

Addition of *Frerea indica* Dalzell to the flora of Nashik district, Maharashtra, India

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ARTICLE INFO	ABSTRACT
Received : 31 August 2022 Revised : 16 January 2023 Accepted : 22 January 2023 Available online: 09 April 2023 Key Words: Endemic Critically endangered <i>Frerea indica</i> Nashik district New additions Maharashtra	In the Indian subcontinent, the Western Ghats are a biodiversity hotspot. The Western Ghats mountain range runs for more than 1,600 kilometers along India's western coast, from 8.3188890 N to 21.273330 E. The Western Ghats biodiversity hill range is divided into three sub-regions: the Northern Western Ghats (NWG), Central Western Ghats (CWG), and Southern Western Ghats (SWG). The studied area of Nashik district is a part of the Northern Western Ghats of India. The current botanical investigation explored the rich plant biodiversity area of Nashik district. During floral exploration in the Nashik district, we explored critically endangered, endemic, and monotypic genus of the <i>Frerea indica</i> Dalzell flowering plant species reported for the first time from the studied area. <i>F. indica</i> is a jeopardized limited to Maharashtra state only in the Western Ghats of India. This significance plant species was first time located at Shivneri fort, Junnar tehsil, Pune district. In presence conditions, 9 regions of the northern Western Ghats of Maharashtra, India are reported only.

Introduction

The Western Ghats along with Sri Lanka it is one of the 34th mega biodiversity hotspot region of interest assigned in view of high plant species endemism and furthermore serious level of danger because of habitat loss (Myers *et al.*, 2000). The *Frerea indica* is a critically endangered, endemic, and monotypic genus of the Western Ghats of India (Oldfield, 1997; Nandikar *et al.*, 2018). *F. indica* Dalzell belongs to the family Apocynaceae (Dalzell, 1865). *F. indica* is a jeopardized limited to Maharashtra in the Western Ghats of India (Umdale *et al.*, 2021). This plant taxa first time found on the hill (Shivneri fort- birthplace of Chhatrapati Shivaji Maharaj) near Junnar in the Pune district (Dalzell, 1865; Irwin and Narasimhan, 2011), were some reported localities such as Ahmednagar (Radha falls), Pune (Junnar and Purandar), Raigad (Shivthar Ghal), Satara (Mahabaleshwar, Sajjan gadh) districts (Hemadri, 1970; Mishra and Singh, 2000; Selvam *et al.*, 2009). It is an attractive

succulent plant species that grows on steep hill slopes at high altitudes. In the present conditions this plant species has critically endangered because of its unique and small habitat (Umdale *et al.*, 2021). During the field study, we observed *F. indica* naturally lives with *Euphorbia neriifolia* L. as a strong and positive association (Tetali *et al.*, 1997). This pretty flower species is recorded from Kalmuste hills ranges of Trimbakeshwar Taluka, Nashik district (red colored arrow and circle indicating the specimen collection site) (Figure 1). This species was observed at 883 meters above mean sea level along the Kalmuste hills (N19.931599, E73.478387 GPS location recorded). The floral exploration of Nashik district has been carried out by Lakshminarasimhan and Sharma in 1991 year published the flora of Nashik district. The flora of the Nashik district has no taxonomical records of studied taxa (Lakshminarasimhan and Sharma, (1991). *F. indica* is proposed as an

