

NOTE

Distribution of Lichen Flora on South Korea

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(Received January 30, 2004 / Accepted June 3, 2004)

After an overview on the temporary situation of the lichenology in South Korea, localities of 95 macrolichen taxa are reported for South Korea. In this revised lichen flora of South Korea, 16 species are apparently new to the territory. Voucher specimens have been deposited in the Korean Lichen Research Institute (KoLRI) at Sunchon National University in Korea, and duplicates have also been donated to the National History Museum and Institute, in Chiba, (CBM) Japan.

Key words: foliose lichen, fruticose lichen, checklist

The lichen flora of South Korea are not well catalogued. It has been said that, before the Korean War, there were many lichen specimens at Seoul National University, but now there are none. Some specimens, collected between 1910 and 1930, have been deposited in the Tokyo National Science Museum. Also, there are probably some specimens scattered around Europe, in museums and universities. "The Lichen Flora of North Korea", published by Jong Dzae Ri (1983, 1988) and Huneck *et al.*, (1989, 1994), cataloged the lichen flora of North Korea. There have been a few local studies (Kim and Lee, 1975; Cho and Lee, 1980; Kim, 1981; Park, 1982, 1983; Moon *et al.*, 1991) in South Korea, but most of the specimens reported in their studies are not available at this moment. Park (1990) first published a work on the macrolichen flora of South Korea in an international journal, with full descriptions for each specie. 189 species, in 46 genera and 17 families, were included in her report, but all the specimens are now kept at Duke University, USA. Since that time, there have been no nation-wide surveys of lichen flora in South Korea. In 2003, a long-term project on South Korean lichen flora was launched as part of a series of bioresource preservation programs, funded by the Korean government. Here, we provide a list of macrolichen species found in 2003.

South Korea is a peninsula stretching from north and south (33-38°N and 125-132°E). North Korea is the sector of the peninsula which is connected to mainland China. Korea is a mountainous country, but the mountains are not high, in almost all cases lower than 1,200 m. Near the west coast and in the southwest there are extensive flat alluvial plains and hilly terrain. The east coast features steep mountain ranges.

South Korea is located in a temperate region, and has four distinct seasons. Because of the very different movements of air masses between summer and winter-tropical vs. Siberian- there is a great difference between these two seasons. During the last 30 years, the annual average temperature has been 10-16°C. In winter, the average number of days during which the temperature drops below 0°C is 100 for central South Korea, 50 for the southern region, and 12 for Jeju Island. In summer, the average August temperature is 23-27°C. The annual average precipitation is 1,000-1,850 mm; 50-60% of this is rain, usually during the summer, and about 5-10% of this precipitation is due to snow. The mountainous regions have a rather different climate distribution, owing to altitude (www.kma.go.kr/weather/climate).

Twelve mountains (some in national parks) and three islands were visited in 2003. Each place visited is indicated on the map (Fig. 1) by a number. Most of these are located in the southern part of Korea. Table 1 lists the places visited, and gives their locations. In the lowlands, lichen flora is sparse, probably due to human disturbances

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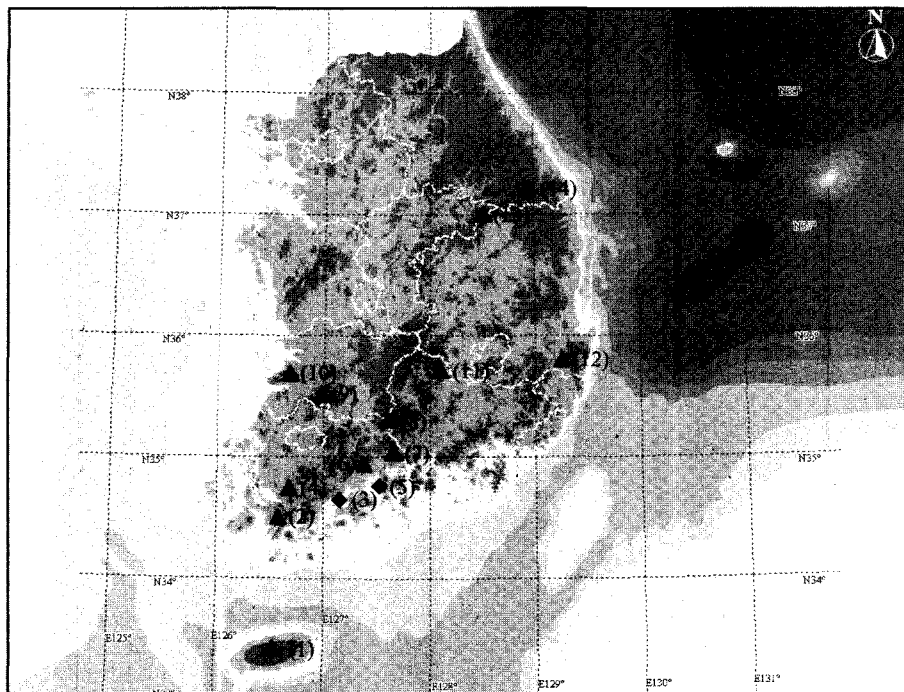


