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# ASSESSING SOILS OF GAZIANTEP HAVING HIGH SUSCEPTIBILITY TO EROSION FROM THE POINT OF VIEW OF MICROFUNGUS

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**ABSTRACT** **The aim of the present study has been to determine microfungi flora of 43 soil samples, extracted from a depth of 0-15 cm, from 43 agricultural localities taking place in Yavuzeli, Araban, Karkamış, Nizip and Oğuzeli counties of Gaziantep with high susceptibility to erosion through the soil dilution method at the level of species. In these soils, which have quite high K-factor ranging between 0.3 and 0.79, quite poor in organic matter and have slightly alkaline nature, 2 divisions, 3 subphyla, 4 classes, 4 subclasses, 5 orders and 7 genera from microfungi flora were determined. The microfungi species, has been Rhizopus sp., Mucor sp., Penicillium sp. and Aspergillus sp. respectively. Cladosporium sp., Acremonium sp. and Candida sp. species have also been encountered in a couple of localities. The results suggest that microfungal diversity of these soils under study is low due to high susceptibility to erosion and insufficient organic content**

**KEYWORDS** :microfungal diversity of these soils under study is low due

## INTRODUCTION

**1 Introduction** Soil erosion does not only cause loss of plant nutrient elements but also affects living conditions of microfungi and other organisms living in the soil. The objective of the present study has been to search microfungal diversity of soils with high susceptibility to erosion (K factor). For this purpose, the object of the present study has been to determine microfungi flora of 43 soil samples, extracted from a depth of 0-15 cm, from 43 agricultural localities taking place in Yavuzeli, Araban, Karkamış, Nizip and Oğuzeli counties of Gaziantep with high susceptibility to erosion (K-factor) through the soil dilution method at the level of species. However, many studies relating to the fact that soil microfungi have a positive effect on formation and stability of soil micro and macro aggregate have been seen in different countries. Lynch (1984) and Tisdal (1991) determined in their study that there is a strong correlation between soil aggregate stability and organic matter content as well as microorganism activities. In the same way, Lynch and Bragg (1985) found that saprophyte fungi increase macroaggregate stability while Emerson et al. (1986) determined that ectomycorrihizal hyphae have a significant role in formation and stability of macroaggregate in forest soils. Tisdal (1994) evidenced in his study that soil microorganisms have significant positive effect on size of soil aggregates. Aggregate stability is an important factor determining tendency to erosion (Coote et al. 1988). An increase in aggregate stability increases resistance to erosion (Bryan 1976, Luk 1979, Lane and Nearing 1989).

Fungi perform many activities in soil. Most important ones may be listed as Aspergillus, Penicillium, Rhizopus Trichoderma, Chaetomium and Zygorhynchus, which use mannans in tissues of plants (Rumack and Salzman 1978).

Soil is a biologically balanced system and even the smallest change in its nature can modify soil enzyme activities and microbial populations related to matter cycle (Pozo et al. 2003).

For this purpose, microfungal status was determined in this study in soils, whose erodibility factor had been found high.

Soil's aggregate stability would increase significantly in presence of microfungi. Presence of microfungi is an indicator for soil nutrient elements also because fertility of soils is very closely related to activities of microorganisms and direction of the reactions caused by them. The elements like carbon, nitrogen, phosphorus, sulfur, iron, magnesium etc required by plants are converted into a useful form for soil as a result of various syntheses and analyses mediated by microorganisms. Furthermore, certain microorganisms are regarded as an important criterion for status of nutrient elements. For example, Aspergillus sp. is regarded as an indicator for P, K, Mg and different microelements in soil (Scheffer and Schachtschabel 1992).

Jonasson et al. (1996) determined in their study that soil microorganisms that most of them are heterotrophic convert complex compounds like protein, starch, cellulose, lignin and phosphate esters into the forms, which are useful both plants and themselves, through the enzymes secreted by them.

