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## *Haematomma rubidum* sp. nov. from China

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**ABSTRACT**—*Haematomma rubidum* from southern China is described as new species characterized by convex apothecia with thin whitish margins that become hidden in age; submuriform ascospores with 15–21 transverse and 0–3 longitudinal septa; and a thallus containing atranorin and russulone but lacking dibenzofurans or xanthenes. Photographs of the new species accompany a detailed taxonomic description.

**KEYWORDS**—East Asia, *Haematommataceae*, lichenized fungi, taxonomy

## Introduction

*Haematomma* A. Massal. is a cosmopolitan genus characterized by blood-red lecanorine apothecia and transversely septate, submuriform to muriform ascospores. Three species that produce submuriform spores are *H. parda* Aptroot, *H. staigeriae* Nelsen & al., and *H. wattii* (Stirt.) Zahlbr. (Staiger & Kalb 1995, Nelsen & al. 2006, Aptroot 2007), while only one, *H. gallowayi* Brodo, is characterized by muriform spores (Brodo 2007).

During our studies, we discovered a new *Haematomma* species in Yunnan Province (21°08′–29°15′N, 97°31′–106°12′E) in southwestern China. The natural conditions and dry and wet climate in the province provide excellent

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habitat for many rare species and Yunnan is the most species-rich region for lichens in China (Wang 2012).

Here we describe a new submuriform-spored species of *Haematomma* and present a brief diagnosis, together with discussion on the differences between (sub)muriform-spored species of *Haematomma*.

### Materials & methods

The voucher specimens were examined morphologically using an Olympus SZ51 stereomicroscope and Olympus CX21 polarizing microscope and photographed with Olympus SZX16 and BX61 with DP72 cameras. Both thallus and medulla were tested with K (a 10% aqueous solution of potassium hydroxide) and C (a saturated solution of aqueous sodium hypochlorite). Lichen substances were identified using standardized thin layer chromatography techniques (TLC) with solvent systems A and C (Orange & al. 2010). The collection is deposited in the lichen section of the Herbarium, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming, Yunnan, China (KUN).

### Taxonomic description

*Haematomma rubidum* R. Tang & Z.T. Zhao, sp. nov.

FIG. 1

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Differs from *Haematomma staigeriae* by its convex apothecia, its lack of soralia, and the absence of lichexanthone.

TYPE: China. Yunnan Province, Lijiang City, Mt. Maanshan, Jiushijiulongtan Lake, 26°39'N, 99°46'E, alt. 3400 m, on *Rhododendron*, 16 Aug. 2000, LS Wang 00–20099 (Holotype, KUN).

ETYMOLOGY: *rubidum* refers to both the red *Rhododendron* blooms of its substrate and the red disc of the lichen.

THALLUS crustose, corticolous, smooth, slightly cracked, without isidia or soralia, whitish, thin, 0.05 mm thick; prothallus not seen. APOTHECIA 0.5–1.0 mm diam., constricted at the base, dispersed, disc cinnabar-red to brownish-red, primarily plane, soon becoming convex, epruinose, margin thin, initially flush with disk but soon becoming hidden with age; AMPHITHECIUM 75–95 µm thick; EPIHYMENIUM orange-red, K+ red, 5–7.5(–10) µm thick; HYMENIUM hyaline, 75–90 µm tall; HYPOTHECIUM hyaline or slightly brown; PARAPHYSES branched and anastomosing. ASCI clavate, containing 8 spores; ASCOSPORES persistently colorless, fusiform, submuriform with 15–21 transverse and 0–3 longitudinal septa per segment in optical view, 75–100 × 10–12.5 µm, the last cell of the spore, 20–25 µm long. The upper half of some spores muriform, while the lower half transversely septate. PYCNIDIA: not observed.