Fig. 1. Map of the study areas in South Korea. Numbers indicate collection sites. See Table 1.

Table 1. Mountains and islands of South Korea from which lichens were collected for this study. See Fig. 1.

Number	Name of place	Location	Province(s)
1	Halla (Mt.)	N33°22'-31' E126°29'-41'	Jeju (island)
2	Duryun (Mt.)	N34°58' E127°28'	Jeollanam
3	Sorok island	N34°31' E127°07'	Jeollanam
4	Wolchul (Mt.)	N34°45' E126°40'	Jeollanam
5	Gae Island	N34°28' E127°55'	Jeollanam
6	Jogae (Mt.)	N34°59' E127°17'	Jeollanam
7	Baekwoon (Mt.)	N35°03'-07' E127°36'-38'	Jeollanam
8	Jiri (Mt.)	N35°17'-20' E127°31'-40'	Jeollanam, Jeollabuk
9	Naejang (Mt.)	N35°28'-29' E126°52'-54'	Jeonbuk
10	Seunwoon (Mt.)	N35°28'-29' E126°33'-34'	Jeonbuk
11	Gaya (Mt.)	N35°47' E128°05'	Grungsangnam
12	Nam (Mt.)	N35°48' E129°18'	Gyeongsangbuk
13	Sobaek (Mt.)	N36°56'-57' E128°26'-30'	Chungchungbuk, Gyeongsangbuk
14	Taebaek (Mt.)	N37°05'-06' E127°55'-57'	Gangwon

and air pollution, and thus we concentrated instead on the rich lichen flora of the mountains.

About 600 specimens were collected, mainly during the summer of 2003. These collections were deposited in the Korean Lichen Research Institute (KoLRI) at Suncheon National University, and some of them were sent, as duplicates, to the National History Museum and Institute (CBM), in Chiba, Japan.

For this study, identifications were handled mainly by Dr. H. Harada (HH), at CBM. Thin-layer chromatography (TLC) was also performed to identify lichen chemical

compounds. Usually, half plates (10 cm high) were used, but full plates were also used, in order to identify certain confusing compounds. Three developing solvent systems were used, according to usual protocols (Culbertson 1972, 1974; Huneck and Yoshimura, 1996).

In this paper, only representative specimens have been cited, in cases involving large sample numbers. Where appropriate, the nomenclature follows Haradas. (2003) checklist. Recent generic treatments were adopted for this study. Following are the lichen species identified in this study; the lichen species newly added to the Parks list

(1990) are marked with an asterisk, and, among them, any newly reported species are also listed in bold type.

Anaptychia isidiza Kurok

a) Duryun Mt., Daehung temple, on rock, 200 m (N34°57'59", E127°28'51"), 03-309, Det. HH, 2003.

b) Naejang Mt., on rock, 690 m (N35°29'38", E126°54'28"), 03-459, Det. HH, 2003.

Anaptychia palmulata (Michx.) Vain

a) Taebaek Mt., on bark, 960 m (N37°06'28", E128°56'49"), 03-630, Det. HH, 2003.

b) Jiri Mt., on bark, 1400 m (N35°17'36", E127°31'59"), 03-296, Det. HH, 2003.

Anzia colpota Vain.

a) Jiri Mt., on rock, 510 m (N35°15'59", E127°34'41"), 03-205, Det. HH, 2003.

b) Taebaek Mt., on rock, 1290 m (N37°05'52", E128°57'02"), 03-876, Det. JH, 2003.

