

Psathyrella ovispora D. Deschuyteneer, Heykoop & G. Moreno, *sp. nov.*

Authors: D. Deschuyteneer, M. Heykoop, G. Moreno, Pablo alvarado

Etymology: Name reflects the unusual morphology of its spores.

Classification: *Psathyrellaceae, Agaricales, Agaricomycetes.*



AH40382 - in nitrified calcareous meadow, 13 Mar. 2018, *J.A. Picado*, paratype

Summary: This extensive descriptions and illustrations of this species are intended to complement the publication appearing in *Persoonia* - Vol 43-2019 ; pp.388-389 & 433..



AH33723 – nitrified calcareous meadow under *Foeniculum vulgare*, 27 Oct. 2006, *F. Esteve-Raventós* ; paratype



AH 33724 on nitrified calcareous loamy soil, among grass with *Conium maculatum* and *Urtica urens*, 2 Dec. 2016, *G. Moreno & M. Heykoop* ; holotype

Habitat and distribution – Gregarious on nitrified calcareous loamy soil among grasses under *Conium maculatum*, *Foeniculum vulgare* with *Urtica urens*. So far only known from Spain and Hungary.

Macroscopic description

Cap: 9–23 mm broad and 6–13 mm high, convex to conical convex, flattened convex at maturity, with umbo, ochre-brown, hygrophanous, striate when moist, first drying at the margin that adopts a beige straw colour, leaving the central area with a darker ochre colour, finally light beige ochre colour.

Veil fugacious, consisting of white appressed fibrils at margin of pileus, connecting the upper part of stipe, soon evanescent, leaving remnants on the edge of some gills near the stipe.

Gills subventricose, adnate, close, more or less dark blackish greyish coloured, with white edge, but coloured brown in its half near the margin of the cap; lamellulae present.

Stipe: 30–50 x 1.5–3 mm, cylindrical, slightly widened at the base, not rooting, white to whitish, some with pale creamy ochre tones especially in the lower two thirds.

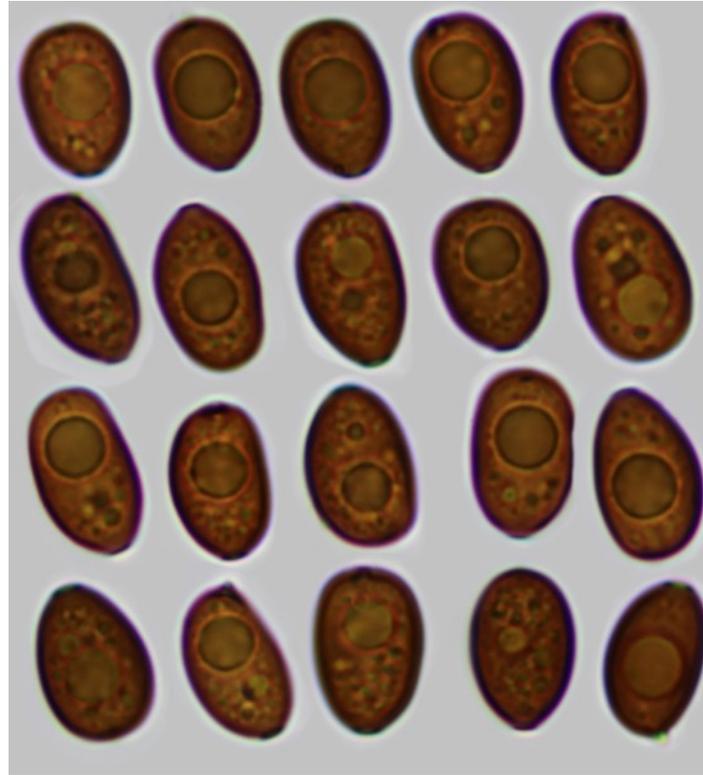
Odour not distinctive.

Spores (measurements see below), ellipsoid and ovoid in frontal view and even a little rounded, asymmetric and slightly amygdaliform in side-view, smooth, germ pore distinct, central, 1–1.5 μm , hilar appendix very tiny, base sometimes truncate giving a subtriangular look in frontal view, dark brown, not opaque, very granular, containing most often one large oil drop.

