



A checklist of Lichens of Rajasthan, India

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Sinha GP, Gupta P, Kar R, Joseph S 2015 – A checklist of Lichens of Rajasthan, India. Current Research in Environmental & Applied Mycology 5(4), 367–375, Doi 10.5943/cream/5/4/7

Abstract

The paper presents an updated list of 90 species of lichens from the state of Rajasthan, India. Three species marked by an asterisk (*) viz. *Malmidea psychotrioides* (Kalb & Lücking) Kalb, Rivas Plata & Lumbsch, *Staurothele rugulosa* (A. Massal.) Arnold and *Willeya diffractella* (Nyl.) Müll. Arg. are new records for India while 35 species marked by double asterisks (**) are new records for Rajasthan.

Key Words – Ascomycetes – new records – taxonomy – *Willeya*

Introduction

Rajasthan, with a geographical area of about 3,42,274 sq km is situated between 23° 3' - 30° 12' North latitudes and 69° 30' - 78° 17' East longitudes. Lichenologically, the state is known by the Mount Abu area of Aravali hills (Awasthi & Singh, 1979) and some sporadic revisionary publications from the area. However, other areas of Aravali hill as well as drier areas of the state remained unexplored. To bridge this gap, the studies on lichens of Rajasthan were initiated in the year 2012 at Botanical Survey of India, Allahabad. Based on exploration and identification of new collections from various areas of the state as well as earlier information (Awasthi & Singh, 1979, Singh & Sinha, 2010) an updated checklist of 90 species of lichens is presented herewith (Table -1). Prior to this study, 52 species were known from the state. Out of these, three species dealt briefly, in order to facilitate their identification, marked by an asterisk (*) are new records for India and 35 species marked by double asterisks (**) are additions to the lichen biota of the state of Rajasthan.

Materials & Methods

Specimens were collected from twelve localities of the state. The specimens were studied with standardized techniques and identified with the help of authenticated specimens available in the herbarium and published literature (Awasthi & Singh 1979, Upreti & Büdel 1990, Awasthi 1991, 2007, Thomson 1991, Divakar & Upreti 2005, Gueidan & al. 2014). The morphology and anatomy of specimens were studied under the stereomicroscope Motic SMZ-168 and compound microscope Nikon Eclipse 50i respectively. The specimens are deposited in the cryptogam herbarium section of Botanical Survey of India, Allahabad (BSA).

Results

Malmidea psychotrioides (Kalb & Lücking) Kalb, Rivas Plata & Lumbsch in Kalb, Rivas Plata, Lücking & Lumbsch, Biblioth. Lichenol. 106: 165. 2011. Fig 1

Thallus corticolous, crustose, rimose, sub-verrucose, greyish-white; prothallus greenish-black; medulla white, K-. Apothecia rounded, sessile, 0.5–2.2 mm diam.; disc plane, brown to dark brown; margin thick, smooth, white, prominent; excipulum paraplectenchymatous, brown, encrusted with hydrophobic granules, olive-grey, K+ green, 20–40 µm wide; epihymenium reddish-brown, 15–18 µm thick; hymenium colourless, 64–70 µm high; hypothecium brown, 40–70 µm thick, K-; paraphyses simple, capitate, apices brown; asci clavate, 8-spored, 65–80 × 8–12 µm, I+ blue; ascospores colourless, simple, ellipsoid, thick walled, halonate, 13–15(–18) × (6–) 7–8 µm, perispore 1.03 µm thick. Thallus K+ yellow; medulla K-, C-, KC-, P-; atranorin present.

The species, previously known from Brazil, was collected from bark of a tree in an open place along road side forest.

Specimen examined – India, Rajasthan, Mount Abu, on way between Gurusikhar-Trevor's Tank, 24° 38' 36.9" N, 72° 46' 40" E, alt. 1540 m, 07. 09. 2012, G.P. Sinha & R. Kar 7853.

