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First report of *Conidiobolus coronatus* in Turkey

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Abstract — *Conidiobolus coronatus* (*Entomophthorales, Zygomycota*) was isolated from infected specimens representing an *Issus* sp. (*Issidae, Hemiptera*) collected from the Trabzon province of Turkey. The species, which represents a new record for the Turkish mycoflora, is described briefly and illustrated.

Key words — insect, entomopathogenic fungi, hazelnut

Introduction

Members of the widespread order *Entomophthorales* (*Zygomycota*) are predominantly pathogens of insects and mites (Pell et al. 2001). Species of *Conidiobolus*, most notably the ubiquitous *C. coronatus*, are recorded as widespread soil saprophytes utilising a variety of substrates, including plant detritus, living plants, different dead arthropods and the fruiting bodies of other fungi in various regions of the world (MacLeod & Müller-Kögler 1973, Keller 1987, Sajap et al. 1997, Dromph et al. 2001, Laxman et al. 2005, Manning et al. 2007, Comerio et al. 2008). *Conidiobolus coronatus*, mainly tropical strains, is known to cause disease in both insects and humans (Ribes et al. 2000, Prabhu & Patel 2004); the disease has been named rhinophycomycosis, rhinophycomycosis entomophthorae, rhinoentomophthoromycosis, and conidiobolomycosis (King 1979, Ochoa et al. 1996, Yang et al. 2010).

Material & methods

Dead insects collected in 2008 from a hazelnut orchard in in the Black Sea region of Turkey were cultured for entomopathogenic fungi. After the cadavers were washed in a solution of 2% sodium hypochlorite for 1 min, they were dried on filter paper. After transfer to Petri dishes containing 20 ml of PDA, the cadavers were incubated at 25°C for 1 week with high humidity (80 ± 10% rh). Colonies of filamentous fungi

emerging from each cadaver and identifiable as the genus *Conidiobolus* were transferred to PDA and identified to species using the relevant literature (Emmons & Bridges 1961, Prasertphon 1963, MacLeod & Müller-Kögler 1973, King 1979, Keller 1987, Humber 1997, Hatting et al. 1999, Toledo et al. 2007, Comerio et al. 2008). After identification, all isolates were deposited in the fungal collection of Department of Plant Protection, Faculty of Agriculture, Atatürk University, Erzurum-Turkey.

Results

The description and illustration of *Conidiobolus coronatus* given below are based on the Turkish collections of the material. This is the first report of *C. coronatus* from Turkey.

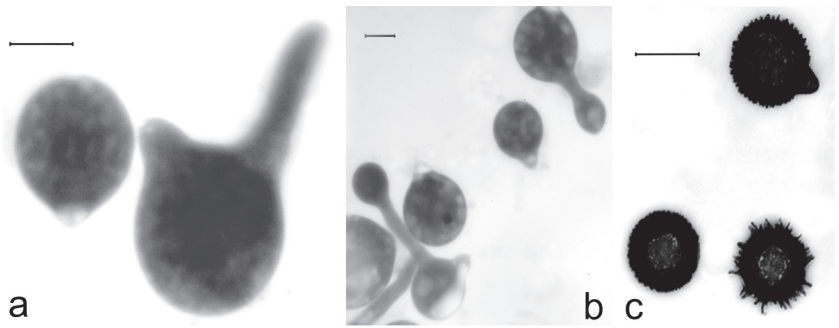

Figure 1. *Conidiobolus coronatus:* A— primary conidium and germinating primary conidium; B— primary conidia and secondary conidia produced on germ tube arising from primary conidia; C— villose conidia may be the equivalent of resting spores in this species. Bar = 20 μm.

Conidiobolus coronatus (Costantin) A. Batko, *Entomophaga,* Mem. Hors. Ser. 2: 129. 1964. Fig. 1

Colonies (PDA) expanding, hyaline, soon with irregular radial blooms; at 25°C reaching 85 mm diam. after 2 days; primary conidia (Fig. 1A) globose, with more prominent basal papilla tapering toward obtuse apex; variable in size, (23.2–)32.1(–46.8) × (18.1–)24.6(–35.1) μm; basal papilla prominent with pointed apex, forcibly discharged; secondary conidia (Fig. 1B) forming singly and forcibly discharged or (more commonly) producing many forcibly discharged secondary microconidia on short germ tubes arising from primary conidia; conidiophores simple, unbranched; villose conidia (resting spores; Fig. 1C) resembling primary conidia but covered with villose appendages (unique to this species), (19.9–)25.8(–34.8) μm diam.

Specimen examined: On cadavers of *Issus* sp. (*Issidae, Hemiptera*). **TURKEY: Trabzon province, Of district**, *Corylus avellana* L. (*Corylaceae*) orchards, 40°51'30"N, 40°16'00"E, alt. 160 m, VI-VIII 2008, coll. K AK (KA 123).

Discussion

Conidiobolus coronatus, originally isolated from a culture of *Agaricus campestris* L. (possibly derived from a dead insect hidden between the lamellae), was described in 1897 as *Boudierella coronata* Costantin (MacLeod & Müller-Kögler 1973). Since then it has been isolated from numerous and diverse sources (MacLeod & Müller-Kögler 1973, King 1979, Keller 1987, Sajap et al. 1997, Dromph et al. 2001, Laxman et al. 2005, Manning et al. 2007, Comerio et al. 2008). Utilization of the species as a biological control is limited by its potential to cause human disease (King 1979, Ochoa et al. 1996, Ribes et al. 2000, Prabhu & Patel 2004).

Diameters of both the primary and villose conidia measured in this study fell within the ranges observed by Emmons & Bridges (1961; primary conidia: 36–44 μm), Prasertphon (1963; primary: 25–61 μm; villose: 8–42 μm), Keller (1987; primary: 37–74 μm; villose: 16–42 μm), Hatting et al. (1999; primary: 41.5–66 × 30–48 μm), Toledo et al. (2007; primary: 17.6–39.5 × 24.7–29.6 μm; villose: 19.8–24.7 μm), and Comerio et al. (2008; primary: 30–38 μm).

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