AH 33723



AH 33724



AH 40386

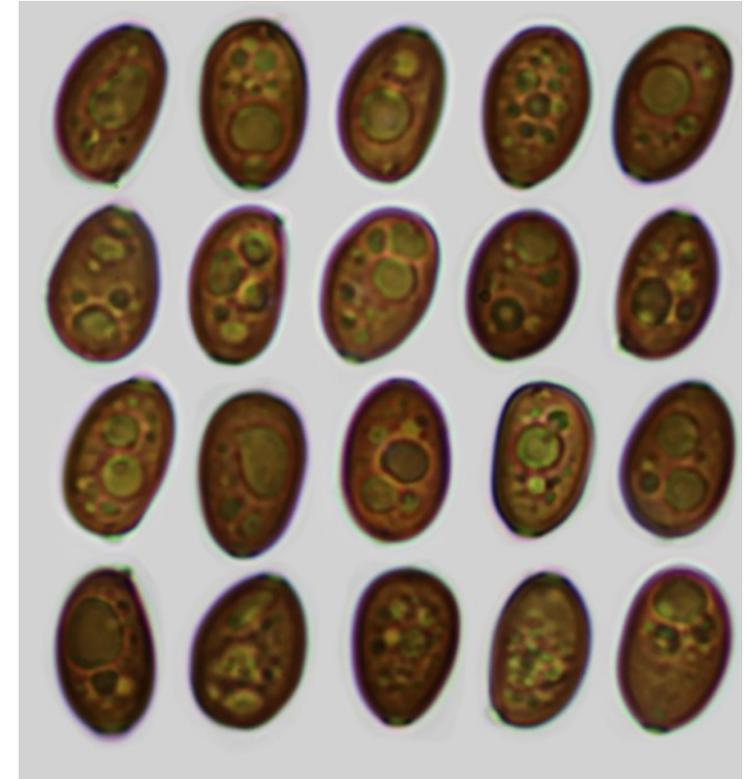
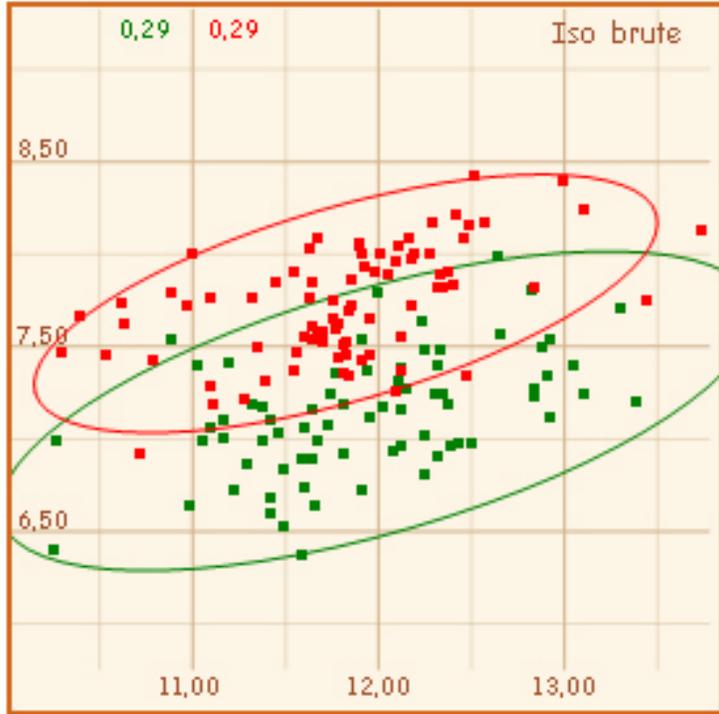


Diagram of the spores dimensions illustrating significant differences in width measurement in front or profile view as well as infrageneric dimensional variations. **red = in face view** – **green = in profile**

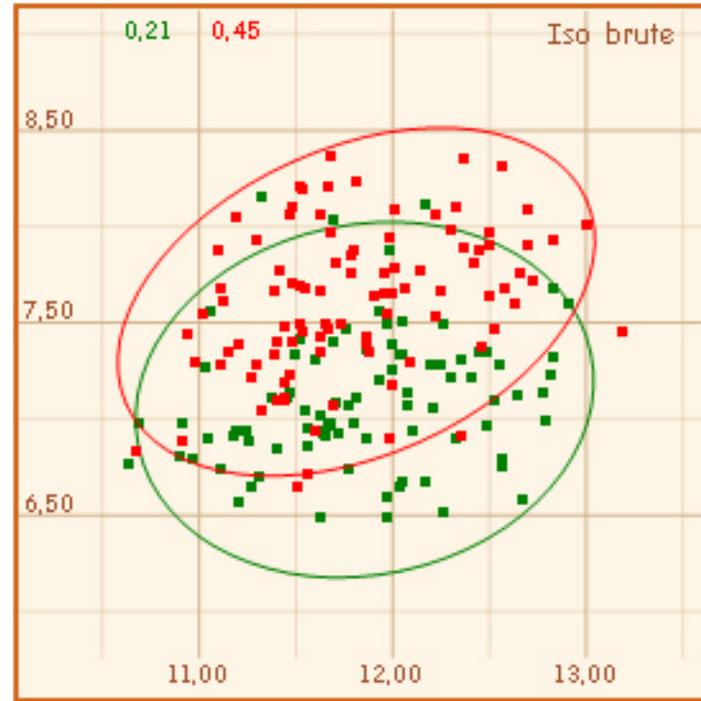
33723



Spores in face view: (N = 82)
 (10,3) 11 - 12,5 (13,7) × (6,9) 7,4 - 8,1 (8,4) μm
 Me = 11,8 × 7,7 μm ; Q = (1,4) 1,43 - 1,6 (1,7) ; Qe = 1,5

