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Author(s): Li-Song Wang , Xin-Yu Wang & H. Thorsten Lumbsch

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Eight lecanoroid lichen species new to China

Li-Song WANG^a, Xin-Yu WANG^a & H. Thorsten LUMBSCH^{b*}

^a Key Laboratory for Plant Diversity and Biogeography of East Asia,
Kunming Institute of Botany, Chinese Academy of Sciences, 132 Lanhei Road,
Kunming, Yunnan 650201, P.R. China

^b Science & Education, The Field Museum, 1400 S. Lake Shore Drive,
Chicago, IL 60605, US

Abstract – Eight crustose lichen species are recorded for the first time for China. The species newly recorded are: *Diploschistes hypoleucus*, *Lecanora epibryon*, *L. leproplaca*, *L. plumosa*, *L. sibirica*, *L. tropica*, *Loxospora lecanoriformis*, and *Tephromela khatiensis*. Among those, *D. hypoleucus* is newly recorded for Asia.

Asia / *Diploschistes* / *Lecanora* / Lichens / *Loxospora* / *Tephromela*

INTRODUCTION

The province of Yunnan is located in southwestern China, between 21°08' – 29°15'N and 97°31' – 106°12'E, with an average altitude of 2000 m. The highest peak in Yunnan measures 6740 m, while the lowest part of the province is at 76 m. The large differences in altitudes and the high relief energy in this area that covers tropical areas in the south part and temperate zones in the northern part of Yunnan enabled the development of a diverse lichen flora that has long attracted lichenologists (Hue, 1887, Zahlbruckner, 1930). However, the lichen flora of the area is still poorly known and recently numerous additional species have been discovered in the area (Aptroot, 2006, McCune *et al.*, 2003, Liang *et al.*, 2012).

After careful examination of specimens identified as “*Lecanora*” collected from the province of Yunnan, eight species new to China have been discovered, including one genus new to China: *Loxospora* A. Massal., and one species new to Asia: *Diploschistes hypoleucus*. Chinese species of the genus *Lecanora* have been recently studied (Lü *et al.*, 2009, 2012), but our discoveries indicate that the diversity of this genus in China is still not well known and that further studies are required to enhance our knowledge on lecanoroid lichens in the area.

MATERIALS AND METHODS

The lichens recorded here were collected mostly by the first author and are deposited in the herbarium of the Botanical Institute of the Chinese Academy of Sciences in Kunming (KUN). Morphological and chemical studies followed standardized lichenological procedures.

* Corresponding author: tlumbsch@fieldmuseum.org

RESULTS AND DISCUSSION

***Diploschistes hypoleucus* (Vain.) Zahlbr., *Hedwigia* 31: 35. 1892**

Fig. 1A

Morphological and chemical description: A complete description of this taxon is given by Lumbsch (1989).

Ecology and distribution: *Diploschistes hypoleucus* is a terricolous lichen occurring in tropical and subtropical regions worldwide. It is widely distributed in the Neotropics and has also been recorded from Africa (Lumbsch, 1989, Guderley & Lumbsch, 1996). This is the first record of this species from Asia.

Notes: This species is characterized by having a greenish to brownish, shiny thallus and rather large apothecia. Similar morphologically is *D. cinereo-caesius* (Sw. ex Ach.) Vain., which also occurs in China. The latter species, however, is readily distinguished by the presences of lecanoric acid and a thicker thallus with matt surface.

Chinese specimen examined: **CHINA. YUNNAN:** Dali Co., Jianchuan, Shibaoshan Mt., alt. 2665m, 17 Aug 2011 Wang Li-song 11-32514.

***Lecanora epibryon* (Ach.) Ach., *Lich. Univ.*: 396. 1810**

Fig. 1B

Morphological and chemical descriptions: Descriptions can be found elsewhere (Brodo, 1984, Lumbsch *et al.*, 1994, Ryan *et al.*, 2004, Smith *et al.*, 2009).

Ecology and distribution: The nominal subspecies of this species has a bipolar distribution (Lumbsch *et al.*, 1994) and occurs on soil and over bryophytes mostly in arctic-alpine habitats of the northern Hemisphere and is also known from Tierra del Fuego. This is the first record from China.

