**test1**

***Cleistanthus collinus* (Roxb.) Benth. ex Hook.f.**

* **Overview:** *Cleistanthus collinus* is a member of the Phyllanthaceae family (Dymock, 1893). It is endemic to the arid forests of southern and central areas of India (Subramanian and Krishnamurthy, 1975; Annapoorani *et al.,* 1984). Several components of the plants were shown to be poisonous (Roxburgh, 1874).
* **Local name:**

*Sanskrit:* Indrayava (इंद्रयव), Kaudigam (कौडिगम), Kutaja (कुटजा), Nandi (नंदी)

*Hindi:* Garrar (गरार), Garari (गरारी), Karra (कर्रा)

*Chhattisgarhi:* Karra (कर्रा)

*English:* Garari

* **APG IV Classification:**

*Kingdom:* Plantae

*Clade:* Tracheophyte

*Clade:* Angiosperms

*Clade:* Eudicots

*Clade:* Rosids

*Order:* Malpighiales

*Family:* Phyllanthaceae

*Genus: Cleistanthus*

*Species: C. collinus*

* **Synonyms:**

*Amanoa collina* (Roxb.) Baill. in Étude Euphorb.: 582 (1858)

*Andrachne cadishaco* Benth. in N. Wallich, Numer. List: n. o 7877 (1847), nom. Nud.

*Andrachne orbiculate* Roth in Nov. Pl. Sp.: 364 (1821)

*Bridelia collina* (Roxb.) Hook. & Arn. in Bot. Beechey Voy.: 211 (1837)

*Clutia collina* Roxb. in Pl. Coromandel 2: 37 (1802)

*Emblica palasis* Buch. -Ham. In Trans. Linn. Soc. London 13: 507 (1822)

*Lebidieropsis collina* (Roxb.) Müll.Arg. in Linnaea 32:80 (1863)

*Lebidieropsis orbiculata* var. *collina* (Roxb.) Müll.Arg. in A.P.de Candolle, Prodr. 15(2):509 (1866), nom. Illeg.

*Lebidieropsis orbiculata* (Roth) Müll.Arg. in A.P.de Candolle, Prodr. 15(2): 509 (1866)

*Lebidieropsis orbiculate* var. *lambertii* Müll.Arg. in A.P.de Candolle, Prodr. 15(2): 510 (1866)

* **Geographical distribution:** This *Cleistanthus collinus* is indigenous to India and Sri Lanka. It is classified as vulnerable according to the International Union for Conservation of Nature (IUCN). It is predominantly found in the dry woods of central and southern regions of India, notably Tamil Nadu, Karnataka, Andhra Pradesh, Puducherry, Maharashtra, Bihar, and Odisha. It is prevalent in rural and countryside of Puducherry, Odisha, Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Karnataka, Malabar, and Tamil Nadu (Nagaraj, 1987; Kazi and Gude, 2022).
* **Distribution in Chhattisgarh:** Throughout in Chhattisgarh.
* **Description:**

***(i) Stem:*** The trees are small and deciduous, reaching heights of 2-15 meters. The branchlets are covered with fine hairs while young, but become smooth as they mature. The young branches are scarlet, while the mature ones are spreading, hard, and smooth. The bark is a dark brown colour, almost black, and has a rough texture. It tends to flake off in rounded thick scales (Kazi and Gude, 2022).

***(ii) Leaf:*** The leaves are simple, arranged alternately in two rows; the stipules are located on the sides and are linear in shape. The lamina is 3-11 cm long and 1.5-8 cm wide. It has an ovate-elliptic to oblanceolate shape, but can also be suborbicular, obovate, or acute. The apex is round, retuse, obtuse, subacute, or apiculate. The margin is entire and the texture is either chartaceous or firmly coriaceous. The lamina is glabrous and has a glaucous appearance underneath. It is regularly glossy. The lateral nerves are pinnate, thin, and prominent. They are arranged horizontally and there are 4-8 pairs. The intercostae are reticulate. The petiole is 3-10 mm in length, Pubescent to glabrous, and slender(Kazi and Gude, 2022).

