



***Syntrichia Sinensis* (Müll. Hal.) Ochyra (Pottiaceae, Bryophyta), an Addition to the Moss Flora of the Kingdom of Saudi Arabia**

Faten Zubair Filimban

Division of Plant Sciences, Biology Department, College of Sciences, King Abdulaziz University, P.O. Box 80200, Jeddah 21551, Kingdom of Saudi Arabia

Abstract

Syntrichia sinensis (Müll. Hal.) Ochyra (Pottiaceae), is reported here as a new distributional record from Jizan Region in Saudi Arabia. A detailed description, ecology and other pertaining notes are provided with photographs to facilitate its easy identification in the field.

Keywords: *New Record; Kingdom of Saudi Arabia; Jizan Region; Fyfa Mountains; Pottiaceae, Syntrichia, mosses*

Introduction

The family Pottiaceae is the largest among the class Bryopsida with Worldwide distribution. It consists of 77 genera and nearly 1500 species of which the majority of its members are growing on soil in a wide array of habitats. *Syntrichia* Brid., is the biggest genera in this family and comprises about 90 species with a cosmopolitan distribution. It is considered the most difficult group among Pottiaceae owing to its high degree of polymorphism and close resemblance to the genus *Tortula* Hedw. Many authors consider *Tortula* as congeneric with *Syntrichia*. However, both these genera can be segregated by the anatomical features of their costa, the presence or absence of substereids, hydroids as well as the sclerodermis and hyalodermis in stems. According to (Taha. *et al.*, 2020), the moss flora of Saudi Arabia comprises 119 taxa belonging to 48 genera in 20 families. Among them, the genus *Syntrichia* is represented by 5 taxa viz. *S. caninervis* Mitt., *S. fragilis* (Taylor) Ochyra, *S. laevipila* Brid., *S. princeps* (De Not.) Mitt., and *S. ruralis* (Hedw.) F. Weber & D.

Mohr. Sadly, all are in the rare and threatened categories.

As part of the Survey, exploration, collection, and *ex-situ* conservation of endemic and threatened species of the Kingdom of Saudi Arabia, several botanical exploration trips were conducted to different ecological niches of the country. In one of such explorations, an interesting species of Bryophyte was stumbled which is belonging to the family Pottiaceae from Fyfa Mountains (Fig. 1) in E. Jizan Region of Saudi Arabia, on soil, N 17° 35. 365', 042° 52. 862, 1233m elevation. On critical study with relevant literature (Zander. 1993; Gallego. 2005; Rothfels. *et al.*, 2012; Akhooi. *et al.*, 2014; Taha. 2019; Taha. *et al.*, 2020) and type specimens housed at BCB, BM, FH, K (herbaria codes according to Thiers 2020+) it is identified as *Syntrichia sinensis* (Müll. Hal.) Ochyra. Perusal literature (Zander. 1993; Gallego. 2005; Rothfels. *et al.*, 2012; Akhooi. *et al.*, 2014; Taha. 2019; Taha. *et al.*, 2020) reveals that this species is so far not recorded for Saudi Arabia, hence it is described with photographs here.



Figure 1: Fyfa Mountains in E. Jizan Region of Saudi Arabia (Photo by the author on 28 January 2021).

Materials & Methods

The plant materials were collected from Fyfa Mountains (E-Jizan Region) and prepared as herbarium specimens according to standard procedure. The materials were identified by relevant literature (Zander. 1993; Gallego. 2005; Rothfels. *et al.*, 2012; Akhoodi. *et al.*, 2014; Taha. 2019; Taha. *et al.*, 2020) and type specimens housed at BCB, BM, FH, K. was examined through high-resolution images accessed at <https://jstor.org>. The description was prepared based on fresh collection examined under a binocular microscope (Olympus SZ11). The voucher specimens are deposited at the herbarium, Division of Plant Sciences, Biology Department, College of Sciences, King Abdulaziz University, Jeddah for further studies.

Results

Syntrichia sinensis (Müll. Hal.) Ochyra, *Fragm. Florist. Geobot.* 37: 213. 1992 (Fig. 2).

- *Barbula sinensis* Müll. Hal., *Nuovo Giorn. Bot. Ital.*, n. s. 3: 100. 1896. – *Tortula sinensis* (Müll. Hal.) Broth., *Nuovo Giorn. Bot. Ital.* 13: 279. 1906. Neotype: China interior, Provincia Shensi sept., in monte Lao-y san, Mart. 1896, legit Rev. Jos. Giralddi, determ. Prof. C. Müller sub n. 1382 (H-BR 4205016).

