

**STUDIES ON FUNGAL DIVERSITY ASSOCIATED WITH THE CARROT, RADISH
AND ONION****Dhekle N. M.***Department of Botany, ACS College, Shankarnagar, Tq. Biloli Dist. Nanded***Abstract**

During the present studies the common vegetables of the study region such as Carrot (*Daucus carota*), Radish (*Raphanus sativus*) and Onion (*Allium cepa*) were collected directly from the fields and from the local vegetable markets. They were screened for the incidence of fungal diversity associated with them by moist blotter plate method. The fungi like *Alternaria tenuis*, *Aspergillus flavus*, *A. niger*, *A. nidulans*, *A. fumigatus*, *Curvularia lunata*, *Drechslera tetramera*, *Fusarium oxysporum*, *Fusarium moniliforme*, *Penicillium spp.*, *Chaetomium globosum*, *Collectotrichum fulcatum*, *Macrophormina phaseolina*, *Rhizoctonia solani* and *Rhizopus stolonifer* were found to be associated with the test vegetables and their seeds. The fungi like *Alternaria tenuis*, *Aspergillus flavus*, *A. niger*, *Curvularia lunata*, *Drechslera tetramera*, *Fusarium moniliforme* and *Rhizopus stolonifer* were found to be common and dominant on the test vegetables.



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INTRODUCTION

The vegetables are important sources of essential vitamins and minerals needed for human system. They have roughage in sufficient quantities, low protein and fat contents, but carbohydrates, vitamin A, C, E and minerals like P, Ca, Fe, Mg and K are in plenty and they rank next to cereals as source of carbohydrates (Singh et al., 2005). Many vegetables of different category like root vegetables, stem vegetables, leafy vegetables fruit vegetables and cole vegetables are cultivated in the Marathwada region of the Maharashtra State. In the Maharashtra particularly in the Nanded district of the Marathwada region the vegetables like Carrot (*Daucus carota*), Radish (*Raphanus sativus*) and Onion (*Allium cepa*) are commonly cultivated. It is evident from the literature that the vegetables and their seeds carry large number of fungi both in field and during storage. Most of the fungi cause decay and rots (Kunte and Yawalkar, 1991). The vegetables associated with the fungi found to be useless.

The vegetable seeds associated with the fungi found to be unable to germinate. The biodeteriorated vegetables and their seeds show many changes in their contents (Verma et al., 1991). The biodeterioration of vegetables and their seeds directly related with the toxins and enzymes production by the associated fungi. It is also clear from the literature that several workers have studied extensively mycoflora associated with the seeds of different crops. However detail studies on mycoflora associated with the vegetables and their seeds, their role in vegetable bio-deterioration, seed germination, seedling emergence and their biological control are meager in the Marathwada region. Considering these facts the present research work has been selected.

MATERIALES AND METHODS

During the present studies the common vegetables of the study region such as Carrot (*Daucus carota*), Radish (*Raphanus sativus*) and Onion (*Allium cepa*) were collected directly from the fields and from the local vegetable markets. They were screened for the incidence of mycoflora associated with them by moist blotter plate method as described by International Seed Testing Association (ISTA, 1966), De Tempe (1970), Neergaard (1973) and Agarwal (1981).

Moist blotter plate method:

A pair of white blotter papers of 8.5 cm. diameter was jointly soaked in sterile distilled water, placed in presterilized borosil petriplates of 10 cm diameter. The test vegetable samples were placed separately at equal distance on the moist blotter plates. The plates were incubated for seven days at room temperature. After incubation, the vegetable samples were examined under stereoscopic microscope for the preliminary determination of the fungal species associated with them. Identification and further confirmation of the associated fungal species was made by preparing slides of the fungal growth and observing under compound microscope. The common and predominant fungi associated with the test vegetables were maintained on PDA slants in the form of pure culture for further studies. The fungi associated with the test vegetables such as Carrot (*Daucus carota*), Radish (*Raphanus sativus*) and Onion (*Allium cepa*) were preliminary identified on the basis of sporulation characters like asexual or sexual spores or fruiting structures. Detailed examination of fungal characters was done under compound microscope and their identification was confirmed with the help of latest manuals (Subramanian, 1971; Neergaard and Mathur, 1980; Jha, 1993 and Mukadam, 1997). Pure culture of the identified fungi were prepared and maintained on PDA (Potato Dextrose Agar) slants.

RESULTS AND DISCUSSION

From the results presented in table-1 it is clear that total fourteen fungi were found to be showed their association with the Carrot. The Carrot seeds were found to be showed association of more fungi than the roots. The fungi like *Aspergillus carbonarius*, *A. fumigatus*, *Cladosporium sp.* and *Rhizopus stolonifer* showed their incidence only on the seeds of carrot and not on the roots where as the fungi like *Alternaria tenuis*, *Aspergillus flavus*, *A. nidulans*, *A. niger*, *Curvularia lunata*, *Drechslera tetramera*, *Fusarium moniliforme* and *F. oxysporum* were found to be showed their incidence on both roots and seeds of carrot.

