

Journal of Basic Sciences

An International Peer Reviewed Quarterly Research Journal

Special Issue

July 2015

www.skpubs.com



Special Issue on

INTERNATIONAL CONFERENCE ON BIODIVERSITY

(22, 23 and 24 January 2015)

Organised by

Department of Botany

M.V.P. Samaj Nashik's

ARTS, COMMERCE AND SCIENCE COLLEGE, NANDGAON

Under Indo-Europe Educational Exchange Program,

Supported by Indo-Europe Educational & Cultural Association, Nashik



E-ISSN-2454-1931



Endemic and threatened flowering plants of Western Ghats with special reference to Konkan region of Maharashtra

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Abstract: Konkan is prosperous for plant diversity as well as beauty of Maharashtra. Konkan is a narrow coastal strip to the west of Sahyadri and about 800 km in length from Goa to Tapi basin. Politically it comprises 6 districts- Bombay, Raigad, Ratnagiri, Sindhudurg, Thane and recently formed Palghar.

During our preliminary floristic survey in Konkan region of Maharashtra, there are about 100 endemic and threatened flowering plant species have been located. The plant species belonging to endemic or threatened category are *Pimpinella tomentosa*, *Decaschistia trilobata*, *Abutilon renadei*, *Erinocarpus nimmonii*, *Vigna khandalensis*, *Rotala floribunda*, *Bidaria khandalense*, *Brachystelma malwanense*, *Ceropegia attenuata*, *C. anantii*, *C. huberi*, *C. jainii*, *C. mohanramii*, *C. oculata*, *C. sahyadrica*, *C. vincaefolia*, *Operculina tansaensis*, *Barleria grandiflora*, *Lepidogathis lutea*, *Habenaria panchganiensis*, *Curcuma inodora*, *Camptorrhiza indica*, *Chlorophytum borivilianum*, *Iphigenia magnifica*, *I. stellata*, *Arisaema sahyadricum*, *Wiesneria triandra*, *Aponogeton bruggenii*, *Eriocaulon ratnagiricus*, *E. sharmae*, *E. tuberiferum*, *Fimbristylis ratnagirica*, *Bhidea burnsiana*, *Glyphochloa mysorensis*, *G. ratnagirica* etc. Some of flowering plants have been described after the name of Konkan region; these RET plants are also located from the Konkan viz. *Pinda concanensis*, *Canscora concanensis*, *Begonia concanensis*, *Ceropegia concanensis*, *Euphorbia concanensis*, *Dipcadi concanense*, *Amorphophallus konkanense* etc.

Keywords: Endemic; RET; flowering plant; konkan; western ghats.

1 Introduction

Western Ghats is under huge human pressure and numbers of species are rare, endangered and threatened (RET). In recent year increasing loss of biodiversity has created serious threat to the survival of mankind. The main causes of biodiversity loss are habitat destruction, pollution, population, invasive weed, over exploitation and climate change. Destruction of the habitat is the major threat of biodiversity. Endemism is the ecological state of a species being unique to a defined geographic location, such as an island, nation, country or other

defined zone. In India about 5725 flowering plants are endemic, which represents 33.5 percent of Indian flowering plants. Among the endemic species, 3471 species are found in the Himalaya, 2015 species in peninsular India and 239 in the Andaman and Nicobar islands (M. P. Nayar, 1996).

As far as endemic flowering plants of the Konkan of Maharashtra concerned, no detailed inventory was undertaken in the past. Many new taxa have been described from Konkan in last 20 years; hence it has become necessary to assess

the current position of endemic plants of the Konkan region of Maharashtra. The present study is also required due to the fact that endemism is one of the most important factors for determining the status of threatened plants. However, the criteria for categorizing the threatened plants have been revised by IUCN (2014.3).

