

## *Peronospora verbenae* sp. nov. – a new downy mildew on *Verbena officinalis*

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**Abstract:** BRAUN, U., JAGE, H., RICHTER, U. & ZIMMERMANN, H. 2009: *Peronospora verbenae* sp. nov. – a new downy mildew on *Verbena officinalis*. *Schlechtendalia* **19**: 77–80.

The new species *Peronospora verbenae* (Chromista, Oomycetes, Peronosporales) on *Verbena officinalis* from Germany is described, illustrated and discussed.

**Zusammenfassung:** BRAUN, U., JAGE, H., RICHTER, U. & ZIMMERMANN, H. 2009: *Peronospora verbenae* sp. nov. – ein neuer Falscher Mehltau auf *Verbena officinalis*. *Schlechtendalia* **19**: 77–80.

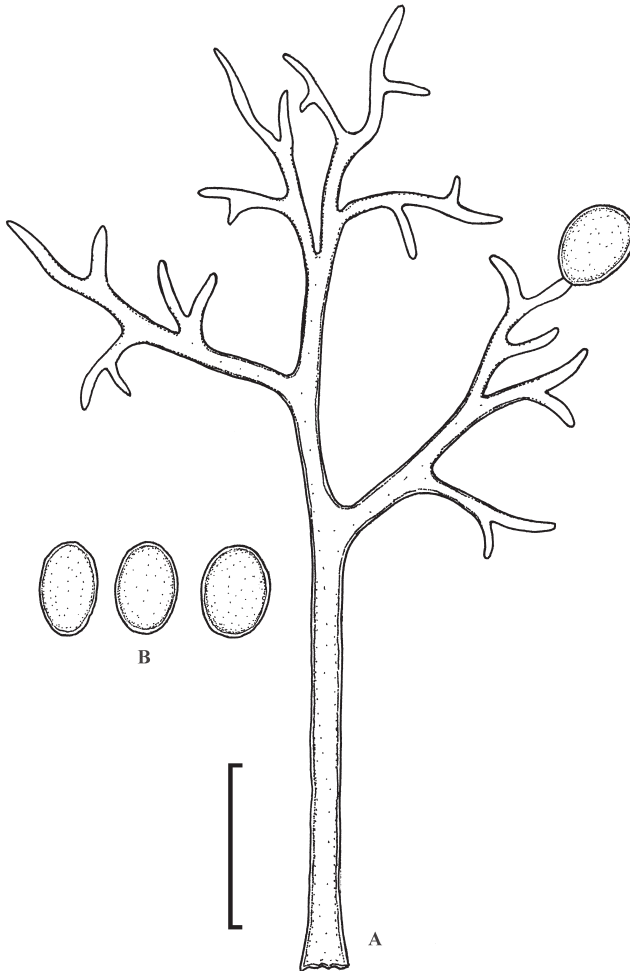
Die neue Art *Peronospora verbenae* (Chromista, Oomycetes, Peronosporales) auf *Verbena officinalis* aus Deutschland wird beschrieben, abgebildet und diskutiert.

**Key words:** Oomycota, Peronosporales, *Peronospora*, new species, Verbenaceae, Germany.

In 2007 and 2008, several collections of a downy mildew on *Verbena officinalis* have been found in Germany (Sachsen-Anhalt and Baden-Württemberg). Based on the characteristics of conidiophores and conidia, this fungus has to be assigned to the genus *Peronospora* Corda s. str. (emend. CONSTANTINESCU & FATEHI 2002). This is the first record of a *Peronospora* on *Verbena* and the Verbenaceae at all (NOVOTEL'NOVA & PYSTINA 1985, CONSTANTINESCU 1991, BRANDENBURGER & HAGEDORN 2006, SHIN 2006, etc.). FARR et al. (1989) listed *Plasmopara halstedii* (Farl.) Berl. & De Toni on *Verbena* sp. from New Mexico, USA, which must be classified as a doubtful record, since this species is confined to composites (*P. halstedii* s. lat.) or *Helianthus* (*P. halstedii* s. str.). Species of the genus *Peronospora* are strongly host specific. The host ranges do not exceed the limits of a single host family. Phylogenetic examinations based on molecular sequence analyses strongly support the use of a narrow species delimitation and host range as a taxonomic marker within *Peronospora* (CONSTANTINESCU & FATEHI 2002, CHOI et al. 2003, GÖKER et al. 2004). Hence, the first *Peronospora* on *Verbena* has to be considered a new species. *P. verbenae* is undoubtedly an indigenous, but hitherto overlooked species. Several collections made within two years in different parts of Germany indicate that this fungus is not rare.

