A Study on Microfungi Isolated from Plants in
Adıyaman Province, Turkey

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Abstract In this article, 74 microfungi species and their hosts recorded in Adıyaman province are identified. The research was carried out between 2010 and 2013. Approximately 700 vascular plant specimens infected and uninfected with microfungi were collected from the area. In total, 74 microfungi species were identified on the collected host specimens. These species belong to 7 families and 14 genera; 25 species belong to Ascomycota, 49 to Basidiomycota.

Keywords Microfungi, Parasite, Adıyaman, Turkey

1. Introduction

Microfungi growing on cultivated plants have been well studied in Turkey. However, studies on the microfungi growing on the natural plants of Turkey are rarer, although recently research has been carried out on such microfungi [1-12]. A study was carried out by us on microfungi found on the flowering plants grown naturally in Adıyaman province in 2010-2013.

Floristically Adıyaman is one of the richest areas of Turkey [13,14]. Adıyaman is a typical transitional belt between the 2 phytogeographical regions. These regions the Irano-Turanian and Mediterranean. According to the grid square system adopted by Davis in the Flora of Turkey, Adıyaman is located in the squares B7, C6, C7. (Figure 1). Adıyaman thus possesses a rich flowering plant flora. It is known that richness of host species is an important factor in microfungi diversity [15, 16,17]. For this reason the present research was conducted to study microfungi flora.

Figure 1. The map of Turkey, Anatolian Diagonal and location of Adıyaman province
2. Materials and Methods

Research materials were collected during 2010-2013, between May and October in each year. During the field study, 700 flowering plant specimens, infected and non-infected with microfungi, were collected from the study area. It is difficult to determine the infected host specimens due to the host plants being destroyed by the microfungi. For this reason, efforts were made to collect both microfungi infected and non-infected samples where possible. The specimens were prepared according to established herbarium techniques.

The Flora of Turkey [13,14] was the main source used for the identification of the host specimens. Some doubtful identifications were checked using Flora Europaea [18], Flora of Iraq [19], Flora Iranica [20].

After the identification of host specimens, the microfungi found on them were studied. The microfungi were determined using the relevant literature [21-35, 15-17]. The results obtained from this study supported the previous findings. Hair type, for example, prevents pathogen spores or germinations tubes entering the epidermis and stomata. Hairiness is therefore an important barrier to pathogens. Although Brassicaceae, Boraginaceae and Scrophulariaceae are common and contain many species, parasitic fungi were seldom found on them [34,38,40]. In the study area, many of the species belonging to these families, like Alyssum spp. (Brassicaceae), Onosma spp. (Boraginaceae), and Verbascum spp. (Scrophulariaceae) are densely hairy. The fungi spores probably do not germinate among the hairs or the germination tubes do not enter the host tissue passing the hairs.

As a result of this study carried out first time in Adıyaman province (Turkey). For future studies on microfungi, 700 specimens were added to the herbaria.

<table>
<thead>
<tr>
<th>Host Families</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteraceae</td>
<td>26.44</td>
</tr>
<tr>
<td>Rosaceae</td>
<td>11.52</td>
</tr>
<tr>
<td>Polygonaceae</td>
<td>10</td>
</tr>
<tr>
<td>Poaceae</td>
<td>7.43</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>6.61</td>
</tr>
<tr>
<td>Diğer 6 familya</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1. Percentages of the major families.

According to species numbers, the largest families in the research area are Pucciniaceae (41 species) and Erysipheaceae (24 species). In other words, 86.48% of the microfungi flora of Adıyaman province belong to 2 families. The other 5 families contain 9 (13.51%) species. These families contain many species, and most of the species belonging to these genera are common in the world.

According to species numbers, the largest genera in the research area are Puccinia Pers. (28 species), Uromyces (Link) Unger (7 species), and Erysiphe DC. (14 species). These 3 genera contain 49 (66.21%) species. These genera contain many species, and most of the species belonging to these genera are common in the world.

3. Results and Discussion

At the end of the studies on 700 infected and non-infected host specimens collected from the study area, 11 families, 70 genera and 74 host species were established. Percentages of some large host families are given in Table 1.

The species belonging to the divisions are given in Table 2.

Table 2. Species numbers of the divisions.

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Number of species</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basidiomycota</td>
<td>49</td>
<td>66.21</td>
</tr>
<tr>
<td>Ascomycota</td>
<td>25</td>
<td>33.78</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

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As seen from the Table 1, 5 families, namely Asteraceae, Rosaceae, Polygonaceae, Poaceae, Fabaceae, Euphorbiaceae contain 62% of host species. According to these results parasitic fungi prefer the plants belonging to these families as hosts. Because the species belonging to these families are common, the spores of the microfungi are easily carried to these hosts by vectors.

In the second phase of the study, the microfungi species found on the hosts were named. At the end of this period, 7 families, 14 genera and 74 species belonging to 2 divisions, namely Ascomycota and Basidiomycota were established. The other 5 families contain many species, and most of the species belonging to these genera are common in the world.
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