**Anzia hypoleucoides* Müll. Arg., Sobaek Mt., on bark, 1370 m (N36°57'15", E128°29'19"), 03-761, Det. JH, 2003.

Anzia opuntiella Müll. Arg., Naejang Mt., on rock, 590m (N35°29'38", E126°54'28"), 03-470, Det. HH, 2003.

**Canoparmelia texana* (Tuck.) Elix & Hale, Jiri Mt., Chuneun temple, on bark, 300 m, 03-33, Det. HH, 2003.

Cetrelia japonica (Zahlbr.) W.L.Culb. & C.F.Culb., Taebaek Mt., on bark, 990 m (N37°06'23", E128°56'47"), 03-397, Det. HH, 2003.

**Cladia aggregata* (Sw.) Nyl., Baekwoon Mt., on soil, 1040 m (N35°05'01", E127°38'27"), 03-264, Det. JH, 2003.

Cladonia amaurocraea (Flörke) Schaer., Taebaek Mt., on rock, 990 m (N37°06'23", E128°56'47"), 03-419, Det. HH, 2003.

**Cladonia angustata* Nyl., Baekwoon Mt., on soil, 1050 m (N35°04'40", E127°38'47"), 03-269, Det. HH, 2003.

**Cladonia ceratophyllina* (Nyl.) Vain., Seunwoon Mt., on soil, 250 m (N35°28'44", E126°33'43"), 03-240, Det. HH, 2003.

Cladonia chlorophaea (Flörke ex Sommerf.) Spreng., Halla Mt., on rock, 1100m (N33°22'41", E126°34'54"), 03-371, Det. HH, 2003.

Cladonia furcata (Huds.) Schaer., Baekwoon Mt., on soil, 1050 m (N35°05'07", E127°38'24"), 03-289, Det. HH, 2003.

Cladonia glaucilis subsp. *turbinata* (Ach.) Ahti., Halla Mt. Gwauneumsa valley, on soil, 800 m, 03-368, Det. HH, 2003.

**Cladonia granulans* Vain.:Vainio, Taebaek Mt., on soil, 1190 m (N37°11'49", E128°55'07"), 03-685, Det. HH, 2003.

**Cladonia humilis* (With.) J.R.Laundon, Taebaek Mt., on soil, 1190m (N37°11'49", E128°55'07"), 03-689, Det. HH, 2003.

**Cladonia macilentia* Hoffm., Taebaek Mt., on soil, 1190 m (N37°11'49", E128°55'07"), 03-685, Det. HH, 2003.

Cladonia ramulosa (With.) J.R.Laundon,

a) Duryun Mt., Daehung temple, on rock, 200 m

(N34°57'59", E127°28'51"), 03-320, Det. HH, 2003.

b) Taebaek Mt., on soil, 1190 m (N37°11'49", E128°55'07"), 03-688, Det. HH, 2003.

Cladonia rangiferina (L.) Weber, Halla Mt., Baekrokdam, on rock, 1700 m, 03-357, Det. HH, 2003.

Cladonia scabriuscula (Delise ex Cuby) Nyl., Jiri Mt., on rock, 510 m (N35°15'59", E127°34'41"), 03-211, Det. HH, 2003.

Coccocarpia palmicola (Spreng.) Arv. & D.J.Galloway, Naejang Mt., on rock, 600 m (N35°29'47", E126°53'41"), 03-437, Det. HH, 2003.

Collema flaccidum Ach. Nylander, Jogae Mt. Songgwang temple., 200 m (N34°59'56", E127°16'43"), 03-168, Det. HH, 2003.

Collema japonicum (Müll. Arg.) Hue, Naejang Mt., on rock, 590 m (N35°29'38", E126°54'28"), 03-458, Det. HH, 2003.

Dermatocarpon miniatum (L.) W.Mann, Sobaek Mt., on rock, 470 m (N36°56'24", E128°31'44"), 03-803, Det. JH, 2003.

**Dirinaria applanata* (Fée) D.D.Awasthi, Jiri Mt., Chuneun temple, on bark, 300 m, 03-28, Det. HH, 2003.

Flavoparmelia caperata (L.) Hale, Jiri Mt., on bark, 400 m (N35°15'04", E127°35'23"), 03-196, Det. HH, 2003.

Fuscopannaria leucosticta (Tuck.) P.M.Jørg., Halla Mt., on bark, 1100 m (N33°22'41", E126°34'54"), 03-349, Det. HH, 2003.

