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STUDIES ON FUNGAL DIVERSITY ASSOCIATED WITH CAULIFLOWER, TOMATO AND BHENDI

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Abstract:

During the present studies the common vegetables of the study region such as Cauliflower (*Brassica oleracea* var. *botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) 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*, *Macophormina 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.

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 Cauliflower (*Brassica oleracea* var. *botrytis*), Tomato (*Lycopersicon esculentum*), Bhendi (*Abelmoschus esculentus*) etc. 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 biodeterioration, seed germination, seedling emergence and their biological control are meagre 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 Cauliflower

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(*Brassica oleracea* var. *botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) 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 (1978).

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 Cauliflower (*Brassica oleracea* var. *botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) 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 thirteen fungi were found to be showed their incidence on the cauliflower. Out of thirteen, eight fungi were found to be showed their incidence and growth on both seeds and flowers in the corymbs. Three fungi namely *Aspergillus fumigatus*, *Chaetomium globosum* and *Macrophomina phaseolina* were found to be showed their incidence only on the seeds and the fungus *Penicillium* sp. was found to be showed its incidence only on the flowers in the corymbs of cauliflower.

From the results presented in table-2, it is observed that total twelve fungi were found to be showed their incidence on the fruit and seeds of Tomato. The fruit of Tomato were found to be showed association to more fungi than the seeds. Eight fungi were found to be showed their incidence on both fruits and seeds of Tomato. Whereas three fungi namely *Fusarium oxysporum*, *Macrophomina phaseolina* and *Penicillium* sp., were found to be showed their incidence and growth only on the fruits and the fungus *Cladosporium* sp. showed its incidence only on the seeds of Tomato.

From the results presented in table-3 it is clear that total thirteen fungi were found to be associated with the fruits and seeds of Bhendi. Ten fungi were found to be associated with both fruits and seeds of Bhendi. Whereas two fungi namely *Aspergillus carbonarius* and *Penicillium* sp. were found to be associated only with the seeds and *Aspergillus fumigatus* was found to be associated only with the fruits of Bhendi.

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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PLATES

Table-1: Incidence of mycoflora associated with Cauliflower (*Brassica oleracea* var. botrytis) by moist blotter plate method after ten days of incubation at room temperature

Sr. No.	Mycoflora	Incidence on Cauliflower	
		Corymb	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 globosum</i>	-	+
7.	<i>Colletotrichum fulcatum</i>	+	+
8.	<i>Curvularia lunata</i>	+	+
9.	<i>Drechslera tetramera</i>	+	+
10.	<i>Fusarium moniliforme</i>	+	+
11.	<i>Macrophomina phaseolina</i>	-	+
12.	<i>Penicillium</i> spp.	+	-
13.	<i>Rhizopus stolonifer</i>	+	+

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

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

Sr. No.	Mycoflora	Incidence on Tomato	
		Fruits	Seeds
1.	<i>Alternaria tenuis</i>	+	+
2.	<i>Aspergillus flavus</i>	+	+
3.	<i>Aspergillus nidulans</i>	+	+
4.	<i>Aspergillus niger</i>	+	+
5.	<i>Cladosporium spp.</i>	-	+
6.	<i>Curvularia luntata</i>	+	+
7.	<i>Drechslera tetramera</i>	+	+
8.	<i>Fusarium moniliforme</i>	+	+
9.	<i>Fusarium oxysporum</i>	+	-
10.	<i>Macrophomina phase lonia</i>	+	-
11.	<i>Penicillium spp.</i>	+	-
12.	<i>Rhizopus stolonifer</i>	+	+

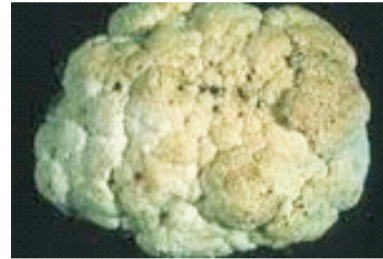
Note: + = incidence of mycoflora; - = No incidence of mycoflora

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

Sr. No.	Mycoflora	Incidence on Bhendi	
		Fruits	Seeds
1.	<i>Alternaria tenuis</i>	+	+
2.	<i>Alternaria carbonarius</i>	-	+
3.	<i>Aspergillus flavus</i>	+	+
4.	<i>Aspergillus fumigatus</i>	+	-
5.	<i>Aspergillus niger</i>	+	+
6.	<i>Chaetomium globosome</i>	+	+
7.	<i>Colletotrichum fulcatum</i>	+	+
8.	<i>Curvularia luntata</i>	+	+
9.	<i>Drechslera tetramera</i>	+	+
10.	<i>Fusarium moniliforme</i>	+	+
11.	<i>Fusarium oxysporum</i>	+	+
12.	<i>Penicillium spp.</i>	-	+
13.	<i>Rhizopus stolonifer</i>	+	+

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

PLATES
Plate-18



Infected Corymbs of Cauliflower



Infected Fruits of Tomato



Infected Fruits of Bhendi

Plate-18: Fungal diversity on the Cauliflower, Tomato and Bhendi

PLATE -19



Plate-19 : Incidence of mycoflora on the seeds of Bhendi
(*Abelmoschus esculentus* (L.) Moench)

PLATE-21



Cabbage
(*Brassica oleracea* var. *capitata* L.)

Cauliflower
(*Brassica oleracea* var. *botrytis* L.)

Plate-21 : Incidence of mycoflora on the seeds of Cabbage and Cauliflower

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