The studies conducted in many countries have shown that soil fungi have been negatively affected by different environmental problems. Especially, it has been found that fungal diversity in polluted soils is lower compared with that in non-polluted soils. It has been found that organic content is low while lime and pH is higher in polluted soils. It has been reported that these factors affect microfungi flora negatively (Singh et al. 1990, Hemida 1992, Hasanekoğlu and Sülün 1991, Azaz 2003). Ocak et al. (2004) conducted a similar study by comparing microfungi flora in soils polluted by Gaziantep Cement Plant to those in the closest non-polluted soils. In the study, 116 different microfungal isolates were obtained in the study. Penicillium sp. Aspergillus sp.,Ulocladium sp., Rhizopus sp and Cladosporium sp. of them were found as the most prevalent species. However, a richer flora in both number and species diversity was found in nonpolluted soils. Analyzing soil showed that lime content and pH is higher while organic content is lower in polluted soils. They reported that these factors affect microfungal flora negatively.

The objective of our study has been to search microfungal status in soils, whose organic content has been low and pH has been 7 and higher, from agricultural fields having high erodibility in Gaziantep.

**2 Materıal and Methods** The here presented soil erosion study was conducted at five towns in Gaziantep province (Nizip, Oğuzeli, Araban, Yavuzeli and Karkamış ). In the east of the study site, the river Euphrates flows. The soil of the Gaziantep catchment area assemble from 55.38 % Chromic Cambisols, 23.09 %, colluvial soils, 8.13 % Cambisols, 7.37 % soils from basaltic parent rock and 1.28 % other soil types such as Regosol, Terra rossa and Terra fusca (Anonymous 1992).

2.1 Geology

The geomorphological character of Gaziantep province is marked by hilly surfaces. In the south, the Amanos (Nur) mountains are the boundary between Hatay and Osmaniye with the highest peak at1527 m. The other mountainous part of this province is located parallel to the Nur mountains. The northern

border of the eastern region extends to the Euphrates.
The peaks of the adjacent mountains are from south to north:

## CONCLUSION

A significant fungal diversification was not observed in the fields under study due to low organic content, high temperature averages, low precipitation, low soil humidity and fungicide use in the fields. Furthermore, alkalinity of soils and the fact that lime cannot be washed out from soil due to low precipitation also affect significantly living conditions of fungi.

It was frequently observed during the researches that soils of the fields under study had been fallowed in certain intervals because they were used for agricultural purposes and their straw was then burnt. Therefore, biodiversity has been significantly affected in these fields. To increase biological activity in these soils, unnecessary chemical fertilization should be prevented and mycorrhizal applications should be conducted to increase organic content of soil (Dorioz et al. 1993) because organic content increases aggregate stability and thus, it makes soil more resistant to water and wind erosion and it ensures better ventilation and water uptake for soil. Furthermore, microorganisms prepare a good environment for growth of plant roots in addition to the increase in aggregate stability (Tisdale et al. 1982, Miller and Jastrow 1990). Mycorrhizal fungi applications to soil may result in an increase in aggregate stability and may provide good protection against erosion. In fact, Bearden and Petersen (2000) evidenced in their study on semi-arid vertisol soils in India that arbuscular mycorrhizal (AM) fungi application to soil has a significant positive effect on aggregate stability and geometrically soil aggregate size and also increases fertility of soil. These plants, which are important in terms of preventing erosion, are distributed in Gaziantep region and can all be recommended to prevent erosion. Convolvulus arvensis L. species, belonging to Convolvulacae family, which is commonly known as field bindweed, has a deep root system. The roots can reach 3 m, and lateral roots can reach 2 m. Furthermore, new plants can grow on rhizomes which have a length of more than 1 m. These plants are perennial ones and widely distributed in meadows, pastures, rocky, stony, pebble, arid slopes, fields and cultivated lands. Especially sloped areas should be vegetated with horizontally developing and creeping plants with different root depths. Intensification and widespread use of these pioneer plants in the region will significantly eradicate erosion problem in the region ( Tunc et al.2013).

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