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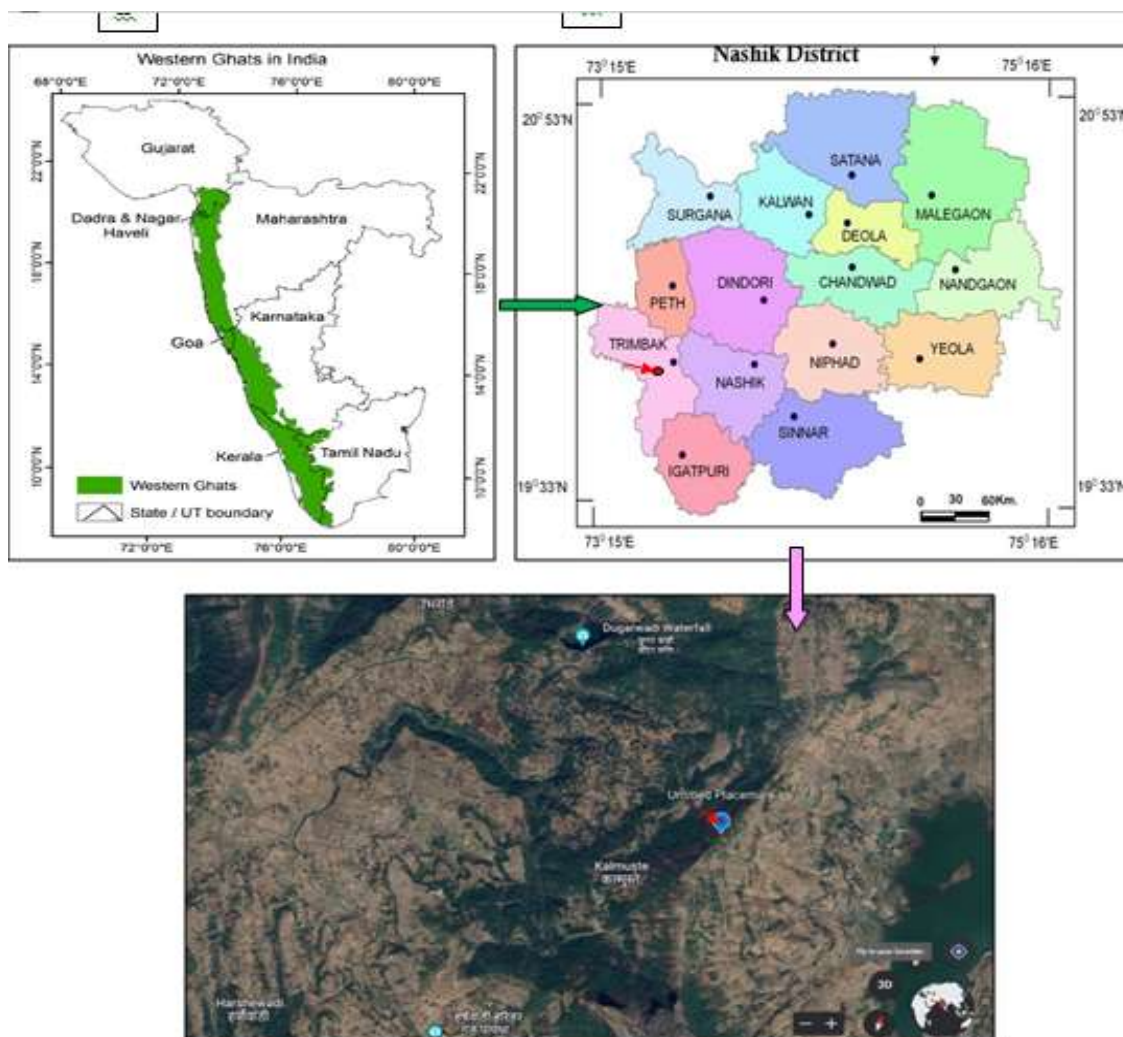
addition to the flora of Nashik district, based on the collections from different localities in Nashik district. During a field exploration for locating *F. indica* along the steep hill slopes of Kalmuste hills range noticed during the year 2020 to 2022, after exploration studied site we noticed about less than 10 individual plants, not a single specimen was collected from the site because of species coming under critically endangered IUCN status. We just click some photographs of this species, with the help of specimens photographs, deposited herbarium and identified the species using some standard floras such as Flora of the Presidency of Bombay by Cooke (1958), Flora of Nasik district by Lakshminarasimhan and Sharma (1991), Flora of

British India: Vol. IV. Asclepiadeae to Amaranthaceae by Hooker (1890) and Flora of Maharashtra by Singh *et al.* (2000).



(a)

(b)

Figure 1: Morphology of *Frerea indica* DalzellFigure 2: Map showing *F. indica* collected from Nashik district

Material and Methods

Study area:

The *F. indica* specimen was locality recorded during floral exploration in the Trimbakeshwar tehsil, slopes of Kalmuste hills ranges of Nashik district (Maharashtra), India (N19.931599, E73.478387 GPS location recorded) (Figure 2). The studied site was explored during the years 2020–2022. The studied living plant specimen recorded its livingness during the monsoon, winter, and summer seasons of the year. During the monsoon and winter seasons, plants show their actual livingness, i.e., specimen have leaves, flowers, and stems, but during the summer season, plant specimen have only succulent stems. *F. indicas* specimen identification by using Flora of the Presidency of Bombay and Flora of Maharashtra (Dalzell, 1865; Singh *et al.*, 2000). Repeated survey of the some area under study using Global Positioning System (G.P.S.).

