

Lichens from some monuments in Karnataka and Orissa, India

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An attempt is made to enumerate lichens from some Indian monuments. The collected material consists of 18 genera and 40 species. Taxonomic account and a key for their identification is provided. The monuments exhibit a distributional pattern of lichens depending on microclimates created at different niches by their architectural designs.

Key-words- Lichen flora, saxicolous, monument, Karnataka, Orissa.

INTRODUCTION

STUDIES on the vegetation of different habitats sometimes yield interesting results. Lichens, many of which appear to be quite choosy about their substrate, constitute a good subject for the same. As a matter of fact, many a times the information about substratum on which they grow is decisive in their identification to the specific level. Different types of barks, rocks and other substrata with diverse texture and chemical composition display their characteristic lichen elements.

The theme objects as habitat of lichens in this paper, i.e. monuments are integral part of our cultural heritage that belongs to one of the oldest civilizations of the world. Since time immemorial India had a continuous inflow of alien cultures, whose mixing up with ours caused periodical changes and modifications to the latter but failed to erase its identity. However, they left an indelible mark on our society that can be perceived in its different aspects, including architecture in the form of monuments, that are strewn throughout the country.

Monuments as habitat, unlike boulders and tree trunks, are complex structures, made of a variety of materials. Nonetheless, one can expect the lichen-flora of this habitat comprising predominantly saxicolous species.

India enjoys diverse topographical and climatic conditions. The monument flora of different regions thus shows its characteristic vegetational patterns

governed by climatic conditions and substrate properties.

An attempt is made to record the existing lichen flora of monuments of two states, viz. Karnataka and Orissa, both rich in monuments. In near future spread of atmospheric pollution (presently restricted mainly to big and industrial cities) to more extensive areas of the country or large scale implementation of conservational practices may bring a sea change to the composition of lichen elements in the flora of monuments or may completely eradicate it.

The lichens enumerated here comprise 18 genera and 40 species.

MATERIAL AND METHOD

Collections of the two fruticose forms did not pose any problem. They were simply pulled out of the substratum. The foliose forms were scrapped out with the help of a scalpel after rendering them soft by wetting. Real difficulty arose in collection of crustose forms that firmly adhere to the substratum or even penetrate it and become endolithic. In general, they can be collected only alongwith the substratum on which they grow. It is not possible in case of monuments as they are protected buildings. The lichen patches were, therefore, photographed and gently scraped after wetting. The scrappings constitute small fragments of lichen thallus. In spite of this technique, many crustose forms could not

be collected. The enumeration of lichen taxa here thus does not constitute the full representation of the total lichen flora of monuments.

The collected lichens were prepared as herbarium samples that have been deposited at the lichen herbarium of National Research Laboratory for Conservation of Cultural Property and duplicates at lichen herbarium of National Botanical Research Institute (LWG).

In the enumeration of floral elements, families have largely been arranged according to Poelt's classification (1973), genera are arranged in alphabetical order in each family and so are species within each genus. Species of *Caloplaca* and *Lecanora* have been described in brief as they could not be identified to specific level. Others are already known taxa and need not be described here in detail. A composite key for identification of species is provided at the end of descriptive part. Name of each species is accompanied with taxonomic or other relevant notes, if and when necessary and details of specimens examined. Citations of specimen numbers are accompanied with abbreviations of monuments in order to avoid repetition of long names every time, which are as follows:

Karnataka = K, Orissa = O (Shown in parenthesis with abbreviations of monuments)