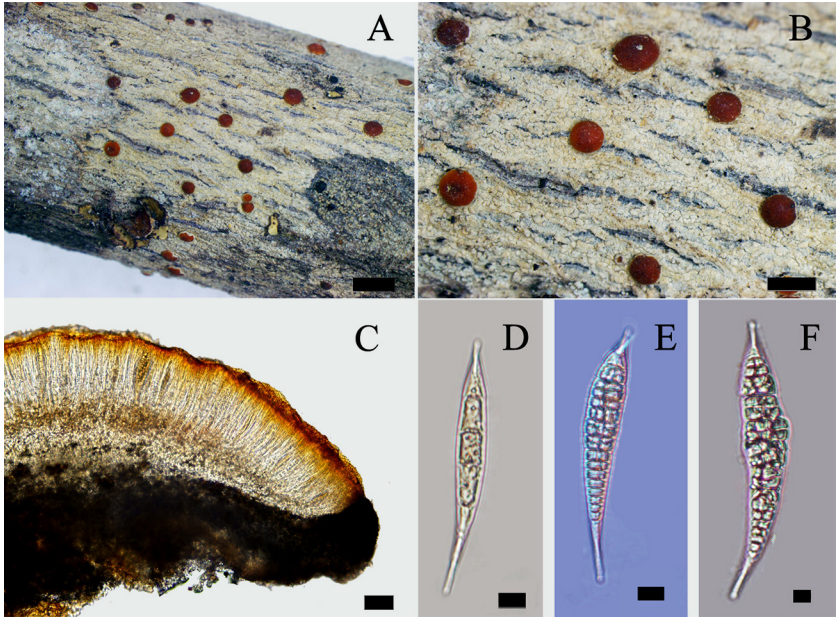


FIG. 1: *Haematomma rubidum* (holotype, KUN 00-20099). A. Thallus; B. Thallus with apothecia; C. Section through apothecium; D-F. Ascospores. Scale bars: A = 2 mm; B = 1 mm; C = 50  $\mu$ m; D, E = 10  $\mu$ m; F = 5  $\mu$ m.

CHEMISTRY—Cortex and medulla K<sup>+</sup> yellow, C<sup>-</sup>, KC<sup>-</sup>, IKI<sup>-</sup>. Atranorin and russulone detected by TLC.

HABITAT—Growing with *Lecidella* spp. on the trunk of *Rhododendron* on a sunny slope, above 3000 m elevation.

COMMENTS—*Haematomma rubidum* is characterized by its convex apothecia, submuriform ascospores, and K<sup>+</sup> red epihymenium. When young the apothecial margin is usually even with disk but eventually becomes hidden or covered in the lower part due to the gradual bulging of disk. *Haematomma* identification is still based on classical taxonomy. Nonetheless, its unique morphology and chemistry significantly separate *H. rubidum* from other *Haematomma* species. These differences support our proposing a single collection as a new species, but future DNA sequence analyses are needed to confirm its taxonomic disposition.

*Haematomma staigeriae*, which also possesses submuriform spores and a K<sup>+</sup> red epihymenium, can be distinguished by its narrower (6–10  $\mu$ m)

TABLE 1. Distinguishing characteristics of (sub)muriform-spored *Haematomma* species

CHARACTER	<i>H. rubidum</i>	<i>H. gallowayi</i>	<i>H. parva</i>	<i>H. staigeriae</i>	<i>H. wattii</i>
SORALIA	Absent	Present	Partly present	Present	Absent
APOTHECIUM					
Disc	Cinnabar- to brownish-red, convex	Cinnabar red, smooth	Brown, flat	Cinnabar-red, smooth	Cinnabar- red, smooth
Margin	Thin	Thick	Thick	Thick	Thick
EPIHYMENIUM	K+ red	K+ purple	K-	K+ red	K+ purple
ASCOSPORE					
Type	Submuriform	Muriform	Submuriform	Submuriform	Submuriform
Long. septa	0-3	1-3	0-2	0-1	0-1
Transverse septa	15-21	(6-)12-17 (-23)	14-17	11-23	15-25
Length (µm)	75-100 ×	(46-)51-78 ×	55-75 ×	50-90 ×	60-95 ×
Width (µm)	10-12.5	10-15.5	5-7.5	6-10	6.5-10
CHEMISTRY					
Atranorin	+	+	+	+	+
Haematommone	-	+	-	-	+
Lichexanthone	-	-	-	+	-
Placodiolic acid	-	+	-	-	+
Russulone	+	-	-	+	-
Zeorin	-	+	-	-	-
Unk. substance	-	-	+(2)	+	-
REFERENCE	<b>This study</b>	Brodo 2007	Aptroot 2007	Nelsen & al. 2006	Staiger & Kalb 1995

ascospores, flat discs, and a thallus with soralia and lichexanthone. In China, another species of *Haematomma* with submuriform spores, *H. wattii*, has been reported. However, *H. wattii* contains haematommone rather than russulone. The main differences among (sub)muriform-spored species of *Haematomma* are shown in TABLE 1.

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