Spore in profile: (N=74)
 (10,3) 11,2 - 12,9 (14,2) × (6,4) 6,7 - 7,5 (8) μm
 Me = 12 × 7,2 μm ; Q = (1,4) 1,6 - 1,8 (1,9) ; Qe = 1,7

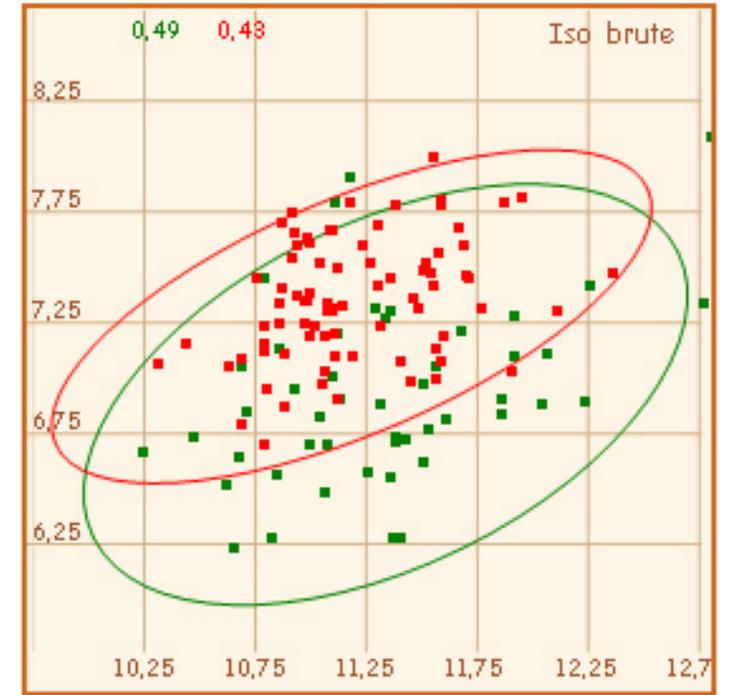
33724



Spores in face view: (N = 96)
 (10,7) 11,2 - 12,5 (13,2) × (6,7) 7,1 - 8,1 (8,4) μm
 Me = 11,8 × 7,6 μm ; Q = (1,4) 1,44 - 1,7 (1,8) ; ; Qe = 1,6

Spore in profile: (N=74)
 (10,6) 11,2 - 12,6 (12,9) × (6,5) 6,7 - 7,5 (8,2) μm
 Me = 11,9 × 7,1 μm ; Q = (1,4) 1,6 - 1,8 (1,9) ; Qe = 1,7