- *Barbula alpina* Bruch & Schimp., *Bryol. Eur.* 2: 101. 1842, nom. illeg. [non *Barbula alpina* Steud., *Nomencl. Bot.* 2: 71. 1824.].
- *Tortula alpina* (Bruch & Schimp.) Bruch., *Musci Frond. Exsic.*: 163. 1843. – *Syntrichia alpina* (Bruch. & Schimp.) Jur., *Laubm.-Fl. Oesterr.-Ung.*: 1939. 1882.
- *Barbula brachypila* Müll. Hal., *Nuovo Giorn. Bot. Ital.*, n.s. 5: 181. 1898.
- *Barbula erythrotricha* Müll. Hal., *Nuovo Giorn. Bot. Ital.*, n.s. 5: 181. 1898. Lectotype (designated by Chen, 1940): China interior, Provincia Shen-si sept., in monte Lao-y-huo prope Schan-gen-ze, 12 Mart. 1897, legit Rev. Jos. Giralddi, determ. Prof. C. Müller sub n. 1800 (H-BR 4205010).

Plants 0.5–1 cm high; Stems erect, branched, 2–10 mm. Leaves longitudinally folded and spirally twisted around the stem but little crisped when dry, wide-spreading when moist, oblong-lingulate to spatulate; margins revolute in the proximal 1/2, entire; apices acute; costa excurrent into a smooth to slightly toothed, hyaline awn, brown or reddish, smooth; basal cells abruptly differentiated, narrower toward the margins; distal cells polygonal, or quadrate, 08–15 µm, with 6–8 papillae per cell; marginal cells not differentiated. Setae red, 12–20 mm. Capsule

red, 2–3 mm, straight or slightly curved, with a distinct neck; operculum 1.2– 1.5 mm, red; peristome 0.6–1 mm, red, the basal membrane pale, about 1/4 the total length. Spores 10– 16 μm , papillose (Fig 2).

Specimen Examined

SAUDI ARABIA: E. Jizan Region, Fyfa Mountains, on soil, N 17° 35. 365', 042° 52. 862, 1233 m elevation, 28 January.2021, F. Filimban 577 A.

Distribution

The plant is mainly distributed is in Central and Northern Asia, including China (Li. *et al.*, 2001), Japan (Noguchi & Iwatsuki. 1988), Mongolia (Tsegmed. 2010), Kazakhstan, Turkmenistan, Tajikistan and Kyrgyzstan (Mamatkulov. *et al.*, 1998; Ignatov, Afonina, Ignatova. *et al.*, 2006). It has a limited

distribution in northern continental part of the southern Russian Far East and southern Siberia from Transbaikalia to Altai Republic, being not rare in Transbaikalia and Altai. It has reported in Georgia (Chikovani & Svanidze. 2004), Armenia (Manakyan. 1995), and Azerbaijan (Lyubarskaya. 1986). In Europe it grows in Germany (Düll & Meinunger. 1989), Austria (Köckinger. *et al.*, 2008), Poland (Ochyra. *et al.*, 2003) and Mediterranean countries (Cyprus, Italy, France, NE Spain, Slovenia, Tunisia and Turkey (Gallego. 2005; Pavletić. 1955; Ros. *et al.*, 2013). *Syntrichia sinensis* is also reported in a restricted area in North America on the Rocky Mountains in Colorado and New Mexico (Mishler. 2007). In the Middle East the plant is found in Oman (Rothfels. *et al.*, 2012).



Figure 2: Newly recorded *Syntrichia sinensis* (Müll. Hal.) Ochyra (Pottiaceae) in Fyfa Mountains in E. Jizan Region of Saudi Arabia (Photo by the author on 28 January 2021).

Discussions and Conclusions

The discovery of *Syntrichia sinensis* from Saudi Arabia resulted in the number of species of the genus raised to six. It is closely similar to *S. laevipila* by its gross morphology but quite distinct by the shorter hair point, short basal membrane of the peristome, laminae cells with more number of papillae and the

absence of bradened leaves and vegetative diaspores make it a remarkably unique taxon. Moreover, *S. laevipila* is an epiphytic species whereas *S. sinensis* is terricolous or saxicolous. According to (Kramer. 1980), the type specimen of *Barbula sinensis* [= *Syntrichia sinensis*] deposited in B was destroyed during World War II and no duplicates were

available at BM, H, FH, NY. However, we are refraining from designating a Neotype now pending further investigation in the future. A

key to the species of *Syntrichia* in Saudi Arabia is provided below to facilitate its easy identification in the field.

Key to the species of *Syntrichia* in Saudi Arabia

- | | |
|--|----------------------|
| 1 Plants with vegetative diaspores | <i>S. laevipila</i> |
| Plants without vegetative diaspores | 2 |
| 2 Upper third of lamina bistratose | <i>S. caninervis</i> |
| Upper third of lamina unistratose | 3 |
| 3 Costa without hydroids | <i>S. ruralis</i> |
| Costa with hydroids | 4 |
| 4 Hair point smooth, rarely weakly spinulose | 5 |
| Hair point spinose or leaf without hair point | 6 |
| 5 Plants epiphytic, peristome basal membrane 0.25-0.6 mm hig | <i>S. laevipila</i> |
| Plants terricolous or saxicolous | <i>S. sinensis</i> |
| 6 Leaves fragile, usually broken | <i>S. fragile</i> |
| Leaves not fragile, intact | <i>S. princeps</i> |

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