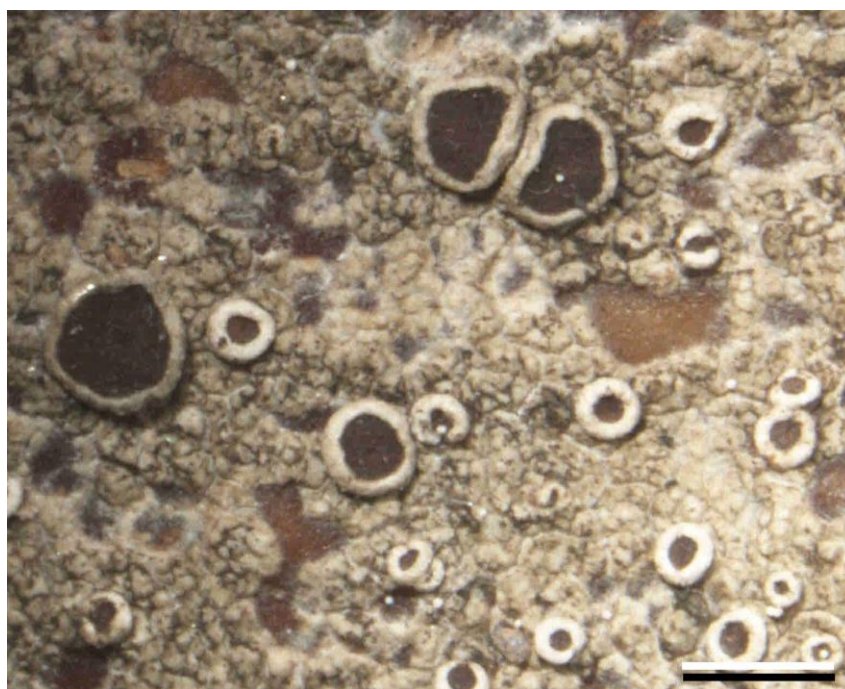


Fig. 1 – Habit – *Malmidea psychotrioides* (Kalb & Lücking) Kalb, Rivas Plata & Lumbsch – Bar = 2.5 mm

Staurothele rugulosa (A. Massal.) Arnold, Verh. K. K. Zool.-Bot. Ges. Wien 47: 389. 1897. Fig 2
Polyblastia rugulosa A. Massal., Mem. Lichenogr.: 139. 1853.

Thallus saxicolous, crustose, rimose-areolate, areoles with deep cracks, flat to slightly concave, 0.2–0.7 mm diam., whitish-grey; medulla white; prothallus absent. Perithecia black, embedded in the thalline areoles; peridium brownish, 37–52 µm wide, with brown involucrellum around the ostiole, dimidiate at base; centrum colourless, 98–148 µm high, I+ yellow turning red, with rounded algal cells, 2.21–3.83 µm diam.; paraphyses absent, short periphysoids present; asci 4-spored; ascospores colourless, narrowly ellipsoid-ovoid, muriform, (23–)29–35(–42) × (10–)11–12(–16) µm. Thallus and medulla K-, C-, KC-, P-.

The pantropical species was collected from calcareous rocks in an open scrub forest.

Specimen examined – India, Rajasthan, Sajjangarh Wildlife Sanctuary, 24° 35' 38.5" N, 73° 38' 22.4" E, alt. 912 m, 18.09.2012, G.P. Sinha & R. Kar 7971.