40386



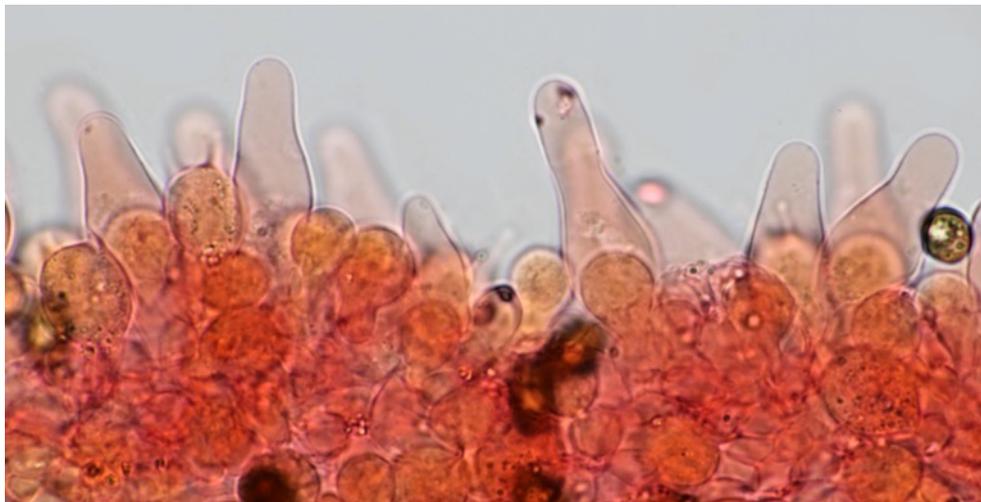
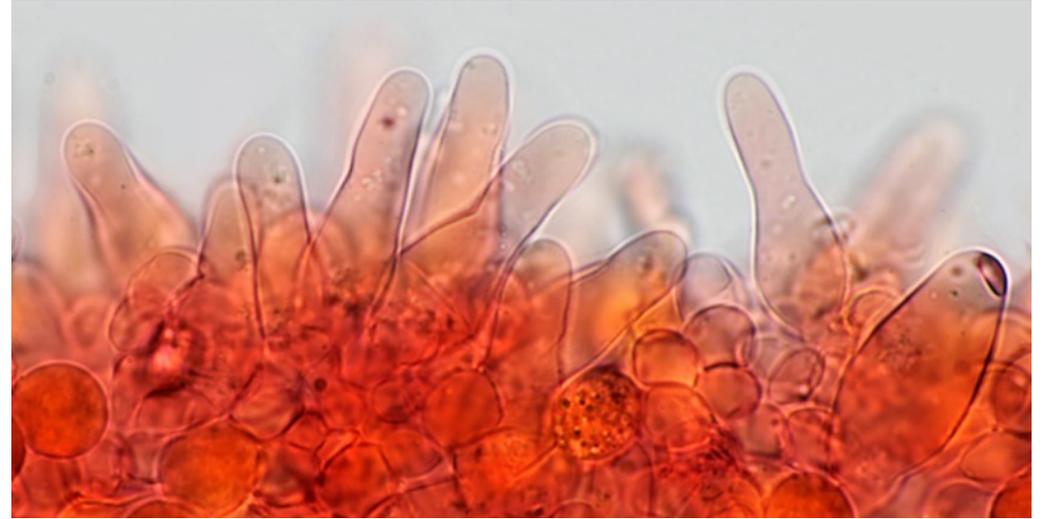
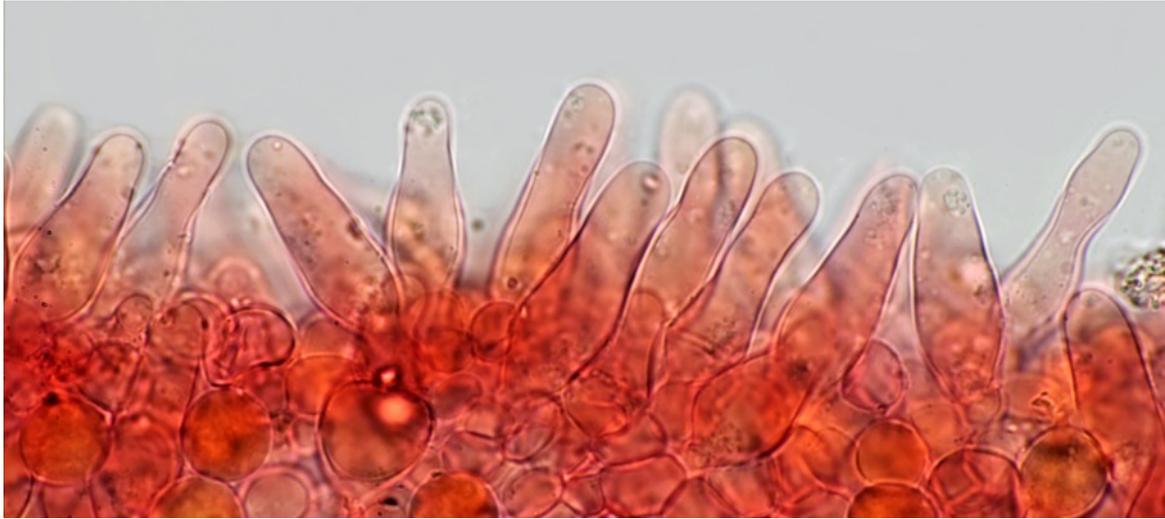
Spores in face view: (N = 87)
 (9,6) 10,8 - 11,7 (12,4) × (1,9) 7 - 7,7 (8) μm
 Me = 11,2 × 7,3 μm ; Q = (1,4) 1,44 - 1,6 (1,7) ; Qe = 1,5

Spore in profile: (N = 48)
 (10,2) 10,7 - 12 (12,8) × (6,2) 6,5 - 7,3 (8,1) μm
 Me = 11,3 × 6,9 μm ; Q = (1,4) 1,5 - 1,7 (1,8) ; Qe = 1,6