Amreshwar temple, Chaurasi, distt. Puri	A	(O)
Ehairingeshwar temple, Dhauli, distt. Puri	B	(O)
Chamundi temple, Chamundi hill, distt. Mysore	C	(K)
Chennakeshava temple, Belur, distt. Hassan	Ch	(K)
Chennakeshava temple, Hullekere, distt. Hassan	Cha	(K)
Chennakeshava temple, Turuvekere, distt. Tumkur	Chan	(K)
Hoysaleswara temple, Halibed, distt. Hassan	H	(K)
Keshava temple, Somnathpur, distt. Mysore	K	(K)
Kotitirth temple, Bhubaneswar, distt. Puri	Ko	(O)
Panchalingeshwar temple, Somnathpur, distt. Mysore	P	(K)
Rameshwar temple, Bhubaneswar, distt. Puri	R	(O)
Shatrughaneshwar temple, Bhubaneswar, distt. Puri	S	(O)
Sivappa's Fort Complex, Kavaledurga, distt. Shimoga	Sh	(K)
Sun temple, Konark, distt. Puri	Su	(O)
Tippu's Jail, Srirangapatna, distt. Mysore	T	(K)
Yoganarsimhaswami temple, Baggavalli, distt. Chikmangalur	Y	(K)

ENUMERATION OF LICHENS

Ascolichens

Family - Roccellaceae

Genus *Roccella* DC.

R. montagnei Bel. emend. Awas.

Specimen examined: 93.30 (Su).

Family - Verrucariaceae

Genus *Endocarpon* Hedw.

E. nanum A. Singh & Upreti

The commonest and most widely distributed species of this genus not only on monuments but also elsewhere in dry situations in India. It grows in association with species of *Peltula* and *Phylliscum*.

Specimens examined: 90.132 A,B. & C (P), 90.239-1 (Ch), 93.18B (A), 93.19B (A).

E. pusillum Hedw.

Specimen examined: 90.210-2 (Cha).

Family - Thelotrematacea

Genus *Diploschistes* Norman

D. euganeus (Massal.) Steiner

Specimen examined: 90.197 (Y).

Family-Licheniaceae

Genus *Phylliscum* Nyl.

This xerophytic genus commonly grows on exposed horizontal face (roof) of monuments in association with species of *Endocarpon*, *Peltula* and sometimes *Caloplaca*.

P. indicum Upreti

Specimens examined: 90.127 (K), 90.138 (T), 90.9A (Chan), 90.210-1 (Cha).

P. tenue A. Henssen

Specimen examined: 90.132A (P)

Family -Peltulaceae

Genus *Peltula* Vainio

It is generally found on lime-plastered roofs along with taxa of *Endocarpon* and *Phylliscum*.

P. eupluca (Ach.) Poelt ex Pisut

Specimens examined: 90.206 (H), 90.238 (T)

P. patellata (Bagl.) Swinsc.

Common on lime plaster or bricks along with *Endocarpon* and *Caloplaca*.

Specimens examined: 90.126 (K), 90.132A (P), 90.137A (T), 90.137B (T), 90, 159B) Chan).

Family- Collemataceae

Genus *Leptogium* (Ach.) Gray

L. indicum Awas. & Akhtar

Specimen examined: 90.168 (Sh).

L. pichneum (Ach.) Malme

Specimen examined: 90.204 (Ch).

Family - Coccocarpiaceae

Genus *Coccocarpia* Pers.

C. palmicola (Sprengel) Avrid. & D. Galloway

Specimens examined: 90.167 (Sh), 90.172 (Sh).

Family- Lecanoraceae

Genus *Lecanora* Ach.*Lecanora* sp. type 1

Thallus cracked areolate, whitish, surface smooth to undulate, K+yellowish. Apothecia, up to 0.5 mm diam., sessile, disc black, plane, later becoming convex, margin distinct in young condition sometimes indistinct in older apothecia, paraphyses simple, asci with a narrow to somewhat wide "Chamber axiale", spores 10 X 6.5 µm.

Zeorin and atranorin present

Specimens examined: 90 195C (Y), 90. 196B (Y).

