A taxonomic study of *Byssoloma subdiscordans* (*Pilocarpaceae*, lichenized *Ascomycota*) in Japan

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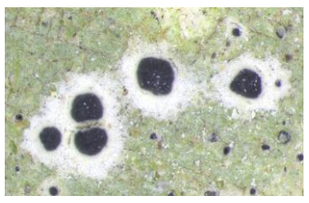
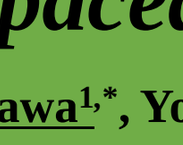
Introduction



Byssoloma subdiscordans is characterized by whitish green thallus, black disc with white well-developed byssoid margin, 3-septate ascospores, and pycnidia producing pear-shaped conidia.

Taxonomic traits (generally)

- Large variations on morphology (prothallus presence, thickness of thallus, apothecial disc color, etc.)
- Chemical compounds were poorly examined ?



Ecology

- Wide distribution

- Various substrates

- Unknown photobiont relationship ?

In this study, we examined *B. subdiscordans* from the morphological, chemical, and ecological points of view based on the Japanese materials, and evaluated using molecular phylogenetic analyses.

Conclusion

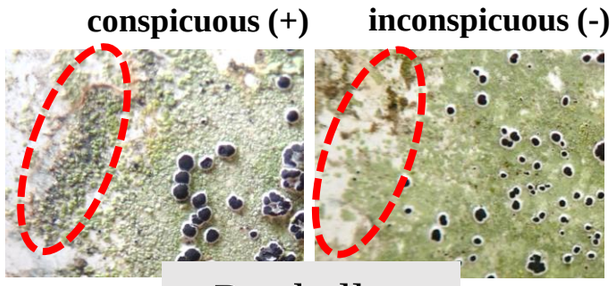
***Byssoloma subdiscordans* occurring in Japan can be separated into at least five species distinguished by the differences of prothallus, apothecia and chemical profiles. The species delimitations were supported by the molecular phylogeny, but no correlation with photobiont was found.**

Materials & Methods

Thirty-three specimens collected from five prefectures in Japan were used. Lichen compounds were examined by high-performance thin layer chromatography (HPTLC) with solvents A, B', C. Phylogenetic analyses were performed using three loci (nuITS, nuLSU and mtSSU) for mycobiont and one locus (*rbcL*) for photobiont.