*Peronospora verbenae* U. Braun, Jage, A.U. Richt. & H.J. Zimm. sp. nov. **Fig. 1**  
MycoBank, MB 513075

In foliis vivis, sine laesionibus vel maculis flavido-viridulis, deinde bruneolis, interdum violaceis, saepe per venas limitatis, interdum confluentibus, foliis emorientibus, fragilibus. Coloniae hypophyllae, effusae, delicatae, griseolae vel griseo-brunneae.



**Fig. 1:** *Peronospora verbenaе* on *Verbena officinalis*, **A** – conidiophore, **B** – conidia. Bar = 50 µm (U. Richter del.).

Conidiophora solitaria, per stoma emergentia, erecta, 200–350 µm longa, hyalina, laevia, trunco recto, 110–220 × 8–10 µm, latitudine subequali, interdum basi inflata, ad 15 µm diam., pariete tenui, 0.75–1.5(–2) µm lato, rami recti vel leniter curvati, arborescentes, ramificationes monopodiales, usque ad 4-plo, ramulis ultimis plus minusve conicis, rectis vel curvatis, 5–20(–30) × 2–4 µm, apice acuto, obtuso vel subtruncato. Conidia anguste vel late ovoidea, late ellipsoidea-ovoidea, raro subglobosa, (20–)25–35(–38) × 15–25 µm, ratione longitudinis/latitudinis (1.1–)1.2–1.7(–2.1),

utrinque late rotundata, interne granulosa, pallide brunnea, tenuitunicata (ad 1 µm), fere laevia vel verruculosa, sine pedicello, cicatrice indistincta. Oospora ignota.

**Material examined:** On *Verbena officinalis* L. (Verbenaceae), Germany, Sachsen-Anhalt, Saale-Unstrut-Triasland, Eckartsberga, Schloßberg, garden, MTB 4835/3, 4 Oct. 2007, H. Jage (HAL 2098 F, **holotype**), isotype: herb. Jage 1483/07; Sachsen-Anhalt, eastern Harzvorland, SW Friedeburg, south of Schlenzegraben, meadow, MTB 4336/3, 9 Aug. 2008, H. Zimmermann (herb. Zimmermann); Sachsen-Anhalt, Saaleue, W Trebnitz, meadow near river Saale, MTB 4336/1, 17 Aug. 2008, H. Zimmermann (herb. Zimmermann); Sachsen-Anhalt, Saale-Unstrut-Triasland, Freyburg, Burgholz, grassy border of a pathway, MTB 4736/4, 2 Sep. 2008, U. Richter (herb. U. Richter); Baden-Württemberg, Kaiserstuhl, NW Bötzingen, “Vogelsang”, border of a vineyard, MTB 7912/1, 13 Oct. 2008, H. Jage (Herb. Jage 1281/08); Baden-Württemberg, Kaiserstuhl, SE Oberrotweil, “Kaiserstuhl” oberhalb “Kunzenbuck”, forest car park, MTB 7911/2, 13 Oct. 2008, H. Jage (Herb. Jage 1302/08); Baden-Württemberg, Kaiserstuhl, ESE Oberrotweil, “Kaiserstuhl”, above forest car park, MTB 7911/2, 13 Oct. 2008, H. Jage (Herb. Jage 1302A/08).

On leaves, without any symptoms or with yellowish green, later brownish, sometimes purplish violet discolorations or leaf spots on the upper leaf surface, often vein-limited, sometimes confluent, leaves finally sometimes necrotic, brittle. Colonies **hypophyllous**, effuse, thin, greyish to pale greyish brown. Conidiophores solitary, emerging through stomata, erect, 200–350 µm long, trunk straight, 110–220 × 8–10 µm, almost uniform in width throughout, sometimes swollen at the very base, up to 15 µm, hyaline, smooth, wall 0.75–1.5(–2) µm thick, callose plugs absent, branches straight to somewhat curved, arborescent, branching monopodial, in up to four orders, ultimate branchlets more or less conical, straight to curved, 5–20(–30) µm long, 2–4 µm wide at the base, tips pointed, blunt to subtruncate. Conidia narrowly to broadly ovoid, broadly ellipsoid-ovoid, rarely subglobose, (20–)25–35(–38) × 15–25 µm, length/width ratio (1.1–)1.2–1.7(–2.1), ends broadly rounded, content granular, mature conidia pale brown, wall up to 1 µm wide, almost smooth to verruculose, pedicel lacking, scars inconspicuous. Resting organs (oospores) not seen.

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