Lecanora sp. type 2

Thallus whitish or greyish, cracked, at places areolate, smooth, with non-lichenized white prothalloid margin, K+yellowish. Apothecia crowded, immersed, round to slightly elongate, 0.3-0.4 mm across, thalline margin of lighter colour than thallus, disc light reddish-brown, asci 8-spored or fewer-spored by abortion, spores oblong-ellipsoid, 12-15 x 4-5 µm.

Atranorin present

The thallus shows heavy deposition of oxalate crystals, many of which break open the upper corticiform layer.

Specimen examined: 90.18 (Y).

Lecanora sp. type 3

Thallus cracked areolate, rough to verrucose, prothallus indistinct. Apothecial disc light reddish-brown, epruinose, margin verrucose, sometimes becoming indistinct at maturity, asci 8-spored, spores simple, hyaline, oblong-ellipsoid, 7.5-10 x 3.5-5 µm.

Specimen examined: 90.130C (P).

Lecanora sp. type 4

Thallus grey, dark grey to brownish in central part, minutely cracked areolate at periphery, hypothallus indistinct, K+yellowish.

Apothecia immersed, 1-4 in each areole, free or coalescing, round when free, elongate to irregular in outlined otherwise, up to 0.5 mm across, disc dark brown, plane to slightly concave, margin indistinguishable (visible in vertical section), ascio- 8-spored, spores simple, hyaline, oblong-ellipsoid, 10-16.5 X 4-6.5 µm.

Parietin present

The thallus in vertical section shows heavy deposition of oxalate crystals.

Specimen examined: 90.208 (Cha).

Lecanora sp. type 5

Thallus whitish, cracked areolate, smooth, with non-lichenized white prothalloid margin (at places), K+yellowish. Apothecia ± immersed when young, emerging and sessile later, crowded, disc light reddish-brown, whitish and translucent when young, plane, becoming convex at maturity, margin entire, thick when young, thinning out at maturity, asci 8- spored, spores simple, hyaline, oblong-ellipsoid, 10 x 4-6.5 µm.

Specimen examined: 90. 196A (Y).

Family - Parmeliaceae

Genus *Parmelinella* Elix & Hale

P. wallichiana (Taylor) Hale

Atranorin and salazinic acid present

Specimen examined: 90.175 (Sh).

Family-Cladoniaceae

Genus *Cladonia* (Hill.) Weber in Wigg.

C. ramulosa (With.) Laundon

Specimen examined: 90.190 (Sh).

Family-Candelariaceae

Genus *Candelaria* Massal.

C. concolor (Dicks.) B. Stein

It is found on Karnataka monuments in association with *Pyxine cocoes* and sometimes also grows on thalli of *P. cocoes* and *P. petricola*.

Specimens examined: 90.144A (T), 90.157 B (Chan), 90.202B (Ch), 90.211B (Cha).

Family-Teloschistaceae

Genus *Caloplaca* Th. Fr.

Caloplaca sp. type 1

Thallus crustose, not effigurate, ash-grey, smooth, rimulose, K-, sorediate, soredia plane to subglobose. Apothecia 0.5 mm diam., sessile, disc yellow-brown, epithecium K-purple, margin dark brown to blackish, spores polaribilocular, 8-10x 4-5 µm.

Zeorin and atranorin present

Specimens examined : 93.10 A&B (s), 93.13(Ko) 93.18A (A), 93.19 A (A), 93.25 (Su), 93.28 (Su).

Caloplaca sp. type 2

Thallus squamulose, effigurate, whitish-grey, squamules imbricate. Apothecia 0.6 mm diam., lecanorine, sessile, disc yellow-brown, margin of thallus colour, entire, serrate when old, spores 9.5-10 x 5 µm.

Atranorin present

specimen examined: 93.24 B (Su).

Caloplaca sp. type 3

Thallus crustose, orange, rimulose-areolate, K+purple, not effigurate, sorediate, soredia crateriform, yellow, granular in the central part of areole. Apothecia not observed.

Parietin present

Specimens examined: 90.184 (Su), 90.186 (Su), 93.11 (Ko).

