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Isolation and Identification of Extra-aquatic, Pathogenic Fungi from the Polluted Water of Munneru River, Telangana, India

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A B S T R A C T

Munneru is a small River and flows through Dornakal Eru, Kaamanchkal and Daanavaayigudem areas of Khammam district, Telangana, India. Munneru is a major water source, the river is so much polluted with the domestic, factories and municipal solid wastes. Surface water samples were collected from three locations of the river. Water samples were cultured immediately. Potato dextrose agar medium was used for culturing. 50 species and 18 genera were isolated. *Aspergillus spp, Curvularia spp, Drechslera spp, Fusarium spp, Pencillium spp, Trichoderma spp,* were the dominant species isolated from the polluted waters of Munneru River.

Introduction

Munneru is a left tributary of Krishna River. The river originates in Warangal district, Telangana, India. It flows in the districts of Khammam and Krishna. In Khammam Munneru flows through Dornakal Eru, Kaamanchkal and Daanavayigudem sub-urbans of this district. The river act as a water source of Khammam district, Telangana, India.

In the world around 300 species are known to be associated with the aquatic habitat (Shearer *et al.*, 2007). Fresh water fungi are a diverse and heterogeneous group comprising many orders viz Hyphomycetes (Cooker, 1923; Waterhouse, 1942), Oomycetes (Shearer *et al.*, 2007), Chytridiomycetes (Ingold, 1975; Barlocher, 1992), Basidiomycetes (Nakagiri and Ito, 1991). Ascomycetes (Vijayakrishna and Hyde, 2006). Among them Ascomycetes and Hyphomycetes are dominant groups (Vaihya and Deepak paradeshi, 2015). The main role of freshwater Ascomycetes, Basidiomycetes and Mitosporic fungi in fresh water ecosystems are in the degradation of dead organic material (Nizamydeen *et al.*, 2014).

In the present investigation an attempt has been made to study the growth of pathogenic,

extra-aquatic fungal development in the polluted water of Munneru River.

Materials and Methods

The water samples were collected in pre-sterilized bottles during the month of June 2016- November 2016 from the 3 locations Viz Dornakal Eru, Kaamanchkal and Daanavayigudem banks of the Munneru River, Khammam district, Telangana, India. Surface water samples were collected to examine the fungal organisms, and taken the samples 2 feet above from the base of the river.

All the samples were plated on Potato dextrose agar medium (Difcomannual, 1969) after isolating them by dilution technique (Pramer and Schmidth, 1966) and stored at room temperature until the colonies were grown. Pure cultures were maintained on the PDA slants and stored at refrigerator.

To identify the mycelium sides were stained with cotton blue in lacto phenol and observed under the electron microscope. The identification of colonies was done by using the hand book of soil fungi (Nagamani and Manoharachary).

Results and Discussion

50 species and 18 genera were isolated from the river of Munneru. The isolated species were *Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus nidulans, Aspergillus ripens, Aspergillus ustus, Aspergillus ochraceus, Aspergillus terrius, Aspergillus oryzae, Aspergillus awamori, Aspergillus restrictus, Aerobasidium pullulans, Alternaria alternate, Alternaria solani, Curvularia brachyspora, Curvularia lunata, Curvularia geniculate, Cheatomium indicum, Cheatomium globossum, Cheatomium funicola, Cladosporium cladosporioides, Cylindrocladium parvum, Drechslera tetramera, Drechslera australiensis, Drechslera spicifera, Fusarium moniliformae, Fusarium oxysporum, Fusarium subdlutinans, Fusarium roseum, Macrophomina phaseolina, Mucor globossum, Mucor indicum, Mucor racemosus, Myrothecium roridium, Pencillium chrysogenum, Pencillium rubrum, Pencillium griseofulvum, Periconia byssoides, Pacelomyces spp, Rhizopus stolonifera, Rhizopus nigricans, Rhizopus orizae, Rhizopus arrhizus, Trichoderma koningii, Trichoderma viridae, Trichoderma reesi, Trichoderma harizianum, Verticillium glacum, Verticillium atro-album.*

In the bank of Dornakal Eru 16 species were isolated such as*Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus nidulans, Aspergillus ripens, Alternaria alternata, Alternaria solani, Fusarium moniliformae, Fusarium oxysporum, Mucor globossum, Mucor indicum, Mucor racemosus, Pencillium chrysogenum, Rhizopus stolonifer, Rhizopus nigricans.*

In kaamanchkal 25 species such as *Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus nidulans, Aerobasidium pullulans, Alternaria alternata, Curvularia brachyspora, Curvularia lunata, Curvularia geniculata, Cheatomium indicum, Cheatomium globossum, Cheatomium funicola, Cladosporium cladosporioides, Drechslera australiensis, Drechslera spicifera, Fusarium moniliformae, Fusarium oxysporum, Fusarium roseum, Macrophomina phaseolina, Mucor globossum, Mucor indicum, Mucor racemosus, Pencillium griseofulvum, Periconia byssoides, Paecilomyces spp, Trichoderma viride, Verticillium glacum* were isolated.