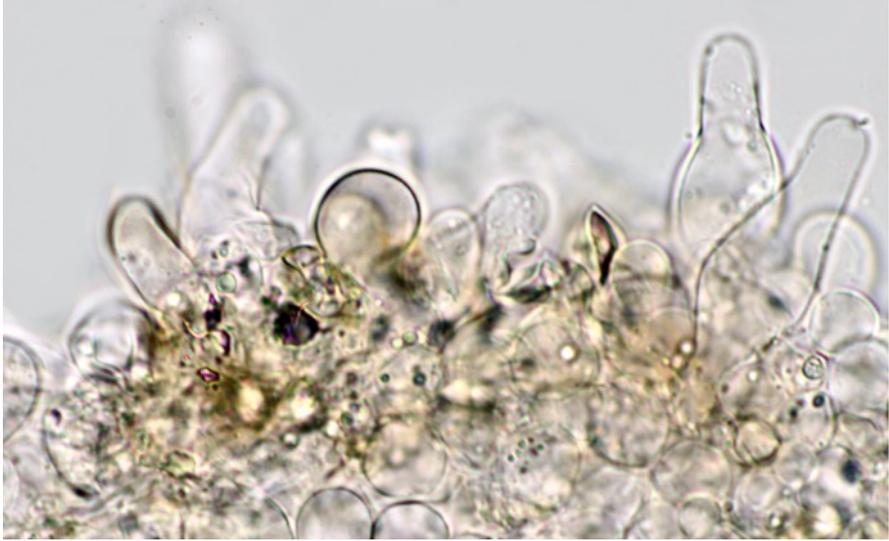
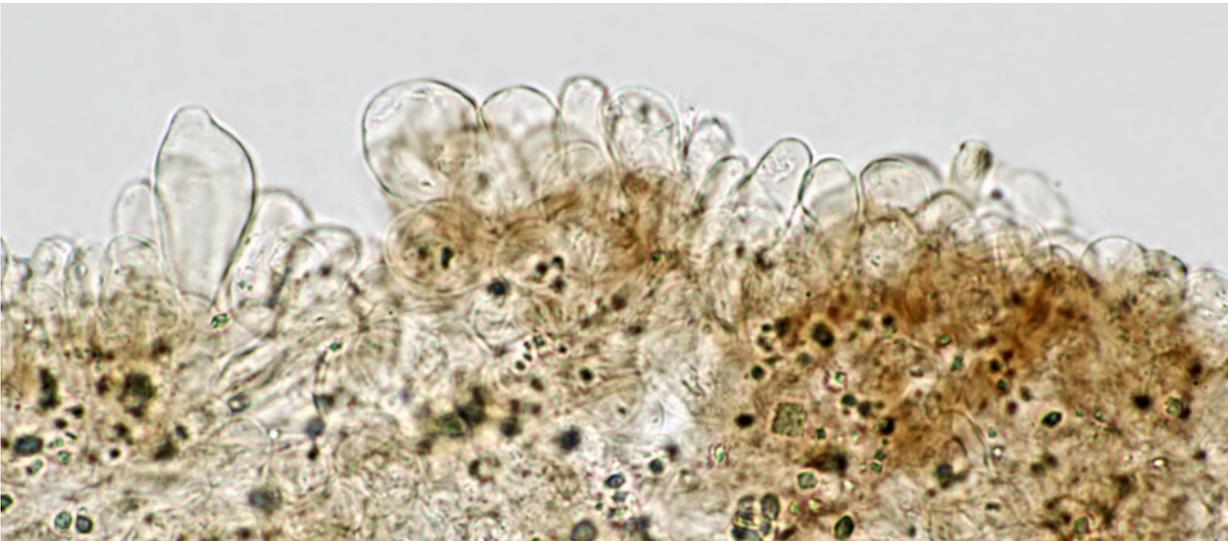
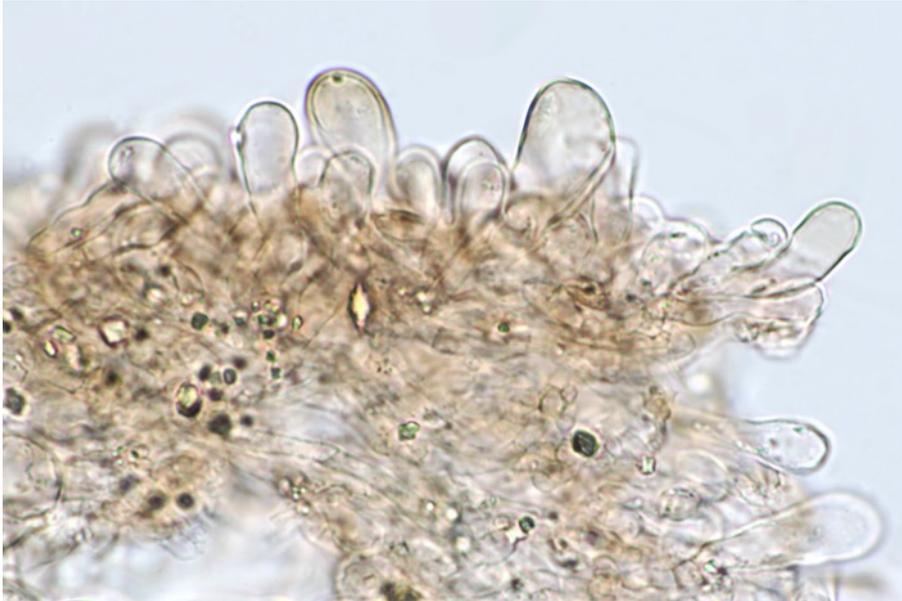
Pleurocystidia (39.5–)43.7–66.7(–77.3) × (9.5–)10.4–17.4(–19.4) μm, numerous, mostly lageniform with a long neck, some of them shorter (sub)utriform, ventricose or clavate, apex obtuse, very rarely forked, most often widely pedicellate, always thin-walled, hyaline, some of them covered with mucoid droplets or granular deposits which gradually disappear in exsiccate. The importance of these deposits will have to be reassessed after examination of new fresh specimens.