Caloplaca sp. type 4

Thallus scaly, yellow-orange to orange K+purple, not effigurate, scales dispersed or compact, round or irregular in outline, up to 0.75 mm across sometimes thallus inconspicuous or even absent. Apothecia numerous and sometimes crowded, up to 0.75 mm diam., lecanorine sessile, disc of darker shade than thallus, margin concolorous to disc, entire persistent, epithecium K+purple, spores polaribilocular 9-13 x 6.5 µm

Parietin present

Specimens examined: 90.132B (P.), 90.137C (T), 90.140, 90.160 (Chan), 90.201 (Ch), 90.239 (Ch).

C. holochracea (Ny1.) Zahlbr.

Specimens examined: 90.129 (P), 90.130 (P), 90.195 (7), 93.25 (Su).

Family-Physciaceae

Genus *Buellia* de Not.

B. posthabita (Ny1.) Zahlbr.

Specimen examined: 90.209 (Cha).

Buellia sp.

Similar to *Buellia palniensis* S. Singh & Awasthi but internal stipe is HNO₃

Specimen examined: 90.143 (T).

Genus *Dirinaria* (Tuck.) Clem.

D. confluens (Fr.) Awasthi

Dirinaria africana (Müll. Arg.) Awasthi, reported earlier by us (Chatterjee *et. al* 1995) as new record for India, has been merged with *D. confluens* by Swinscow & Krog (1978), who consider the former simply as a saxicolous form of the latter.

Atranorin and divaricatic acid present

Specimen examined : 90.108 (C).

D. consimilis (Stirton) Awasthi

Atranorin and sekikaic acid present

Specimens examined: 90.192A (Y), 90.194 (Y).

D. papillulifera (Nyl.) Awas.

Atranorin (always) and divaricatic acid (sometimes)

Specimens examined: 93.16 (B), 92.23 B (A).

Genus *Heteroderima* Trevisan emend. Poelt

H. hypocaezia (Yasuda) Awas.

Specimens examined: 90.179 (Sh), 90.181 (Sh).

H. incana (Stirton) Awas.

Specimen examined: 90.173 (Sh).

H. leucomela subsp. *boryi* (Fée) Swinsc. & Krog.

Specimen examined: 90.185 (Sh).

H. microphilla (Kurkok.) Skorepa

Specimen examined: 90.176 (Sh).

Genus *Physcia* (Schreber) Michaux

P. phaea (Tuck.) Thomson

Specimen examined: 90.188 (Sh)

Ptribacoides Ny1.

Specimens examined: 90.191 (Y), 90.196A (Y).

Genus *Pyxine* Fr.

The most common foliose genus on monuments, especially of Orissa.

Specimens examined: 90.125 (K), 93.3 (R), 93.5 (S), 93.14 (B).

P. cocoes (Swartz) Nyl. var. *cocoes*

Lichens Imperfecti

Specimens examined: 90.142A (T), 90.144B (T), 90.145 (T), 90.146 (T), 90.205 (Ch), 93.17 (B), 90.23A(A), 90.27 (Su)

Family-Leprariaceae

P. cocoes var. *perominula* (Stirton) Awasthi

Genus *Lepraria* Ach.

Specimens examined: 90.144A, 90.157A & 90.158 (Chan), 90.207B (H).

Lepraria sp.

P. petricola Nyl. in Crombie var. *petricola*

Thallus leprose, greenish grey with black tinge, K-, C-, KC-, P-.

Specimens examined: 90.128 (P), 90.207A, (H), 90.211A (Cha), 93.15(B)

Specimens examined: 90.161 (Chan), 93.1 (R), 93.2 (R), 93.9(S), 93.21A (A), 93.22 (A).

