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| **ARAŞTIRMA MAKALESİ** | **RESEARCH ARTICLE** |

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| **ARTICLE INFO** | | **ABSTRACT** |
| ***Article history:***  Recieved / Geliş : 16.07.2024  Accepted / Kabul: xx.xx.2024  ***Keywords***:  Keyword1  Keyword2  Keyword3  Keyword4  ***Anahtar Kelimeler:***  Turkishkw1  Turkishkw2  Turkishkw3  Turkishkw4  🖍Corresponding author/Sorumlu yazar:  Name SURNAME  [user@xxx.edu.tr](mailto:user@xxx.edu.tr)  Makale Uluslararası Creative Commons Attribution-Non Commercial 4.0 Lisansı kapsamında yayınlanmaktadır. Bu, orijinal makaleye uygun şekilde atıf yapılması şartıyla, eserin herhangi bir ortam veya formatta kopyalanmasını ve dağıtılmasını sağlar. Ancak, eserler ticari amaçlar için kullanılamaz.  © Copyright 2022 by Mustafa Kemal University. Available on-line at <https://dergipark.org.tr/tr/pub/mkutbd>  This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License. | | The aim of this study was to determine the fungal and bacterial microbiomes of broomrape species (*Orobanche spp.*) found in tomato, potato, carrot, parsley, tobacco, pea and thyme crops in different districts of XXX province. Fungal isolates obtained from the isolations made from plants showing disease symptoms were identified as *xxxxxxxxxxxx* as a result of morphological, MALDI-TOF MS and molecular identification studies. Fungal isolates obtained from the isolations made from plants showing disease symptoms were identified as *xxxxxxxxxxxx* as a result of morphological, MALDI-TOF MS and molecular identification studies. Fungal isolates obtained from the isolations made from plants showing disease symptoms were identified as *xxxxxxxxxxxx* as a result of morphological, MALDI-TOF MS and molecular identification studies. Fungal isolates obtained from the isolations made from plants showing disease symptoms were identified as *xxxxxxxxxxxx* as a result of morphological, MALDI-TOF MS and molecular identification studies. Antagonist/plant growth promoting bacterial species such as xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx were isolated from healthy broomrape plants and pathogenic bacterial species such as *xxxxxxx* were isolated from plant samples of broomrape plants showing symptoms of disease and identified by MALDI-TOF MS analysis. |
| **ÖZET** |
| Bu çalışmada xxxxxx ilinin farklı ilçelerinde yetiştiriciliği yapılan domates, patates, havuç, maydanoz, tütün, bezelye ve kekik tarlalardaki canavar otu türlerinde (*Orobanche* *spp.*) fungal ve bakteriyel mikrobiyomlarının belirlenmesi amaçlanmıştır. Hastalık belirtisi gösteren bitkilerden yapılan izolasyonlarda elde edilen fungal izolatlar morfolojik, MALDI-TOF MS ve moleküler tanılama çalışmaları sonucunda *xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx* olarak teşhis edilmiştir. Hastalık belirtisi gösteren bitkilerden yapılan izolasyonlarda elde edilen fungal izolatlar morfolojik, MALDI-TOF MS ve moleküler tanılama çalışmaları sonucunda *xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx* olarak teşhis edilmiştir. Hastalık belirtisi gösteren bitkilerden yapılan izolasyonlarda elde edilen fungal izolatlar morfolojik, MALDI-TOF MS ve moleküler tanılama çalışmaları sonucunda *xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx* olarak teşhis edilmiştir. XXXXXXXX gibi antagonist/bitki gelişimini teşvik eden bakteri türleri, hastalık belirtileri gösteren canavar otu bitki örneklerinden ise *YYYYYYYYYYYYY* gibi patojenik karakterli bakteri türleri izole edilerek MALDI-TOF MS ile tanılanmışlardır. XXXXXXXxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxX gibi antagonist/bitki gelişimini teşvik eden bakteri türleri, hastalık belirtileri gösteren canavar otu bitki örneklerinden ise *YYYYYYYYYYYYY* gibi patojenik karakterli bakteri türleri izole edilerek MALDI-TOF MS ile tanılanmışlardır. |
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**INTRODUCTION**

Parasitic weed species of the genus Orobanche, commonly called broomrape, attack almost all vegetables, tobacco, muskmelon, and sunflower in Europe, the Middle East, North Africa and Asia (Anonymous, 2024). Tomatoes, parsley, potatoes and carrots are widely grown in greenhouse and in the open field, while tobacco, peas and thyme plants are grown in relatively limited areas in Hatay province of Turkey. Broomrape has been reported to cause yield losses of 33% in tobacco (XXX et al., 1987), 50-100% in broad 33% in sunflower (XXX & YYY, 1973) and 24-88% in carrot (XXX, 1973). There are currently no registered herbicides in Turkey for use against broomrape, which is encountered in tomato, pepper, aubergine, parsley, carrot, tobacco, chickpea, lentil, broad bean and potato. Methods such as solarisation, crop rotation, use of trap crops, deep ploughing, appropriate fertilisation, resistant plant breeding, biological control and chemical control are used in the control (XX & YYY, 2019; XXX, 2017). In Nepal, more than 70% of the fungal strains on *Orobanche aegyptiaca* Pers. were identified as *Fusarium* spp, while other fungi were *Acremonium fusidioides, Alternaria alternata, Cladosporium cladosporioides, Epicoccum nigrum, Moltierella alpina, Papulaspora* sp, *Phoma* spp, *Sordaria fimicola, Rhizoctonia* sp, *Trichoderma* spp and *Trichothecium roseum* (XXXX et al., 2019). With the area and density of broomrape increasing day by day, the lack of an effective control method is making this weed more important every day. In addition, the fact that monkshood is a root parasite and its appearance and attractiveness keep both growers and outsiders from worrying about the problem. However, in areas where broomrape is widespread, growers are anxiously awaiting for effective control method.

