- *H. rosa- sinensis* L.

cv. Houdini

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Pollen Parent- *H. rosa- sinensis* L.

cv. HVH Rain Drop

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***H. rosa-sinensis* L. cv. 'Krishna's Radiance'**

Figure 1: The hybrid *Hibiscus rosa- sinensis* L. cv. 'Krishna's Radiance' and it's female parent *H. rosa-sinensis* L. cv.'Houdini' and male parent *H. rosa-sinensis* L. cv. 'HVH Rain Drop'.

Results and discussion

CHARACTERIZATION OF NEW CULTIVAR

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, 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 cultivar. The characters like beautiful blue flower with a brilliant contrasting white eye at centre and white rays spreading up to the margin, a longer flowering period (more than two days in winter and 1 day in summer) and upright, well branched bush have been observed as a stable. Hence, the new cultivar was registered on 05.04.2023 at the International Hibiscus Society and subsequently, the register cultivar accepted by the society. (https://internationalhibiscussociety.org/searchive/genealogy_tree?Search_box=Krishna%20s%20Radiance).

TAXONOMY OF *HIBISCUS ROSA-SINENSIS* L. CV. KRISHNA'S RADIANCE

Shrubs up to 2 m high; branches densely upright, green; intermodal portion 2.5-4.5 cm long. Leaves simple, petiolate; petiole ca. 4.5 × 0.3 cm; blades broadly ovate, 11.7-12 × ca. 10 cm, cordate at base, crenate along margin, acute at apex, dark green on upper surface, light green on lower surface, 5-nerved from the base. Stipules linear to lanceolate. Inflorescence axillary, solitary; peduncle ca. 4.1 × 0.3 cm; pedicel ca. 0.7 × 0.4 cm; flower bud pale yellow, ca. 5.3 × 2 cm. Flowers purple 15.5-16 × 15.5-16 cm. Epicalyx number ca. 3 × 3.2 cm, linear to lanceolate, 7 lobed, each lobe 0.8-0.9 × 0.2-0.3 cm. Sepals united below the half ca. 3.1 × 4.8

cm, tube ca. 1 × 0.9 cm long, 5-lobed; lobes ovate-lanceolate, ca. 2 × 0.9-1 cm, acute to acuminate at apex. Petals 8-8.2 × ca. 8 cm, polypetalous, obovate, cuneate to unequal at base, entire to undulate along margin, rounded at apex, upper surface with white eye zone and

