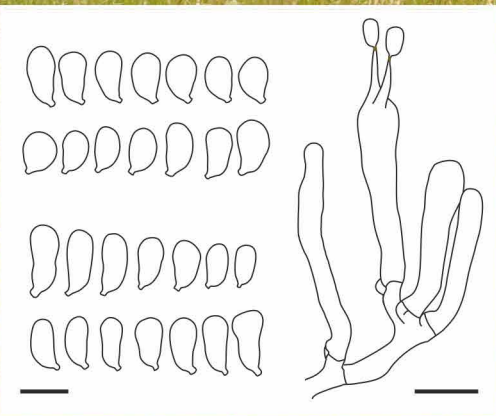


*Arrhenia alcalinophila*



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***Arrhenia alcalinophila* Karich, Krisai & Klofac, sp. nov.***Etymology.* Named after its base-rich habitat.Classification — *Hygrophoraceae*, *Agaricales*, *Agaricomycetes*.

*Basidiomata* omphalinoid. *Pileus* 4–15 mm wide, when fresh greyish cream and translucently striate with brownish striation, centrally small umbilicate and brownish, hygrophanous, becoming light grey when drying, glabrous, margin straight to somewhat wavy and slightly involute. *Lamellae* slightly to strongly decurrent, developed normally, sometimes slightly thickish, not clearly anastomosing, greyish, lighter than fresh pilei and darker than dried ones. *Stipe* central, sometimes slightly eccentric, 10–25 mm long, 1–2 mm wide, concolorous to pileus, smooth, slightly pruinose at apex. *Smell* inconspicuous, occasionally pelargonium-like when drying; *taste* not tested. *Spore print* white. *Basidia* 2-spored 26–33 × 7–8 µm. *Sterigmata* 6–8 µm. *Basidiospores* variable in size and shape ( $n = 67$ , 2 collections, 3 basidiomata): 9.0–12.0(–14.0) × (4.5–)5.0–6.5(–7.5) µm,  $Q = (1.4–)1.5–2.4(–2.9)$ ,  $Q_{AV} = 1.8–2.1$ , subglobose to broadly ellipsoid or (sub)lacrymoid to pyriform and then centrally constricted. *Hymenophoral trama* subirregular, consisting of 2–8 µm wide hyphae, indistinctly incrustated. *Pileipellis* a cutis of (sub-)parallel 3–13 µm wide hyphae. *Pileipellis* and *pileitrama* hyphae distinctly incrustated. *Stipitipellis* hyphae 2–9 µm wide, incrustated. *Stipititrama* hyphae not incrustated. *Cystidia* absent. *Clamp connections* abundant in all tissues.

*Sociability, Habitat & Distribution* — Basidiomata growing solitary or in small clusters on the ground in unimproved grassland on loamy to calcareous soil. Known from Germany, Austria, France and the USA (from one environmental sample).

*Typus.* GERMANY, Mittelherwigsdorf, 'Katzenlehne', N50°55.51' E14°44.71', 280 m a.s.l., orchard meadow in unimproved grassland on loamy soil, 2 Oct. 2022, A. Karich (holotype GLM-F135687; ITS and LSU sequences GenBank OR258065 and OR258067; MycoBank MB 849350).

*Additional materials examined.* AUSTRIA, Lower Austria, Pyhra: Hinterholz-Schauching, N48°8.65' E15°39.65', mapping grid square 7859/4, 400 m a.s.l., in meadow, 10 Nov. 2012, W. Klofac, WU-Myc 32560, ITS sequence GenBank MW113705. — GERMANY, Zittau, 'Kaiserfelder', N50°52.44' E14°47.58', 283 m a.s.l., on bare soil in a sheep pasture, 10 Oct. 2021, A. Karich, GLM-F135688, ITS and LSU sequences GenBank OR258064 and OR258066.

*Colour illustrations.* Orchard meadow at the holotype location. Basidiomata of holotype and GLM-F135688 (photo credit A. Karich); line drawings of spores from holotype (top) and GLM-F135688 (bottom) and two-spored basidia from holotype (drawing A. Karich). Scale bars = 1 cm (basidiomata), 10 µm (line drawings).

*Notes* — A recent study showed high morphological and molecular genetic diversity in the *Arrhenia acerosa* complex (Voitk et al. 2020). This species complex includes pleurotoid species, e.g., *A. acerosa* and *A. glauca*, as well as species with omphalinoid habit. *Arrhenia alcalinophila* was treated as 'G-3' in Voitk et al. (2020). Due to the limited number of specimens and the limited information about the specimens available the authors decided not yet to describe 'G-3' as new species. In a phylogenetic tree based on ITS-sequences, *A. alcalinophila* belongs to a separate clade within the *acerosa*-complex and is quite distant from another species with omphalinoid habit, i.e., 'G-2'. In contrast to *A. alcalinophila*, however, all examined specimens of 'G-2' have four-spored basidia, while the spore size is roughly in the same range (Voitk et al. 2020). Phylogenetically, *A. acerosa* s.str. is the closest species, but has pleurotoid basidiomata, at least, when young.

From a look at the morphological descriptions of *A. griseopallida* in the literature (Quelét 1886, Bas et al. 1995, Ludwig 2001) it is obvious that it could be confused with *A. alcalinophila*. However, according to Kühner & Lamoure (1972), *A. griseopallida* can develop pleurotoid basidiomata and has four-spored basidia. Furthermore, the colour of fresh basidiomata of *A. griseopallida* is dark greyish brown and therefore seems to represent another group within the *acerosa*-complex (Clemençon 1982, Ludwig 2001). Persoon (1828), who examined Desmazière's original material of *Agaricus griseopallidus*, mentions an upright pileus margin, thicker lamellae and a slightly reddish colouration when drying. All these features were not observed in specimens of *A. alcalinophila*. Lutzoni (1997) published an ITS/LSU sequence of *Phaeotellus griseopallidus* (= *A. griseopallida*) generated of a specimen which had been approved by Lamoure (GenBank U66436). It can be concluded that this specimen represents *A. griseopallida* s.str.

**Supplementary material****FP1553** Phylogenetic tree.

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