Notes: *Lecanora epibryon* is characterized by the presence of small crystals in the amphithecium, an egranulose, brown epihymenium, and the presence of small oil droplets in the hymenium. Similar species include *L. campestris*, which also occurs in China, but which occurs on rocks, has smaller ascospores and a thinner amphithecial cortex (Brodo, 1984, Ryan *et al.*, 2004).

Chinese specimen examined: **CHINA. YUNNAN:** Zhongdian Co., Geza, Hongshan Mt., alt. 4490 m, 6 Oct 2009 Wang Li-song 09-31011.

***Lecanora leproplaca* Zahlbr., *Ark. Bot.* 31A(6): 64. 1944**

Fig. 1C

Morphological and chemical descriptions: Descriptions can be found elsewhere (Lumbsch, 1994, Lumbsch & Elix, 2004).

Ecology and distribution: This corticolous taxon has a pantropical distribution and has been found in subtropical China in Sichuan. The species is here recorded from China for the first time.

Notes: *Lecanora leproplaca* is readily identified by the presence of soredia, red-brown apothecial discs and a *glabrata*-type epihymenium. This species is closely resembles *L. tropica*, which lacks soredia.

Chinese specimen examined: **CHINA. SICHUAN:** Miyi Co., Malong, Baiposhan Mt., alt. 2100 m, 5 Jul 1983 Wang Li-song 83-688.

***Lecanora plumosa* Müll. Arg., *Flora* 65: 484. 1882**

Fig. 1D

Morphological and chemical descriptions: Detailed morphological descriptions have been published elsewhere (Lumbsch, 1994, Lumbsch & Elix, 2004, Ryan *et al.*, 2004).

Ecology and distribution: This is a saxicolous species, which has been collected in China in the tropical region of southern Yunnan. This is the first

