



## Rediscovery of *Cayratia Pedata* (Lam.) Gagnep. Var. *Glabra* Gamble (Vitaceae), a Steno-Endemic and Endangered Climber

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### Abstract

The documentation of ethnopharmacobotanical information's of herbaceous plants in Thiashola (Thaishola in Tamil), Manjoor, Nilgiris South Division, Western Ghats was undertaken with necessary permission from the Principal Chief Conservator of Forests, Chennai and the District Forest Officer, Ooty under Section 28 (i) of Wildlife Protection Act, 1972, during 2009 and 2010. However, while working on the ethnobotanical survey in evergreen forest of Thiashola, we rediscovered *Cayratia pedata* (Lam.) Gagnep. var. *glabra* Gamble at the altitude between 1800 and 2200 m above mean sea level, the type locality, after a gap of 57 years. Before this, *Cayratia pedata* var. *glabra* had not been reported from Thiashola. The present study deals the full description; photograph and note on its taxonomy are provided. Current threat status has also been assessed based on the recent botanical explorations.

**Keywords:** Thaishola, *Cayratia pedata* var. *glabra*, endemic, nilgiri

### Introduction

The Indian subcontinent is remarkable for its exceptional level of biological diversity at broad habitat level and within these habitats at species level. Due to rich diversity of biotic resources, India is ranked one of the 12 mega diversity countries in the tropics<sup>1</sup>. This rich biodiversity in India is largely due to her varied physical environment in terms of latitude, longitude, altitude, geology and climate. Apart from this status of mega diversity country India harbours three important global hotspots such as Western Ghats, Eastern Himalayas and Western Himalayas, due to high degree of endemism.

The mountains along the west coast of peninsular India, the Western Ghats, constitute one of the unique biological regions and it extends from the southern tip of the peninsula (8° N) northwards and about 1600 km to the mouth of river Tapti (21° N). Among the various bio-geographic zones of India, Western Ghats contain high degree of endemism and is very rich in its medicinal wealth. The forests and hills of this region is a treasure house, nearly of about 2000 species of higher plants, 92 species of amphibians, 89 species of reptiles, 15 species of birds and 12 species of mammals are endemic to Western Ghats<sup>2,3</sup>.

The Nilgiri Biosphere Reserve or Blue Mountains is an International Biosphere Reserve occupies a total area of 2542.49 Sq Kms, located in the Western Ghats of Palghat Gap (10° 45' - 12° 5' N latitude and 76° 10' - 77° 10' E longitude), spreads over an area of 5,520 km<sup>2</sup> in the states of Karnataka (1527.4 km<sup>2</sup>), Kerala (1455.4 km<sup>2</sup>) and Tamil Nadu (2537.6 km<sup>2</sup>) and falls under the biogeographical region of the Malabar rain forest. Sholas, an evergreen forest and non-renewable natural resources are found intensively in the Nilgiris South Division and adjacent areas of Kerala in the upper ranges of Silent Valley, Attapadi and New Amarambalam. They are found in the mountain zones around 1600 m and above. These relic forests occupy the sheltered valleys in the mountain depressions. The sholas are extremely dense, with an average of 3000 small trees per hectare. It is a natural vegetation of the high plateau called as virgin forest. The shola, a stable plant community in equilibrium, is considered to be climax vegetation with high biodiversity, which includes many endemic, endangered and rare species of both flora and fauna. Because of the well organized structure, the sholas provide eco-balance as well. Further, due to the arrangement of soil profile, angle of land surface, they are the potential sites for many economically and medicinally important plants<sup>4,5</sup>.

The total geographical area of sholas in Nilgiris is 4225 ha. One among the shola in Nilgiris is Thiashola (Image 1). It is a montane subtropical wet evergreen forest located in the glens or depressions at an altitude between 1800 and 2200 m above mean sea level with limited geographical area of 1600 ha. Thiashola is located in close proximity at latitude 11° 13'N and longitude, 76° 39'E. The study forest is located in the hill slopes and surrounded by grasslands which extend upto hill tops throughout the slopes.

The documentation of ethnopharmacobotanical informations of herbaceous plants in Thiashola (Thaishola in Tamil), Manjoor, Nilgiris South Division, Western Ghats was undertaken with prior permission from the Principal Chief Conservator of Forests, Chennai and the District Forest Officer, Ooty under Section 28 (i) of Wildlife Protection Act, 1972, during 2009 and 2010. Since the study shola is declared as reserve forest, the entry is restricted and direct impact of man on the forest is negligible (Image 2). However, while working on the ethnobotanical survey in evergreen forest of Thiashola, we rediscovered *Cayratia pedata* (Lam.) Gagnep. var. *glabra* Gamble at the altitude between 1800 and 2200 m above mean sea level. The climber *Cayratia pedata* var. *glabra* was found as a single population in evergreen vegetation of the study area<sup>6</sup>. Before this, *Cayratia pedata* var. *glabra* had not been reported from Thiashola (Image 3).