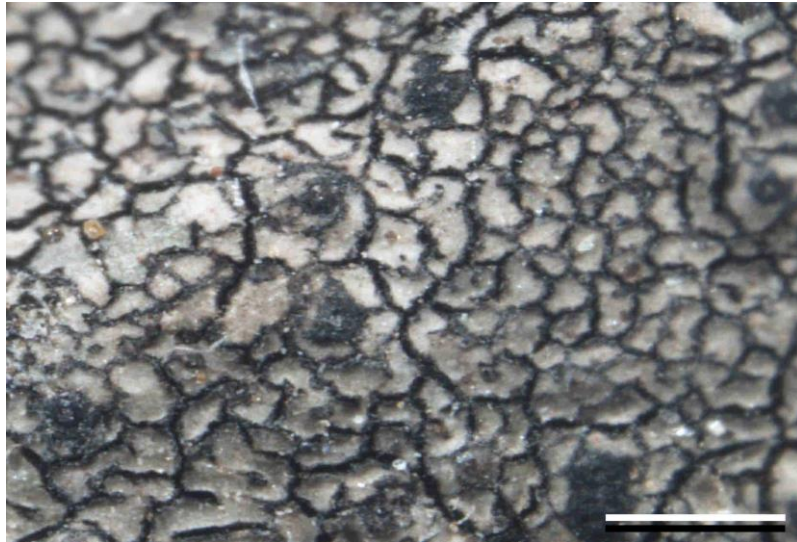


Fig. 2 – Habit – *Staurothele rugulosa* (A. Massal.) Arnold – Bar = 2.5 mm

***Willeya diffractella* (Nyl.) Müll. Arg.**, Flora 66: 345. 1883. *Verrucaria diffractella* Nyl., Mém. Soc. Acad. Maine Loire 4: 33. 1858. *Staurothele diffractella* (Nyl.) Tuck., Gen. Lich.: 258. 1872. Fig 3

Thallus saxicolous, crustose–subsquamulose, rimose–areolate, areoles with deep cracks, slightly convex, 0.3–0.9 mm diam., yellowish–grey, brown with green appearance; medulla white; prothallus absent. Perithecia black, embedded in the thalline areoles; ostiole raised and prominent; peridium dark brownish, with a dark brown involucrellum around the ostiole; involucrellum dimidiate at base; centrum colourless, I+ yellow turning red, with rounded algal cells, 2.70–3.65 μm diam.; paraphyses absent, short paraphysoids present; asci 4–8 spored; ascospores colourless, ellipsoid–ovoid, muriform, (16–)17–19(–25) \times (7–)8–9(–12) μm . Thallus and medulla K–, C–, KC–, P–.

The pantropical species was collected from calcareous rocks in an open place along road side forest.

Specimen examined – India, Rajasthan, Sawaimadhopur, Kusalidra forest, on way between Pali and Sawaimadhopur, 25° 56' 08.4" N, 76°22' 46.4" E, alt. 252 m, 30.09.2013, G.P. Sinha & R. Kar 8517.

