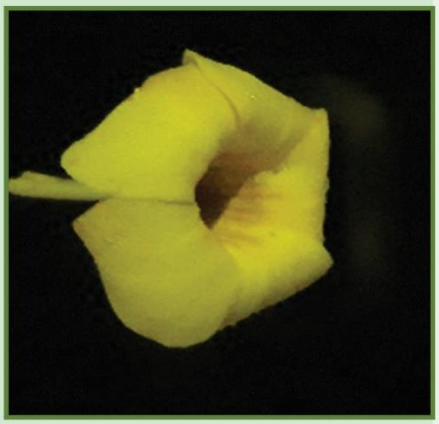
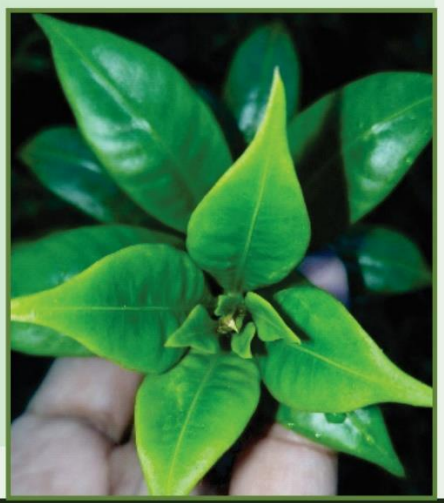
Rukkatthana *(Allamanda cathartica)*
A Charming Beauty in Sri Lanka





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FOREWORD

Allamanda cathartica is a very significant evergreen herbal shrub, commonly called ‘’Golden Trumpet’’ or Rukkathana in Sri Lanka. This meticulous herb is having variety of importance as an ornamental, aesthetic medicinal and other values. This monograph is a comprehensive and contemporary overview on botanical aspects, geographical distributions, morphological variations and cultural practices. The book affirms the importance of the Rukkathana plant as an essential and integral herb of the natural eco system. The addition of color plates and scientific illustrations makes this book the most comprehensive resource on underutilized plant Rukkathana.

This monograph was prepared by Ms. W. G. C. Madushani as a part of her M.Phil. degree programme and as a realization of an endeavor of the World Bank Funded AHEAD / ICE Project of University of Colombo Institute for Agro-Technology and Rural Sciences – Sri Lanka. This monograph would be helpful to the undergraduate and post graduate students, botanists, floriculturists and researchers to understand the taxonomic literature specifically in family Apocynaceae for which *Allamanda cathartica* belongs.

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1. Introduction

1.1 General Description

Allamanda cathartica is commonly called **''Golden Trumpet ''** and in Sri Lanka it is known as Rukattana. It belongs to the family Apocynaceae and native to tropical South America, from Peru and Colombia eastwards to French Guiana and Brazil. This is perennial plant and mainly grows in Sri Lanka as an ornamental plant in home gardens and rode sides. Individuals are fast growing plants and spread rapidly by layering. It produces, attractive and charming concurred bright yellow flowers. In Sri Lanka, the shrub blooms throughout the year. Also, it is abundantly distributed in the wet zone, dry zone and intermediate zone. In this plant various parts are being used in Ayurveda medicine owing to their medicinal properties. Thereby, *Allamanda cathartica* is an important medicinal and ornamental plant however, still remains as a neglected plant.

1.2 Scientific Classification

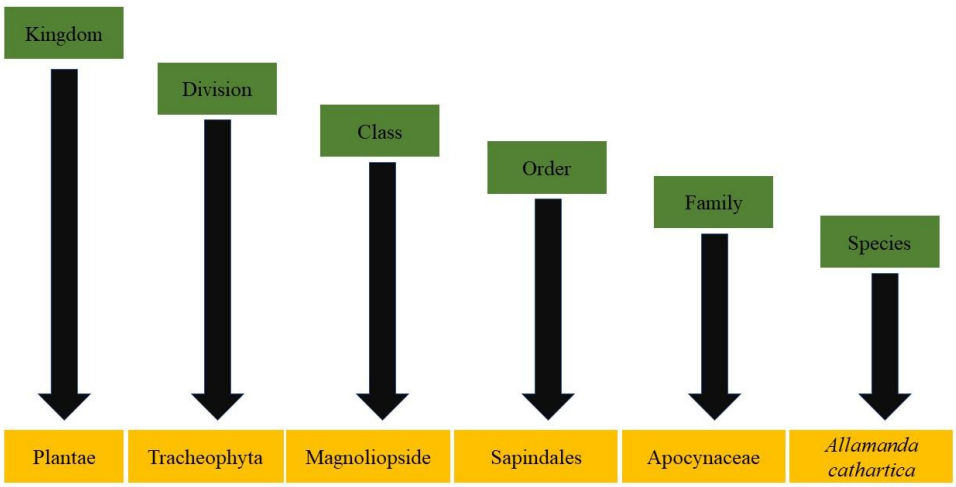

Figure 1.1 : *Scientific Classification of Rukkathana*

1.3 Synonyms

Table 1.1 : *Allamanda cathartica* synonyms

Country	Name
Sri Lanka	Rukattana
Australia [2]	Allamanda
Bangladesh	Allamanda , Allokananda,Fok Kaia
Brazil [8]	Buiussu, Goldern trumpet, Yellow Bell, Buttercup flower
Guatemala [5]	Butter cup, and Campana
India [6]	Allmanda, Golden trumpet vine
Indonesia [3]	Bunga Terompet
Thailand [4]	Golden trumpet
Nigeria [7]	Allamonda, Yellow Allamanda, Golden trumpet