*Cayratia pedata* var. *glabra* is a globally endangered and fragile liana belongs to the family Vitaceae (Grape family) embraces 12 genera and approximately 700 species. Although plants belonging to this family are widely distributed in the tropical and subtropical areas of the world, some often extend into the temperate regions. In India the family is represented by 8 genera and 95 species occurring in the Western Peninsular India and in the Himalayas<sup>7,8,9</sup>. As per the IUCN red list categories the species *Cayratia pedata* var. *glabra* is listed in Red data book. It is endemic to peninsular India and is known by various names like “Pannikkodi, Tiripatakam, Kattupirandi, Ainthilai kodi” in Tamil, “Velutta Sori Valli, Tripadi, Amarccakkoti” in Malayalam and “Gummadi tige, Edakula mandulamari, Gummadi tige” in Telugu. The whole aerial plant part of this genus is used in Ayurveda, Folk and Siddha for the treatment of boils<sup>8</sup>, antiseptic, antidiarrhoeal, refrigerant and cough<sup>10</sup>. The decoction of leaves checks uterine and other fluxes<sup>11</sup>. Lukewarm leaf juice is used as ear drops for fungal infections<sup>12</sup>. The leaves are astringent, refrigerant and also used to cure ulcers<sup>13,10</sup> (Image 4).

#### Materials and Methods

The ethnopharmacobotanical investigations of herbaceous plants were carried out in Thiashola (2100 m above msl – 1600 ha), Manjoor. Plants were collected in their flowering and fruiting seasons from the natural habitat. While collecting the individual plant species, a thorough observation was made regarding the location, natural habitat, distribution pattern, habit, nature of roots, tubers, bulbs or rhizomes, floral and fruit characteristics etc. Seasonal variations, flowering and fruiting stages were also recorded and were entered on the spot in the field note book. The information about the medicinal value of the plants was gathered from the tribal community (Todas) of Thiashola.

The collected plants were identified with the help of the existing Floras<sup>14,15,6</sup> and the identity was compared with type specimens available in the herbarium of Botanical Survey of India, Southern Circle, TNAU Campus, Coimbatore, Tamil Nadu. The plant *Cayratia pedata* var. *glabra* was newly discovered and were identified in the presence of bilobed fruit, it is the important differentiable characterization among the other genus.



Image 1. Origin point of the study shola



Image 2. Side view of the study shola

## Results

The study revealed that out of 106 species enumerated, 76 have been recognized as medicinally and economically important species. At the time of collection we have identified *Cayratia pedata* var. *glabra* with the help of elderly triple people of that region. The tribal community of the Thiashola utilizes *Cayratia pedata* var. *glabra* as ethnomedicine but that time they don't know about botanical name. It is taken orally to rejuvenate the body and is a popular health tonic. Ancient tribes in the Western Ghats of India have also used the leaves of *Cayratia pedata* for several medicinal purposes particularly as an anti-ulcer and hepatoprotective. The whole aerial parts contain strong antioxidants.

### Vegetative and reproductive characters:

*C. pedata* var. *glabra* is a large, fragile liana. The terminal buds of plants develop into tendrils. Tendrils are leaf-opposed, branched, wiry and coiled structure. Stem is hirsute. The leaves are alternate, pedately 5 foliolate (8-15 cm) long and grows upto a height of (8-12 m) with nodes and internodes. Leaflets are elliptic, oblong, serrate (7-12 leaflets; 3-6 cm long) and acuminate apex. Leaves are dark green in colour with characteristic odour and bitter taste. Inflorescence arises just opposite the leaves on the stem. It is axillary, corymbose cymes and divaricate. Flowers are bisexual, greenish, fruiting peduncles (2-5 cm long), sepals (4), lobes rotund (0.5 mm), petals (4), green, ovate (1/8 inch) reflexed soon falling, leaving a conspicuous wavy margin. At young stage the flower is yellow in colour later it is white. Stamens (4), very fugitive, present just opposite the petals, arise from the base of a disc, adnate with the ovary and the filaments are (1 mm) long. Anthers free, large, ditheous and introrse. Gynoecium the ovary is (1 mm) size, bicellular, each locule consists of 2 ovules with axile placentation. Style is one and short (1.5 mm). Stigma bifurcated. Fruits are slightly green in colour, fleshy and bilobed shape at its apex. Fruit shape is the important differentiable characterization among the other genus.

Phenology:

Flowering: May to July

Fruiting: August to October.

Distribution: *C. pedata* var. *glabra* is mainly grown in the Kodanad and Thiashola borders and scrambling over the hedges and trees. The same species has also been reported in Srilanka and Malaya.



**Image 3.** *Cayratia pedata* (Lam.) Gagnep. var. *glabra* Gamble with flowers and fruits



**Image 4.** *Cayratia pedata* (Lam.) Gagnep. var. *glabra* Gamble with fruits

## Discussion

Udayan<sup>16</sup> conducted survey by Taxonomy group of the Centre for Medicinal Plants Research (CMPR), Kottakkal on medicinally important plants of the Western Ghats forest areas of Kerala, Karnataka and Tamil Nadu for about 3-years. This survey resulted in the collection of many species that are of conservation concern that includes rare, endemic, endangered and threatened plants. The list includes very rare and endemic plants such as *Anaphyllum wightii*, *Cayratia pedata*, *Cullenia exarillata*, *Cyclea fissicalyx*, *Cynometra travancorica*, *Dysoxylum beddomei* and *Gymnema khandalense*. Paulsamy<sup>17</sup>, documented some economically important species, with poor population size, like *Acmella calva*, *Asparagus fysoni*, *Cayratia pedata*, *Disphorum leschenaultianum*, *Lycianthes bigeminata*, *Phyllanthus virgatus*, *Rubia cordifolia* and *Thalictrum javanicum* in the shola understories of Nilgiris. These species are found to be endangered due to their lower germination percentage.



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