



Soil-borne Fungal Biodiversity of Some Fruit Crops of Nashik District and Control Measures

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ABSTRACT

Twenty one fungal species were associated with *Punica granatum*, *Vitis vinifera*, *Citrus medica* and *Mangifera indica* from Nashik district in rhizosphere and soil. Rhizosphere mycoflora is higher than the soil mycoflora. All fungal species can be controlled by 500 ppm concentration of Moximate, a promising fungicide.

Work on rhizosphere fungi of some crop plants has received considerable attention (Agnihotrudu 1955, Bhuvneshwari & Vasantharajan 1963, Gangawane & Deshpande 1978, Khairnar & Saler 1985, Khairnar & Mahajan 1985). Rhizosphere of various plants in different ecological habitats has been studied (Gangawane & Deshpande 1978, Maliszewaska & Moreus 1957, Sunar & Chonan 1971). The present communication reports the rhizosphere and soil fungi of some fruit crops and their control measures from Nashik district.

Rhizosphere and non-rhizosphere soils of fruit crops, *Punica granatum*, *Vitis vinifera*, *Citrus medica* and *Mangifera indica* were collected from different regions of Nashik district in May 2010. The rhizosphere and soil fungi were isolated by the soil dilution plate-count method of Timonin (1940) using Waksman's synthetic and Rose Bengal agar medium. The rhizosphere samples were incubated by using Harly & Waid technique (1955) plates in triplicates with 1 mL of dilution at room temperature ($26\pm 4^\circ\text{C}$) for eight to ten days. Number of fungal colonies per gram of soil was calculated.

Equal volume of 2x medium (served as food) and 2x concentration of Moximate fungicide (served as poison) along with 1 mL of spore suspension from dilution flask (served as control soil dilution) were taken. Thus, the media has final concentration of 50, 100 and 500 ppm of Moximate in the plate media with single strength without Moximate served as control. Observations for the number and types of fungi present on the plate were made from 6th day onwards.

The results of the study are given in Table 1. Fungal population was higher in rhizosphere of all four fruit crop

species than the soil. Highest fungal population was observed in *Punica granatum* followed by *Vitis vinifera*, *Citrus medica* and *Mangifera indica*.

The common fungal species in the rhizosphere and soil of four crops were *Aspergillus carbonarius*, *A. flavus*, *A. niger*, *A. ustus* and *Rhizopus stolonifer*. The maximum fungal species were recorded from rhizosphere as well as from soil of *Punica granatum*. It has been observed that the root exudates composition of *Punica granatum* may have played an important role in bringing out maximum mycoflora of this specific fruit crop. Similar effects of root exudates of higher plants have already been reported by Rovira (1963), Gangawane & Deshpande (1978) and Khairnar & Saler (1985). The mycoflora in four fruit crops have been reported according to root exudates composition in their respective rhizosphere and soil region.

In fungicidal treatment, all 21 fungal species can tolerate 50 ppm concentration of the fungicide (Moximate), three species can tolerate 100 ppm concentration (*Aspergillus carbonarius*, *A. flavus*, *Rhizopus stolonifer*), but at 500 ppm concentration no fungi can tolerate and all completely disappeared.

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Table 1: Fungal colonies in rhizosphere (R) and soil (S) of four fruit crops and control measure.

Fungal species	<i>Punica granatum</i>		<i>Vitis vinifera</i>		<i>Citrus medica</i>		<i>Mengifera indica</i>		Moximate (Fungicide)		
	R	S	R	S	R	S	R	S	50ppm	100ppm	500ppm
<i>Aspergillus carbonarius</i>	04	03	08	07	06	04	15	10	+	+	-
<i>A. caespitosus</i>	02	01	-	-	-	-	-	-	+	-	-
<i>A. flavus</i>	02	-	05	02	02	02	-	02	+	+	-
<i>A. fumigatus</i>	03	-	-	-	-	-	-	-	+	-	-
<i>A. flavipes</i>	-	01	-	-	-	-	-	-	+	-	-
<i>A. niger</i>	03	03	11	04	03	01	03	01	+	-	-
<i>A. terreus</i>	01	-	-	-	-	-	-	-	+	-	-
<i>A. ustus</i>	10	10	07	04	02	03	-	-	+	-	-
<i>A. zonatus</i>	01	01	-	-	-	-	-	-	+	-	-
<i>Botryotrichum piluliferum</i>	02	-	-	-	-	-	-	-	+	-	-
<i>Chetomium globosum</i>	01	-02	-	-	-	-	-	-	+	-	-
<i>Candida</i> sp.	01	-	-	-	-	-	-	-	+	-	-
<i>Fusarium oxysporum</i>	03	01	02	01	01	-	-	-	+	-	-
<i>Mucor globosum</i>	02	-01	02	01	01	-	-	-	+	-	-
<i>Penicillium funiculosum</i>	-	-	02	02	-	-	-	-	+	-	-
<i>Pythium</i> sp.	-	-	02	-	01	-	03	-	+	-	-
<i>Sclerotium rolfsii</i>	01	-	-	-	-	-	-	-	+	-	-
<i>Syncephalastrum racamosus</i>	-	-01	-	-	-	-	-	-	+	-	-
<i>Rhizopus nigricans</i>	03	02	01	-	-	-	-	-	+	-	-
<i>R. stolonifer</i>	04	01	-	01	03	-	01	-	+	+	-
Unsporulated mycelium	-	-	01	01	-	-	-	-	+	-	-
Total fungal species	16	12	10	09	08	04	04	03	21	03	-

+ Present; - Absent

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