

Identified Saprophytic Microfungi on the *Cyclotrichium* (Boiss.) Manden.& Scheng. species Distributed in Turkey

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Abstract

Thirteen plant samples belonging to six *Cyclotrichium* species collected from different regions of Turkey were examined and 82 microfungi isolates were obtained. The identification of the isolates show that there are 14 different species representing 7 genera and 20 different sterile microfungi were determined. *Aspergillus* and *Penicillium* were stated as the richest taxa in terms of species numbers.

Key words: *Cyclotrichium*, saprophytic microfungi, isolation, identification.

INTRODUCTION

Turkey is regarded as an important gene-centre for the family Lamiaceae. The family is represented by 45 genera, 550 species and 730 taxa in Turkey. The rate of endemism in the family is 42.2 % [1,2,3]. *Cyclotrichium* is represented by the following 6 species in the Flora of Turkey: *C. glabrescens* (Boiss. & Kotschy ex Rech. f.) Leblebici, *C. leucotrichum* (Staph. ex Rech. f.) Leblebici, *C. longiflorum* Leblebici, *C. niveum* (Boiss.) Manden. & Scheng., *C. origanifolium* (Labill.) Manden. & Scheng. and *C. stamineum* (Boiss. & Hohen.) Manden. & Scheng. [1,2]. *C. niveum* and *C. glabrescens* are endemic and the ratio of endemism in the genus in Turkey is 33.3%. All the *Cyclotrichium* species are Irano-Turanian elements except *C. origanifolium* which is an East Mediterranean Mountain element growing at high altitudes (1300-2200 m) in SW Anatolia [4].

Lots of the studies were done about the microfungi, especially after the 1920s. Generally all these studies on microfungi were focused on the widening of on soil, their activities, ecological properties and their relationship with agricultural plants. Among these studies there are not many studies about the plant inhabiting microfungi [5,6]. As it is known, saprophytic microfungi has an important role in dividing dead organic materials into pieces. These microfungi can grow up on all terrestrial habitats. Also, they can be found on even painted walls and window sills.

MATERIALS AND METHODS

The dried plant examples used in this study were taken from Dr. Bayram Yıldız's and Dr. Tuncay Dirmenci's personal herbarium and the data about these taxa were shown in Table 1.

In order to state the loads of microfungi on the *Cyclotrichium* examples, they were examined under stereo microscope. These parts were scraped with a thin pin to 2 ml distilled water then 1ml of each solution was inoculated to previously prepared peptone dextrose agar plates and then incubated in 25 °C for

10 days [7]. In order to prevent the growth of bacteria, 30mg/l streptomycin and to restrict the colony size 30 mg/l rose-bengal were added to the isolation medium [8]. This procedure is repeated for each of the 13 plant samples. The colonies grown up on petri dishes were examined under the stereomicroscope and transferred to a separate agar plate. Identification was undertaken following the Smith's method [9]. The pure colonies of isolates were obtained in czapex dox and malt extract agar. The development of the colonies were regularly examined both macroscopically (developing degree of cultures, colour of colonies and changes in colour, colour of colony reverse, colour changes of medium, texture of colony surface, presence of odour, presence of exudates) and microscopically by using Olympus BX 51 (habit of hifa and its combination, development of fructification, colour, dimension and formation of fructification, details of structure and all details of spores) for the final identifications. Identification of the isolates were performed using the literatures [10-20].

Citations of the authors presented were standardised according to Kirk and Ansell [21].

RESULTS AND DISCUSSION

The aim of this study was to determine the microfungi inhabiting on dry *Cyclotrichium* species. For this purpose, 13 examples of 6 *Cyclotrichium* species which were taken from different regions of Turkey in different years were examined. No microfungi could be isolated from two of these thirteen examples by using this applied isolation method under the experimental conditions but the rest eleven examples provided 82 microfungi isolates. After the identification of the isolates, 14 different species representing 7 genera and 20 different sterile microfungi were determined. The genera with the highest species diversity found in this study were *Aspergillus* and *Penicillium*, represented by 4 species (Table 2).

The plant-inhabiting fungi are categorized as pathogenic fungi, endophytes and saprophytes. Many bioactive compounds such as pneumocandins, taxol and zaragonic acid were isolated

Table 1. Information on collection of *Cyclotrichium* sp.

