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A New Record for the Microfungus Flora of Turkey

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Abstract: In this study *Aspergillus silvaticus* Fennell and Raper 1955 were cited firstly for the microfungus flora of Turkey. This species was identified from both soil of vineyard and dried sultanas in Manisa and Izmir provinces, Turkey. Morphological characteristics of the species on identification media and microscopic examinations were reported.

Key words: *Aspergillus silvaticus*, new record, Turkey

INTRODUCTION

Many studies have been carried out in order to determine the microfungus flora of Turkey. The majority of these studies dealt with to determine the microfungus flora of the soil having different characteristics (Oner, 1970, 1974; Ekmekçi, 1975; Oner *et al.*, 1977; Hasenekoglu, 1985, 1987; Gur, 1991; Sulun and Hasenekoglu, 1993; Asan and Ekmekci, 1994; Haliki and Dizbay, 1997; Azaz and Hasenekoglu, 1997; Asan, 1997a, 1997b; Eltem *et al.*, 2002a; Ilhan *et al.*, 2006) while others were undertaken on several kinds of agricultural products (Aran and Eke, 1987; Çolakoglu, 1987, 1991) and foods (Alperden *et al.*, 1982; Hasenekoglu, 1988; Birbir *et al.*, 1995; Eltem and Oner, 1995; Guven *et al.*, 1997; Eltem *et al.*, 2001, 2004).

A check-list based on the reported articles about flora studies on microfungus in Turkey years between 1940-2000 was prepared and the taxa number belong to the genera *Aspergillus* were reported as 82 including species and varieties (Asan, 2000). According to published studies after that list, total numbers of species and varieties are continuing to increase (Eltem *et al.*, 2002b; Azaz and Pekel, 2002; Eltem *et al.*, 2004). Recently a new checklist of the reported species of genus *Aspergillus* from Turkey have been published by Asan (2004). Total numbers of species and varieties of the genus *Aspergillus* were determined as 117 on that report.

MATERIALS AND METHODS

Collection of Soil and Dried Sultana Samples and Isolation of Microfungi

Soil and dried sultanas samples were taken from the vineyards in Manisa and Izmir provinces (Fig. 1). For the isolation of moulds from soil samples, the Soil Dilution Plate Method (Waksman, 1922; Warcup, 1955) was used. Dried sultanas were collected from different parts of the heap after drying process in vineyards then were partitioned into subsamples and placed into sterile polyethylene bags to carry them to the laboratory. They were kept in a deep freeze at -20°C until preparation. Then 1 kg of raisin was diluted at 1:3 sample:water, w/v) ratio and homogenized in a blender at high speed. Fifty gram was taken from the homogenate and 450 mL distilled water was added and homogenized in shaker at 20°C for 30 min. Therefore, the homogenate was 10⁻¹, from which a series of dilutions at 10⁻², 10⁻³, 10⁻⁴ and 10⁻⁵ were prepared.

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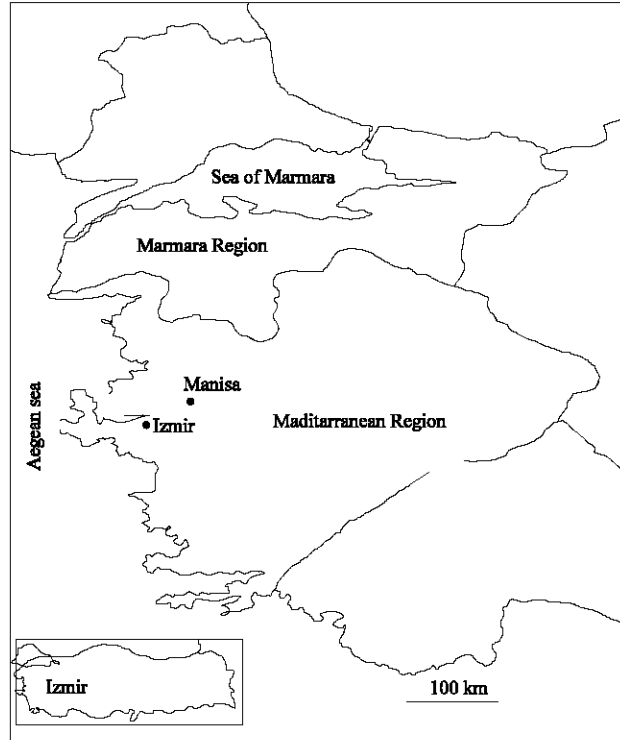


Fig. 1: Map of investigation area, main stations indicated as underlined

In the isolation of moulds from dried sultanas the Pour Plate Method (Brock and Madigan, 1991) was used. Rose-Bengal Chloramphenicol Agar (Oxoid CM549) and Dichloran-Glycerol (DG18) Agar Base (Oxoid CM729) were used as isolation media.

