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A noteworthy range extension for *Haradaea moenchiae-manticae,* a rarely reported smut fungus

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Abstract. *Haradaea moenchiae-manticae* is reported for the first time from the Iberian Peninsula (from Spain), on *Moenchia erecta* subsp. *erecta,* and from Africa (from Morocco and Algeria), on a new host plant, *M. erecta* subsp. *octandra.*

Key words: Africa, Algeria, *Haradaea moenchiae-manticae,* Iberian Peninsula, *Microbotryaceae, Moenchia,* Morocco, smut fungi, Spain, taxonomy

Introduction

The genus *Haradaea* was described for accommodation of a group of former *Ustilago* species on caryophyllaceous plants that destroy ovules, filling the capsules with purplish spore mass (Denchev et al. 2006b). *Haradaea* comprises nine species (Denchev 2006; Denchev et al. 2006 a, b).

Haradaea moenchiae-manticae is a rarely collected smut fungus on plants in the genus *Moenchia,* currently known from Serbia, Romania, Bulgaria, and UK (Lindtner 1950; Săvulescu 1957; Vánky 1985, 2011; Denchev 1997, 2001; Denchev et al. 2010). It is reported here as a new species for the Iberian Peninsula and Africa (cf. Almaraz 2002; Vánky et al. 2011), based on specimens observed in the herbarium and mycological collection of the Royal Botanic Garden, Madrid (MA) in April 2017.

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Material and methods

Dried specimens from the herbarium and mycological collection of the Royal Botanic Garden, Madrid (MA) were examined with a light microscope (LM) and scanning electron microscope (SEM). For LM observations and measurements, spores were mounted in lactoglycerol solution (w : la : gl = 1 : 1 : 2) on glass slides, gently heated to boiling point to rehydrate the spores, and then cooled. The measurements of spores are given in the form: min–max (extreme values) (mean ± 1 standard deviation). The total number of spores (n) from all collections (x) measured are given in the form '$(n/_x)$'. For SEM, spores were attached to specimen holders by double-sided adhesive tape and coated with gold in an ion sputter. The surface structure of spores was observed and photographed at 10 kV accelerating voltage using a Hitachi S-3000N scanning electron microscope. The description given below is based entirely on the specimens examined.

Taxonomy

Haradaea moenchiae-manticae (Lindtner) Denchev & H.D. Shin, in Denchev et al., Mycologia Balcanica 3: 72, 2006. **Figs 1–8**

≡ *Ustilago moenchiae-manticae* Lindtner, Bulletin du Muséum d'Histoire Naturelle du Pays Serbe, Série B 3–4: 32, 1950.