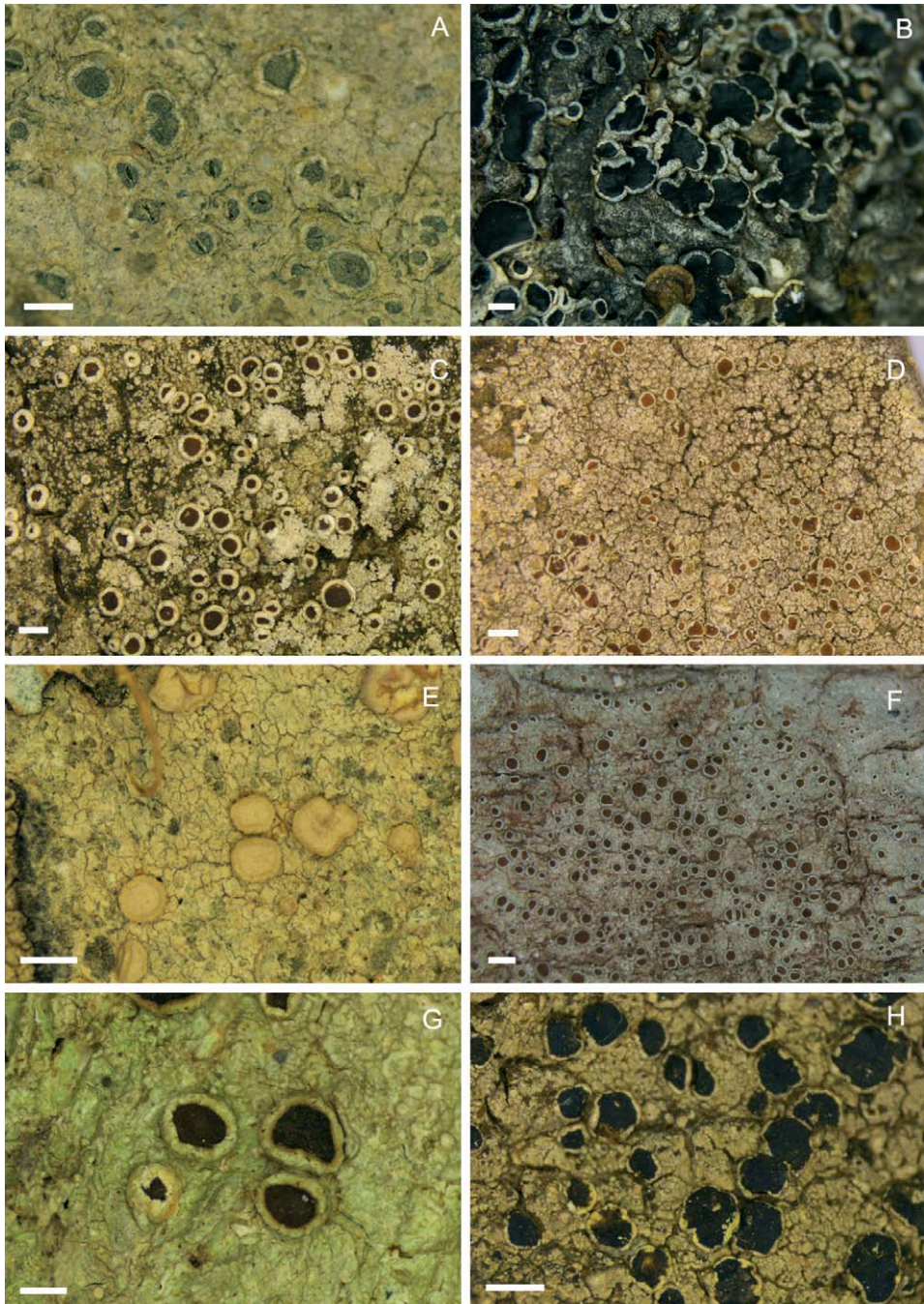


Fig. 1. Habit of newly recorded lichens. **A.** *Diploschistes hypoleucus*. **B.** *Lecanora epibryon*. **C.** *L. leproplaca*. **D.** *L. plumosa*. **E.** *L. sibirica*. **F.** *L. tropica*. **G.** *Loxospora lecanoriformis*. **H.** *Tephromela khatiensis*. Scale bars = 1 mm.

record of this species from China. It is a pantropical species, which has recently been recorded from Thailand (Papong & Lumbsch, 2011).

Notes: *Lecanora plumosa* is characterized among saxicolous species of *Lecanora* sensu stricto by its pale apothecial discs and the presence of the 2'-*O*-methylperlatolic acid chemosyndrome.

Chinese specimen examined: **CHINA. YUNNAN:** Xishuangbanna Dai Autonomous Prefecture, XTBG electronic station, alt. 600m, 30 Aug 1982 Wang Li-song 82-1305.

***Lecanora sibirica* Müll. Arg., *Flora* 71: 205. 1871**

Fig. 1E

Morphological and chemical description: A detailed morphological descriptions is provided elsewhere (Lumbsch *et al.*, 1997).

Ecology and distribution: *Lecanora sibirica* is a corticolous species that occurs on bark of conifers and deciduous trees in temperate eastern Asia (Oxner, 1940). It is here recorded for the first time from China.

Notes: This taxon is characterized by the presence of coalescing soredia, apothecia with pruinose discs, and the presence of usnic acid (Lumbsch *et al.*, 1997). Similar species include *L. mughosphagneti* Poelt & Vezda and *L. subcarpineae* Szatala. The latter differs in lacking soredia and usnic acid and having apothecial discs with sordidone (C+ orange) and containing the psoromic acid chemosyndrome. *Lecanora mughosphagneti* is readily distinguished from *L. sibirica* by an entirely sorediate thallus, the absence of usnic acid, and the presence of the protocetraric acid chemosyndrome.

Chinese specimens examined: **CHINA. YUNNAN:** Weixi Co., Yezhi Commune, alt. 3500m, 11 May 1982 Wang Li-song 82-51B; **SICHUAN:** Xiaojin Co., Shuangqiaogou, alt. 3300 m, 23 Aug 1996 Wang Li-song 96-17728.

***Lecanora tropica* Zahlbr., *Cat. Lich. Univ.* 5: 589. 1928**

Fig. 1F

Morphological and chemical descriptions: Descriptions can be found elsewhere (Lumbsch, 1994, Lumbsch & Elix, 2004, Ryan *et al.*, 2004).

