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Taxonomical and Ethnobotanical Studies of *Ficus racemosa* L. (Dicotyledonae: Moraceae) in Socioeconomic Perspective from New Forest Dehradun

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Abstract
Ficus racemosa commonly known as Gular or Cluster Fig is belonging to family Moraceae of class Dicotyledonae. The study of *Ficus racemosa* showed that ethanomedicinal and medicinal value at Forest Research Institute (F.R.I.), Dehradun (Uttarakhand) India. The plant profoundly used in Ayurvedic medicine to cure various diseases such as ulcers, fever, leprosy, vomiting, dysentery, syphilis and inflammation of liver. *F. racemosa* roots, leaf, stem and fruits contain antibacterial, anti-oxidant, anti-diabetic, anti-inflammatory, anticancer, antimicrobial and immunomodulatory effects. During dry winter season *F. racemosa* tree leaves are important fodder sourcein the Himalaya region of India, Nepal, Bhutan and Bangladesh. During exploration, minimum leaf size 10x12 cm. and maximum size 10x14cm were observed. The fig size of *F. racemosa* ranged between 2 mm to 2.5 mm.

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INTRODUCTION

Plants are universally recognized as a vital component of the world's biological diversity and an essential resource for the planet (Singh et al., 2018; Singh et al., 2019). In addition to the cultivated plant species used for food, medicine, timber and fibres, many wild plants have great economic and cultural importance (Aggarwal et al., 2020; Upadhyay et al., 2020; Sharma et al., 2020; Devi et al., 2020; Doharey et al., 2021; Singh et al., 2021a, b, c; Shah et al., 2021). Plants play a key role in maintains the planet's basic environmental balance and ecosystem stability and provide an irreplaceable component of the habitats for the world animal life (Prip, 2018, Singh et al., 2020 a, b, c, d, e). *Ficus* species are known to be used in modern medicine and medicinal properties of the taxa has been justified by various phytochemical analysis of various authors (Abdulla et al., 2010; Kumar et al., 2021a, b, c, d, e). *Ficus* species are used to as a medicine to cure diseases eg. *Ficus racemosa* is commonly known as gular and has been used extensively in the treatment of biliary disorders, jaundice,

dysentery, diarrhea, haemorrhoids, respiratory diseases. *Ficus racemosa* Linn. (Moraceae) is a popular medicinal plant in India, which has been used in Ayurveda, for cure diseases (Ahmed and Urooj, 2010).

F. racemosa widely cultivated in India and having medicinal properties (Trivedi et al., 1969). Different parts of *F. racemosa* are used as fodder (CSIR. 1952), edible and ritual (Manandhar, 1972; DMP, 1982; Dhakal and Aizz, 1996; Chaudhary et al., 1999; Pathak, 2000; Sah et al., 2002; Manandhar and Acharya, 2003). Totally parts of *F. racemosa* (leafs, fruits, bark and sap of the root) are medicinally important in the India (Kirtikar and Basu, 1975). *F. racemosa* leaves mixture are used to against bilious infections as powdered form (Kirtikar and Basu, 1975). A decoction of leaves is used as a douche in dysmenorrhea (Nadkarni et al., 1976), as a wash for wounds and ulcers. Leaf juice used for massage on hairs to prevent splitting. Leaf latex is used for boils and blisters and measles (Siwakoti & Siwakoti, 2000).Its fruits contain sterols, triterpenoids, flavonoids, glycosides, tannins, carbohydrates in rich amount (Deshmukh et al., 2007). *F. racemosa* contain antioxidant activity (Sharma and Gupta 2008). *F. racemosa* leaves extract show antibacterial potential against *Escherichia coli*, *Bacillus pumilus*, *Bacillus subtilis*, *Pseudomonas aeruginosa,* and *Staphylococcus aureus* (Mandal et al., 2000).

MATERIALS AND METHODS

Present study was designed to work out the diversity, distribution, socioeconomic and ethnomedicinal importance of *Ficus racemosa* (Dicotyledonae: Moraceae) at Forest Research Institute (F.R.I.), Dehradun (Uttarakhand) India. Flora of New Forest Dehradun is evergreen, deciduous in nature and wide spread more than 1100 acre. Plant sample collected on the basis of survey, identified according there to leafs, fruits (Fig) and bark according to morphological and taxonomical view in laboratory process and herbarium specimen housed in Systematic Botany Discipline, F.R.I., Dehradun.