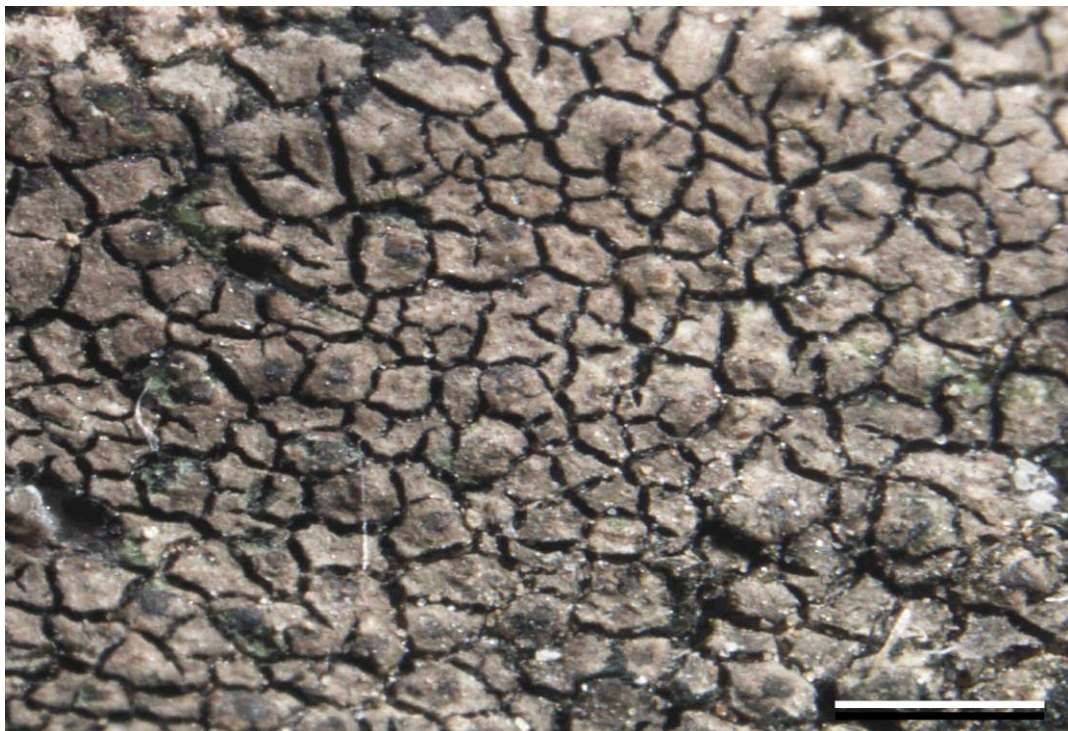


Fig 3 – Habit – *Willeya diffractella* (Nyl.) Müll. Arg. – Bar = 1.0 mm

Table 1 Enumeration of lichens of Rajasthan (**1.** Ajmer **2.** Banswara **3.** Baran **4.** Bharatpur **5.** Bhilwara **6.** Bundi **7.** Chittougarh **8.** Kota **9.** Rajsamand **10.** Sawaimadhapur **11.** Sirohi (Mt. Abu) **12.** Udaipur)

Co – Corticolous, Cr – Crustose, Fo – Foliose, Sa – Saxicolous, Sq – Squamulose, subfr – Subfruticose, (*) – New records for India, (**) – New records for Rajasthan)

Sl. No.	Lichen Species	Family	Habit	Habitat	Localities												Status	Voucher Specimen No./Literature Report		
					1	2	3	4	5	6	7	8	9	10	11	12				
1	<i>Anema decipiens</i> (A. Massal) Forss.	Lichinaceae	Sq	Sa											+	+	Rare	7763 C, 7909B		
2**	<i>Aspicilia caesiocinerea</i> (Nyl.ex Malbr.) Arnold	Megasporaceae	Cr	Sa													+	Rare	7788 A	
3**	<i>Aspicilia cinerea</i> (L.) Korb.	Megasporaceae	Cr	Sa													+	Rare	7824	
4	<i>Buellia alboatrior</i> (Nyl.) Zahlbr.	Caliciaceae	Cr	Co													+		Earlier Report	
5**	<i>Buellia nilgiriensis</i> S. R. Singh & D.D. Awasthi	Physciaceae	Cr	Sa													+	Rare	7787, 7855A	
6**	<i>Buellia quartziana</i> S. R. Singh & D.D. Awasthi	Physciaceae	Cr	Sa													+	Endemic	7844	
7**	<i>Buellia stellulata</i> (Taylor) Mudd	Physciaceae	Cr	Sa													+	Rare	7855 B	
8**	<i>Buellia subglaziouana</i> S. R. Singh & D.D. Awasthi	Physciaceae	Cr	Sa													+	Endemic	7869	
9	<i>Caloplaca abuensis</i> Y. Joshi & Upreti	Teloschistaceae	Cr	Sa													+		Earlier Report	
10	<i>Caloplaca awasthii</i> Y. Joshi & Upreti	Teloschistaceae	Cr	Sa													+		Earlier Report	
11	<i>Caloplaca bassiae</i> (Willd. Ex Ach.) Zahlbr.	Teloschistaceae	Cr	Co													+		Earlier Report	
12	<i>Caloplaca cinnabarina</i> (Ach.) Zahlbr.	Teloschistaceae	Cr	Sa													+		Earlier Report	
13	<i>Caloplaca cupulifera</i> (Vain.) Zahlbr.	Teloschistaceae	Cr	Co													+		Earlier Report	
14	<i>Caloplaca obliterans</i> (Nyl.) Blomb. & Forssel	Teloschistaceae	Cr	Sa													+		Earlier Report	
15**	<i>Caloplaca poliotera</i> A. Massal	Teloschistaceae	Cr	Sa														+	Common	7940 A, 7940C
16	<i>Collema callopismum</i> A. Massal	Collemataceae	Fo	Sa													+	Rare	7828 B	
17**	<i>Collema cf. crispum</i> (Huds.) Wigg.	Collemataceae	Fo	Sa													+		7883	

