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ENCALYPTA SINICA (MUSCI: ENCALYPTACEAE), FIRST RECORD FOR THE MOSS FLORA OF RUSSIA

ENCALYPTA SINICA (MUSCI: ENCALYPTACEAE), ПЕРВОЕ УКАЗАНИЕ ДЛЯ ФЛОРЫ МХОВ РОССИИ

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Abstract

Encalypta sinica J.-C. Zhao & M. Li was found in the Sangilen highlands (the Republic of Tuva). This is the third record of the species in the world and the first record for Russia. A description and illustrations of the species based on the Russian specimen are provided.

Резюме

Encalypta sinica J.-C. Zhao & M. Li обнаружена на нагорье Сангилен (республика Тыва). Это третья находка вида в мире и первое указание для России. Приводятся основанные на российском образце описание и иллюстрации вида.

KEYWORDS: new record, rare species, Asian Russia, China

Introduction

While processing the collection of mosses from the Republic of Tuva, several *Encalypta* plants with specific octopus-shaped papillae on leaf cells were found in a cushion of *Bryum* sp. According to the recent revision (Fedosov, 2017), 16 *Encalypta* species are known for moss flora of Russia, but none of them have such papillae.

Leaf cells with stellate papillae along with obtusely pointed leaves, cylindric capsules with peristome and calyptrae with high-conic papillae are listed in the *Encalypta*-key in Moss Flora of China (Tong *et al.,* 2001) as typical for *Encalypta sinica* J.-C. Zhao & M. Li. The species was described in the end of the 20th century as a new Chinese endemic from Mt. Xiaowutai (Zhao *et al.,* 1999; Tong *et al.,* 2001). Since the first description of *E. sinica*, I have found no reports of new records in China, but it was once noted as a new addition to the Korean bryoflora (Ellis *et al,* 2014). Furthermore, another species with stellate papillae has recently been described from China, also from Mt. Xiaowutai – *Encalypta sylvatica* F.J.Shen & J.C.Zhao (Shen *et al.,* 2022); it is emphasized, that *E. sylvatica* is similar to *E. sinica,* but differs from the latter in having smooth calyptra, absence of preperistome, and overall smaller plant size (4–8 mm vs 12–14 mm high). Both species belong to the section Rhabdotheca and are closely related to *E. raptocarpa* (Zhao *et al.,* 1999; Shen *et al.,* 2022). Unfortunately, the sample from Tuva was very scarce, with fewer than 10 plants, and only one of them had mature sporophyte: capsule with peristome, spores clearly heteropolar as it is typical for section Rhabdotheca; however, calyptra was absent. In the moss flora of Russia, section Rhabdotheca includes 5 species, but only one of them, *E. raptocarpa,* has a persistent peristome (Fedosov, 2012, 2017). Until recently, *E. rhaptocarpa* was considered to be common in Siberia. But according to the critical treatment of the genus in Russia (Fedosov, 2012, 2017), most of the specimens in NSK-collection previously assigned to *E. rhaptocarpa* have been referred to *E. trachymitria* Ripar. or *E. pilifera* Funck.

Material and Methods

Now in NSK-collection there are only few *E. rhaptocarpa* specimens; three of them, which had numerous mature ribbed capsules with red stripes and well-developed red peristome were selected for comparison.

Encalypta rhaptocarpa Schwägr. – Russia, the Republic of Tuva, Mongun-Taiga Distr., Mongun-Taiga Mtn. NE macroslope, Mugur River valley, 50.30905°N – 90.21408°E, 2760 m alt., stone field in tundra belt, on fine soil, 30.VII.2019. *Pisarenko* (NSK2008410); Yamalo-Nenets Autonomous Distr., 18 km south of Tazovsky settlement, 67.3329°N – 78.7555°E, 38 m alt., convex top of a hill, draft-shrablets tundra, on fine soil, 12.VII.2010. *Pisarenko* (NSK2004104); Magadan Province, the coast of Nagaev Bay in Magadan vicinity, 59.562816°N – 150.68583°E, 16 m alt., rock outcrops on the steep seashore, on fine soil, 10.VIII.2014. *Pisarenko* (NSK2005264).

SEM observations were conducted using Hitachi TM-1000, without any metal coating, at 15 kV.