RESULTS

To big free standing trees (*F. racemosa).* The *Ficus* species recorded occurs in mixed deciduous forest, dry deciduous forest, tropical evergreen forest and secondary forest. *F. racemosa,* prefer to grow in dry and open places. *Ficus racemosa* L. Sp. PI. 2: 1060. 1753. *Ficus racemosa* L. var. elongate (King) Barrett, Bull. Torrey Bot. Club 73: 3t23. 1946 known as Gular and also known in English nameas cluster fig. *Ficus racemosa* trees, 25-30 m tall, d.b.h. 60-90 cm; monoecious in nature. Bark greyish brown, smooth. Branchlets, young leaf blades, and fig with bent hairs or densely covered with white soft pubescence. Branchlets brown. Stipules ovate lanceolate, 1.5-2 cm, membranous pubescent. Leaves alternate; petiole 2-3 cm; leaf blade elliptic-obovate, elliptic or narrowly elliptic, 10-14 × 3-4.5 cm, leathery, abaxially pale green, pubescent when young, glabrescent, and scrabous, adaxially dark green and glabrous, base cuneate to obtuse, margin entire, apex acuminate to obtuse; basal lateral veins 2, secondary veins 4-8 on each side of midvein. Figs in tumor like aggeregate on short branchlets of old stem, occasionally axiallary on leafy shoot or on older leafless branchlets, paired, reddish orange when mature, pear shaped, 2-2.5 cm in diameter, basally attenuated into a stalk, apical pore navel-like, flat; peduncle ca. 1 cm; involucral bracts triangular-ovate. Male, gall, and female flowers within same fig. Male flowers: near apical pore, sessile; calyx lobes 3 or 4; stamens 2. Gall and Female flowers: pedicellate; calyx lobes linear, apex 3 or 4 toothed; style lateral; stigma clavate. Fruiting around whole year. Found in moist areas, beside rivers and streams, occasionally in streams; 100-1700 m. S Guangxi, Guizhou, Yunnan[India, Indonesia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam. In India (Assam, Bihar, Delhi, Goa, Kerala, Gujarat, M.P, Jammu and Kashmir, Manipur, Meghalaya, Sikkim, Orissa, Myanmar, West Bengal).