P. petricola var. *pallida* Swinsc. & Krog.

Key to identification of species

1. Thallus fruticose _____ 2
1. Thallus not fruticose _____ 3
- 2:1 Thallus of two types ; primary thallus dorsiventral -squamulose, secondary thallus erect, hollow, terete podetium. Terricolous _____ *Cladonia ramulosa*
- 2:1 Thallus strap-shaped, or flattened, erect or pendulous. corticolous or saxicolous ____ *Roccella montagnei*
- 3:1 Thallus foliose _____ 4
- 3:1 Thallus not foliose _____ 22
- 4:3 Photobiont cyanobacteria _____ 5
- 4:3 Photobiont green alga _____ 8
- 5:4 Photobiont *Scytonema*, thallus heteromerous, lead-grey to brown-black, isidiate, apothecia biatorine _____ *Coccocarpia palmicola*
- 5:4 Photobiont *Nostoc*, thallus homoiomerous or heteromerous _____ 6
- 6:5 Thallus without hypothallus, homoiomerous, both surfaces with a single- layered, paraplectenchymatous cortex, apothecia with thalline exciple _____ 7
- 6:5 Thallus with a distinct hypothallus, heteromerous, only upper surface corticated, apothecia without thalline exciple _____ *Parmeliella* sp.
- 7:6 Thallus isidiate _____ *Leptogium pichneum*
- 7:6 Thallus non-isidiate _____ *Leptogium indicum*
- 8:4 Thallus yellow _____ *Candelaria concolor*
- 8:4 Thallus grey, greyish-white to brownish _____ 9
- 9:8 Upper cortex of thallus prosoplectenchymatous _____ 10
- 9:8 Upper cortex of thallus paraplectenchymatous _____ 13
- 10:9 Thallus adpressed to substratum, compact, rosetiform _____ 11
- 10:9 Thallus attached at centre, lax, laciniae to the most part free from substatum _____ 12
- 11:10 Laciniae sorediate along margins, ca. 3.0 mm broad _____ *Heterodermia hypocaesia*
- 11:10 Laciniae sorediate, 1.0-1.5 mm broad _____ *Heterodermia microphylla*

12:10	Laciniae linear, ca. 1.0 mm broad, cercinately revolute at apices _____	<i>Heterodermia leucomela</i> subsp. <i>boryi</i>
12:10	Lobes resulate, 2.0-4.0 mm broad, not cercinately revolute at apices _____	<i>Heterodermia incana</i>
13:9	Lower cortex of thallus paraplectenchymatous _____	14
13:9	Lower cortex of thallus prosoplectenchymatous _____	15
14:13	Thallus K+yellow, isidiate, lobes up to 10 mm broad, short ciliate at margins, medulla K+yellow turning red, P+yellow, atranorin and salazinic acid present _____	<i>Parmelinella wallichiana</i>
14:13	Thallus K+yellow, sorediate, laciniae 1.0-1.5 mm broad, short ciliate at margins, medulla K-, P-, atranorin present _____	<i>Physcia tribacoides</i>
15:13	Laciniae tend to become marginally confluent with adjacent ones throughout the thallus or at its central part only, underside without rhizinae _____	16
15:13	Laciniae discrete throughout, underside rhizinate _____	18
16:15	Thallus isidiate or sorediate, sterile _____	17
16:15	Thallus neither isidiate nor sorediate, fertile _____	<i>Dirinaria confluens</i>
17:16	Thallus isidiate _____	<i>Dirinaria papillulifera</i>
17:16	Thallus sorediate _____	<i>Dirinaria consimilis</i>
18:15	Thallus bluish-grey, white maculate epsuinose, K+yellow, UV- _____	<i>Physcia phaea</i>
18:15	Thallus whitish, glaucous grey, yellowish -grey to grey, pruinose, K-, UV+yellow _____	19
19:18	Thallus sorediate, sterile _____	20
19:18	Thallus esorediate, fertile _____	21
20:19	Laciniae rounded at ends, pruina diffused _____	<i>Pyxine cocoes</i> var. <i>cocoes</i>
20:19	Laciniae ± flabellate at ends, pruina agglutinated _____	<i>Pyxine cocoes</i> var. <i>prominula</i>
21:19	Internal stipe of apothecium red-brown, K+purple-red _____	<i>Pyxine petricola</i> var. <i>petricola</i>
21:19	Internal stipe of apothecium yellowish, K- _____	<i>Pyxine petricola</i> var. <i>pallida</i>
22:3	Thallus squamulose to scaley _____	23
22:3	Thallus otherwise _____	30
23:22	Thallus scaley, yellow-orange to orange _____	<i>Caloplaca</i> sp. (Type 4)
23:22	Thallus squamulose, not yellow or orange _____	24
24:23	Photobiont cyanobacteria (<i>Chroococcus</i>), thallus blackish to dark olive green _____	25
24:23	Photobiont green alga, thallus grey to brown _____	26
25:24	Squamules 0.5-1.5 mm across, compactly saggregated to form extensive seemingly crustose patches _____	<i>Phylliscum indicum</i>
25:24	Squamules 0.2-0.4 mm across, dispersed to occasionally a few aggregated and form minute gelatinous masses _____	<i>Phylliscum tenue</i>
26:23	Fructifications perithecia _____	27
26:23	Fructifications apothecia _____	28
27:26	Squamule underside pale _____	<i>Endocarpon nanum</i>
27:26	Squamule underside black _____	<i>Endocarpon pusillum</i>
28:26	Apothecia 8-spored, spores polaribilocular _____	<i>Caloplaca</i> sp. (Type 2)
28:26	Apothecia multispored, spores simple _____	29
29:28	Thallus reticulate-rugose, esorediate _____	<i>Peltula patellata</i>
29:28	Thallus not reticulate-rugose, sorediate _____	<i>Peltula euplaca</i>

