

## Taxonomic Notes on Asian Species of *Cladonia* (*Cladoniaceae*, *Ascomycota*)

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Three species of the lichen genus *Cladonia* are described as new: *Cladonia fragosa* Ahti & Sohrabi (type from Prov. Jilin, China), *C. sinoaltaica* Ahti & Davydov (type from Xinjiang, China), and *C. sumatrana* Ahti (type from Sumatra, Indonesia). In addition, the recent records of *C. awasthiana* Ahti & Upreti from outside the Himalayas are referred to *C. rei* Schaer., and *C. tixieri* Abbayes (type from Vietnam) is reduced to synonymy of *C. cartilaginea* Müll. Arg.

**Key words:** Caucasia, China, lichen, new records, new synonyms, new taxa, Sumatra, Thailand, Vietnam.

Species of the lichen family *Cladoniaceae* have been studied intensively in many parts of the world, in recent times increasingly with molecular methods.

The Asian species are fairly well studied largely thanks to the Japanese master lichenologist and phytochemist Yasuhiko Asahina and his pupils and followers. However, the species in parts of Asia and especially Southeast Asia are still very insufficiently known. Some species groups are poorly understood throughout the world. Recent progress in molecular taxonomy has clarified some of the problems (e.g., Stenroos et al. 2002, 2015), but also created new, sometimes unexpected problems.

Our recent (unpubl.) phylogenetic analyses of the *Cladoniaceae* using DNA sequence

data have included material from little known areas. Some specimens have turned out to represent unnamed species. Some new Asian taxa, overlooked or misidentified by earlier authors, are described below. They all have morphological and chemical characters, which can allow their identification without molecular analyses. Some other species are treated because of changes discovered in their taxonomic status or known distribution.

### Material and Methods

Collections from the herbaria ALTB, BAK, G, H, L, RAMK, REN, TBI, and TUR were studied. The specimens were examined under stereomicroscope and photographed with a Nikon D800 camera and an AF-S VR Micro-Nikkor 105 mm f/2.8G IF-ED lens.

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ハナゴケ属の3新種を記載した: *Cladonia fragosa* Ahti & Sohrabi (タイプは中国・吉林省), *C. sinoaltaica* Ahti & Davydov (タイプは中国・新疆), *C. sumatrana* Ahti (タイプはインドネシア・スマトラ島). *C. fragosa* と *C. sinoaltaica* はいずれもホモセツカ酸を含み, 日本産のヒメレンゲゴケ *Cladonia ramulosa* (With.) J. R. Laundon やツエハナゴケ *C. rei* Schaer と形態的には酷似するが遺伝子解析では異なるクレードを形成する. *C. sumatrana* は *R. tenuiformis* Ahti に似ているが分枝の叉

の孔は稀でタムノール酸を含むので区別できる. また, ヒマラヤ以外から *C. awasthiana* Ahti & Upreti と報告された種は何れも *C. rei* と同定される. ベトナム産の *C. tixieri* Abbayes は *C. cartilaginea* Müll. Arg. の異名となった.

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