Cheilocystidia (23.6–)30.6–43(–55) × (8.2–)9.3–12.4(–14.1) μm, very numerous and densely packed, hyaline, sublageniform, ventricose, clavate, subutriform, often polymorphic, always thin-walled, apex obtuse, sometimes subcapitate, very rarely forked. At the half of the lamella-edge close to the cap margin thin-walled cheilocystidia become scattered, fewer in number, intermixed with many clavate marginal cells (=paracystidia), some of them thick-walled and brown coloured.



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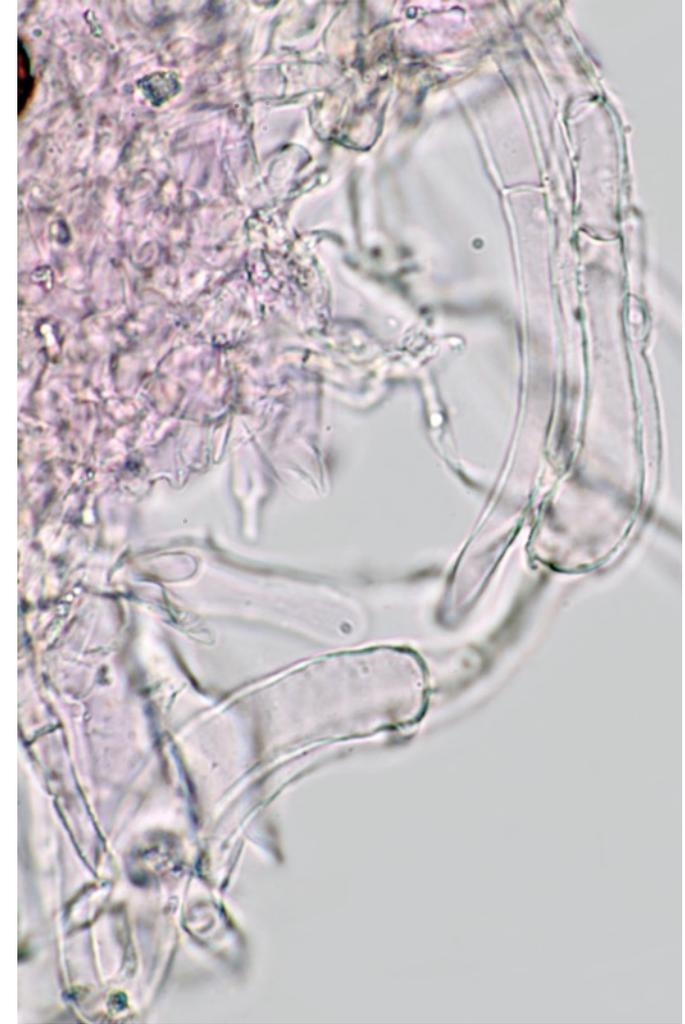


Basidia 4-spored, rarely 2-spored, (21.9–)23.4–29.4(–31) × (10.2–)11.6–13.5(–15.1) μm, av. 26.5 × 12.6 μm, clavate, hyaline with intracellular content.

Veil fibrillose, consisting of elongated and septate hyaline hyphae with inflated endings.