30:22	Thallus placodioid _____	<i>Caloplaca holochracea</i>
30:22	Thallus crustose _____	31
31:30	Thallus leprose to granular, forming granular crust _____	<i>Lepraria</i> sp.
31:30	Thallus well developed _____	32
32:31	Thallus yellow-orange to orange _____	<i>Caloplaca</i> sp. (type 3)
32:31	Thallus shades of grey _____	33
33:32	Thallus sorediate and often fertile, spores polaribilocular _____	<i>Caloplaca</i> sp. (type 1)
33:32	Thallus esorediate, spores not polaribilocular _____	34
34:33	Apothecial disc black _____	35
34:33	Apothecial disc differently coloured _____	37
35:34	Apothecia lecanorine, ascus amyloid, tholus with wide "Chamber axiale", spores thin-walled, simple, hyaline _____	<i>Lecanora</i> sp. (type 1)
35:34	Apothecia lecideine, spores 2-celled, thick-walled brown _____	36
36:35	Spores mischoblastomorphic _____	<i>Buellia posthabita</i>
36:35	Spores not mischoblastomorphic _____	<i>Buellia</i> sp.
37:34	Proper margin of apothecia blackish, disc white pruinose, with fine radiating furrows, spores hyaline to brown, muriform _____	<i>Diploschistes euganeus</i>
37:34	Proper margin of apothecium not blackish, disc reddish-brown, epruinose, without radiating furrows, spores simple, hyaline _____	38
38:37	Amphithecium of apothecia with aggregation of large number of minute crystals of less than 10 µm diameter (<i>Lecanora allophana</i> and <i>Lecanora campestris</i> type-Brodo, 1984; <i>L. allophana</i> type-Miyawaki, 1988) _____	39
38:37	Amphithecium of apothecia with aggregation of fewer number of crystals of more than 10 µm diameter (<i>Lecanora pulicaris</i> type-Brodo, 1984; <i>L. chlorotera</i> type-Miyawaki, 1988) _____	40
39:38	Apothecia immersed, thalline margin merging with thallus, thallus smooth, with white hypothallus _____	<i>Lecanora</i> sp. (type 2)
39:38	Apothecia emerging, thalline margin distinct, thallus rough to verrucose, prothallus indistinct _____	<i>Lecanora</i> sp. (type 3)
40:38	Apothecia immersed, thalline margin merging with thallus, thallus dark grey to brownish at centre, grey elsewhere, hypothallus indistinct _____	<i>Lecanora</i> sp. (type 4)
40:38	Apothecia emerging, thalline margin distinct, thallus whitish, with white prothalloid margin at places _____	<i>Lecanora</i> sp. (type 5)