Taxonomy & Morphology: Identification and classification of *F. indica* using different available local Floras and other available literature. During filed exploration studied specimen photographs, with the help of specimens photographs, deposited herbarium and identified the species using some standard floras such as Flora of the Presidency of Bombay by Cooke (1958), Flora of British India: Vol. IV. Asclepiadeae to Amaranthaceae by Hooker (1890) and Flora of Maharashtra by Singh *et al.* (2000).

Herbarium consultation: The *F. indica* identified by using different deposited herbarium voucher specimen No. 17540, K000911102, 27510.000, 33586.000, and 62981.000 of BSI, Western Circle, Pune herbaria. This plant database gathered from Western Ghats of India (Datar & Watve, 2018; Naoroji Godrej Centre for Plant Research, 2022).

Results and Discussion

Studied taxa explored during the year 2021-2022 record of beautiful plant taxa belonging to endemic, critically endangered, and monotypic *Frerea* genus of family Apocynaceae. The plant was correctly identified using Flora of Maharashtra and Flora of Bombay Presidency and authenticated by BSI accession numbers K000911102, 27510.000,

33586.000, and 62981.000. The critical literature survey of available scientific literature was studied taxa not been added in the Flora of Nashik district. It can be claimed that these are new records for the Flora of Nashik district, Maharashtra state (India).

Family: Apocynaceae

***Frerea indica* Dalz.** in J. Linn. Soc. Lond. 8:10, t. 3. 1865 (Dalzell, 1865); Hook.f. Fl. Brit. India 4: 76 (Hooker, 1885); Cooke, Fl. Pres. Bombay 2: 243.1958 (Repr.) pp. 178 (Cooke, 1908); Flora of Maharashtra state. pp. 361-362 (Singh *et al.*, 2000).

Synonyme: *Desmidorchis dalzellii* M.R. Almeida, *Boucerosia frerei* (G.D.Rowley) Meve & Liede, *Caralluma frerea* Dazell, *Ceropegia frerei* (G.D.Rowley) Bruyns

Description: Studied species is a fleshy glabrous herb 4-6 in; stems and branches green, fleshy, quadrangular, marked with scars of fallen leaves. Leaves 3-6 cm long. Flowers solitary, extra axillary; pedicels curved; corolla 2.0 to 2.5 cm across, fleshy, yellowish green on the outer side, deep purple on the inner, with an irregularly shaped yellow spot at the center of each lobe, divided less than 1/2 way down, fringed with fine, deep purple hairs on the edges; corona staminal, outer bowl-shaped, with five, short, broad, sinuate truncate lobes, inner arising from the inner margin of the outer corona, 5 linear, truncate lobes, incurved at the apex (Figure 1).

Common names: Shiv Suman and Shindal Makadi.

Flowering and fruiting: September to January.

Distribution: Endemic to the northern Western Ghats of Maharashtra (Nashik, Ahmednagar, Pune, Raigad, Satara).

Ecology: The studied plant specimen associated with *Euphorbia neriifolia*. Mostly this taxa grown on the rocky crevices of hill cliffs from an altitude 600 to 1347 m.

This plant taxa first time reported on the top of hill (Shivneri fort) near Junnartehsil in the Pune district of Maharashtra (Dalzell, 1865; Irwin and Narasimhan, 2011), were some other localities reported like Ahmednagar (Radha falls), Pune

(Junnar and Purandar), Raigad (Shivthar Ghal), Satara (Mahabaleshwar, Sajjan gadh) districts (Hemadri, 1970; Mishra and Singh, 2000; DST, 2004; Selvam *et al.*, 2009). Studied significance plant species in presence conditions, 9 regions of the northern Western Ghats of Maharashtra, India are reported only. Studied plant species we reported first time in Nashik district of Maharashtra state, India for addition of Flora of Nashik district (Umdale *et al.*, 2021).

Conclusion

During floral exploration in the Nashik district, we explored *F. indica* flowering plant species reported

for the first time from the studied area. *F. indica* is a new addition of the Flora of Nashik district.

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Conflict of interest

The authors declare that they have no conflict of interest.

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