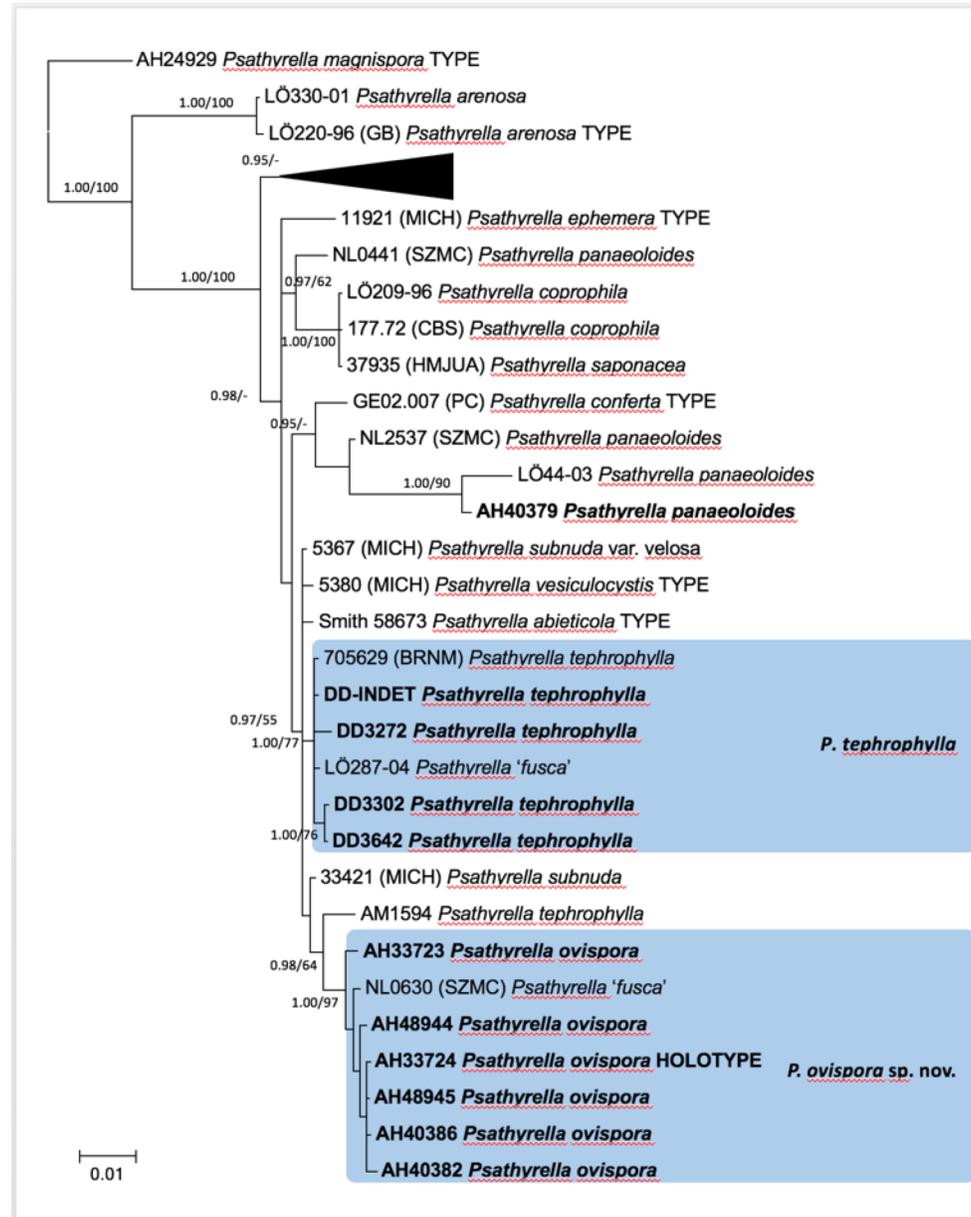
Clamp-connections : present.



Typus: SPAIN, Madrid, Alcalá de Henares, El Gurugú, on nitrified calcareous loamy soil, among grass with *Conium maculatum* and *Urtica urens*, 2 Dec. 2016, G. Moreno & M. Heykoop, (**holotype AH 33724**, ITS and LSU sequences GenBank MF966497 and MN190260, Mycobank MB832058).

Additional specimens examined. Psathyrella ovispora: SPAIN, Madrid, Alcalá de Henares, El Gurugú, on nitrified calcareous loamy soil, among grass with *Conium maculatum* and *Urtica urens*, 2 Dec. 2016, G. Moreno & M. Heykoop, paratype **AH 33723**, ITS and LSU sequences GenBank MF966496 and MN190261; Madrid, Alcalá de Henares, Campus of the University of Alcalá, Faculty of Sciences, in nitrified calcareous meadow under *Foeniculum vulgare*, 27 Oct. 2006, F. Esteve-Raventós paratype **AH 40386**, ITS sequence GenBank MF966503; Madrid, Alcalá de Henares, Campus of the University of Alcalá, Faculty of Sciences, in nitrified calcareous meadow, 26 Oct. 2012, J. Rejos & F. Esteve-Raventós, paratype **AH 40382**, ITS sequence GenBank MN190257; Madrid, Alcalá de Henares, Campus of the University of Alcalá, Faculty of Sciences, in nitrified calcareous meadow, 13 Mar. 2018, J.A. Picado, paratype **AH 48944**, ITS and LSU sequences GenBank MN190258 and MN190262, *ibid.*, paratype **AH 48945**, ITS and LSU sequences GenBank MN190259 and MN190263. *Psathyrella tephrophylla:* Belgium, Steenokkerzeel, in a mixture of humus and mulch under deciduous trees, 10 Dec. 2017, D. Deschuyteneer, (D. Deschuyteneer private herbarium) **DD 3272**, ITS sequence GenBank MK577903; Melsbroek, Brabantse golf, in a mixture of humus and mulch under deciduous trees, 14 Dec. 2017, D. Deschuyteneer, **DD 3302**, ITS sequence GenBank MK577904; Kortenberg, Plantsonbos, in a mixture of humus and mulch under deciduous trees, 20 Oct. 2017, D. Deschuyteneer, **DD 3642**, ITS sequence GenBank MK577902; Fosses-la-Ville, Lac de Bambois, in a mixture of humus and mulch under deciduous trees, 4 Oct. 2018, D. Deschuyteneer, **DD-INDET**, ITS sequence GenBank MK583508.