OBSERVATION

On comparing the monument lichen-floras of the two states, the one that of Karnataka seems to be more diverse and rich in species.

Some taxa are equally represented on this habitat in both the states. *Lepraria* sp. grows in moist and shady situations. The basal parts of monuments with more protection from intense light and greater access to ground moisture due to capillary action of the building stone material provide ideal niches for this species to thrive. It finds Orissa climate more congenial, where it forms extensive bluish-green leprose patches (up to 2 m)

on the lower parts of monuments. The foliose genus *Pyxine* is likewise equally common. It forms dominant community, sometimes in pure growth, on upper parts of monuments which are drier, more exposed and illuminated than lower parts. *Pyxine cocoes* and *P. petricola* known to be corticolous (Awasthi, 1980) grow abundantly on rock substratum of monuments. *P. cocoes* var. *cocoes* is common in both the states but var. *prominula* is a common sight on Karnataka monuments only. Regarding *P. petricola*, both the varieties, i.e., var. *petricola* and var. *pallida* are found in both the states but the former variety is more frequent on Karnataka monuments and the latter on the Orissa ones. In Karnataka

Candelaria concolor is a common associate of *P. cocoes* var. *cocoes* and *P. petricola* var. *petricola* and forms part of the dominant lichen community mentioned earlier.

Another foliose genus *Dirinaria*, common to monuments of both the states shows different distribution pattern of the three collected species. *D. papillulifera* known to be a corticolous species (Awasthi, 1975) has been collected from Orissa monuments and *D. confluens* and *D. consimilis* from Karnataka ones.

Of some other foliose lichens, i.e., *Coccocarpia palmicola*, *Parmelinella wallichiana* and four species of *Heterodermia* that are well represented in subtropical to temperate parts of the Himalayas and South India, have all been found at the only location known as Sivappa's Fort Complex, Karnataka. The reason for its rich lichen vegetation may be its location on a moist and thickly wooded hill range that is relatively free from human interference.

Another lichen community comprising exclusively squamulose species of *Endocarpon*, *Peltula* and *Phylliscum* is a common sight on the roof (made of lime plaster) of Karnataka monuments. On Orissa monuments this lichen community is missing, perhaps due to their architectural design where the horizontal face of the building is absent. However, one species of this community, *Endocarpon nanum* was collected from the basal part of Amreshwar temple, Orissa.

The three genera seem to have a wide distribution in India growing on dry, exposed boulders and other similar objects, although the species mentioned here do not figure in these states in their respective monographic revisions (Singh & Upreti, 1984; Upreti & Budel, 1990).

The two crustose forms *Caloplaca* and *Lecanora* are the most common lichens growing on stone monuments. In absence of monographic revisions of their Indian taxa it has not been possible to determine most of them to specific level. It is not possible to present even preliminary observations with regard to their distribution as a large majority of them could not be collected.

In spite of the lack of data, we observed *Caloplaca holochracea* to be a common species on Karnataka monuments, sometimes forming extensive beautiful orange patches on them.

It is not so common in Orissa. When present it forms a lichen community either as pure growth or as mixed growth on the basal parts of some monuments.

The fruticose from *Rocella montagnei* is a littoral species and thrives equally well on bark and rock substrata. It was found growing abundantly on Sun temple, Konark (Orissa) and its environs.

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