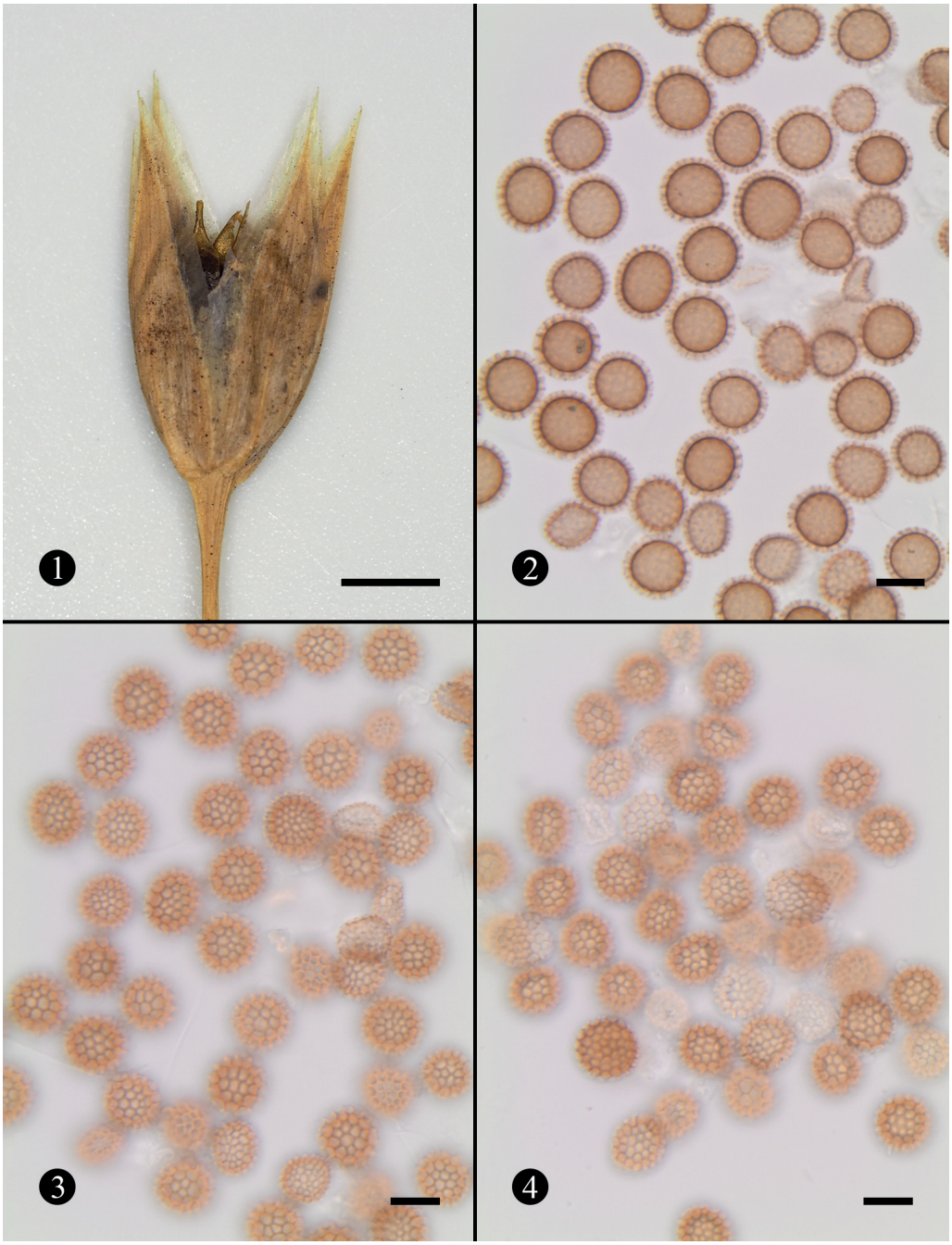
≡ *Microbotryum moenchiae-manticae* (Lindtner) Vánky, Mycotaxon 67: 46, 1998.

Sori destroying the ovules and filling the capsules with a semi-agglutinated, at maturity pulverulent, purplish brown spore mass. **Spores** subglobose, globose or broadly ellipsoidal, sometimes ovoid, (11.5–)12–15.5(–17) × (10.5–)11–14.5(–15.5) (13.7 ± 0.8 × 12.6 ± 0.8) µm ($n/_3$ = 300), medium purplish brown; wall 1.7–2.3 µm thick (including reticulum), reticulate, meshes 5–8(–9) per spore diameter, polyhedral or irregular, 1.0–2.8(–3.3) µm wide, muri (0.8–)1.0–1.4(–1.7) µm high; in SEM the meshes often with a hemispherical protuberance on the bottom.

Specimens examined – On ***Moenchia erecta*** (L.) P. Gaertn. et al. subsp. ***erecta:*** **SPAIN,** SALAMANCA, Martiago, 25 April 1976, leg. E. Rico, s.n. (MA 205833). – On ***M. erecta*** subsp. ***octandra*** (Ziz ex Mert. & W.D.J. Koch) Gürke ex Cout.: **MOROCCO,** Dj. Bou-Zabel, 1300 m, 3 May 1933, leg. A. Faure, s.n. (MA 35045); **ALGERIA,** TIZI OUZOU PROVINCE, Fort National (currently, Larbaâ Nath Irathen), 28 April 1915, leg. L. Ducellier, no. 2433 (MA-Funhist 17169; distributed in R. Maire, Mycotheca Boreali-Africana, no. 203, as *Ustilago duriaeana* Tul. & C. Tul. on *Cerastium glaucum* var. *octandrum* (Salzm. ex Reichenb.) Gren.; see Maire 1916: 298–299).

Distribution – On *Caryophyllaceae: Moenchia erecta* subsp. *erecta* (Bulgaria, Spain, and UK), *M. erecta* subsp. *octandra* (Algeria and Morocco), and *M. mantica* (L.) Bartl. subsp. *mantica* (Romania and Serbia); Europe and North Africa (Fig. 9).