Heterodermia dendritica (Pres.) Poelt, Gaya Mt., Haein temple, on bark, 710 m (N35°47'21", E128°05'52"), 03-153, Det. HH, 2003.

**Heterodermia dissecta* (Kurok.) D.D.Awasthi, Naejang Mt., on rock, 590 m (N35°29'38", E126°54'28"), 03-433, Det. HH, 2003.

Heterodermia hypoleuca (Muhl.) Trevis., Jiri Mt., on bark, 1380 m (N35°17'35", E127°32'50"), 03-306, Det. HH, 2003.

Heterodermia japonica (M. Sato) Swinscow & Krog, Baekwoon Mt., on bark, 1050 m (N35°07'03", E127°36'33"), 03-176, Det. HH, 2003.

Heterodermia microphylla (Kurok.) Skorepa, Taebaek Mt., on bark, 980 m (N37°06'24", E128°56'46"), 03-402, Det. HH, 2003.

Hypotrachyna osseoalba (Vain.) Y.S.Park & Hale, Wolchul Mt., on bark, 400 m (N34°45'22", E126°40'35"), 03-120, Det. HH, 2003.

**Lasallia pensylvanica* (Hoffm.) Llano, Taebaek Mt., on rock, 990 m (N37°06'23", E128°56'47"), 03-404, Det. HH, 2003.

**Lasallia sinorientalis* J.C.Wei: Wei & Jiang, Baekwoon Mt., on rock, 1050 m (N35°06'56", E127°36'37"), 03-227, Det. HH, 2003.

**Leprocaulon arbuscula* (Nyl.) Nyl., Naejang Mt., on rock, 650m (N35°29'48", E126°53'43"), 03-404, Det. HH, 2003.

**Leptogium burnetiae* C.W.Dodge, Jiri Mt., on bark,

1360 m (N35°17'50", E127°33'09"), 03-307, Det. HH, 2003.

**Leptogium pedicellatum* P.M.J?rg., Taebaek Mt., on bark, 950 m (N37°06'30", E128°56'51"), 03-387, Det. HH, 2003.

Lobaria japonica (Zahlbr.) Asahina, Halla Mt., on bark, 1100 m (N33°22'41", E126°34'54"), 03-307, Det. HH, 2003.

Lobaria retigera (Bory) Trevis., Taebaek Mt., on bark, 950 m (N37°06'30", E128°56'51"), 03-387, Det. HH, 2003.

Lobaria spathulata (Inumaru) Yoshim., Taebaek Mt., on bark, 1150 m (N37°06'16", E128°56'02"), 03-654, Det. JH, 2003.

Menegazzia terebrata (Hoffm.) A.Massal., Taebaek Mt., on rock, 1025 m (N37°06'22", E128°57'12"), 03-839, Det. JH, 2003.

Myelochroa aurulenta (Tuck.) Elix & Hale, Seunwoon Mt., Seunwoon temple, on bark, 50 m, 03-249, Det. HH, 2003.

Myelochroa entotheiochroa (Hue) Elix & Hale, Jeju island, Wondang temple, on bark, 100 m (N33°31'25", E126°36'01"), 03-358, Det. HH, 2003.

Myelochroa irrugans (Nyl.) Elix & Hale, Naejang Mt., on bark, 580 m (N35°29'47", E126°53'45"), 03-435, Det. HH, 2003.

**Nephroma bellum* (Spreng.) Tuck., Halla Mt., on bark, 1100 m (N33°22'41", E126°34'54"), 03-307, Det. HH, 2003.

Nephroma helveticum Ach., Halla Mt., on rock, 970 m (N33°23'09", E126°29'47"), 03-349, Det. HH, 2003.

Nephroma parile (Ach.) Ach., Taebaek Mt., on rock, 950 m (N37°06'30", E128°56'51"), 03-387, Det. HH, 2003.

Pannaria conoplea (Ach.) Bory, Halla Mt., on bark, 1100 m (N33°22'41", E126°34'54"), 03-348, Det. HH, 2003.

Parmelia adaugescens Nyl., Halla Mt., Baekrokdam, on bark, 1850 m, 03-492, Det. HH, 2003.

Parmelia fertilis Müll. Arg., Jiri Mt., on bark, 1350 m (N33°17'50", E127°33'09"), 03-304, Det. HH, 2003.