Ecology and distribution: This is a corticolous species, which has been collected in subtropical region from Southwestern Yunnan in China. This is the first record of this pantropical species for China.

Notes: The species is characterized by a non-granulose epihymenium, dark red-brown apothecial discs and a thallus containing zeorin. The species might be confused with *L. ecoronata*, which, however, differs by having smaller apothecia and narrower ascospores and lacks the chodatol chemosyndrome.

Chinese specimens examined: **CHINA. YUNNAN:** Zhenyuan Co., along the road side, 30 km E of Zhenyuan Co., alt. 1220m, 10 Jun 2013 Wang Li-song 13-38127; **GUIZHOU:** Libo Co., Maolan Nature Reserve, alt. 504 m, 19 Sep 2012 Wang Xin-yu 12-35216.

***Loxospora lecanoriformis* Lumbsch, A.W.Archer & Elix, *Lichenologist* 39: 514. 2007**

Fig. 1G

Morphological and chemical description: A full description of this species is given elsewhere (Lumbsch *et al.*, 2007).

Ecology and distribution: Originally described from Australia, it has subsequently been found in Thailand and has probably a wider distribution in south-east Asia (Lumbsch *et al.*, 2007, Papong *et al.*, 2009). In China it mostly occurs in subtropical zone of southeastern Yunnan.

Notes: The species is easily confused with a *Lecanora* species, but is readily distinguished by larger ascospores and a different ascus-type. The New Zealand endemic *Loxospora cyamidia* (Stirt.) Kantvilas, is similar, but differs in having grey-pruinose discs and smaller ascospores, and contains thamnolic acid.

Chinese specimens examined: **CHINA. YUNNAN:** Chuxiong Co., Zixishan Mt., alt. 2440 m, 18 Aug 2011 Wang Li-song 11-32550; Malipo Co., Laojunshan Mt., alt. 1200 m, 20 Oct 1995 Wang Li-song 95-15839; Jingdong Co., Xujiaba water reservoir, alt., 2550 m, 25 Aug 1994 Wang Li-song 94-14532; Wenshan Co., Xichou, alt. 1390 m, 16 Nov 1991 Wang Li-song 91-42; Xinning Co., Mopanshan Mt., alt. 2540 m, 20 Dec 2008 Wang Li-song 08-29868, 29902, 29903, 09-30083; Caojian Co., Zibenshan Mt., alt. 3200 m, 12 Jun 2000 Wang Li-song 00-18824; Zhenyuan Co., Heping, alt. 2300 m, 10 Jun 2013 Wang Li-song 13-38151; **GUIZHOU:** Jiangkou Co., Fanjingshan Mt., alt. 2100m, 3 Jul 1988 Wang Li-song 88-289.

Tephromela khatiensis (Räs.) Lumbsch, Bryologist 99: 288. 1996

Fig. 1H

Morphological characterization: The species has blackish apothecial discs and is morphologically very similar to *T. atra*. It has a greenish black epihymenium, a dark red-brown hypothecium, a hyaline hymenium, 8-spored asci with hyaline, broadly ellipsoid ascospores ($8-12 \times 5-7.5 \mu\text{m}$), and bacilliform conidia ($10-15 \mu\text{m}$ long) (Lumbsch *et al.*, 1996). The hypothecium reacts slightly red with KOH.

Chemistry: Aleatoronic acid (major), atranorin (major), chloroatranorin (minor), and unknown depsidones (minors).

Ecology and distribution: The species occurs on siliceous rocks in mid-elevations (2500 m) in Mopanshan Mt. It has been described from the east Himalaya in India (Räsänen, 1951) at an elevation of 2400 m.

Notes: This species is morphologically similar to *T. atra* and has been confused with it but is readily distinguished by the presence of a hyaline hymenium.

Chinese specimens examined: **CHINA. YUNNAN:** Xinning Co., Mopanshan Mt., alt. 2540 m, 20 Dec 2008 Wang Li-song 08-29954, 29961.

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