Moenchia erecta subsp. *octandra* is a new host plant record for *Haradaea moenchiae-manticae.*



Figs 1–3. *Haradaea moenchiae-manticae* on *Moenchia erecta* subsp. *octandra* (MA 35045). **1.** Habit. **2, 3.** Spores in LM (in median and surface view, respectively). **Fig. 4.** Spores of *H. moenchiae-manticae* on *Moenchia erecta* subsp. *erecta* (MA 205833) in LM (in surface view). Scale bars: 1 = 2 mm, 2–4 = 10 µm

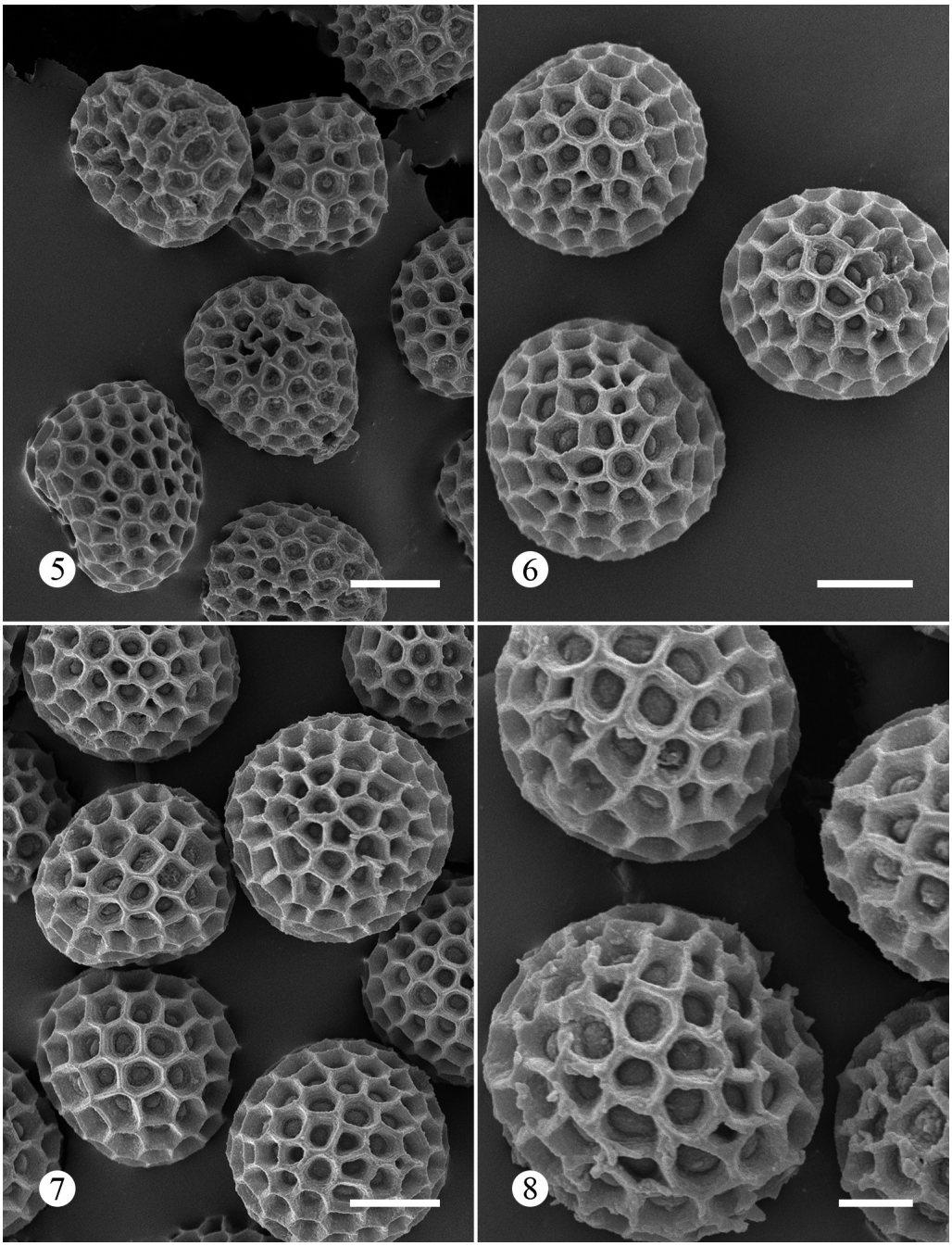


Fig. 5. Spores of *Haradaea moenchiae-manticae* on *Moenchia erecta* subsp. *erecta* (MA 205833) in SEM. **Figs 6–8.** Spores of *H. moenchiae-manticae* on *Moenchia erecta* subsp. *octandra* in SEM (**6, 7** – MA 35045, **8** – MA-Funhist 17169). Scale bars = 5 μm

Fig. 9. *Geographic distribution of Haradaea moenchiae-manticae* (generated with SimpleMappr, Shorthouse 2010): blue circles – collections on *Moenchia mantica* subsp. *mantica,* red circles – on *M. erecta* subsp. *erecta,* and yellow circles – on *M. erecta* subsp. *octandra*

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