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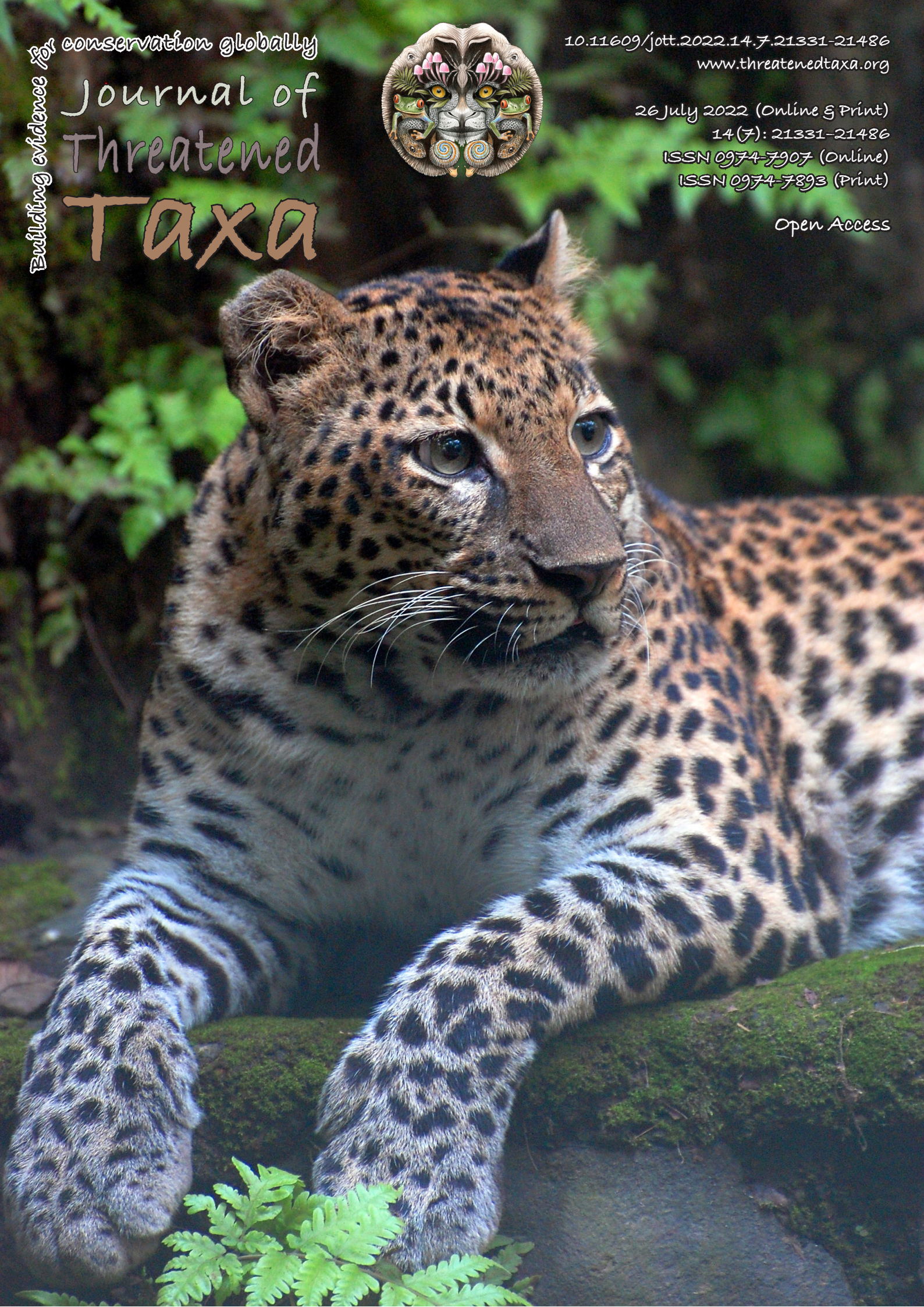

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Cover: A female Javan Leopard *Panthera pardus melas* in rehabilitation phase at Cikananga Wildlife Center. © Yayasan Cikananga Konservasi Terpadu.

