

## Fruit breeding by *Hibiscus rosa-sinensis*: An inherited phenomenon

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### Abstract

*Hibiscus rosa-sinensis* is a south-east Asian native plant, grown by Indian as an ornamental plant. It propagates by hardwood cuttings. In rare conditions, it reproduces by fruit. On search of several years, we found fruit breeding *Hibiscus* plants in Krishna delta of Andhra Pradesh, India.

**Key words :** Fruit breeding, *Hibiscus*, Seed germination.

*Hibiscus rosa-sinensis* is a well-known cultivated ornamental plant. It is an evergreen shrub. There are about 275 species under the genus *Hibiscus*<sup>3</sup>. The *Hibiscus* is native to South-east Asia, and appear in all other tropical regions of the world<sup>5</sup>. It shows best growth in the wet soils and also in slightly acidic soils. It is the national flower of Malaysia. *Hibiscus-rosa sinensis* has been used to treat several disorders. With its antioxidant property, it is used for oxidative modifications. It is also used to treat diabetes related disorders like Hyperglycemia, Hypercholesteremia, Hyperlipidemia<sup>4</sup>. The wild *Hibiscus* species reproduce by sexual method. *Hibiscus* adapt several pollination methods to attract pollinators like birds and insects by its colourful petals and nectar. Under natural circumstances, *Hibiscus* hardly produces fruit and seeds<sup>2</sup>. In general, successful pollination leads to the formation

of zygote and seed development results in the formation of fruit. But in the case of *Hibiscus rosa sinensis*, sexual reproduction is rare a phenomenon. Such rare occurrence was observed in Machilipatnam of Andhra Pradesh.

### Location :

Machilipatnam town is (16.17°N 81.13°E) located in the state of Andhra Pradesh, on East coast of India. This town distributed in 26.67 Km<sup>2</sup> area, at 14 meters elevation from median sea level. In Geographical view, the town is located in tropical savanna climate. Most of the rains occur during South-West monsoon. The average annual rainfall is 760 mm. Soil consists of coastal sand. This town is semi-urban, surrounded by paddy fields and aquaculture ponds at south end. The annual average of humidity is 73%.

*Findings :*

In tropical regions, *Hibiscus* is evergreen and blooms year-around. In and around of Machilipatnam coastal region, *Hibiscus* produces fruits during the last half winter (January-February).

As per our survey, in the Machilipatnam and nearby areas we have noticed that about 10% of the plants develop the ovary as fruit. Fertilized eggs develop as seeds and fruit development starts from the third week of December. The fruit develops in a span of two weeks (Fig. 1). The mature fruits appear from last week of December up to February. The fruit is Dry-dehiscent type. After maturity, just before drying, capsule bursts and shed the seeds (Fig. 2). After shedding seeds, the fruit remain attached to plant. They shed off during rainy season (south-west monsoon) after decompose (fig. 3). Herbarium is preserved at Central Ayurveda Research Institute, Bengaluru (Accession Number RRCBI-20656).



Fig. 1. Mature fruit of *Hibiscus rosa-sinensis*



Fig. 2. Dry dehiscent fruit of *Hibiscus* with seeds



Fig. 3. Broken fruit, attached to twig

*Experimentation :*

For testing, some of the seeds were collected and planted in another geographical region, Zangareddigudem (17.12°23' N, 81.29°23' E). It is an upland area of West Godavari District of Andhra Pradesh state of India at 78 m altitude from median sea level. This study area was selected because, as per our observations, no *Hibiscus* plant reproduced through fruit.

We have planted collected seeds (from Machilipatnam) during February, 2020

and then planted in August 2020 at Zangareddigudem. Seed Scarification of *Hibiscus* seeds with Sulphuric Acid ( $H_2SO_4$ ) stimulate germination and also increase germination ratio<sup>1</sup>. We planted the collected seeds without any chemical scarification. The seeds were germinated in natural conditions, during rainy season. Among the planted seeds, 40% were germinated. Germination occurred in about 7 to 8 days. All germinated plants were survived. first flower was observed at the age of 16 months (December, 2021).

The young plants at Zangareddigudem also produced fruits. Their first fruit was observed in First week of January, 2022 and 2023. Those fruits matured by third week of January and broken to disperse seeds.

Among the fruiting *Hibiscus* plants, only about 2-3% of the flowers develop into fruit. The flowering phenomenon was observed in the germinated generation, in different climatic conditions. It shows the inheritance of the flowering character. The young

generations raised from seeds produced fruits. Such inheritance could be due to mutation.

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