Sl. No.	Lichen Species	Family	Habit	Habitat	Localities												Status	Voucher Specimen No./Literature Report	
					1	2	3	4	5	6	7	8	9	10	11	12			
18**	<i>Collema polycarpon</i> Hoffm.	Collemataceae	Fo	Sa											+	+	Common	7936,7794A,7833,7781A 7781C	
19	<i>Collema pulcellum</i> Ach. var. <i>subnigrescens</i> (Müll. Arg.) Degel.	Collemataceae	Fo	Sa												+	Rare	7871	
20	<i>Collema rysssoleum</i> (Tuck.) Schneid.	Collemataceae	Fo	Sa											+	+	Common	7751, 7771, 7778, 7793, 7794-B, 7937-A.	
21	<i>Collema texanum</i> Tuck.	Collemataceae	Fo	Sa										+	+		Rare	7791, 7915	
22	<i>Collema thamnodes</i> Tuck. ex Ridle	Collemataceae	Fo	Sa											+			Earlier Report	
23**	<i>Cratiria obscurior</i> (Stirt.) Marbach & Kalb	Physciaceae	Cr	Sa												+	Rare	7775	
24	<i>Dermatocarpon vellereum</i> Zschacke	Verrucariaceae	Fo	Sa												+	Common	7857, 7784, 7759, 7834	
25**	<i>Dimelaena oriena</i> (Ach.) Norm.	Physciaceae	Fo	Co													+	Rare	7958A
26	<i>Diploschistes caesioplumbeus</i> (Nyl.) Vain.	Graphidaceae	Cr	Sa												+		Earlier Report	
27	<i>Diploschistes candidissimus</i> (Kremp.) Zahlbr.	Graphidaceae	Cr	Sa												+		Earlier Report	
28**	<i>Endocarpon nanum</i> A. Singh & Upreti	Verrucariaceae	Sq	Sa												+	+	Common	7965, 7773
29	<i>Heppia trichophora</i> D. D. Awasthi & S. R. Singh	Lichinaceae	Cr	Co, Sa												+		Earlier Report	
30	<i>Heterodermia diademata</i> (Tayl.) D.D. Awasthi	Physciaceae	Fo	Co, Sa												+		Earlier Report	
31**	<i>Heterodermia pseudospeciosa</i> (Kurok.) W.Culb.	Physciaceae	Fo	Co												+	Rare	7812	
32	<i>Heterodermia rubescens</i> (Räsänen) D. D. Awasthi	Physciaceae	Fo	Co, Sa												+		Earlier Report	
33	<i>Heterodermia tremulans</i> (Müll. Arg.) W.Culb.	Physciaceae	Fo	Co												+	Rare	7958	
34**	<i>Hyperphyscia adglutinata</i> (Flörke) Mayerh. & Poelt	Physciaceae	Fo	Sa												+	+	Common	7757, 7896B
35**	<i>Hyperphyscia isidiata</i> Moberg	Physciaceae	Fo	Sa											+		+	Common	7896, 7905, 7922, 7948
36	<i>Lecanora allophana</i> (Ach.) Nyl.	Lecanoraceae	Cr	Co.												+		Earlier Report	

