

Short Note:

New Report of *Zingiber capitatum* Roxb from Mendha Lekha, MaharashtraKulkarni D K¹, Sampada Bhusare¹, A R Kasarkar² and M Sabu³¹BAIF Development Research Foundation, Warje –Malwadi, Pune- 411 058²Department of Botany, Vivekanand College, Kolhapur- 416 046³Department of Botany, University of Calicut, Kerala, 673365, India.

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The genus *Zingiber* Boehm. was represented by 141 species and distributed mainly in tropical Asia (Theilade 1999, Theilade and Mood 1999). It was first time studied by Roxburgh (1810) and recorded 11 sp. from western ghats of South India. Fischer (1928) reported 7 sp. of *Zingiber* from Madras Presidency.

Studies on rare and threatened flowering plants from of South India made by Henry *et al.* (1978). They reported 224 species of flowering plants in danger of extinction in south India from the distribution of species available from literature. This list was first hand information for IUCN (International Union for Conservation of Nature and Natural resources). In this list only one member *Amomum hypoleucum* Thw. belong to family Zingiberaceae. Annotated list of threatened and endangered plants of India published by Jain and Sastry (1983) and recorded *Cautleya petiolata* Baker and *Hedygium aurantiacum* Roscoe members of Zingiberaceae from Uttar Pradesh, Nepal and Bhutan and Himachal Pradesh. Phenological studies on rare endangered plants in relation to family Zingiberaceae are important to know plant growth pattern in different environment. In this context, Kasarkar and Kulkarni (2011) carried out research on phonological aspect of *Alpinia* and *Zingiber* belong to family Zingiberaceae from Kolhapur region. In-situ and ex-situ conservation of rare, endangered and threatened plants will be prime importance in recent years.

Zingiber capitatum Roxb is found in many parts of India and reported from Karnataka by Sharma *et al.* (1984), Sikkim (Kumar 2001) and Bihar and Bengal (Jha and Varma, 1995). Sabu (2003) made revision of the genus *Zingiber* in South India. Sharma, *et al.* (1996) carried out revision of Flora of Maharashtra State with special reference to Monocotyledones. They have not

recorded *Z. capitatum* from Maharashtra state so far. During the field visit at village Mendha Lekha, Tal. Dhanori, Dist. Gadchirole, collected samples of *Z. capitatum*. It is situated between latitude 20° 11' to 20° 14' N and longitude 80° 15' to 80° 19' E having elevation 200 meter. Gondia tribals in this region are well versed with traditional knowledge of medicinal, fodder and other economically important plants. *Zingiber capitatum* Roxb plant is known as wild ginger (Ran ale) and found in forest area. Predominate association of plants in this area are *Tectona grandis* L., *Cassia fistula* L., *Gardenia latifolia* Ait., *Phoenix sylvestris* (L.) Roxb. *Boswellia serrate* Roxb. ex Colebr., *Sterculia urens* Roxb., *Cochlospermum religiosum* (L.) Alst., *Cleistanthus collinus*, *Costus speciosus* (Koen.) J.E. Smith., *Curcuma inodora* Blatt., *Curculigo orchoides* Gaertn., *Emblia officinalis* Gaertn. *Holostemma annulare* (Roxb.) K.Schum. , *Butea superba* Roxb. ex Willd., and *Butea monosperma* (Lamk.) Taub., *Helicteres isora* L. *Chloroxylon swietenia* DC., *Buchanania cochinchinensis* (Lour.) Almeida, *Holarrhena pubescens* (Buxh.-Ham.) Wall ex G.Don., *Eulophia nuda* Lindl., *Hemidesmus indicus* (L.) R.Br., , *Chlorophytum borivilianum* Sant. & Fern., *Asparagus racemosus* Willd., *Tacca leontopetaloides* (L.) O. Ktze. , etc.

Description of plant:

Rhizome thick, yellow inside, aromatic root tubers oblong, many. Plants 1.5- 2 m. high. The identification of this plant is based on Spike terminal on the leafy stem. Leafy stem 1-1.25 m. Leaves bifarious 30-45 x 2-3.5 cm. linear, recurved, glabrous above, minutely hairy on the lower side, sheath hairy. Spike terminal, 13-15 x 2-3.5 cm. deep green, turn bright red at maturity, tip obtuse. Bracts green with red margins, 3.5-4 x 1-1.5 cm, sparsely pubescent. Bracteoles light green, 2.5-3 x 1.2-1.5 cm., 2-keeled, sparsely hairy.

