

# A QUALITATIVE AND QUANTITATIVE STUDY OF THE SOIL MYCOFLORA OF A BARLEY FIELD<sup>1</sup>

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## SUMMARY

Qualitative and quantitative rhizosphere effects of fieldgrown barley plants were investigated. The numbers of fungi were much higher in the rhizosphere zone than outside, with an increase during plant growth.

16 species were identified from rhizosphere, 9 from non-rhizosphere and 12 from both zones.

## 1. INTRODUCTION

The present investigation was carried out to study qualitative and quantitative rhizosphere effects of barley plants in a field in Lahore. Fungi were isolated from the rhizosphere and non-rhizosphere soil during the whole development of the plant. The numbers of viable fungi were determined and the species composition in the two zones was recorded. Isolation of fungi was continued after harvest.

## 2. MATERIALS AND METHODS

A lump of soil with a plant was dug out. The upper portion of the plant was cut off and all excess soil was removed from the roots by gentle shaking. Soil in immediate contact with the roots was collected as the rhizosphere sample using a sterilized scalpel (STARKEY 1931). The Soil plate method (WARCUP 1950) and the Soil dilution method (TIMONIN 1940) were used for the isolation of fungi. Colonies were counted with a colony counter; the average number was calculated for monthly intervals.

## 3. RESULTS

A total of 37 species and varieties belonging to 18 genera of fungi were recorded in the rhizosphere and non-rhizosphere soil. Out of the total number, 16 species were found in the rhizosphere zone only, 9 in the non-rhizosphere zone, while 12 species were common to both. Amongst these, *Mucor* and *Fusarium* strains were not identified to the species. Quantitative results are shown in *fig. 1*. More colonies are found in the rhizosphere than in the non-rhizosphere zone. In

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December the barley plants attained their maximal height and maturity. At that period also the roots had their maximal development, and a sharp increase in the average number of colonies was observed.

In January the crop was cut and only stubble was left. The number of fungal propagules was found to decrease. Three to five months after harvest the mycoflora attained the same density as before sowing.

The species isolated are listed below: (table 1).

Table 1. Occurrence of fungi in rhizosphere and non-rhizosphere soil.

Species	rhizosphere	non-rhizosphere
<i>Achaetomium luteum</i> Rai & Tewari	+	+
<i>Acrophialophora nainiana</i> Edward	+	—
<i>Aspergillus fischeri</i> Wehmer	+	—
<i>A. flavus</i> Link ex Fr. var. <i>columnaris</i> Raper & Fennell	+	—
<i>A. fumigatus</i> Fres.	—	+
<i>A. nidulans</i> (Eidam) Winter	+	+
<i>A. nidulans</i> var. <i>latus</i> Thom & Raper	+	+
<i>A. niveus</i> Blochwitz	+	+
<i>A. rugulosus</i> Thom & Raper	+	+
<i>A. tamarii</i> Kita	+	—
<i>A. terreus</i> Thom	+	—
<i>Boothiella tetraspora</i> Lodhi & Mirza	+	—
<i>Chaetomium arcuatum</i> Rai & Tewari	+	—
<i>Ch. abuense</i> Lodha	+	—
<i>Ch. bostrychodes</i> Zopf	+	—
<i>Ch. crispatum</i> Fuckel	—	+
<i>Ch. flavum</i> Omvik	+	+
<i>Ch. funicola</i> Cooke	—	+
<i>Ch. globosum</i> Kunze ex Fr.	+	—
<i>Cunninghamella echinulata</i> Pišpek	+	+
<i>Curvularia lunata</i> (Wakker) Boedijn	+	—
<i>C. subulata</i> (Nees) Boedijn	—	+
<i>Dichotomomyces cejpai</i> (Milko) Scott	+	—
<i>Emericellopsis humicola</i> (Cain) Gilman	—	+
<i>Graphium bulbicola</i> Hennings	+	—
<i>Hormiscium stilbosporum</i> (Corda) Sacc.	—	+
<i>Neocosmospora vasinfecta</i> E. F. Smith	+	+
<i>Penicillium brefeldianum</i> Dodge	—	+
<i>P. cyaneum</i> (Bain. & Sart.) Biourge	+	—
<i>P. oxalicum</i> Currie & Thom	+	—
<i>P. spiculispurum</i> Lehman	+	—
<i>Rhizopus oryzae</i> Went & Geerligs	+	+
<i>Stachybotrys atra</i> Corda	+	—
<i>Stachylidium extorae</i> var. <i>majus</i> Sacc.	+	+
<i>Stysanus stemonitis</i> (Pers.) Corda	—	+
<i>Thielavia sepedonium</i> Emmons	+	+
<i>Thielavia terricola</i> (Gilman & Abbott) Emmons	+	+
<i>Th. terricola</i> var. <i>minor</i> (Rayss & Borut) Booth	—	+

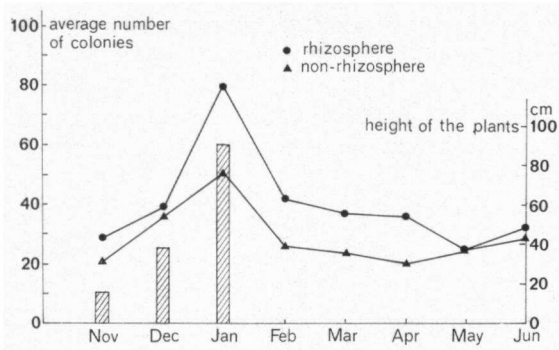


Fig. 1. Number of colonies found in rhizosphere and non-rhizosphere

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