***(iii) Flower:*** The inflorescences are covered in silky villous and can reach a length of up to 6 cm. They are found on either leafless or primary leafy, short horizontal branches. The flowers are unisexual, with a greenish-yellow colour, arranged in clusters. The male flowers have 3-5 blooms, while the female flowers can have up to 5 flowers. They are located in the axil of the top leaves. The bracts are tiny, with a broad base and a subulate shape, measuring 1.5-3 mm in length. The male flower has pedicels that are 1-2 mm long. The sepal lobes are triangular-oblong or lanceolate-elongated, measuring 3-4 mm long and 1-2 mm broad. They are adpressed fulvous and pilose on the outside. There are 5 petals that are fleshy and pale-yellowish-white. The petals are incurved and linear in shape. The staminal column is approximately 1.5 mm long. The fibres are 1.2 mm long. The anthers are oblong and measure 1-1.5 mm long. The pistillode is ovoid and 0.5 mm long. The female flower has pedicels that are 0.5-1.5 mm long and covered in grey hairs. The calyx-tube is approximately 1 mm long. The sepals are triangular-lanceolate, measuring 4-5 mm in length and 1-3 mm in width. The petals are subulate, measuring 2 x 1 mm. The disc plate is shortly cupular-annular. The ovary is superior, subglobose, measuring 2-2.5 x 2-3 mm, and is glabrous. The styles are thick and measure 3-4 mm in length. They are either almost free or attached to a basal column that is approximately 1.5 mm long. The stigma is fleshy, lobed, and bifid above (Kazi and Gude, 2022).

***(iv) Fruit:*** The fruits are either subglobose or broadly elongated, with a truncated apex. They are shallowly 3-lobed or 3-angled, measuring 18-22 x 17-22 mm. When dried, they appear dark brown or black and have a shiny, glabrous surface with conspicuous reticulate venation. The seeds are globose and black, and there are three of them. The pedicels, which are the stalks that attach the fruits to the plant, are 0.5-1.5mm long.

* ***Flowering season:*** November-April.
* ***Fruiting season:*** Throughout year.
* **Importance of the tree**

***(a) Medicinal values:*** Ainslie addresses the toxic nature of the nut from the *Andrachne cadishaw* tree, known as *wodoowunghai.* According to him, the “Tamools” believe that a man can be killed by pounding approximately one pagoda weight. The leaves and roots of the plant are additionally regarded as toxic. Primarily, no animal will touch it, along with it is believed to be a potent treatment for foul ulcers when used with "Kadukai" (*Chebulic myrobalans*). Roxburgh states that the bark or outer layer of the capsule is said to be quite toxic (Roxburgh, 1874; Dymock, 1893). In Malaysia and Africa, a solution made from crushed leaves is utilised as a toxic substance, an agent to induce abortion, and a means for suicide and homicide in livestock and fishes (Elangomathavan, 2013). *Cleistanthus collinus* is widely used as a disinfectant for the treatment of septic wounds and the remedy of fungal ailments (Maity, 2002). The application of *Cleistanthus collinus*, onion, and lime juice in a ratio of 5:3:2 on the scalp promotes hair growth and prevents hair loss and premature greying (Rath *et al.,* 2012). The plant itself is utilised as a remedy for amenorrhoea, diarrhoea, and as a disinfectant. The chemical compounds have been tested on various cancer cell lines and have shown potential contrary to the HIV (Kazi and Gude, 2022).

***(b) Ethnobotanical values:*** For a significant period of time, both tribal (Santhal, Lodha) and non-tribal inhabitants in south-west Bengal have been utilising this plant as fodder for their goats. The goats engage in browsing and consuming the tender foliage of the woodland shrub. In the south-west Bengal area, the locals utilise the plant for roofing shelters and as fence for their ancestral houses and farms (Saha, 2016). The plant wood is utilised as a significant building material for cow barns, dwellings, and transient communities. Additionally, it is employed by Malayali tribals in the Yercaud hills of the south-eastern ghats in the Salem district of Tamil Nadu to build cots, doors, and windows (Rekha and Kumar, 2014). Plant extract has proven to be highly effective for managing mosquito populations that are responsible for spreading diseases such as malaria and dengue (Kazi and Gude, 2022). Within the agriculture sector, the plant has demonstrated its significant value due to its natural insecticidal properties. As a result, it is employed for the purpose of controlling pests that commonly affect crops, such as red flour beetles and black moths. The farmers also use the plant extract to manage ticks in animals (Chichaghare *et al.,* 2019) and utilise the wood to construct windowpanes, doors, and conventional products (Raghunathan, 2017).