2 Material and Methods

Konkan region was preliminary surveyed for its RET & endemic plant diversity during the period of 5 years (2010-2014). During these period regular field visits were made to survey and documentation RET & endemic plant of Konkan. The field data such as distribution, area of occupancy, population size, number of mature individuals, habit, habitat, flower colour and odour was recorded. The photographs were

taken with the help of Nikon D-90 camera. The collected specimens were identified by referring to various floras, monographs, and revisions (N. L. Bor, 1960; C. D. K. Cook, 1996; T. Cooke, 1901-1908; S. P. Gaikwad & S. R. Yadav, 2004; D. K. Mishra & N. P. Singh 2001; B. D. Sharma et al., 1996; N. P. Singh & S. Karthikeyan, 2000; Yadav & Sardesai 2002). The nomenclature & IUCN category of plant has been adapted and updated applying ICBN, IUCN red list website (www.iucnredlist.org, M. Ahmedullah, 1986; M. P. Nayar & A. R. K. Sastry, 1987-1990; M. P. Nayar, 1996) and prepared list as per D. K. Mishra & N. P. Singh (2001). The following IUCN (2014.3) categories viz. EX- Possibly Extinct; EW-Extinct in Wild; CR- Critically Endangered, EN- Endangered, VU- Vulnerable, , LR- Low Risk, (LC- Least Concern; NT- Near Threatened) DD- Data Deficient, NE- Not Evaluated.

Table 1: Checklist of endemic flowering plants of Western Ghats which are located from Konkan region of Maharashtra.

Sr. No.	Botanical Name	Family	Habit	IUCN category
1.	<i>Abutilon ranadei</i> Wood. & Staf.	Malvaceae	Shrub	Critically Endangered
2.	<i>Achyranthes coynei</i> Sant.	Amaranthaceae	Shrub	Endangered
3.	<i>Amorphophalus konkanensis</i> Hett., Yadav & Patil	Araceae	Herb	Vulnerable
4.	<i>Aponogeton bruggeni</i> S. R. Yadav & Govekar	Aponogetonaceae	Herb	Critically Endangered
5.	<i>Aponogeton</i> sp.	Aponogetonaceae	Herb	Not Evaluated
6.	<i>Arisaema sahyadricum</i> S. R. Yadav <i>et al.</i>	Araceae	Herb	Endangered
7.	<i>Arthraxon jubatus</i> Hack	Poaceae	Herb	Vulnerable
8.	<i>Arundinella spicata</i> Dalz.	Poaceae	Herb	Vulnerable
9.	<i>Barleria grandiflora</i> Dalz	Acanthaceae	Shrub	Critically Endangered
10.	<i>Barleria prattensis</i> Sant.	Acanthaceae	Small shrub	Vulnerable
11.	<i>Beaumontia jerdoniana</i> Wight	Apocynaceae	Shrub	Critically Endangered
12.	<i>Begonia concanensis</i> A. D. C. Prodr	Begoniaceae	Herb	Vulnerable
13.	<i>Begonia trichocarpa</i> Dalz	Begoniaceae	Herb	Endangered
14.	<i>Bhidea bursiana</i> Bor	Poaceae	Herb	Endangered
15.	<i>Bidaria khandalense</i> (Sant) Jagtap & Singh	Asclepiadaceae	Climbers	Critically Endangered
16.	<i>Brachystelma malwanense</i> S. R. Yadav & N.P.Singh	Asclepiadaceae	Herb	Critically Endangered
17.	<i>Camptorrhiza indica</i> S. R. Yadav, Singh & Mathew	Colchicaceae	Herb	Critically Endangered
18.	<i>Canscora concanensis</i> Sant.	Gentianaceae	Herb	Endangered
19.	<i>Ceropegia ananti</i> S. R. Yadav <i>et al.</i>	Asclepiadaceae	Herb	Critically Endangered