The plants from these three samples vary in stem and leaf size by about twice. In addition to the ribbed, striped capsule, they have similar features such as a hair-pointed leaf tip and U-shaped branched papillae, typically 2-4 (6) per cell. While the plants in the sample in question are characterized by a capsule lacking red stripes, the

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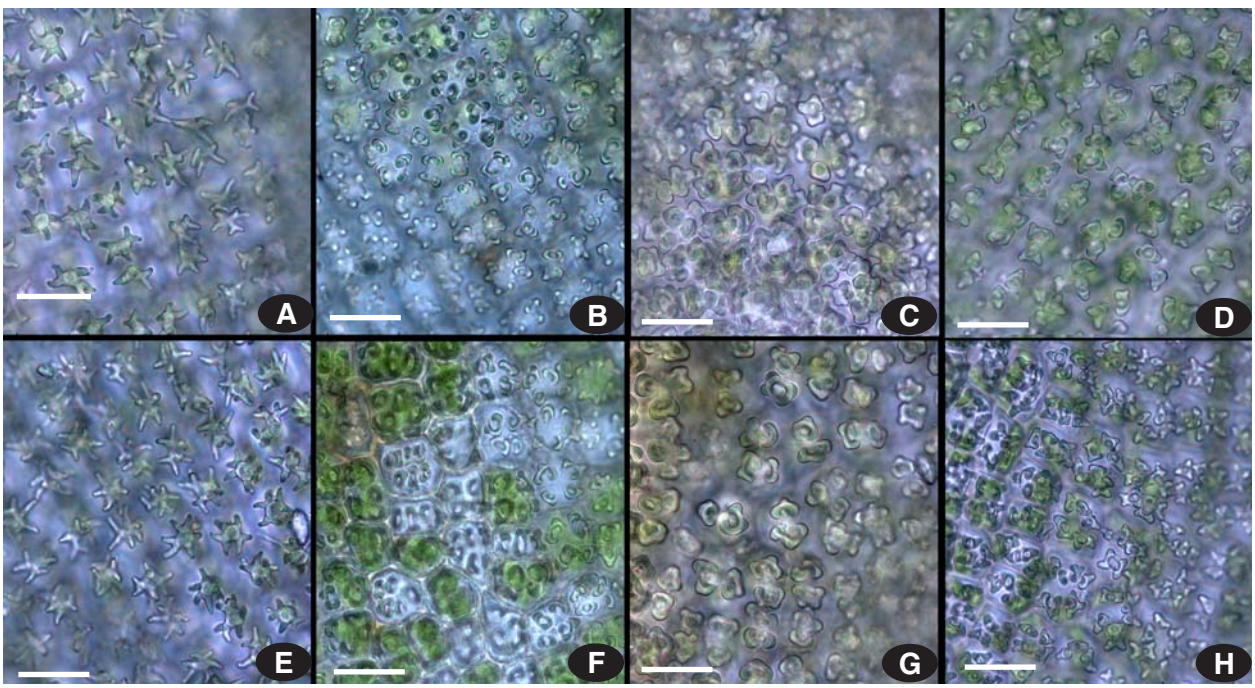

Fig. 1. Upper and median laminal cells of *Encalypta* (light microscope). A, E: *Encalypta sinica* (Tuva, NSK2010677); B, F: *Encalypta rhaptocarpa* (Tuva, NSK2008410); C, G: *Encalypta rhaptocarpa* (Yamalo-Nenets Autonomous Distr., NSK2004104); D, H: *Encalypta rhaptocarpa* (Magadan, NSK2005264). Scale bars: 20 μm for all.