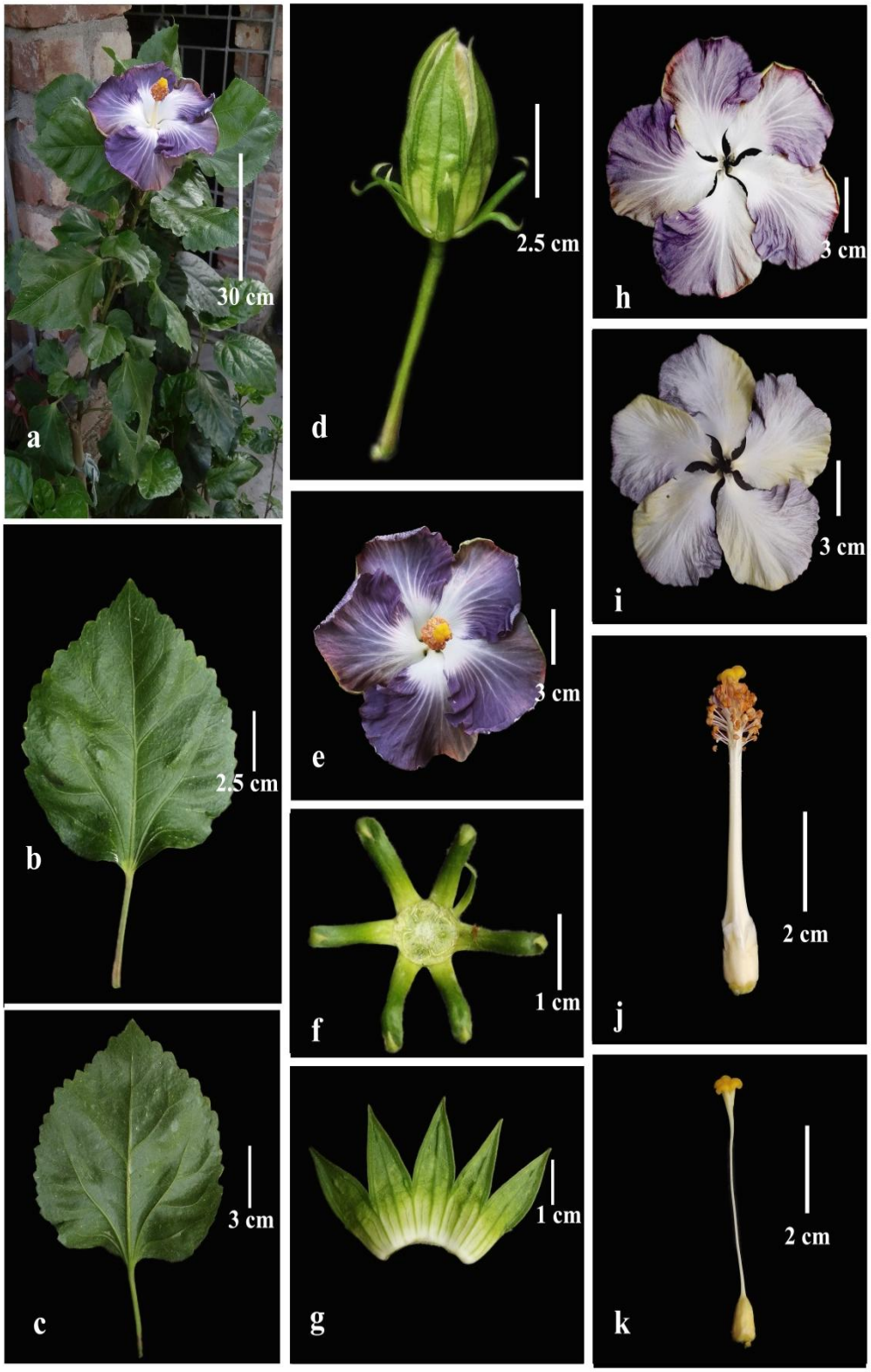

Figure 2: *Hibiscus rosa- sinensis* L. cv,'Krishna's Radiance': a. Habit; b-c. Leaves; d. Flower bud; e. Flower; f. Epicalyx; g. Calyx; h. Corolla-upper surface; i. Corolla- lower surface; j. Staminal column with pistil; k. pistil

purple to blue at edges, lower surface creamy with purple and pale-yellow patches; veins prominently raised beneath, whitish-creamy. Staminal column creamy, ca. 7.8 × 0.5 cm; naked zone ca. 5.1 cm long; anther zone ca. 1.7 × 1.3 cm; anthers golden 0.2-0.3 cm across, kidney shaped, yellow; filaments 0.3-0.4 × 0.1-0.2 cm. Pistil ca. 6.7 cm long; ovary cylindrical, ca. 1.1 × 0.5 cm; style ca. 5 × 0.1 cm long, linear; stigma yellow, ca. 0.8 × 0.9 cm, 5-lobed; lobes 0.2-0.3 × 0.3-0.4 cm, unequal, densely hairy.

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

Propagation: It can be done by cuttings, grafting and budding.

3. CONCLUSION

The present breeding work led to the development of a new cultivar i.e. 'Krishna's Radiance' which has a very much ornamental potential, cultural significance and also useful in landscaping. Since, the hibiscus flowers have high demand in the country especially in West Bengal for cultural significance. The newly developed *H. rosa-sinensis* L. cv. Krishna's Radiance will address the current demand of the country/region and further it has a wide scope for future research, especially in the field of pharmacology and as cosmeceuticals. The developed hibiscus cultivar registered in the International Hibiscus Society.

REFERENCES

1. POWO. *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. 2023. Accessed on 10 July 2023. Available: http://www.plantsoftheworldonline.org.
2. Chakraborty D, Swamy J., Singh D. Development and characterisation of new Hibiscus rosa-sinensis cultivar ('Janaki Ammal') from India. International Journal of Horticulture

and Food Science 2023; 5(1): 77-80. DOI: https://doi.org/10.33545/26631067.2023.v5.i1b.161

3. Swamy J, Chakraborty D, Singh D. Development and Characterisation of New Hibiscus rosa-sinensis cultivar ('A.A. Mao') from India. International Journal of Agriculture Innovations and Research 2023; 11 (6): 135-139.
4. International Hibiscus Society the Official ICRA Nomenclature database of all registered Hibiscus hybrids. 2023. Accessed on 30 June 2023. Available: https://internationalhibiscussociety.org/searchive/index
5. Mao AA, Dash, SS, editors. Flowering Plants of India: An Annotated Checklist (Dicotyledons). Botanical Survey of India, Kolkata. 2020. 1; 165-175.
6. Magdalita PM, Cayaban MFH, Gregorio MT, Silverio JV. Development and characterization of nine new Hibiscus hybrids. Philipp J Crop Sci. 2016; 41(2):31–45.
7. Magdalita PM, San Pascual AO. Hibiscus (*Hibiscus rosa-sinensis*): Importance and classification. In Floriculture and Ornamental Plants. Singapore: Springer Nature Singapore; 2022; 483-522.