20.	<i>Ceropegia attenuata</i> Hook	Asclepiadaceae	Herb	Low Risk
21.	<i>Ceropegia concanensis</i> Kambale, Chandore & S. R. Yadav	Asclepiadaceae	Herb	Critically Endangered
22.	<i>Ceropegia evansii</i> McC	Asclepiadaceae	Twining Herb	Critically Endangered
23.	<i>Ceropegia huberi</i> Ansari	Asclepiadaceae	Twining Herb	Endangered
24.	<i>Ceropegia jainii</i> Ansari & Kulkarni	Asclepiadaceae	Herb	Critically Endangered
25.	<i>Ceropegia mohanramii</i> S. R. Yadav <i>et al.</i>	Asclepiadaceae	Herb	Critically Endangered
26.	<i>Ceropegia oculata</i> Hook	Asclepiadaceae	Twining Herb	Low Risk
27.	<i>Ceropegia odorata</i> Nimmo	Asclepiadaceae	Twining Herb	Critically Endangered
28.	<i>Ceropegia sahyadrica</i> Ansari & Kulkarni	Asclepiadaceae	Herb	Low Risk
29.	<i>Ceropegia santapau</i> Wadhva & Ansari	Asclepiadaceae	Twining Herb	Low Risk
30.	<i>Ceropegia vincaefolia</i> Ansari & Kulkarni	Asclepiadaceae	Twining Herb	Low Risk
31.	<i>Chlorophytum borivillianum</i> Sant. & Fernand.	Liliaceae	Herb	Endangered
32.	<i>Chlorophytum glaucoides</i> Blatter	Liliaceae	Herb	Low Risk
33.	<i>Cleome</i> sp.	Cleomaceae	Herb	Not Evaluated
34.	<i>Coelachne minuta</i> Bor	Poaceae	Herb	Endangered
35.	<i>Crotalaria lutescens</i> Dalz	Fabaceae	Herb	Endangered
36.	<i>Cryptocoryne cognata</i> Schott	Araceae	Herb	Critically Endangered
37.	<i>Cryptocoryne cognatoides</i> Blatt & McC	Araceae	Herb	Critically Endangered
38.	<i>Cucumis setosus</i> A. DC.	Cucurbitaceae	Climber	Vulnerable
39.	<i>Curcuma inodora</i> Blatt.	Zingiberaceae	Herb	Low Risk
40.	<i>Curcuma purpurea</i> Blatt.	Zingiberaceae	Herb	Data Deficient
41.	<i>Cyathocline purpurea</i> (Buch-Ham ex D.Don)	Asteraceae	Herb	Vulnerable
42.	<i>Decaschistia trilobata</i> Wight	Malvaceae	Shrub	Low Risk
43.	<i>Dimeria blatteri</i> Bor	Poaceae	Herb	Vulnerable
44.	<i>Dimeria woodrowi</i> Stapf	Poaceae	Herb	Endangered
45.	<i>Dipcadi concanenses</i> (Dalz) Baker	Liliaceae	Herb	Critically Endangered
46.	<i>Eleocharis lankana</i> T. Koyama ssp. <i>mohamadii</i> Wadood Khan	Cyperaceae	Herb	Critically Endangered
47.	<i>Erinocarpus nimmonii</i> Grab	Tiliaceae	Tree	Low Risk
48.	<i>Eriocaulon ratnagiricus</i> Yadav, Gaikwad & Sardesai	Eriocaulaceae	Herb	Critically Endangered
49.	<i>Eriocaulon sharmae</i> Ansari & Balakar	Eriocaulaceae	Herb	Endangered
50.	<i>Eriocaulon tuberiferum</i> A. R. Kulkarni & Desai	Eriocaulaceae	Herb	Endangered
51.	<i>Euphorbia concanensis</i> Janarthanam & Yadav	Euphorbiaceae	Herb	Critically Endangered
52.	<i>Euphorbia katrajensis</i> Gage	Euphorbiaceae	Herb	Vulnerable
53.	<i>Euphorbia panchganiensis</i> Blatt & McC.	Euphorbiaceae	Herb	Endangered
54.	<i>Fimbristylis ratnagirica</i> V.P.Prasad & V.P.Singh	Cyperaceae	Herb	Endangered
55.	<i>Flemingia gracilis</i> Mukherjee	Fabaceae	Herb	Endangered
56.	<i>Flemingia nigheriensis</i> (Baker) wight & cooke	Fabaceae	Herb	Endangered
57.	<i>Flemingia tuberosa</i> Dalz.	Fabaceae	Herb	Vulnerable
58.	<i>Galactia tenuiflora</i> (Willd) Weight & Arm var. <i>minor</i> Baker	Fabaceae	Twining	Endangered
59.	<i>Glyphochloa mysorensis</i> (Jain & Hemadri) W. D. Clayton	Poaceae	Herb	Endangered
60.	<i>Glyphochloa ratnagirica</i> (Kulkarni & Hemadri) W.D.Clayton	Poaceae	Herb	Endangered
61.	<i>Habenaria panchganiensis</i> Sant. & kap.	Orchidaceae	Herb	Endangered

