

Preliminary observation on lichen flora of Cotigao Wildlife Sanctuary, Goa, India

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The paper enumerates the occurrence of 43 species of lichens belonging to 24 genera and 12 families. The Cotigao Wildlife Sanctuary is rich in pyrenocarpous and graphidaceous lichens represented by 14 and 9 species respectively. The present study has provided baseline information for future lichen studies in the state.

Keywords : Lichens; Cotigao Wildlife Sanctuary; Goa

Introduction

Goa, the beach state of India is situated on the southwest coast at 15.5° N longitude and 74° E latitude. Along with tourism, the state has given considerable importance to biodiversity conservation. Around 755 sq km (20%) of state's geographical area (3702 sq km) has been declared as wildlife-protected area, which offers complete safety and protection to the natural flora and fauna of the state. The protected areas of the state have been well studied for their fauna and angiosperm flora, while cryptogamic studies are yet to be given due importance. Being a part of Western Ghats, the state is expected to have rich lichen flora. However, only a few cursory collections of lichens have been made in the past. Hence, a complete checklist of lichens for the state is not available. The present investigation represents an initial step towards study of the lichen flora of the state.

Cotigao Wildlife Sanctuary

Located in the southeast of Goa, Cotigao Wildlife Sanctuary is the oldest protected area of the state (Fig. 1). It is a representative of the ecosystem in the Western Ghats region. Apart from its aesthetic appeal, it is rich in floral and faunal diversity. The sanctuary has a few open grasslands, moist deciduous forest interspersed with semi-evergreen and evergreen patches along with cane and bamboo. The sanctuary is spread over an area of 86.65 sq km. The altitude ranges from 10 to 843

m above msl and the sanctuary receives annual rainfall around 3000 mm. The sanctuary also hosts a few sacred groves, which, in turn, are abodes of a few old evergreen trees.

Materials and Methods

About 70 lichen specimens were collected from eight forest sites of Cotigao Wildlife Sanctuary in two field trips. The lichen specimens collected were mostly corticolous. The collection sites also included one sacred grove named 'paikghar devaroi' in Gaodonger village.

The specimens were identified through morphological, anatomical and chemical studies. The recent literature [Awasthi (1998, 1991), Lumbsch (1994), Makhija and Patwardhan (1993), Nagarkar *et. al.* (1988), Upreti (1994, 1998), Upreti and Pant (1993), Walker and James (1980)] was consulted for identification of specimens.

Results and Discussion

The study revealed the occurrence of 43 species belonging to 24 genera and 12 families of lichens in the Cotigao Wildlife Sanctuary (Table 1). The area is dominated by crustose lichens with 35 species, while foliose lichens are represented by 8 species only. Fruticose lichens are altogether absent in the study area. The area has rich diversity of pyrenocarpous (perithecia-bearing) and graphidaceous lichens represented by 14 and 9 species respectively. The dominance of pyrenocarpous and graphidaceous lichens clearly

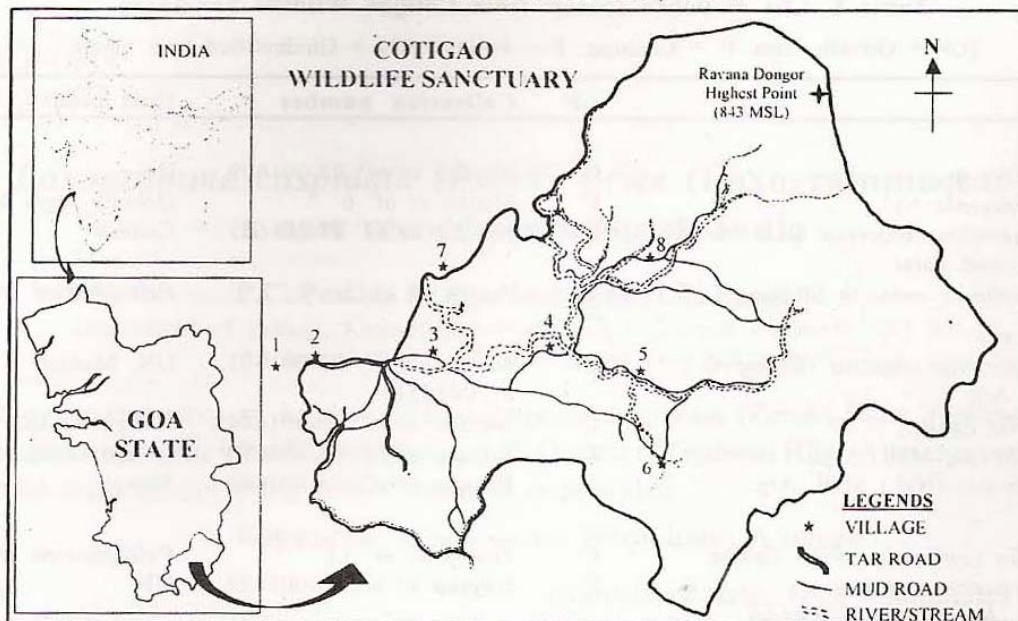


Figure 1. Map of Cotigao Wildlife Sanctuary showing the locality surveyed for lichens (Note: 1. Bhutapal, 2. Shishewal, 3. Astragal, 4. Ponsulimol, 5. & 6. Endrem, 7. Gaodonger, and 8. Edda)

exhibits the moist and humid conditions of the forest, similar to evergreen forest of Eastern Himalayas. Both pyrenocarpous and graphidaceous lichen taxa prefer to grow on smooth, thick-barked trees. The pyrenocarpous genus *Porina* exhibits luxuriant growth on smooth barked trees both in moist and dry habitats, while graphidaceous lichens prefer a more or less dry and open habitat.