FP1025 50 % majority rule ITS-28S rDNA consensus phylogram of the /pygmaea clade of *Psathyrella* (as delimited in Örstadius et al. 2015), with *P. magnispora* as outgroup. It was obtained in MrBayes from 3 900 sampled trees. Values next to nodes represent Bayesian PP and Maximum Likelihood BP. Only nodes supported by > 0.95 PP or > 70 % BP were annotated. Several clades around *P. pygmaea* were condensed (black triangle), and the rooting branch was reduced for publishing. **Bold** names represent samples sequenced in the present work.



Clade A

Clade B

Phylogram by Pablo Alvarado Garcia - Alvalab

Notes:

Psathyrella ovispora is characterized by the unusual if not unique appearance of its spores which vary from ellipsoid to ovoid, with base sometimes truncate giving a subtriangular look in frontal view, asymmetric and amygdaliform in side-view, containing most often one large oil drop. Other characters are the small to medium sized basidiomata and its gregarious fruiting on calcareous nitrified soils.

Psathyrella ovispora was erroneously identified by us as *P. fusca* (Heykoop et al. 2017). A morphological re-evaluation of our material, comparing it with abundant samples of *P. tephrophylla* (= *P. fusca*), has showed that it corresponds to a new species. Moreover, our former cladogram (Heykoop et al. 2017), due to poor sampling, showed a unique *P. fusca* clade. However, new sequences of *P. tephrophylla* generated a cladogram (see Supplementary Data) in which two very distinct clades can be differentiated, i.e. *P. tephrophylla* clade A corresponding to *P. tephrophylla* s. str., and *P. tephrophylla* clade B corresponding to *P. ovispora*. The material included by Nagy et al. (2011) in their study as *P. fusca* is conspecific with *P. ovispora*.

The commonly used name *Psathyrella fusca* (Schumach.) A. Pearson is illegitimate, and must be rejected, since its basionym *Agaricus fuscus* Schumach. 1803 is a later homonym of *A. fuscus* Schaeff. 1774, *A. fuscus* Batsch 1783 and many others. Therefore, the correct name for *Psathyrella fusca* s. str. must be *P. tephrophylla*.

Psathyrella ovispora differs among other things from *P. tephrophylla* by its very different spores, the much smaller basidiomata, by fruiting in a different habitat and by being genetically different. Due to its very wide spores *P. ovispora* keys out (key B) *P. magnispora* in Örstadius et al. (2015). *P. ovispora*, however, differs from *P. magnispora* by its slightly larger basidiomata, the differently shaped spores and cystidia. Besides, *P. magnispora* is completely different genetically and constitutes the very distinct and monospecific *magnispora* clade, whereas *P. ovispora* belongs to the *pygmaea* clade (Örstadius et al. 2015).

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Literature cited.

Deschuyteneer D., Heykoop M. & G. Moreno. (2019). *Psathyrella ovispora* sp. nov. Fungal Planet 1025 – pp. 388-389.

Heykoop M., Moreno G., Alvarado P., Esteve-Raventós E. (2017). *El género Psathyrella (Fr.) Qué! S.l. en España. VI. Especies nuevas o raras y reevaluación de otras.* Bol. Soc. Micol. Madrid 41: 71-98.

Nagy L.G., Walther G., Házi J., Vágvölgyi C., Papp T. (2011). Understanding the Evolutionary Processes of Fungal Fruiting Bodies: Correlated Evolution and Divergence Times in the Psathyrellaceae. Syst. Biol. 60(3):303–317 DOI:10.1093/sysbio/syr005

Örstadius L., Ryberg M., Larsson E. (2015). *Molecular phylogenetics and taxonomy in Psathyrellaceae (Agaricales) with focus on psathyrelloid species: introduction of three new genera and 18 new species.* Mycological Progress 14: 25

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