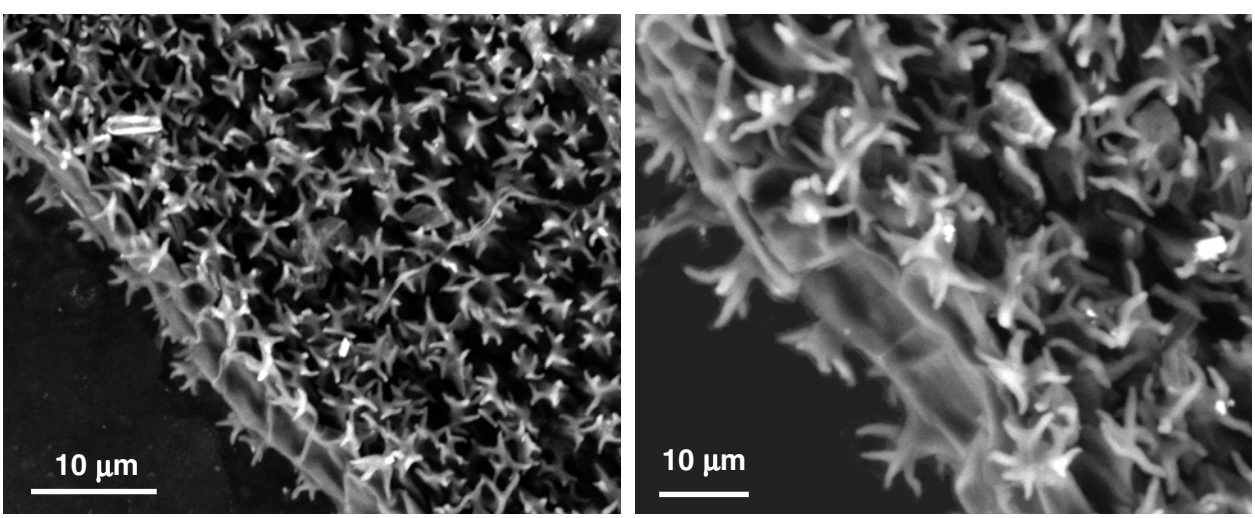

Fig. 2. Stellate papillae in distal leaf cells of *Encalypta sinica* from Tuva Republic; scanning electron microscope images.

absence of a hair-point on the leaves, and peculiar octopus-like papillae, which are usually single. Therefore, based on the listed set of features, I assume it is possible to classify the plants as belonging to *Encalypta sinica.*

The description and illustrations based on material from Tuva Republic are given below.

Encalypta sinica J.C. Zhao & Min Li, Arctoa 8: 1. 1999. Figs. 1–3.

Description: *Plants* medium-sized, in loose tufts, dingy green, slightly glaucous, brown below. *Stems* 0.7–1 cm long, simple or branched, without central strand in transverse section. *Leaves* incurved, contorted or slightly twisted when dry, erect-spreading when moist, lingulate, 3.5–4 mm long, 0.65–0.85 mm wide, apices rounded, mucronate with a crown-like mucro of several sharp cells, margins plane; *costa* strong, narrowing upward, percurrent. Median and upper laminal *cells* irregularly rounded to quadrate, 12–16 μm, with tall stellate papillae; oblong, 40–70×16–26 μm, with reddish, distinctly thickened transverse walls; 3–4 rows of marginal cells linear, 80–110×3–6 μm, thin-walled. *Autoicous*. *Perichaetial leaves* slightly differentiated, somewhat wider than upper stem leaves, broadly pointed. *Setae* reddish, 7–8 mm long, erect, slightly twisted above when dry; *capsules* cylindric, 2.5 mm long, lacking longitudinal ribs. *Peristome* pale reddish-brown, smooth or sparsely verrucose, ca. 300 μm long, rudimentary exostome teeth 30–