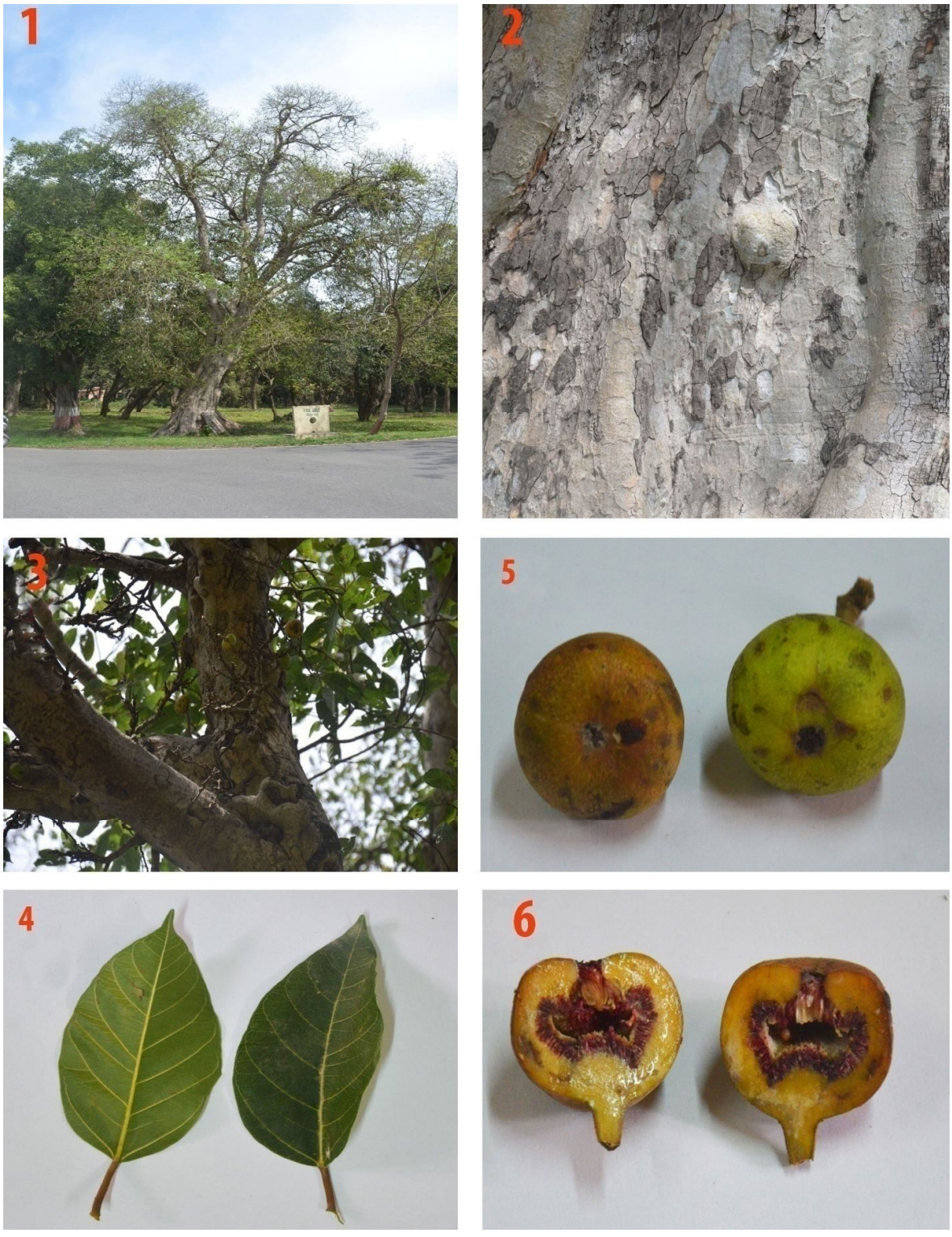

Figure 1: *F. racemosa:* 1. Tree; 2. Bark; 3. Stem; 4. Leaf Surface; 5. Fruit; 6. Fruit Section

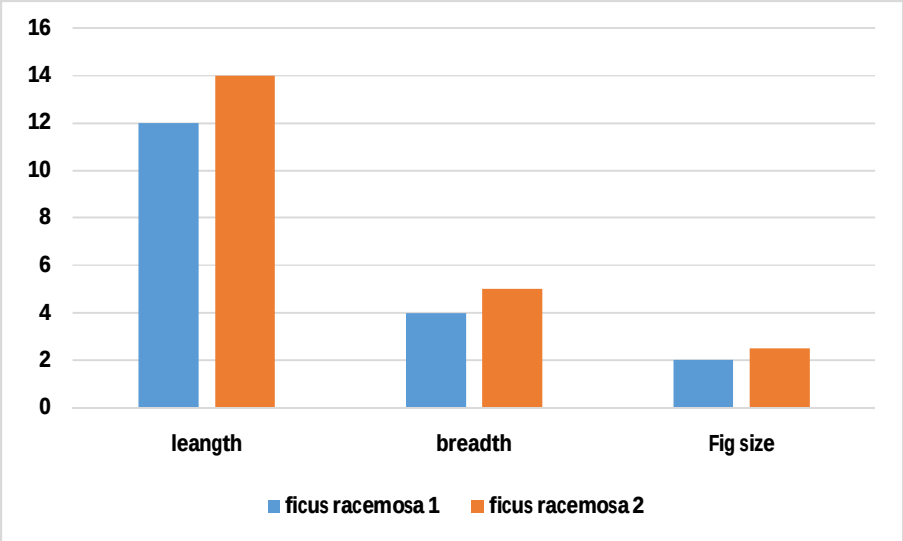

Figure 2: Bar chart illustrating correlation of (a) leaves length (b), leaves breadth (c) and average fig size of *Ficus racemosa*.

DISCUSSION

Ficus (Moraceae) is arguably one of the most important plant genera in the campus of FRI. The medicinal potential of wild plants are well acknowledged from the early time of the great epics of the Ramayana and Mahabharata and written in the oldest Hindu scriptures, viz., Rigveda (Berrens, 2019; Singh et al., 2019; Singh et al., 2020a; Chauhan, 2021; Kumar et al 2021c). All parts of this plant (leaves, fruits, bark, latex, and sap of the root) are medicinally important in the traditional system of medicine in India (Kirtikar & Basu, 1975). Fruits are used to cure visceral obstruction, leprosy, diarrhea and constipation (Vihari, 1995; Nadkarni et al., 1976). The investigation find out the hepato and cardioprotective activity of flavonoids (Sehrawat et al., 2020; Yadav et al., 2020; Aggarwal et al., 2021; Yadav et al., 2021). *F. racemosa* is pharmacologically studied for various activities including antidiabetic, antipyretic, anti-inflammatory, antitussive, hepatoprotective, and antimicrobial activities. A wide range of phytochemical constituents have been identified and isolated from various parts of *F. racemosa* (Ahmed and Urooj, 2010). Bark of *F. racemosa* contain antiseptic and antipyretic in nature. Decoction of its bark used as the treatment of skin diseases, diabetic and ulcers. Bark used as inflammatory swelling and more effective to treatment of various diseases like as asthma, urinary bladder and piles (Murti, 2010).The latex is aphrodisiac and used in boils, diarrhea, dysentery, and hemorrhoids (Yadav, 1999); stomachache (Ghimire et al., 2000), cholera and mumps (Basnet, 1998).

CONCLUSION

During investigation it has been found that *Ficus racemosa* figs are good example of parasitism as well as strangler. During survey it has observed that fruit-eating birds eat the fruits of strangler figs and the indigestible seeds are then voided by the birds and will germinate in a tree crevice or hole. The study also concludes the *Ficus* is one of the major constituent of campus of FRI and its vicinity being a Keystone species. Not only is a beautiful avenue tree its role very significant in campus ecosystem because it produce huge amount of eatable fig which are eaten by birds, reptiles, arthropods, and mammals. Different insects and wasp not only depend on fig for their food rather they complete the entire life cycle with figs.

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