The aim of this study was to determine the fungal and bacterial microbiome of healthy and diseased *Orobanche* spp. in different crops grown in agricultural areas of XXXX province of Turkey.

**MATERIAL AND METHOD**

***Isolation of fungal and bacterial microbiomes from healthy and diseased broomrape plants***

Fields in different districts of Hatay province were inspected using a random sampling method. Fungal and bacterial microbiomes were isolated from healthy and diseased broomrape plant tissues. …………………..Fungal species were isolated from the surface sterilised tissues of plants showing disease symptoms on the common medium Potato Dextrose Agar (PDA) and identified according to morphological characteristics (XX et al., 1971; XXX & YYY, 2021; XXX, 2020).

Figure 1. Cultivation of broomrape (*O. ramosa* L.) plants for use in pathogenicity tests

*Şekil 1. Patojenite testlerinde kullanılmak üzere yetiştirilen canavar otu (O. ramosa L.) bitkisi*

***Molecular identification of fungal and bacterial microbioms***

Fungal isolates selected as representative of the region/plant variety from the re-isolates causing typical disease symptoms were also identified using a universal primer pair (ITS1/ITS4 and ITS4/ITS5) specific for ITS gene region (XXXXXX et al., 1990). ……………………..The consensus sequences obtained for the ITS locus of the fungal isolates were deposited in the NCBI GenBank database (XXXXX et al., 2013).

**RESULT AND DISCUSSION**

The results should be clearly written under sub-headings as in the example below and discussed with recent publications on similar topics.

***Isolation of fungal and bacterial microbiomes from healthy and diseased broomrape plants***

The study was carried out between April and September 2021 at 25 different locations in tomato, carrot, tobacco, pepper potato, sunflower, pea, melon and thyme production areas in different districts of Hatay province (Figure 2).

As a result of the disease screening studies carried out on 148 fields with different crops, broomrape weed species were found in 29 fields (XXXXX et al., 2023). ………………….. were obtained as a result of random sampling.

***Molecular identification of fungal and bacterial microbioms***

Isolations were made to identify fungal and bacterial species from the blackening of root bundles, crowns and stems near the root collar of healthy and diseased broomrape (*Orobanche ramosa* and *Orobanche crenata*) collected during the surveys (Figure 2 and Table 1). All representative fungal isolates were also used in molecular identification studies. The diagnosis of all fungal isolates was confirmed by the sequences of the Internal Transcribed Spacer (ITS) rDNA gene regions using the ITS1/4 or ITS4/5 primer pairs (XXX et al., 1990). *Rhizopus oryzae* has also been reported as a potential pathogen of *Orobanche aegyptiaca* in China (XXX et al., 2021).

Figure 2. Figure tittle in English.

*Şekil 2.* Türkçe şekil alt yazısı*.*

Table 1. Identification of fungal isolates isolated from broomrape plants displaying disease symptoms based on sequence analysis of the ITS gene region

*Çizelge 1. Hastalık belirtisi gösteren canavar otu bitkilerinden izole edilen fungal izolatların ITS gen bölgesine ait dizi analizlerine bağlı tanılama sonuçları*

In the literature review, bacterial species such as *Pseudomonas corrugata* (XX et al., 2013), *Pseudomonas marginalis* (YYY et al., 2018), *Pseudomonas mediterranea* (XXX & YYY, 2010), The presence of these bacterial pathogens as primary or opportunistic-secondary soft rot disease agents of carrots and different Brassica species grown in the Hatay province of Turkey has been recently reported (XX et al., 2022; YYY et al., 2024).

**CONCLUSIONS**

Recently, surveys were carried out to identify broomrape species in tomatoes, carrots, tobacco, peppers and potatoes, sunflowers, peas, clover, melons and thyme in the different districts of Hatay province (XXX et al. 2023). …………………….. The potential plant pathogenicity of these species was considered as the most important issue limiting their use in the biological control of broomrape species. The results of this study, which reveal the fungal and bacterial microbiota of healthy and diseased broomrape, will shed light on different studies to be carried out with this plant in the future.

**ACKNOWLEDGEMENT**

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**CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest between them.

**AUTHOR’S CONTRIBUTIONS;**

All author contributed equally for analyses, writing and interpretation of the article. The authors read and approved the final version of the manuscript.

**STATEMENT OF ETHICS CONSENT**

This article does not require ethical approval as there are no experiments with human or animal subjects.

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