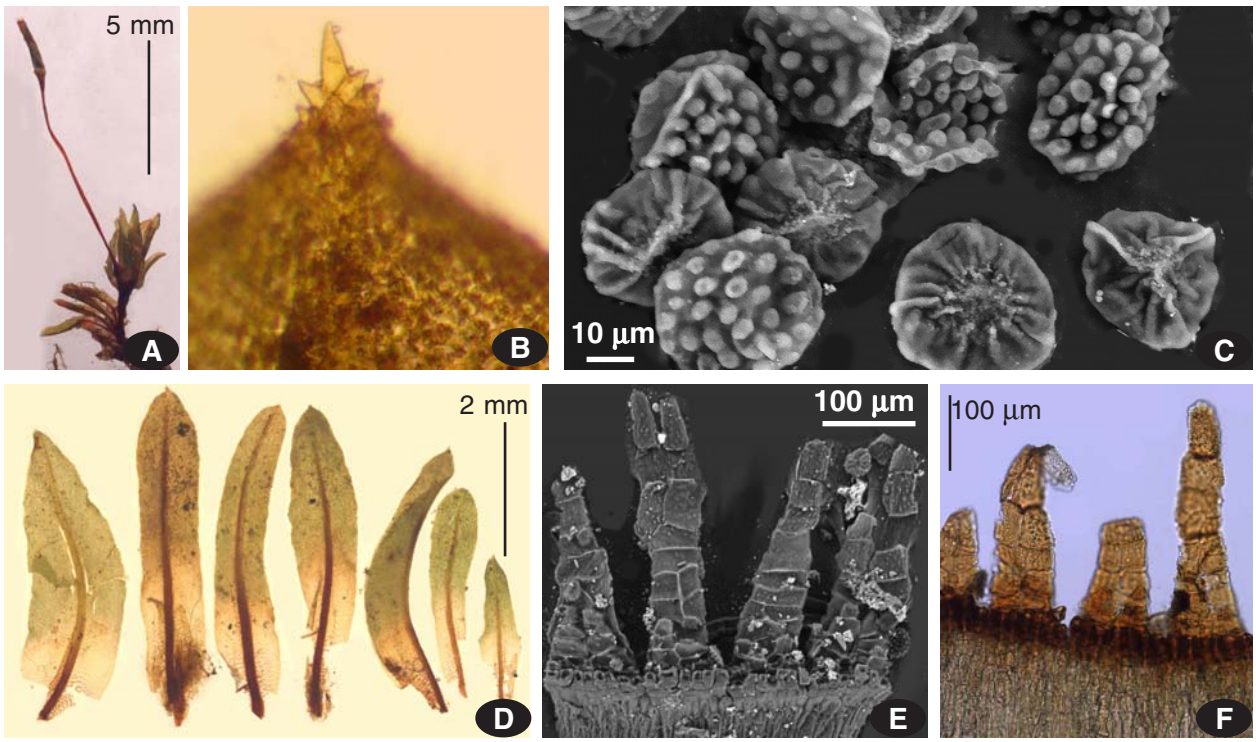

Fig. 3. *Encalypta sinica* (from Tuva, NSK2010677). A: plant with sporophyte, stem leaves are partially removed; B: leaf apex; C: spores; D: leaves, ranging from perichaetial leaf (left) to lower stem leaves (right); E–F: peristome with rudimentary exostome teeth. A–B, D, F – light microscope; C, E – SEM.

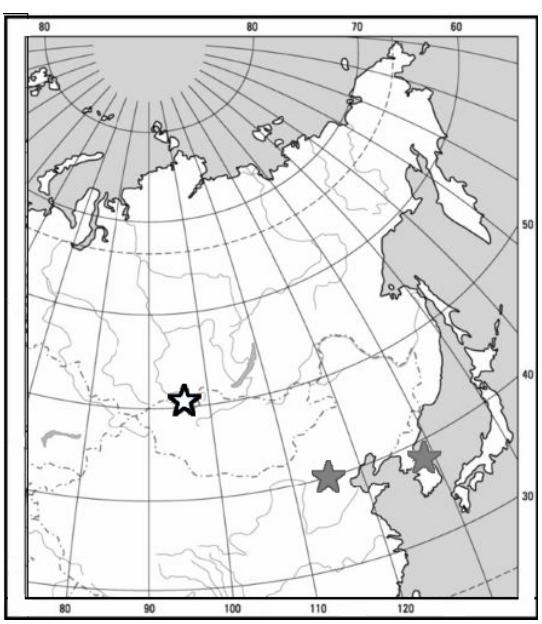

Fig. 4. Distribution of *Encalypta sinica*: filled stars are the type location in China (Hebei Prov., Mt. Xiaowutai) and the locality in Republic of Korea (Gangwon Prov., Jeongseongun); light star is the new finding (Russia, the Republic of Tuva, Sangilen highlands).

70 µm long. Spores heteropolar, 30–36 µm, with large, warty papillae on distal surface.

Specimens examined: Russia, the Republic of Tuva, Erzin Distr., Sangilen highlands, Naryn river upstream, 50.21147°N – 96.23106°E, 1835 m alt., limestone outcrops along the side of the river valley at the foot of N-faced slope under the canopy of larch forest with steppe herbage; rock ledge, on fine soil, 12.VII.2013. *Pisarenko* (NSK2010677).

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