Sl. No.	Lichen Species	Family	Habit	Habitat	Localities												Status	Voucher Specimen No./Literature Report
					1	2	3	4	5	6	7	8	9	10	11	12		
37a	<i>Lecanora campestris</i> (Schaer.) Hue subsp. <i>campestris</i>	Lecanoraceae	Cr	Sa												+	Rare	Earlier Report
37b	<i>Lecanora campestris</i> (Schaer.) Hue subsp. <i>glumargia</i> Upreti	Lecanoraceae	Cr	Sa												+	Rare	Earlier Report
38	<i>Lecanora chlarotera</i> Nyl.	Lecanoraceae	Cr	Co												+	Rare	7803
39	<i>Lecanora cinereofusca</i> H. Magn. subsp. <i>cinereofusca</i>	Lecanoraceae	Cr	Co												+	Rare	Earlier Report
40	<i>Lecanora indica</i> Zahlbr.	Lecanoraceae	Cr	Sa												+	Rare	Earlier Report
41	<i>Lecanora iseana</i> Räsänen	Lecanoraceae	Cr	Co												+	Rare	Earlier Report
42	<i>Lecanora meridionalis</i> H. Magn.	Lecanoraceae	Cr	Co												+	Rare	Earlier Report
43	<i>Lecanora perplexa</i> Brodo	Lecanoraceae	Cr	Co												+	Rare	Earlier Report
44	<i>Lecanora pseudistera</i> Nyl.	Lecanoraceae	Cr	Sa												+	Rare	Earlier Report
45**	<i>Lecanora subrugosa</i> Nyl.	Lecanoraceae	Cr	Co												+	Rare	7779
46**	<i>Lecidella stigmata</i> (Ach.) Hertel & Leuckert	Lecanoraceae	Cr	Sa												+	Rare	7838
47	<i>Leptogium indicum</i> D. D. Awasthi & P. Akhtar	Collemataceae	Fo	Co												+	Common	7760, 7792, 7850, 7874
48**	<i>Leucodecton fissurinum</i> (Hale) A. Frisch	Graphidaceae	Cr	Co											+	Rare	7910 A	
49*	<i>Malmidea psychotrioides</i> (Kalb & Lücking) Kalb, Rivas Plata & Lumbsch	Malmideaceae	Cr	Co												+	Rare	7853
50**	<i>Parmotrema grayanum</i> (Hue) Hale	Parmeliaceae	Fo	Co, Sa												+	Common	7811C, 7837, 7839
51	<i>Parmotrema praesorediosum</i> (Nyl.) Hale	Parmeliaceae	Fo	Co, Sa												+	Common	7790, 7813A, 7843, 7856, 7872
52	<i>Parmotrema sancti-angelii</i> (Lynge) Hale	Parmeliaceae	Fo	Co, Sa												+	Common	Earlier Report
53	<i>Parmotrema tinctorum</i> ((Despr. ex Nyl.) Hale	Parmeliaceae	Fo	Co, Sa												+	Common	7826, 8548
54	<i>Peltula euploca</i> (Ach.) Wetmore	Peltulaceae	Sq	Sa	+	+	+	+	+	+	+	+	+	+	+	+	Common	7898, 7916, 7934, 7955, 8333, 8342, 8343, 8351, 8500-A, 8519B, 8536
55**	<i>Peltula impressa</i> (Vain.) Swinscow & Krog	Peltulaceae	Sq	Sa				+							+	+	Common	8332, 8355, 8359, 8541

Sl. No.	Lichen Species	Family	Habit	Habitat	Localities												Status	Voucher Specimen No./Literature Report
					1	2	3	4	5	6	7	8	9	10	11	12		
56**	<i>Peltula obscurans</i> var. <i>desertifolia</i> (Zahlbr.) Wetmore	Peltulaceae	Sq	Sa			+											8498B
57**	<i>Peltula patellata</i> (Bagl.) Swinscow & Krog	Peltulaceae	Sq	Sa				+		+			+					Common 7961, 8330, 8362, 8364B
58**	<i>Peltula placodizans</i> (Zahlbr.) Wetmore	Peltulaceae	Sq	Sa				+					+					Common 8331, 8350, 8367
59**	<i>Peltula tortosa</i> (Nees) Wetmore	Peltulaceae	Sq	Sa									+					Rare 7911, 7912
60**	<i>Peltula zahlbruckneri</i> (Hausse) Wetmore	Peltulaceae	Sq	Sa	+	+	+	+	+	+	+	+	+	+	+	+	+	Common 7879, 7890, 7956, 8336, 8344, 8353, 8356A, 8365, 8498C, 8500B
61	<i>Pertusaria</i> cf. <i>laetea</i> (L.) Arn.	Pertusariaceae	Cr	Co										+				Earlier Report
62**	<i>Pertusaria leucoplaca</i> Müll. Arg.	Pertusariaceae	Cr	Sa											+			Common 7953, 7946
63	<i>Pertusaria leucostoma</i> (Bernh.) A. Massal.	Pertusariaceae	Cr	Co											+			Earlier Report
64	<i>Pertusaria pertusa</i> (L.) Tuck.	Pertusariaceae	Cr	Sa		+									+	+		Common 8553, 7768, 7867, 7758, 7761
65	<i>Phaeophyscia ciliata</i> (Hoffm.) Moberg	Physciaceae	Fo	Sa											+			Common 7823, 7841, 7852A
66	<i>Phaeophyscia hispidula</i> (Ach.) D.D.Awasthi & S.R. Singh var. <i>hispidula</i>	Physciaceae	Fo	Sa											+			Common 7757B
67**	<i>Phaeophyscia hispidula</i> (Ach.) D.D.Awasthi & S.R. Singh var. <i>exornatula</i> (Zahlbr.) Moberg	Physciaceae	Fo	Sa											+			Common 7811A, 7842B, 7860
68	<i>Phaeophyscia nigricans</i> (Floerke) Moberg	Physciaceae	Fo	Sa											+			Rare 7799
69**	<i>Phaeophyscia orbicularis</i> (Neck.) Moberg	Physciaceae	Fo	Sa		+									+			Common 7756, 7800, 7822, 7840B, 7852B, 7875, 7899, 8556
70	<i>Phylliscum abuense</i> D.D. Awasthi & S.R. Singh	Lichinaceae	Sq	Sa											+			Rare 7859
71	<i>Physcia abuensis</i> D.D. Awasthi & S.R. Singh	Physciaceae	Fo	Co											+			Rare 7754, 7810, 7820