Parmelia laevior Nyl.

a) Jiri Mt., on bark, 1380 m (N35°17'35", E127°32'50"), 03-305, Det. HH, 2003.

b) Naejang Mt., on bark, 710 m (N35°28'58", E126°52'59"), 03-620, Det. JH, 2003.

c) Taebaek Mt., on bark, 1050 m (N37°06'18", E128°57'14"), 03-860, Det. JH, 2003.

Parmelia marmorata Nyl., Halla Mt., Baekrokdam, on bark, 1850 m, 03-492, Det. HH, 2003.

**Parmelia marmophylla* kurok., Jiri Mt., on bark, 1410 m (N35°17'36", E127°31'59"), 03-298, Det. HH, 2003.

**Parmelia omphalodes* (L.) Ach., Taebaek Mt., on rock, 1050 m (N37°06'18", E128°57'14"), 03-411, Det. JH, 2003.

Parmelia pseudolaevior Asahina, Baekwoon Mt., on bark, 1050 m (N35°05'06", E127°38'24"), 03-188, Det. JH, 2003.

**Parmelinella wallichiana* (Taylor) Elix & Hale, Baekwoon Mt., on rock, 700 m (N35°03'45", E127°38'14"),

03-265, Det. HH, 2003.

**Parmelinopsis horrescens* (Taylor) Elix & Hale, Seunwoon Mt., on bark, 100 m, 03-235, Det. HH, 2003.

Parmelinopsis minarum (Vain.) Elix & Hale, Jiri Mt., on rock, 510 m (N35°15'59", E127°34'41"), 03-220, Det. HH, 2003.

**Parmotrema austrosinense* (Zahlbr.) Hale, Jeju Island, Wondang temple, on bark, 100 m (N33°31'25", E126°36'01"), 03-366, Det. HH, 2003.

Parmotrema tinctorum (Nyl.) Hale, Jeju island, Wondang temple, on bark, 100 m (N33°31'25", E126°36'01"), 03-380, Det. HH, 2003.

**Parmotrema ultralucens* (Krog.) Hale, Naejang Mt., on rock, 590 m (N35°29'38", E126°54'28"), 03-473, Det. HH, 2003.

Peltigera degenii Gyeln., Halla Mt., on rock, 1100 m (N33°22'41", E126°34'54"), 03-307, Det. HH, 2003.

**Peltigera elizabethae* Gyeln., Taebaek Mt., on rock, 940 m (N37°06'30", E128°56'51"), 03-385, Det. HH, 2003.

**Peltigera horizontalis* (Huds.) Baumg., Halla Mt., Baekrokdam, on bark, 1800 m, 03-353, Det. HH, 2003.

Peltigera nigripunctata Bitter, Halla Mt., Baekrokdam, on bark, 1800 m, 03-353, Det. HH, 2003.

Peltigera polydactylon (Neck.) Hoffm., Halla Mt., on rock, 1100 m (N33°22'41", E126°34'54"), 03-347, Det. HH, 2003.

Peltigera praetextata (Flörke ex Sommerf.) Zopf., Halla Mt., Baekrokdam, on bark, 1750 m, 03-376, Det. HH, 2003.

**Peltigera rufescens* (J.C.Weiss) Humb.

a) Halla Mt., on bark, 1100 m (N33°22'41", E126°34'54"), 03-307, Det. HH, 2003.

b) Taebaek Mt., on rock, 1100 m (N37°06'26", E128°56'48"), 03-634, Det. HH, 2003.

**Phaeophyscia ciliata* (Hoffm.) Moberg, Naejang Mt., on rock, 600 m (N35°29'38", E126°54'28"), 03-467, Det. HH, 2003.

Phaeophyscia imbricata (Vain.) Essl., Gyongju City, Nam Mt., on rock, 100 m (N35°48'11", E129°18'47"), 03-147, Det. HH, 2003.

Phaeophyscia limbata (Poelt) Kashiw., Taebaek Mt., on bark, 950 m (N37°06'30", E128°56'51"), 03-389, Det. HH, 2003.

**Phylliscum japonicum* Zahlbr., Naejang Mt., on rock, 630 m (N35°29'48", E126°53'43"), 03-486, Det. HH, 2003.

**Physcia orientalis* Kashiw., Duryun Mt., Daehung temple, on bark, 200 m (N34°57'59", E127°28'51"), 03-95, Det. HH, 2003.

