# A STUDY OF FUNGAL COMMUNITY OF SUGARCANE FIELDS IN MISSAN/ IRAQ

## Summary

A study of fungi inhabiting four sugarcane (*Saccharum officinarum* L. ) cultivars (CO331, CO976, CP52-68 and Missan 1) and the soil of sugarcane fields at Missan city was conducted. Some aspects of the ecology and taxonomy of fungi were investigated. The results included the following:

1- Species isolated from soil and plant

A total of 119 species belonging to 46 genera were isolated and identified, by using eight isolation methods and eight different culture media. Nine species were reported for the first time in Iraq. These new records were as follows: *Biopolaris bicolor*, *Chaetomium convolutum*, *C. spiralotrichum*, *Drechslera graminea*, *Embellisia hyacinthi*, *Fusariella intermedia*, *Leptoshaeria sacchari*, *Lophotrichus plumbescens* and *Nigrospora sacchari*. Also 22 species were reported for the first time from sugarcane in Iraq. Of the total new records on sugarcane ( 31 species) , 22 species were probably considered as new records from this plant in the world.

2- Survey of soil fungi

One hundred one species belonging to 37 genera were isolated from sugarcane field soils. Deuteromycotina was the dominant group with 82 species constituted 81.19% of the species, followed by Ascomycotina with 13 species constituted 12.87% and Zygomycotina and Oomycotina with three species for each one (2.97%).

The most occurred isolated genus was *Aspergillus* with percentage of 100%, followed by *Alternaria*, *Chaetomium* , *Fusarium*, *Penicillium*, *Trichoderma* and *Ulocladium* with percentage occurrence of more than 75% and less than 100% , while 22 genera showed <50% incidence.

3- The soil fungal community analysis

Community composition and structure were based upon analysis of 435660 colonies/gm dry soil by using dilution method from soil of four

sugarcane cultivars which were (CO331, CO976, CP52-68 and Missan 1), they have a number of colonies of 121620, 112690, 99460 and 101890 colonies/gm dry soil respectively.

The isolates were assigned to 67 species of Deuteromycotina, 11 species of Ascomicotina and three species of Zygomycotina. Correlation analysis showed that there were differences between the total number of isolates and collecting times.

The highest total number of isolates for all cultivars was recorded during March, while the lowest total number of isolates was recorded during July.

The most frequently isolated genera were *Aspergillus* and *Chaetomium*, where as the most occurred genera were *Aspergillus*, *Chaetomium*, *Fusarium* and *Trichoderma.* The dominant and sub-dominant genera constituted 11.42% of the total isolated genera for each one. Although 68.57% of the isolated genera were rare.

A high diversity of fungal community was found among sugarcane cultivars. The similarity of fungal community was higher between CO331 and CO976 (64.19%) and lesser between CO331 and Missan 1 (54.32%).

The relationship between the total number of isolates and some of environmental factors such as temperature, moisture, salinity, total organic matter, %Nitrogen and pH was studied. There was a positive correlation between the total number of isolates and each of moisture, total organic matter and %Nitrogen, while the correlation between the total number of isolates and each of temperature, salinity and pH was negative.

4. The study of fungal community associated with plant

Seventy one species belonging to 33 genera were isolated from different parts of sugarcane such as living and dead leaves and stems and roots . They assigned to 55 species of Deuteromycotina , 12 species of Ascomycotina and two species of each of Zygomycotina and Oomycotina . Amongest 63 species were isolated by culture media

technique , 34 species were isolated by moist chamber method and four species were isolated by water culture method.

The community structure of fungi associated with different parts of sugarcane was determined. The results showed that the total number of species was significantly differed according to the sample collection date, cultivars and different parts of plant, where as the higher number was recorded during March and the lower number was recorded during July. Also the highest number of species was found on CO331 and the lowest number was obtained from Missan1. In contrast the leaves showed a high number of species, while the less number was isolated from the roots.

The study explained that *A. alternata* and *A. niger* were found on all parts of all cultivars, while the other species were found on one, two or three cultivars and some parts. Some species associated only with leaves, stems or roots and with living or dead parts.

The most occurred isolated species were *A. alternata*, *A. fumigatus*, *A. niger* , *A. terreus*, *C. elatum* and *C. globosum*.

A high similarity was found between the fungal community of both CO331 and CO976, while the fungal community of CP52-68 and Missan 1 revealed less similarity.

The relationship between the total number of fungal species and plant physical and chemical factors (water content, electricity, %Nitrogen , %sugar and leaves area) was studied. There was a positive correlation between the total number of species and each of water content and leaves area , while the correlation between the total number of species and each of electricity, %Nitrogen and %sugar was negative.

5. The pathogenic fungi

Ten pathogenic fungi associated with sugarcane were isolated, but there were no symptoms appear on the plant during January 2001 to July 2002.