62.	<i>Heteropogon ritchiei</i> (Hook f.) Blatt. & McC.	Poaceae	Herb	Vulnerable
63.	<i>Heterostemma deccanense</i> Talb.	Asclepiadaceae	Twining Herb	Vulnerable
64.	<i>Hitchenia cauliana</i> (Grah.) Baker	Zingiberaceae	Herb	Vulnerable
65.	<i>Hypoestis lanata</i> Dalz	Acanthaceae	Shrub	Critically Endangered
66.	<i>Iphigenia magnifica</i> Ansari & Rao	Colchicaceae	Herb	Vulnerable
67.	<i>Iphigenia stellata</i> Blatt.	Colchicaceae	Herb	Vulnerable
68.	<i>Ipomoea clarkei</i> C. B. Cl.	Convolvulaceae	Climbing Herb	Endangered
69.	<i>Ischemum bolei</i> Almeida	Poaceae	Herb	Endangered
70.	<i>Ischemum bombaiense</i> Bor	Poaceae	Herb	Critically Endangered
71.	<i>Ischemum huegelii</i> Hack.	Poaceae	Herb	Critically Endangered
72.	<i>Ischemum santapau</i> Bor	Poaceae	Herb	Low Risk
73.	<i>Jansenella neglecta</i> Yadav, Chivalkar & Gosavi	Poaceae	Herb	Not Evaluated
74.	<i>Lepidogathis lutea</i> Dalz	Acanthaceae	Herb	Low Risk
75.	<i>Lindernia estaminodiosa</i> (Blatt, & Hallb.) Mukh	Scrophulariaceae	Herb	Not Evaluated
76.	<i>Mariscus konkanensis</i> (T. Cooke) Sedgw.	Cyperaceae	Herb	Low Risk
77.	<i>Merremia rhyncorhiza</i> (Dalz.) Hall. f.	Convolvulaceae	Twining Herb	Not Evaluated
78.	<i>Murdania lanuginosa</i> (Wall ex Cl.) Brueck	Commelinaceae	Herb	Endangered
79.	<i>Nanothamnus sericeus</i> Thom.	Asteraceae	Herb	Not Evaluated
80.	<i>Neuracanthus racemosa</i> Lamk.	Acanthaceae	Herb	Not Evaluated
81.	<i>Nilgirianthus membranceus</i> (Taib) Brmerk	Acanthaceae	Shrub	Vulnerable
82.	<i>Operculina tansaensis</i> Santapau & Patel	Convolvulaceae	Climbing shrub	Critically Endangered
83.	<i>Peristylus richardianus</i> Wight	Orchidaceae	Herb	Critically Endangered
84.	<i>Pimpinella tomentosa</i> (Dalzell & Gibson) Clarke	Apiaceae	Herb	Low Risk
85.	<i>Pinda concanensis</i> (Dalz) Mukherjee & Constance	Apiaceae	Herb	Low Risk
86.	<i>Pleocaulis ritchiei</i> (Clarke) Bremek.	Acanthaceae	Herb	Low Risk
87.	<i>Pogostemon deccanensis</i> (Panigr.) Press	Lamiaceae	Herb	Low Risk
88.	<i>Polyzygus tuberosus</i> Dalz	Apiaceae	Herb	Vulnerable
89.	<i>Rotala floribunda</i> Wight	Caesalpinaceae	Herb	Endangered
90.	<i>Rungia crenata</i> T. Anders	Acanthaceae	Herb	Low Risk
91.	<i>Salacia brunoniana</i> Wight & Arn	Celastraceae	Shrub	Critically Endangered
92.	<i>Scurrula stocksii</i> (Hook.f.) Dans	Loranthaceae	Herb	Critically Endangered
93.	<i>Seshagiria sahyadrica</i> Ansari & Hemadri	Asclepiadaceae	Shrub	Vulnerable
94.	<i>Smithia agharkarii</i> Hemadri	Fabaceae	Herb	Vulnerable
95.	<i>Thalictrum dalzelli</i> Hook	Ranunculaceae	Herb	Endangered
96.	<i>Trithuria konkanensis</i> Yadav & Janarthanam	Hydatellaceae	Herb	Low Risk
97.	<i>Utricularia babui</i> Sardesai, Gaikwad & Yadav	Lentibulariaceae	Herb	Endangered
98.	<i>Utricularia purpurascens</i> Graham	Lentibulariaceae	Herb	Endangered
99.	<i>Vigna khandalensis</i> (Sant) Raghavan & Wadhwa	Fabaceae	Herb	Vulnerable
100.	<i>Vigna trilobata</i> (L.) Verde var. <i>pusilla</i> Naik & Pokle	Fabaceae	Herb	Low Risk
101.	<i>Wiesneria triandra</i> (Dalz) Mich	Alismataceae	Herb	Endangered
102.	<i>Ziziphus rugosa</i> Lam. var. <i>glabra</i>	Rhamnaceae	Shrub	Endangered