Physciella denigrata (Hue) Essl., Naejang Mt., on bark, 600 m (N35°29'38", E126°54'28"), 03-457, Det. HH, 2003.

Physciella melanchra (Hue) Essl., Duryun Mt., Daehung temple, on bark, 200 m, 03-312, Det. HH, 2003.

Pilophorus clavatus Th.Fr., Halla Mt., on rock, 970 m (N33°23'09", E126°59'47"), 03-370, Det. HH, 2003.

Punctelia borreri (Sm.) Krog., Sobaek Mt., on bark, 650 m (N36°56'11", E128°30'06"), 03-736, Det. HH, 2003.

Punctelia rudecta (Ach.) Krog., Naejang Mt., on rock, 600 m (N35°29'38", E126°54'28"), 03-478, Det. HH, 2003.

Pyxine endochrysin Nyl., Sorok Island, on rock, 15 m, 03-69, Det. HH, 2003.

**Ramalina commixta* Asahina, Jiri Mt. Baemsa valley, on bark, 400 m, 03-12, Det. HH, 2003.

Ramalina conduplicans Vain., Jiri Mt. Baemsa valley, on bark, 500 m, 03-50, Det. HH, 2003.

**Ramalina exilis* Asahina, Naejang Mt., on rock, 590 m (N35°29'38", E126°54'28"), 03-470, Det. HH, 2003.

**Ramalina pertusa* Kashiw., Gae island, on rock, 20 m, 03-470, Det. HH, 2003

Ramalina sinensis Jatta, Taebaek Mt., on bark, 1000 m (N37°06'16", E128°56'32"), 03-414, Det. HH, 2003.

Ramalina yasudae Räsänen, Taebaek Mt., on rock, 1000 m (N37°06'16", E128°56'32"), 03-414, Det. HH, 2003.

**Rimelia clavulifera* (Räsänen) Kurok., Naejang Mt., on rock, 650 m (N35°29'41", E126°52'53"), 03-615, Det. JH, 2003.

Rimelia reticulata (Taylor) Hale & Fletcher, Baekwoon Mt., on rock, 1050 m (N35°04'40", E127°38'47"), 03-284, Det. HH, 2003.

Stereocaulon exutum Nyl., Jiri Mt., on rock, 1340 m (N35°17'52", E127°33'19"), 03-301, Det. HH, 2003.

Stereocaulon japonicum Th.Fr., Baekwoon Mt., on rock, 1050 m (N35°06'56", E127°36'37"), 03-270, Det. HH, 2003.

Stereocaulon sorediiferum Hue., Baekwoon Mt., on rock, 1050 m (N35°06'56", E127°36'37"), 03-266, Det. HH, 2003.

**Sticta wrightii* Tuck., Taebaek Mt., on bark, 990m (N37°06'23", E128°56'47"), 03-386, Det. HH, 2003.

Umbilicaria esculenta (Miyoshi) Mink., Taebaek Mt., on rock, 990 m (N37°06'23", E128°56'47"), 03-417, Det. HH, 2003.

Umbilicaria kisovana (Zahlbr.) Kurok., Taebaek Mt., on rock, 1050 m (N37°06'56", E128°56'47"), 03-221, Det. HH, 2003.

**Xanthoria elegans* (Link) Th.Fr., Seunwoon Mt., on rock, 290 m (N35°28'31", E126°33'42"), 03-245, Det. JH, 2003.

95 species, spanning 40 genera and 15 families, were reported in this study. 34 species (marked with asterisks) were newly added to the Park's list (1990). Among them, 16 lichen species, *Cladonia ceratophyllina*, *Cladonia granulans*, *Lasallia pensylvanica*, *Leprocaulon arbuscula*, *Nephroma bellum*, *Parmelia omphalodes*, *Parmelinella*

wallichiana, *Parmelinopsis horrescens*, *Peltigera rufescens*, *Phaeophyscia ciliata*, *Physcia orientalis*, *Physciella melanchra*, *Ramalina commixta*, *Ramalina exilis*, *Rimelia clavulifera*, and *Sticta wrightii*, were apparently new to this area.

Acknowledgements

This study was supported by a grant (M1-0219-14-0001) from the Korean Ministry of Science and Technology, through KISTEP, in 2002.

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