The most common foliose lichen of the area is *Pyxine cocus* (Swartz.) Nyl. found growing on cashewnut and mango trees.

Occurrence of more than 40 species of lichens in a single locality of the sanctuary clearly indicates lichen richness of the area. The present study has provided baseline information for future lichen studies in the state. The preliminary observations reveal that the Cotigao Wildlife Sanctuary has rich and unique lichen flora. More intensive and extensive survey of the area will provide a clear picture of diversity and status of lichens of the wildlife sanctuary and Goa State.

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Table 1. List of lichen species from Cotigao Wildlife Sanctuary
(GF = Growth form, C = Crustose, F = Foliose, UN = Unidentified host plant).

Sl No.	Taxa	GF	Collection number	Host plant
Arthoniaceae				
1	<i>Arthonia</i> sp.	C	Nayaka <i>et al.</i> 03-001609	UN
2	<i>A. dispersula</i> Nyl.	C	Phatak <i>et al.</i> 6	<i>Delonix regia</i> Rafin.
3	<i>Arthothelium confertum</i> (A.L. Smith) Makh. and Patw.	C	Nayaka <i>et al.</i> 03-001625	Cashew
4	<i>Cryptothecia subsecta</i> Stirton	C	Phatak <i>et al.</i> 5	<i>Peltophorum</i> sp.
Arthopyreniaceae				
5	<i>Arthopyrenia alboatra</i> (Krempelh.) Müll. Arg.	C	Nayaka <i>et al.</i> 03-001602, 03-001618	UN, Mango
6	<i>A. finkii</i> Zahlbr.	C	Nayaka <i>et al.</i> 03-001644	<i>Holigarna</i> sp.
7	<i>A. indusiata</i> Müll. Arg.	C	Nayaka <i>et al.</i> 03-001650	<i>Holigarna</i> sp.
8	<i>A. subnexa</i> (Nyl.) Müll. Arg.	C	Nayaka <i>et al.</i> 03-001640	Mango
Bacidiaceae				
9	<i>Bacidia connexula</i> (Nyl.) Zahlbr.	C	Phatak <i>et al.</i> 12	<i>Peltophorum</i> sp.
10	<i>Phyllopsora manipurensis</i> (Müll. Arg.) Gotth. Schneider	F	Nayaka <i>et al.</i> 03-001639	UN
11	<i>P. parvifolia</i> (Pers.) Müll. Arg.	F	Nayaka <i>et al.</i> 03-001608	<i>Xylia xylocarpa</i> (Roxb.) Taub.
Graphidaceae				
12	<i>Graphina adscribens</i> (Nyl.) Müll. Arg.	C	Nayaka <i>et al.</i> 03-001603	Mango
13	<i>G. cleistoblephara</i> (Nyl.) Zahlbr.	C	Phatak <i>et al.</i> 10	<i>Peltophorum</i> sp.
14	<i>G. confluens</i> (Fée) Müll. Arg.	C	Nayaka <i>et al.</i> 03-001634	Cashew
15	<i>Graphis nakanishiana</i> Patw. and Kulk.	C	Nayaka <i>et al.</i> 03-001621	UN
16	<i>G. nigroglauca</i> Leighton	C	Phatak <i>et al.</i> 2	Mango
17	<i>Phaeographina chrysenderodes</i> (Nyl.) Awsthi and K. Singh	C	Nayaka <i>et al.</i> 03-00161610	UN
18	<i>P. wattiana</i> Müll. Arg.	C	Nayaka <i>et al.</i> 03-001604	UN
19	<i>Phaeographis extrusula</i> (Stirton) Zahlbr.	C	Nayaka <i>et al.</i> 03-001630	Mango
20	<i>P. platycarpa</i> Müll. Arg.	C	Phatak <i>et al.</i> 12	<i>Peltophorum</i> sp.
Lecanoraceae				
21	<i>Lecanora tropica</i> Zahlbr.	C	Phatak <i>et al.</i> 14	<i>Peltophorum</i> sp.
22	<i>Lecidella</i> sp.	C	Nayaka <i>et al.</i> 03-001636	Mango
Lecidiaceae				
23	<i>Lecidea</i> sp.	C	Nayaka <i>et al.</i> 03-001606, 03-001623	<i>Holigarna</i> sp.
Parmeliaceae				
24	<i>Parmotrema latissimum</i> (Fée) Hale	F	Phatak <i>et al.</i> 15	<i>Peltophorum</i> sp.
Physciaceae				
25	<i>Dirinaria aegialita</i> (Afz. in Ach.) Moore	F	Phatak <i>et al.</i> 9	<i>Peltophorum</i> sp.
26	<i>Heterodermia obscurata</i> (Nyl.) Trevisan	F	Phatak <i>et al.</i> 3	<i>Alstonia scholaris</i> (L.) R. Br.
27	<i>Physcia tribacia</i> (Ach.) Nyl.	F	Phatak <i>et al.</i> 24	<i>Peltophorum</i> sp.