



## New species and record of *Zygophiala* (Capnodiales, Mycosphaerellaceae) on apple from Montenegro

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### Abstract

Species of *Zygophiala* are components of the sooty blotch and flyspeck complex that blemish the cuticle of fruits reducing their economic value. In our study, six strains were isolated from apple fruit collected in orchards in Montenegro. *Zygophiala montenegroensis* is a newly described species based on its unique morphological characteristics and the analysis of multiple sequences including the internal transcribed spacer of the rDNA, the partial translation elongation factor 1-alpha and the actin genes. *Zygophiala cylindrica* is described as a new record in Montenegro and Europe.

**Key words:** epiphytic fungi, flyspeck, rRNA, SBFS, *Schizothyrium*, taxonomy

### Introduction

Sooty blotch and flyspeck (SBFS), a disease complex caused by a diverse array of fungi, occurs on several fruit crops, including apple, pear, and persimmon, in humid areas worldwide. On the epicuticular wax layer of many fruits including apple, SBFS fungi form a wide range of mycelial types. The flyspeck mycelial type appears as a cluster of numerous shiny, black, round to ovoid sclerotium-like bodies without a visible intercalary mycelial mat (Batzer *et al.* 2005). Infected fruit are generally not acceptable to consumers leading to economic loss for apple growers.

*Zygophiala* is one of the most prevalent SBFS genera worldwide (Gleason *et al.* 2011). The type species of the anamorph genus, *Z. jamaicensis* E.W. Mason (in Martyn 1945: 3), was reported as the cause of leaf speckle on banana in Jamaica. *Schizothyrium* was recognized as the teleomorph of *Zygophiala* (Durbin *et al.* 1953). To date, seven species have been described: *Z. cryptogama* Batzer & Crous (in Batzer *et al.* 2008: 254), *Z. cylindrica* G.Y. Sun, H.Y. Li & Rong Zhang (in Li *et al.* 2010: 250), *Z. jamaicensis*, *Z. qianensis* G.Y. Sun & Y.Q. Ma (in Ma *et al.* 2010: 153), *Z. tardicrescens* Batzer & Crous (in Batzer *et al.* 2008: 255), *Z. wisconsinensis* Batzer & Crous (in Batzer *et al.* 2008: 255), *Schizothyrium pomi* (Mont. & Fr.) Arx (1959: 336).

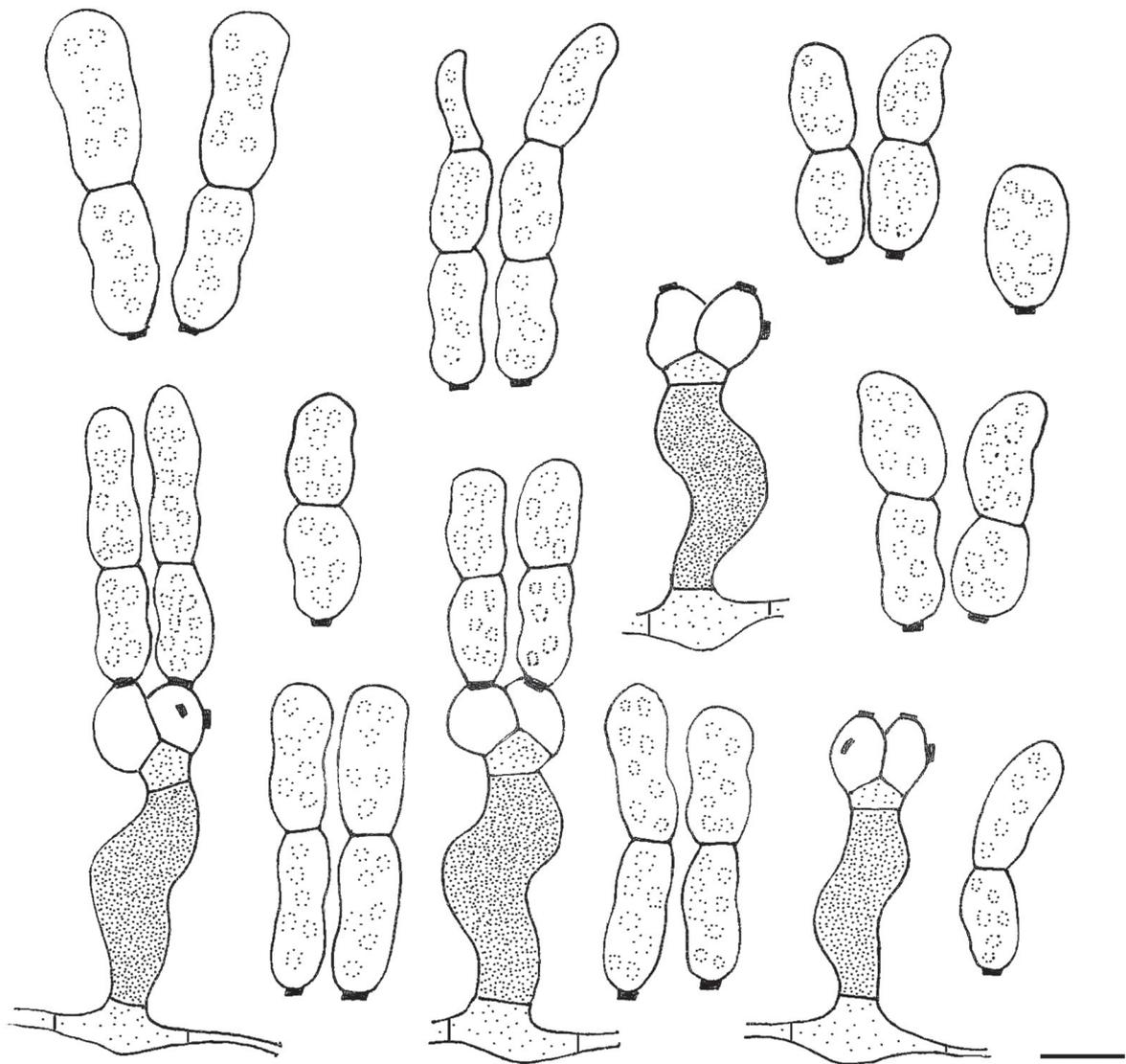
In southeastern and northern Europe only *Schizothyrium pomi* has been reported (Ivanović *et al.* 2010). *S. pomi*, *Z. wisconsinensis* and *Zygophiala* sp. FS6 were reported in Turkey (Mayfield *et al.* 2013).

In our study, we identified two *Zygophiala* species from flyspeck mycelial types on apples grown in Montenegro. The species were identified based on morphological characteristics and DNA analyses.

### Materials and methods

#### Isolates and morphology

During September 2013, apples were collected in Montenegro. Apple peels with typical flyspeck signs were excised and pressed between paper towels. Then, individual sclerotium-like bodies were transferred to PDA (potato dextrose agar) slants and cultured at 25°C in darkness (Sun *et al.* 2003). Four weeks later, visible colonies were purified.



**FIGURE 6.** Conidiophores, conidiogenous cells and conidia of *Zygothia cylindrica* ZMHS23. Scale bar = 10  $\mu$ m.

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