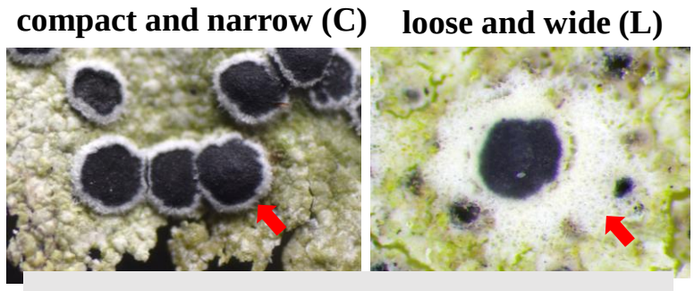
Results

conspicuous (+) **inconspicuous (-)**



Prothallus

compact and narrow (C) **loose and wide (L)**

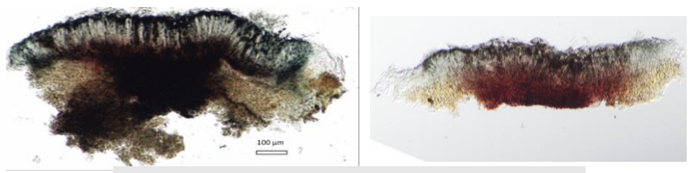


Apothecial byssoid margin

pure black (PB) **greyish black (GB)**

Disc color

convex (凸) **concave（凹）**



Disc unevenness

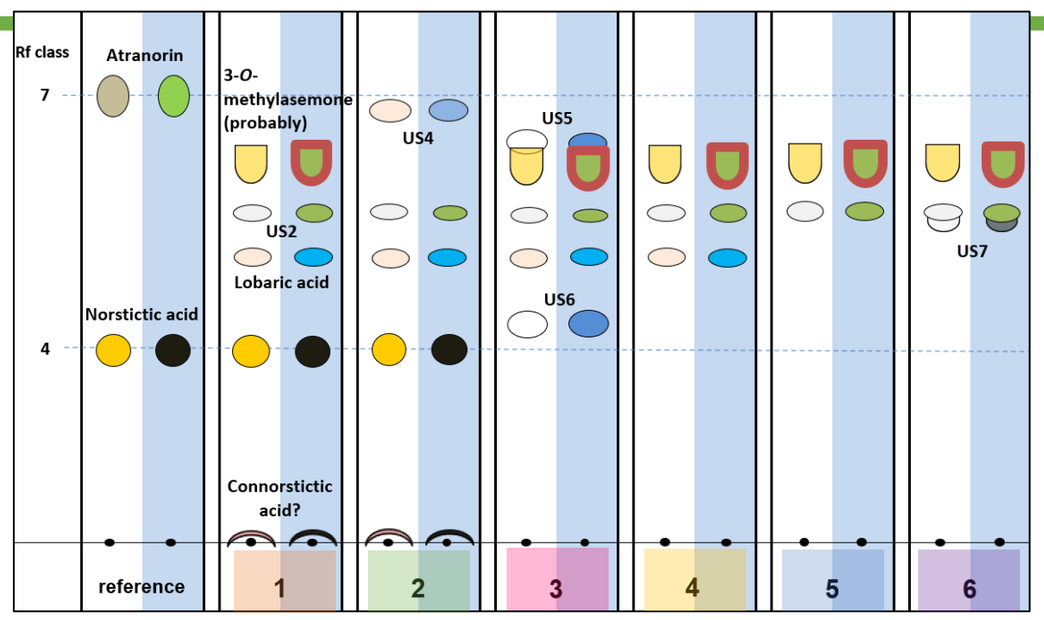


Fig. 1. **Six chemotypes (1–6)** recognized by HPTLC (solvent B') in Japanese *B. subdiscordans*.
US = Unidentified substances. White/Blue line show under daylight/UV 366 nm.

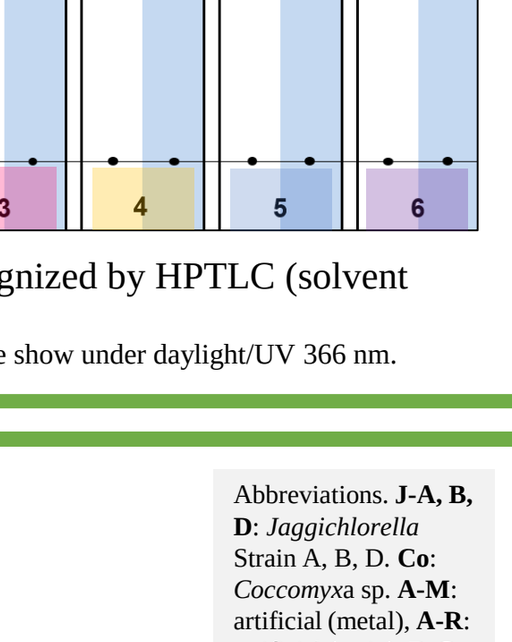
Table 1. **Five morphotypes (A–E)** recognized by combination of four morphological traits

Traits \ Morphotypes	A	B	C	D	E
Prothallus	+	-	-	-	-
Apothecial margin	C	C	L	L	L
Disc color	PB	PB	PB	GB	PB
Disc unevenness	凸	凸	凸	凸	凹

Discussion

Among morphological, chemical and ecological traits, each clade in the molecular phylogenetic tree showed strong relationship with chemical profile. Morphological traits were also moderately related with each clade. However, each clade was not related with photobiont clades and habitat differences. In addition, three different chemotypes (chemotypes 1, 5 and 6) sympatrically occurred at the same locality and substrate. This fact indicates that these differences would be genetically stable within a same environmental condition.

Morphotype	Chemotype	Photobionts	Substarate	Localities
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Hi
A	1	J-A	B-C	Hi
A	1	?	A-M	Hi
A	1	J-A	A-M	Ya
A	1	?	A-M	Ch
A	1	J-D	A-M	Ch
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Hi
B	1	J-A	A-R	Hi
A	4	J-A	A-M	Mi
B	4	J-A	A-M	Mi
A	1	?	A-M	Ch
A	1	J-A	B-C	Hi
A	1	J-A	A-M	Sh
B	1	J-A	A-M	Ch*
A	1	?	B-C	Hi
B	1	?	B-D	Hi
A	1	J-A	A-M	Hi
A	1	J-A	A-M	Ch
A	1	J-A	A-M	Ch
B	1	J-A	A-M	Ch
C	2	Co	L	Mi
C	2	J-B	L	Mi
D	5	J-A	A-M	Ch*
D	5	J-A	A-M	Ch*
D	5	?	A-M	Ch*
A	3	J-A	A-M	Mi
E	6	J-A	A-M	Ch*
E	6	J-A	A-M	Ch*



Abbreviations. **J-A, B, D**: *Jaggichlorella* Strain A, B, D. **Co**: *Coccomyxa* sp. **A-M**: artificial (metal), **A-R**: artificial (resin). **B-C**: bark of *Cerasus* sp. **B-D**: bark of dead tree. **L**: leaf of *Ilex latifolia*. **Ch**: Chiba Pre., **Sh**: Shizuoka Pre., **Hi**: Hiroshima Pre., **Ya**; Yamaguchi Pre., **Mi**: Miyazaki Pre.

Fig. 2. Relationships between morphotypes, chemotypes, photobionts, substrates, localities and molecular phylogeny of mycobionts.
"*" in localities indicates that each samples was sympatrically present.