2. Botany of the Plant

2.1. Leaves

Leaves are arranged whorled or verticulate, along the stem. These leaves are simple. They are borne on very short petioles.The leaf shape is varied in broad lanceolete to narrow lanceolete, leaf base shape varied in acute to cunate, apex shape varied in acute to acuminate and leaflet margin is entire.

Figure 2.1 : Leaves of Rukkathana

Its length varied from 3.5cm to 7.5 cm. Leaflet width varied from 0.9cm to 2.5cm, petiole length ranged from 0.5cm to 1.5cm and Internode length is varied to 2.0cm to 4.0cm. Leaf color ranged from light green to dark green colour.

2.2. Flower

Figure 2.2 : Flowers of Rukkathana

Flowers have five bright yellow concurred petals that are fused together at the base to form a tube referred as corolla tube is about 3-5cm long. This tube has light reddish markings on the inside and is topped with five spreading petal lobes. The flowers also have five sepals of 6-15mm long. Each flowers also has five stamens that are joined directly onto the inside of the petals. The flowers are born in loose clusters near the tips of the stems. Each contain about 8-10 flowers. Petal length is varied from 1.8cm to 5.5 cm. and width varied from 1.5cm to 3.5cm. Flowers occurs throughout the year

2.3. Fruit

Allamanda cathartica fruit are rounded capsules that are densely covered with soft spines. These fruits are rarely seen in cultivated plants.

2.4. Stem

Allamanda cathartica older stem are mostly woody and brownish in color. Stem cross section is rounded shape. The younger branches, the stems and leaves contain a milky sap (latex).

Fiaure 2.3: Stem of Rukkathana

2.5. Root

Allamanda cathartica has a very strong and extensive root system and therefore a combination of manual and chemical methods are recommended for its management.

3. Properties of the Plant

3.1 Chemical composition of the plant

The plant contain several chemicals as follows;

- Flavonoids [17]
- Saponins [18]
- Terpenoids
- Tannin
- Cardiac glycoside
- Phenolic
- Alkaloids [15]
- Anthraquinones
- Lignin
- Lipids
- Quinones
- Steroids
- Terpenes
- 9,12,15-octadecatrienoic acid(Z,Z,Z) [20]
- n-hexadecenoic acid [20]
- 3-O-methyl-d-glucose[20]
- 9,12,15-octadecatrienoic acid ethyl ester [20]
- 3-O-methyl –d-glucose [20]
- 2-furancarboxaldehyde5-(hydroxymethyl)
- 9,12,15-octadecatrienoic acid

3.2. Pharmaceutical activities

The plant comprised of following Pharmaceutical Activities;

1. Antioxidant [16]
2. Hepatoprotective
3. Digestive activity
4. Wood healing activity [9]
5. Anti –tumour activity
6. Anticancer
7. Antifertility [11]
8. Antimicrobial [12]
9. Antifungal
10. Antiviral
11. Analgesic
12. Antidepressant
13. Thrombolysis
14. Antimalarial [14]
15. Antihemorrhagic
16. Cytotoxicity
17. Anti-Inflammatory [10]
18. Anti-diabetic [13]

3.3. Uses in traditional medicine

In Ayurveda and Unani medicine the entire plant is being used as medicine beyond the certain limit of concentration. Paste of roots is applied on insects' bites. The plant is used for curing acute abdominal pain, to treat liver tumours, jaundice, splenomegaly, and malaria. The chemicals in the plant help to improve blood circulation [1] and to reduce inflammations.

3.4. Hazards of the plant

All parts are poisonous if eaten, its sap causes skin and eye irritation. Symptoms may include fever, swollen lips, thirst, nausea, and diarrhea. All the parts of the plant induce skin photosensitivity. This means they make skin more vulnerable to irritation due to ultra-violet rays. Furthermore, ingesting the plant could causes nausea and vomiting. [19]

4. Geographical Distribution

4.1. Worldwide Distribution

Allamanda cathartica is having a wide global distribution in warm climates of tropical and subtropical areas of many countries including South America, Peru [21] ,Colombia eastwards to French Guiana and Brazil. Sri Lanka, India, Nepal, Buthan, Thailand, Indonesia [23], Philippines, Bangaladesh, Taiwan, United states, Ecudor, Colombia, Mexico, Austraila, China, Tanzania, Guatemala, Salvador, Cuba, Singapore [24], Hongkong, Myanmmar and Spain etc.