Flowers pale yellow, 4.5 - 4.8 cm. long, longer than the bracts. Calyx 1-1.3 x 1-1.2 cm, 3 toothed, white, membranous, apex truncate, unequally 3- toothed, short hairs on the margin. Corolla tube cylindrical, c. 1.5 cm. long, glabrous; lobes deep yellow, unequal, glabrous, dorsal lobe 2-2.4 x 1-1.3 cm., about 11-nerved, lateral lobes 2-2.2 x 0.4-0.5 cm, about 6-nerved. Labellum deep yellow, 2-2.3 x 1.8-2 cm, tip bilobed ; lateral lobes 2.5-2.7 cm. long. Anther yellow c. 1.2 cm., beak equal to the anther lobes. Ovary c. 5 mm. long, pubescent, style shorter, stigma funnel- shaped with ciliate margin, below the beak. Capsule oval, three sided, smooth , bright red, 3- celled. Seeds many, black, arillate, aril white, lacerate.

Flowering and fruiting: Generally plant produce flowers and fruits in July – October. In present Mendha lekha village we recorded flowering in Nov. 2012.

Scientific evaluation *Zingiber capitatum* rhizome:

The antioxidant, antimicrobial and preliminary phytochemical analysis were investigated here for the first time. The antioxidant properties of *Zingiber capitatum* rhizome extracts were evaluated using different methods (α , α -Diphenyl- β -Picryl-hydrazyl, Hydrogen peroxide, Ferric reducing antioxidant power). Antimicrobial activities were studied by well diffusion method, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were done. Preliminary phytochemical analysis revealed the presence of phytoconstituents. The total amount of ascorbic acid, phenolics, and flavonoids were estimated. Result indicates rhizomes extracts have antioxidant activity ranging from 32.2 to 63.74% with IC_{50} value ranging from 8.14 to 8.25 μ g/ml. The antimicrobial activity showed significant activity against a range of pathogens the best activity showed by chloroform extract followed by methanolic extract > hot aqueous extract > acetone extract reported. Preliminary phytochemical analysis revealed the presence of alkaloid, cardiac glycoside, tannin, saponin and carbohydrates. The total amount of ascorbic acid, phenolics and flavonoid were estimated. *Zingiber capitatum* has the traditional use but not been rationalized in the term of its experimental verification either *in vitro* or *in vivo*. The results obtained in this study suggest the potential of *Zingiber capitatum* as a source of natural antioxidant and antimicrobial agents.

Activity against both gram positive and gram negative bacteria indicates the presence of broad spectrum antibiotic compound in the plant. (Jane *et al.*, 2011)

Conservation measures:

The principal purpose of documentation of rare, endangered, endemic and threatened plants are not only to present facts about the distribution and conservation status of taxa. The preliminary documentation of endemic plants from Maharashtra state were made by Tetali *et al.* (2000). It is also necessary to recommend suitable measures to conserve and strengthen existing populations. Preservation of taxa without enrichment is the simplest measure and consists of preserving more or less unaltered, a viable habitat areas containing one or more populations of the taxon being conserved. The area must be of such shape and size as to minimise edge effects where vegetation might be altered in response to changes outside the reserve boundaries. In some instance the species could be preserved in a core reserve with a surrounding buffer zone transitional to modified communities (Given, 1976).

The newly passed Biological Diversity Act has created space for making this much needed and significant transition in management of ecosystems. This ambitious act aims to promote conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources, including habitats, cultivars, domesticated stocks and breeds of animals and microorganisms. It provides for the establishment of a National Biodiversity Authority (NBA), State Biodiversity Boards (SBB) and Biodiversity Management Committees (BMC) at the level of Panchayats, Municipalities and City Corporations. The Act stipulates that "Every local body shall constitute a BMC within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and micro-organisms and chronicling of knowledge relating to biological diversity". The BMCs have the required legislative support and should therefore be in a position to strike roots more effectively. Most significantly, BMCs would serve to take science right down to the grass-roots (Gadgil, 2004).

The main function of the BMC is to prepare People's Biodiversity Register in consultation with local people. In this connection, Mendha lekha forest is belong to Gondia community having an area of 1800 hectare. The forest rights are given to Gram Sabha for conservation, utilization and management of local plant resources. In this way local people participated in PBR and register more than 150 plant resources utilize for NTFP, medicines, food, fodder, etc. BMC of Mendha lekha

will conserve *Zingiber capitatum* plant in same locality without disturbing natural habitat.

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Fig. 1: *Zingiber capitatum* Roxb. at Mendha Lekha field site.

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