***(c) Cultural values:*** Currently, no particular religious beliefs pertaining to *Cleistanthus collinus* have been recognised or not have been identified.

***(d) Ethical values:*** *Cleistanthus collinus* poisoning appears to be a concerning issue among rural communities, particularly among young women who intentionally inflict harm upon themselves. However, it does possess certain therapeutic qualities to a certain degree (Priyadharsini *et al.,* 2024).

* **References**

1. Annapoorani, K. S., Periakali, P., Ilangovan, S., Damodaran, C., & Sekharan, P. C. (1984). Spectrofluorometric determination of the toxic constituents of Cleistanthus collinus. Journal of analytical toxicology, 8(4), 182-186.
2. Chichaghare, A. R., Deshmukh, H. K., Kumar, N. M., & Jamatiya, A. (2019). Garari (Cleistanthus collinus): Multipurpose hedge crop for organic farming through agroforestry intervention. Journal of Pharmacognosy and Phytochemistry, 8(2), 2124-2127.
3. Dymock, W. (1893). *Pharmacographia indica* (Vol. 3).
4. Elangomathavan, R. (2013). Bio-prospecting of Cleistanthus collinus and its antibacterial activity. *Asian Journal of Pharmaceutical and Clinical Research*, 206-209.
5. Kazi, M., & Gude, A. (2022). Review on poisonous, pesticidal and medicinal attributes of Cleistanthus collinus (roxb.) Benth. Ex hook. f. *World journal of pharmaceutical and medical research*, *8*(4), 66-78.
6. Maity, S. (2002). Ethnobotany of Lateritic West Bengal. *Vidyasagar University [Ph. D. Thesis.]. Midnapore*.
7. Nagaraj, S. (1987). Cardiac toxicity of Oduvanthalai (Cleistanthus collinus) common leaves poisoning in Tamil Nadu (Report of 25 cases). *Antiseptic*, *84*, 33-5.
8. Priyadharsini, R. P., Parasuraman, S., Puli, S., & Raveendran, R. (2024). A Review on the Poisonous Plant Cleistanthus Collinus. *Journal of Pharmacology and Pharmacotherapeutics*, 0976500X241257741.
9. Raghunathan, M. (2017). An ethnomedicinal survey of medicinal plants utilized by folk people of the Thrissur forest circle, Kerala. Eur J Pharm Med Res, 4, 401-9.
10. Rath, S., Dubey, D., Sahu, M. C., Debata, N. K., & Padhy, R. N. (2012). Surveillance of multidrug resistance of 6 uropathogens in a teaching hospital and in vitro control by 25 ethnomedicinal plants used by an aborigine of India. Asian Pacific Journal of Tropical Biomedicine, 2(2), S818-S829.
11. Rekha, R., & Kumar, S. S. (2014). Ethnobotanical plants used by the Malayali tribes in Yercaud hills of Eastern Ghats, Salem district, Tamil Nadu, India. Global Journal of Research on Medicinal Plants & Indigenous Medicine, 3(6), 243.
12. Roxburgh, W. (1874). *Flora Indica: Or, Descriptions of Indian Plants. Reprinted Literatim from Carey's Edition of 1832*. Thacker, Spink.
13. Saha, S. K. (2016). Parashi (Cleistanthus collinus Roxb.)-A Multipurpose Plant of Ethno-botanical Importance in South West Bengal of India. The Indian Ecological Society, 43(1), 426-430.
14. Subramanian, R., & Krishnamurthy, G. (1975). Thin-layer chromatographic detection of the lignan lactones of Cleistanthus collinus (Roxb.). Journal of Chromatography A, 107(1), 230-233.