5.2 Distribution in Sri Lanka

In Sri Lanka, *Allamanda catharica* is abundantly distributed in Kalutara,Matara. Galle, Gampaha, Kandy, Anuradhapura, Polonnaruwa,Rathnapura,Kurunegala,Kegalle, districts. Monaragala, Matale, Jaffna, Mulative, Puttalam, Trincomalee, Vavnia districts and hardly distributed in Nuwaraeliya, Badulla districts

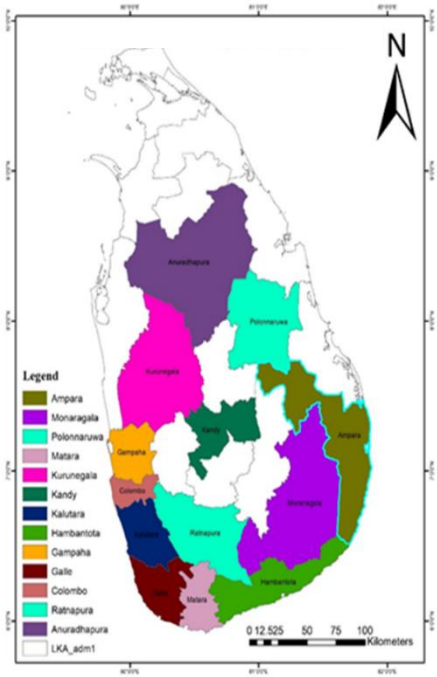

Figure 4.1: Mainly *Allamanda cathartica* distribution districts in Sri Lanka

5. Morphological variations in Sri Lanka

5.1 Floral Variations

Plate 05- Bright yellow petals, highly concurred petals **–Rathnapura**

Plate 06- Slightly curved Light yellow &petals **Matara**

Plate 07– weakly curved petals, free petals -

Plate 08- Bright yellow petals, Highly curved petals **– Rathnapura**

Plate 09. Light yellow, slightly curved petals **Thissamaharamaya**

Plate 10. Slightly curved petals- **Hambantota**

Plate 11- Light yellow petals, weakly curved

Plate 12-Highly curved petals,bright yellow petals- **Kandy**

Plate 13- highly curved petals, bright yellow

Plate 14- light yellow petals, highly curved

Plate 15 – Bright yellow, free petals, slightly curved

Plate 16- light yellow color, slightly curved

Plate 17- light yellow color, slightly curved

Plate 18- Bright yellow petals, overlap petals-

Plate 19- Bright yellow

Figure 5.1*: Floral variations of Rukkathana*

Petal shapes varied as Obovate, Oblanceolate, and Oblong

5.2 Leaf Variations

Plate 20- Higher internode length, narrow lanceolete – **Kaluratara**

Plate 21. shorter internode length. Yellowish green leaves **– Rathgnapura**

Plate 22 oblanceolate leaves, higher internode length – **Matara**

Plate 23- Narrow lanceolate leaves- Higher internode length- **Matale**

Plate 24 Dark green leaves, higher internode length- **Monaragala**

Plate 25- Light green leaves, borad lanceolate- **Kandy**

Plate 26 Shorter internode length – Narrow lanceolate-

Figure 5.2*: Leaf variations of Rukkathana*

6. Reproduction and Dispersal

6.1 Sex distribution

Flowers are Bisexual (Each flower has both male and female structures).

6.2 Pollination

Flowers are pollinated by insects. The color selectively attracting the pollinators.

6.3 Seed dispersal

Seeds are rarely produced by cultivated varieties and spread by birds and other animals.

6.4 Genomic composition

Chromosome number of *Allamanda cathartica* is 2n=18

6.4 Propagation

Plate 6.1 : *Allamanda cathartica*

Propagation is mainly done by vegetative propagation. The propagation of *Allamanda cathartica* in vegetative mean is difficult possibly due to the existence of latex within the plant parts that might suppress the root formation. Generally, this plant is propagated through stem cuttings using hard woods or semi - hard woods but with a limited success. The shoot tips raised in sand and coir dust mixture give the highest rate of survival with highest rooting percentage at three weeks after the establishment of shoot tips. These plants with a well-developed root system are ready for field planting by four weeks. (Rifnas *et al*., 2019)

7. Management Practices

7.1 Requirements for Planting

Exposure

Full sun light

Water

A particularly high water content in growing soil needs during the 1st year after planting. The best use is rain water because *Allamanda* is sensitive to calcium-loaded water. Regular spraying the leaves with soft water helps to keep the high moisture levels that it needs.

Soil

Adaptable to different soil types, no other special requirements.

Fertilizer

Add fertilizer to the flowering plants once or twice a month, especially for plants grown in pots.

7.2 Pruning of *Allamanda cathartica*

Allamanda plants require frequent pruning for their rapid growth. Severe pruning can also be performed several times a year, or one in every couple of years. After pruning, the hedges should be watered and fertilized to stimulate the plant to grow.

7.3 Pest and Disease Management

Allamnda is a plant very hardly prone insects pests. If leaves turn brown and curl, most probably aphids are colonizing the plant. The plants are susceptible to root rot when overwatered or planted under shade.

Considering all these characteristics and performances there is a vast potential to popularize this neglected ornamental plant as a domesticated indoor plant in the floriculture industry.

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