Identification of Microfungi

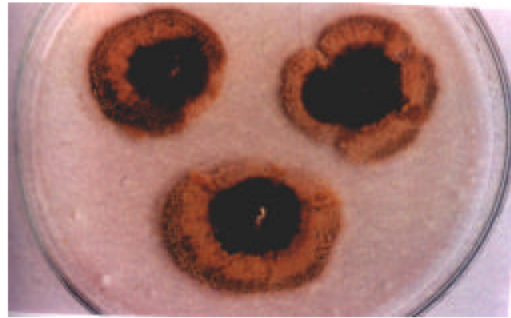
The characteristics of the isolates were recorded according to micro and macro morphology on the culture media for identification. They were identified on the species level using the Raper and Fennell (1965), Domsch *et al.* (1980), Samson *et al.* (1981), Samson and Pitt (1990, 2000). Czapek Dox Agar (CZ) (Modified) (Oxoid CM97), Malt Extract Agar (MEA) (Oxoid CM59) were used as identification media. Citation of the authors of fungal names were made according to Kirk and Ansell (1992). Cultures are deposited on microfungus culture collection of Bioengineering Department at Ege University, Turkey.

RESULTS

Aspergillus silvaticus was isolated and identified both soil and raisin samples Characteristics of the reported species on culture media and microscopic examinations were given below:

Cultural Characteristics

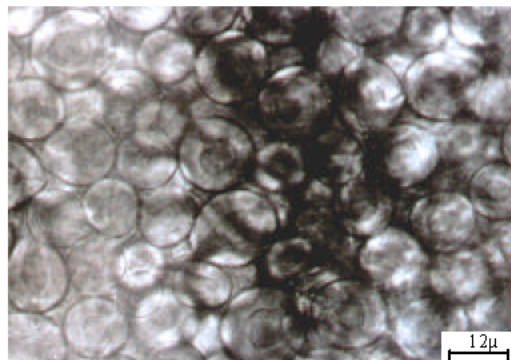
In ten days, at 25°C on CZ, produces colonies which are 3.5-4 cm in diameter. Colony surface is olive green in center and orange- buff shades in the margins, reverse is ochra or pink-dark red colour (Fig. 2A) hulle cells are distributed all the surface of the colony. Conidial heads are radiate in pattern



(a)



(b)



(c)

Fig. 2: (A) Colony view on CZ, (B) Conidiophores, 400X magnification, (C) Hulle cells, 1000X magnification

and 200-300 µm in diameter, olive green and yellow- green in colour. The around of colony turns pink by the diffusible pigments.

Microscopic Examination

Conidiophores are 200-400×5.5-8 µm (Fig. 2B). Vesicles are subglobose and 10-15 µm in diameter. Phialide biseriata, metulae 5.0-7.0×2.5-3.0 µm, phialide 5.5-7.0×2.2-2.8 µm in measurements. Conidia are conspicuously rough, globose-subglobose, dark yellow-brown and 2.0-3.0 µm in diameter. Hulle cells are very abundant, globose-subglobose, 12-25 µm in diameter and yellow in colour (Fig. 2C).

DISCUSSION

Smith and Moss (1985) reported that members of genus *Aspergillus* are the dominant ones in the soil of mild climatic zones confirming our results. Also Eltem *et al.* (2002a) reported that the genus *Aspergillus* is also dominant in vineyards.

According to the reports about examination of mycoflora in Turkey from soil, agricultural and some other food commodities the members of the genera *Aspergillus* and *Penicillium* have been reported as the dominant and all these reported *Aspergillus* species and varieties were listed first time as a check list (Asan, 2000). Since that time, some other species and varieties have been reported such as *A. flavofurcatus*, *A. pulverulentus*, *A. unguis*, *A. viridimitans* and *A. foetidus* var. *pallidus* by Eltem *et al.* (2002b), *A. heteromorphus* by Azaz and Pekel (2002), 2 varieties *A. foetidus* var. *acidus* and *A. nidulans* var. *acristatus* by Eltem *et al.* (2004) from Turkey. A very recent detailed study on the reported descriptions of genus *Aspergillus* from Turkey was carried out by Asan (2004) and total taxa number for the genus *Aspergillus* has been reported as 117, many species and varieties were reduced as synonyms, by this study this number has been reached to 118.

This species has been reported as being isolated from soil, Ghana before and it is being deposited under different accession numbers of international culture collection centers. Present new ecovar will also be submitted on CBS culture collection immediately.

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