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SHORT COMMUNICATION

Cetrelia isidiata (Asahina) W.L. Culb. & C.F. Culb. (Parmeliaceae) – an addition to the Indian lichen biota

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Abstract: *Cetrelia isidiata* (Asahina) W.L. Culb. & C.F. Culb., is characterized by the presence of isidia, pseudocyphellae on thallus, and containing anziaic acid. The species is reported here as an addition to the Indian lichen biota from Arunachal Pradesh. A detailed description along with key to isidiate species of the genus known is provided.

Keywords: Ascomycetes, biodiversity, lichenized, taxonomy.

The genus *Cetrelia* W.L. Culb. & C.F. Culb. (Parmeliaceae) is represented by 18 species from the world Randlane et al. (2013), of which 10 species are reported from India (Mishra & Upreti 2015). According to Randlane & Saag (2004) the isidiate species of *Cetrelia* show their restricted distribution in Asia whereas sorediate species are found in European and Asian countries. Culberson & Culberson (1968) provided a monograph on the genera *Cetrelia* and clearly mentioned that *Cetrelia isidiata* might be mistaken from *C. pseudolivetorum* in colour spot test as both species produce a pink colour in C reaction, therefore, thin layer chromatography (TLC) test will be desirable for the recognition of olivetoric and anziaic acids. *Cetrelia braunsiana* (Müll. Arg.) W.L. Culb. & C.F. Culb., and *C. pseudolivetorum* are isidiate species of *Cetrelia* earlier reported from India (Singh & Sinha 2010).

Materials and Methods

The present study is based on the *Cetrelia* specimen preserved in the herbarium of CSIR-National Botanical Research Institute, Lucknow (LWG). The specimen was examined morphologically, anatomically, and chemically. Thin hand-cut sections of thalli were mounted in water or cotton blue and 5% KOH and observed under a compound microscope. For chemical spot tests the usual reagents of K, C, KC, and P were used. TLC was performed in solvent system A (Toluene: 1, 4-dioxane: acetic acid: 180: 60: 8 ml), following the technique of Orange et al. (2001). The specimen was identified up to the species level with the help of publications of Mishra

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Competing interests: The authors declare no competing interests.

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& Upreti (2015) and Culberson & Culberson (1968).

Result

Cetrelia isidiata was reported earlier from China, Japan, and Taiwan (Randlane & Saag 2004). It is a new record for Indian lichen biota recorded for the first time in Arunachal Pradesh. A detailed taxonomic description of the species is provided together with illustration, key to the isidiate species and comparative characteristic features of Indian isidate species of the genus *Cetrelia* (Table 1).

***Cetrelia isidiata* (Asahina) W.L. Culb. & C.F. Culb.**
(Image 1, Figure 1)

Contr. U. S. Natl. Herb. 34: 510 (1968).

= *Cetrelia sanguinea* Schaer. f. *isidiata* Asahina, Nov. Fl. Jap. 5: 73 (1939).

Thallus foliose, corticolous, loosely attached to the substratum, 5–19 cm across; lobes 0.5–1.5 cm broad; upper surface grayish or light brownish, pseudocyphellate; pseudocyphellae tiny and infrequent; isidia present on mostly margin of lobes, simple, globose or sometime coralloid or poorly developed; lower surface black, margins brown or concolorous to upper surface; rhizines black; medulla white. Apothecia and pycnidia not seen.

Chemistry: Medulla K–, C+ pink or red, KC–, P–; anziaic acid as major compound, ±atranorin.

Remarks: *Cetrelia isidiata* morphologically exhibits its similarity with *C. braunsiana* and *C. pseudolivetorum* but differs in presence of anziaic acid in the thallus. The species is also close to *C. sanguinea* (Schaer.) W.L. Culb. & C.F. Culb., in having anziaic acid in the thallus but differs by lacking isidia. In India, the species is found growing on bark of trees at an elevation of 2,966 m in Eastern Himalayan state of Arunachal Pradesh.

Specimen examined: 15-037820 (LWG), 16.vii.2015, India: Arunachal Pradesh, Tawang district, around monastery, on bark, 27.585N, 91.857E, 2,966 m, coll. R. Bajpai.