From the results presented in table-2 it is observed that total twelve fungi were found to be showed their incidence on Radish. The fungi like *Alternaria tenuis*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus niger*, *Curvularia lunata*, *Drechslera tetramera*, *Fusarium moniliforme* and *Rhizopus stolonifer* were found to be showed their incidence on both roots and seeds of Radish. Where as the fungi like *Chaetomium globosum* and *Macrophomina phaseolina* showed their incidence only on the roots and the fungi like *Aspergillus nidulans* and *Penicillium sp.* showed their incidence only on the seeds of Radish.

From the results presented in table-3, it is evident that total fourteen fungi were showed their incidence on onion bulbs and seeds. The onion seeds were found to be showed association of more fungi than the bulbs. The fungi like *Aspergillus nidulans* and *Colletotrichum fulcatum* were found to be showed their incidence only on the onion bulbs where as the fungi like *Aspergillus fumigatus*, *Curvularia lunata*, *Drechslera tetramera*, *Fusarium oxysporum*, *Macrophomina phaseolina* and *Penicillium sp.* were found to be showed their incidence only on the seeds of onion. The fungi like *Alternaria tenuis*, *Aspergillus flavus*, *Aspergillus niger*, *Fusarium moniliforme* and *Rhizopus stolonifer* were found to be showed their incidence on both bulbs and seeds of onion.

The fungi *Alternaria tenuis*, *Aspergillus flavus*, *Aspergillus niger*, *Curvularia lunata*, *Drechslera tetramera* and *Fusarium moniliforme* were found to be common and dominant on the test vegetables.

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TABLES

Table-1: Incidence of mycoflora associated with Carrot (*Daucus carota*) by moist blotter plate method after ten days of incubation at room temperature

Sr. No.	Mycoflora	Incidence on Carrot	
		Roots	Seeds
1.	<i>Alternaria tenuis</i> L.	+	+
2.	<i>Aspergillus carbonarius</i> L.	-	+
3.	<i>Aspergillus flavus</i>	+	+
4.	<i>Aspergillus fumigatus</i>	-	+
5.	<i>Aspergillus nidulans</i>	+	+
6.	<i>Aspergillus niger</i>	+	+
7.	<i>Chaetomium globosom</i>	+	-
8.	<i>Cladosporium</i> spp.	-	+
9.	<i>Curvularia luntata</i>	+	+
10.	<i>Drechslera tetramera</i>	+	+
11.	<i>Fusarium moniliforme</i>	+	+
12.	<i>Fusarium oxysporum</i>	+	+
13.	<i>Penicillium</i> spp.	+	-
14.	<i>Rhizopus stolonifer</i>	-	+

Note: + = incidence of mycoflora; - = No incidence of mycoflora

Table-2: Incidence of mycoflora associated with Radish (*Raphanus sativus*) by moist blotter plate method after ten days of incubation at room temperature

Sr. No.	Mycoflora	Incidence on Radish	
		Roots	Seeds
1.	<i>Alternaria tenuis</i>	+	+
2.	<i>Aspergillus flavus</i>	+	+
3.	<i>Aspergillus fumigatus</i>	+	+
4.	<i>Aspergillus nidulans</i>	-	+
5.	<i>Aspergillus niger</i>	+	+
6.	<i>Chaetomium globosom</i>	+	-
7.	<i>Curvularia luntata</i>	+	+
8.	<i>Drechslera tetramera</i>	+	+
9.	<i>Fusarium moniliforme</i>	+	+
10.	<i>Macrophomina phaselous</i>	+	-
11.	<i>Penicillium</i> spp.	-	+
12.	<i>Rhizopus stolonifer</i>	+	+

Note: + = incidence of mycoflora; - = No incidence of mycoflora

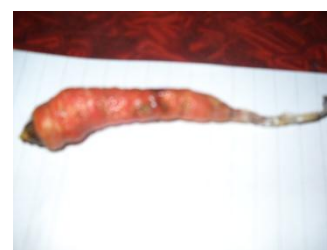
Table-3: Incidence of mycoflora associated with Onion (*Allium cepa*) by moist blotter plate method after ten days of incubation at room temperature

Sr. No.	Mycoflora	Incidence on Onion	
		Bulbs	Seeds
1.	<i>Alternaria tenuis</i>	+	+
2.	<i>Aspergillus flavus</i>	+	+
3.	<i>Aspergillus fumigatus</i>	-	+
4.	<i>Aspergillus nidulans</i>	+	-
5.	<i>Aspergillus niger</i>	+	+
6.	<i>Chaetomium globosom</i>	+	-
7.	<i>Colletoricum fulcata</i>	+	-
8.	<i>Curvularia luntata</i>	-	+
9.	<i>Drechslera tetramera</i>	-	+
10.	<i>Fusarium moniliforme</i>	+	+
11.	<i>Fusarium oxysporum</i>	-	+
12.	<i>Macrophomina phaseolina</i>	-	+
13.	<i>Penicillium spp.</i>	-	+
14.	<i>Rhizopus stolonifer</i>	+	+

Note: + = incidence of mycoflora; - = No incidence of mycoflora

PLATES

Plate-1:



Infected Carrot



Infected Radish

Plate-1: Fungal diversity on the roots of Carrot and Radish

Plate-2:



Plate-2: Fungal diversity on Onion bulbs