Collectore number	<i>Cyclotrichium</i> sp.	Collection sites	Date
TD.1440	<i>Cyclotrichium glabrescens</i>	B9 Bitlis: Hizan, Karbastı village, Gerzemel Mountain, 1600-1700m	17.07.2001
TA.2139	<i>Cyclotrichium leucotrichum</i>	C8 Mardin: Mardin between Kızıltepe 1km, calcareous rocky place.	22.07.2005
TA. 2141	<i>Cyclotrichium leucotrichum</i>	C8 Mardin: Mardin between Kızıltepe, 1km, calcareous rocky place.	22.07.2005
TD. 2476	<i>Cyclotrichium longiflorum</i>	C9 Hakkari: Hakkari between Çukurca 13-15km, 1200m	17.06.2004
TA. 2137	<i>Cyclotrichium niveum</i>	B6 Malatya: Darende between Gürün 2km, marl, 1300m	20 07 2005
TA. 2138	<i>Cyclotrichium niveum</i>	B6 Malatya: Malatya between Darende, South of Develi village, rocky place, 1400m	20.07.2005
BY. 15339	<i>Cyclotrichium organifolium</i>	B5 Kayseri: Yahyalı between Kale, calcareous rocky place, 1400m	22.07.2002
TD. 2178	<i>Cyclotrichium organifolium</i>	C5 Mersin: Arslanköy, road of Gökkol, 2400m	06.08.2002
TD. 1956	<i>Cyclotrichium organifolium</i>	C3 Antalya: north of Demirtaş to 28km, kuşyuvası place.	13.07.2002
TD. 1949	<i>Cyclotrichium organifolium</i>	C4 Antalya: Gebiz, the west side of Bozburun mountain, 1800-1900m	12.07.2002
BY. 15158	<i>Cyclotrichium_stamineum</i>	C9 Şırnak: The 60km to Hakkari, 600m	08.06.2002

from plant-inhabiting fungi [22, 23]. As a result, plant inhabiting fungi are useful biological resources in the exploratory search for secondary metabolites. Therefore, we have focused on to obtain plant-inhabiting fungi.

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Table 2. Isolated microfungi and their substrates

Isolate microfungi	Substrate
<i>Acremonium</i> sp.	<i>Cyclotrichium niveum</i>
<i>Aspergillus candidus</i> Link ex Link 1824	<i>Cyclotrichium leucotrichum</i>
<i>Aspergillus flavus</i> Link ex Gray 1821	<i>Cyclotrichium longiflorum</i>
<i>Aspergillus niger</i> van Tiegh. 1867	<i>Cyclotrichium longiflorum</i> , <i>Cyclotrichium leucotrichum</i>
<i>Aspergillus wentii</i> Wehmer 1896	<i>Cyclotrichium niveum</i>
<i>Cladosporium cladosporioides</i> (Fresen) G.A.de Vries 1852	<i>Cyclotrichium niveum</i>
<i>Cladosporium sphaerospermum</i> Penz. 1882	<i>Cyclotrichium niveum</i> <i>Cyclotrichium leucotrichum</i>
<i>Embellesia alli</i> (Campan.) E.G.Simmons 1971	<i>Cyclotrichium organifolium</i>
<i>Penicillium canescens</i> Sopp. 1912	<i>Cyclotrichium niveum</i> <i>Cyclotrichium leucotrichum</i>
<i>Penicillium lanosum</i> Westlig 1911	<i>Cyclotrichium longiflorum</i>
<i>Penicillium multicolor</i> Grig.-Man.& Prodielova	<i>Cyclotrichium organifolium</i>
<i>Penicillium odoratum</i> M. Chr.&Backus 1961	<i>Cyclotrichium leucotrichum</i>
<i>Trichocladium canedense</i> S. Hughes 1959	<i>Cyclotrichium glabrescens</i>
<i>Ulocladium botrytis</i> Preuss 1851	<i>Cyclotrichium glabrescens</i> <i>Cyclotrichium longiflorum</i> <i>Cyclotrichium stamineum</i> <i>Cyclotrichium leucotrichum</i>

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