A key to the isidiate species of *Cetrelia*

1. Medulla C+ red or pink and thallus containing olivetoric or anziaic acids 2
1a. Medulla C- and thallus containing alectoronic and α-collatolic acids ..... *C. braunsiana*
2. Isidia poorly developed and anziaic acid present in the thallus ..... *C. isidiata*
2a. Isidia well developed and olivetoric acid present in the thallus ..... *C. pseudolivetorum*

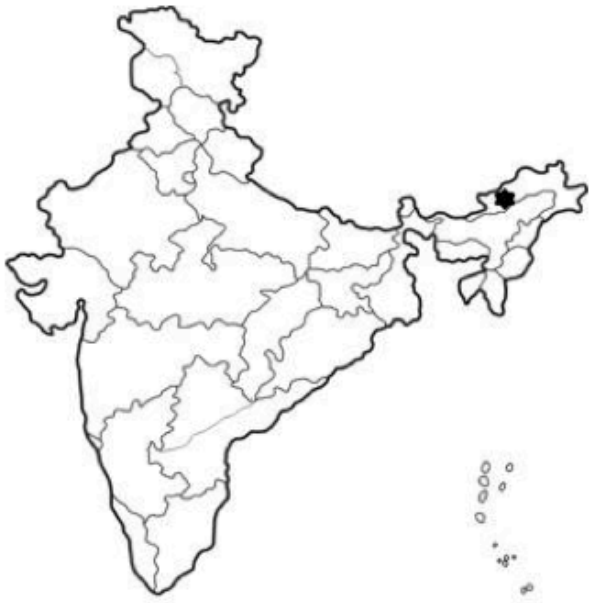

Figure 1. Distribution of *C. isidiata* in India.

Image 1. *Cetrelia isidiata* (Asahina) W.L. Culb. & C.F. Culb. (scale = 1 mm). © G.K. Mishra.

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Table 1. Comparative characteristic features of Indian isidate species of the genus *Cetrelia*.

Characteristics	Name of the species		
	Cetrelia braunsiana	***Cetrelia isidiata***	***Cetrelia pseudolivetorum***
Thallus size	8–12 cm across	5–19 cm across	5–15 cm across
Lobes	5–15 mm wide	0.5–1.5 cm wide	0.5–1.5 cm wide
Upper surface	Gray or ashy-white	Grayish or light brownish	Grayish or grayish-white or uniformly light brownish or tan in old herbarium specimens
Isidia	Simple, marginal to sometimes laminal; often coralloid	Mostly on margin of lobes; simple, globose or sometime coralloid or poorly developed	Along margin and on surface; simple or coralloid, turning into dorsiventral dissected lobules
Pseudocyphellae	Punctiform to irregular, rarely more than 1 mm broad	Tiny and infrequent	Punctiform or slightly elongate
Lower surface	Brown to grayish, the margins brown or grayish like the colour of the upper surface	Black, margins brown or concolorous to upper surface	Black, margins brown or concolorous to upper surface
Apothecia	Rare, submarginal, perforate, about 0.5 mm broad, asci 8 spored, ascospores ovoid, 12–15 × 8–9 µm.	Absent	Absent
Pycnidia	Rare, marginal, black, pruinose; conidia 1 × 4–6 µm, rod-shaped	Absent	Absent
Spot test	Medulla K–, C–, KC+ pink, PD–	Medulla K–, C+ pink or red, KC–, P–	Medulla K–, C+ pink or red, KC– or KC+ pink to red, P–
Chemistry	Alectoronic and α-collatolic acids (as major substance), ±atranorin.	Anziaic acid (as major compound), ±atranorin	Olivetoric (acid as major compound), ±atranorin.
Distribution in India	Himachal Pradesh, Sikkim, Uttarakhand and West Bengal	Arunachal Pradesh	Himachal Pradesh, Sikkim, Uttarakhand and West Bengal

(Parmeliaceae, Ascomycota) in India. *Phytotaxa* 236(3): 201–214.

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