Sl. No.	Lichen Species	Family	Habit	Habitat	Localities												Status	Voucher Specimen No./Literature Report
					1	2	3	4	5	6	7	8	9	10	11	12		
72	<i>Physcia caesia</i> (Hoffm.) Furnrohr.	Physciaceae	Fo	Sa											+	+	Rare	7854A, 7947
73**	<i>Physcia tribacoides</i> Nyl.	Physciaceae	Fo	Co											+	+	Common	7765, 7811B, 7848, 7952
74**	<i>Physcia undulata</i> Moberg	Physciaceae	Fo	Sa											+		Rare	7862
75	<i>Placolecis opaca</i> (Fr.) Hafellner	Catillariaceae	Cr	Sa											+		Rare	7763B
76**	<i>Pyxine cocoes</i> (Sw.) Nyl. var. <i>cocoes</i>	Physciaceae	Fo	Co		+									+	+	Common	7901, 7930, 8545, 8553A
77**	<i>Pyxine minuta</i> Vain.	Physciaceae	Fo	Co												+	Rare	7909
78**	<i>Pyxine petricola</i> Nyl. var. <i>petricola</i>	Physciaceae	Fo	Co		+											Common	8546, 8555, 8558
79**	<i>Pyxine retirugella</i> Nyl.	Physciaceae	Fo	Co		+											Rare	8544A
80**	<i>Rinodina oxydata</i> (A. Massal.) A. Massal.	Physciaceae	Fo	Co												+	Rare	7940B
81	<i>Schaereria cinereorufa</i> (Schaer.) Th.Fr. [<i>Psora</i> <i>cinereorufa</i> (Schaer.) Hellb.]	Schaereriaceae	Sq	Sa												+		Earlier Report
82*	<i>Staurothele rugulosa</i> (A. Massal.) Arnold	Verrucariaceae	Sq	Sa												+	Rare	7971
83	<i>Thelenella luridella</i> (Nyl.) H. Mayrhofer [<i>Microglæna</i> <i>thelostomoides</i> (Nyl.)	Thelenellaceae	Cr	Sa												+		Earlier Report
84	<i>Thyrea indica</i> D.D. Awasthi & S.R. Singh	Lichinaceae	Sq	Sa											+		Rare	7763A
85	<i>Verrucaria elaeomelaena</i> Arn.	Verrucariaceae	Cr	Sa											+			Earlier Report
86*	<i>Willeya diffractella</i> (Nyl.) Müll. Arg.	Verrucariaceae	Cr	Sa											+		Rare	8517
87	<i>Xanthoparmelia congensis</i> (B.Stein) Hale	Parmeliaceae	Fo	Sa											+			Earlier Report
88	<i>Xanthoparmelia conspersa</i> (Ach.) Hale [<i>Parmelia</i> <i>conspersa</i> Ach.]	Parmeliaceae	Fo	Sa											+		Rare	7802
89	<i>Xanthoparmelia</i> <i>pseudocongensis</i> Hale	Parmeliaceae	Fo	Sa											+		Rare	7858
90	<i>Zahlbrucknerella indica</i> D.D. Awasthi & S.R. Singh	Lichinaceae	Subfr	Sa											+			Earlier Report

Acknowledgements

The authors are thankful to Director, Botanical Survey of India, Kolkata for facilities and to authorities of Forest department, Govt. of Rajasthan for providing logistic support in protected areas.

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