3 Results and Discussion

The present work reports about 102 RET plant species from the Konkan region of Maharashtra

and which are endemic to Western Ghats. A species of *Cleome*, collected from Rajapur and it is not match with any species of *Cleome*,

probably it may be new taxa. Another one species of *Aponogeton* collected from Rajapur and this species also not match with any Indian species. *Cryptocoryne cognata* Schott was declared as Extinct in red data book of Indian plants (Nayar and Sastry 1990) but during the present study, it has been observed in the many streams of the Konkan. Therefore, the status of this species has been changed from extinct to endangered. One of closely allied species of *Cryptocoryne spiralis* were collected from Jaitapur but this species does not match with any Indian species of *Cryptocoryne*.

4 Conclusion

Dipcadi concanense Baker, earlier it was in CR category of IUCN, but we have located more than 50,000 population of *D. concanense* from Ratnagiri district and now the IUCN category of this plant will change CR to VN. *Camptorrhiza indica* S. R. Yadav et al. earlier it was restricted only type locality, recently the plant have been located other than type locality. This RET and endemic plant data of Konkan region of Maharashtra will be useful for people of students, researchers, forest officers and policy makers in conservation of bioresources and their utilization in sustainable way.

5 Acknowledgement

The author is very much thankful to Dr. S. R. Yadav, Professor and Head, Department of Botany, Shivaji University, Kolhapur for encouragement and thanks to SERB, Department of Science and Technology (DST), New Delhi for financial assistance (*File No.:- SR/FT/LS-82/2012*), under DST Fast Track Young Scientist Scheme. Author is also thankful to Dr. A. B. Tapase, (Principal) Abasaheb Marathe Arts and New Commerce, Science College, Rajapur, MS, India.

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