In Daanavayigudem 36 species *Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus nidulans, Aspergillus*

ripens, Aspergillus ustus, Aspergillus ochraceus, Aspergillus oryzae, Aspergillus awamori, Aspergillus restrictus, Curvularia brachyspora, Curvularia lunata, Curvularia geniculata, Cheatomium indicum, Cheatomium globossum, Cheatomium funicola, Cladosporiumm cladosporioides, Cladosporium variable, Cyclindrocladium parvum, Drechslera spicifera, Fusarium subglutinans, Macrophomina phaseolina, Mucor indicum, Mucor racemosus, Myrothecium roridium, Pencillium chrysogenum, Rhizopus stolonifer, Rhizopus nigricans, Rhizopus orizae, Rhizopus arrhizus, Trichoderma koningii, Trichoderma reesi,Verticillium glacum, Verticillium atra-album, Trichoderma viridae Were isolated.

In this three locations Daanavayigudem have been recorded more number of fungal organisms than the 2 locations Dornakal Eru and Kaamanchkal.

In the present study the highest numbers of fungi were isolated from the Daanavayigudem area, when compared to the other 2 locations. *Aspergillus spp, Curvularia spp, Drechslera spp, Fusarium spp, Pencillium spp, Rhizopus spp, Mucor spp, Trichoderma spp* were the dominant species recorded in these 3 locations of Khammam.

Excess levels of nutrients and other chemicals lead to changes in aquatic life (Wesbster and Descals, 1979). Highest fungal organisms were recorded in the Daanavayigudem area due to the presence of domestic sewage, factory chemicals and dumped municipalsolid wastes, which are into the River. These nutrients act as catalysts and enhance the growth of the pathogenic organisms in the aquatic environment (Umesh *et al.,* 2012). The fungal populationincreases with the increase of pollution (Sharada Vaidhya and Deepak Paradeshi, 2015; Somashekhar *et al.,* 1982; Bhupendra singh *et al.,* 2014). Hence Daanavayigudem is considered as a highly polluted region than the Dornkal Eru and Kaamanchkal.

Table.1 The table showing the fungal organisms which were isolated from the 3 locations of Munneru River

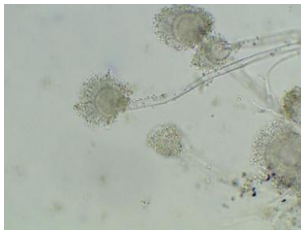
S. No	Fungus name	Dornakal Eru	Kaamanchkal	Daanavayigudem	Total species
1.	*Aspergillus niger*	+	+	+	+
2.	*Aspergillus flavus*	+	+	+	+
3.	*Aspergillus fumigatus*	+	+	+	+
4.	*Aspergillus nidulans*	+	+	+	+
5.	*Aspergillus ripens*	+		+	+
6.	*Aspergillus ustus*	+		+	+
7.	*Aspergillus ochraceus*			+	+
8.	*Aspergillus terries*				+
9.	*Aspergillus oryzae*			+	+

10.	*Aspergillus awamori*			+	+
11.	*Aspergillus restrictus*			+	+
12.	*Aerobasidium pullulans*		+		+
13.	*Alternaria alternate*	+	+		+
14.	*Alternaria solani*	+	+		+
15.	*Curvularia brachyspora*			+	+
16.	*Curvularia lunata*		+	+	+
17.	*Curvularia geniculate*			+	+
18.	*Cheatomium indicum*		+	+	+
19.	*Cheatomium globossum*		+	+	+
20.	*Cheatomium finicola*			+	+
21.	*Cladosporium cladosporioides*		+	+	+
22.	*Cladosporium variable*			+	+
23.	*Cyclindrocladium parvum*			+	+
24.	*Drechslera tetramera*			+	+
25.	*Drechslera australiensis*		+		+
26.	*Drechslera spicifera*		+	+	+
27.	*Fusarium moniliformae*	+	+		+
28.	*Fusarium oxysporum*	+	+		+
29.	*Fusarium subglutinans*			+	+
30.	*Fusarium roseum*		+		+
31.	*Macrophomina phaseolina*		+	+	+
32.	*Mucor globossum*	+	+		+
33.	*Mucor indicum*	+	+	+	+
34.	*Mucor racemosus*	+	+	+	+

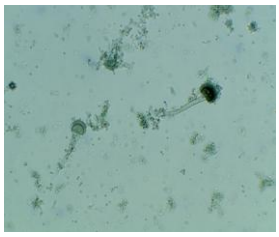
35.	*Myrothecium roridium*			+	+
36.	*Pencillium chrysogenum*	+		+	+
37.	*Pencillium rubrum*			+	+
38.	*Pencillium griseofulvum*		+		+
39.	*Periconia byssoides*		+		+
40.	*Paecilomyces varioti*		+		+
41.	*Rhizopus stolonifera*	+		+	+
42.	*Rhizopus nigricans*	+		+	+
43.	*Rhizopus orizae*			+	+
44.	*Rhizopus arrhizus*			+	+
45.	*Trichoderma koningii*			+	+
46.	*Trichoderma viridae*		+	+	+
47.	*Trichoderma reesi*			+	+
48.	*Trichoderma harizianum*			+	+
49.	*Verticillium glacum*		+	+	+
50	*Verticililium atro-album*			+	+

Fig. The figures 1, 2, 3, 4, 5, 6, 7, 8, 9 were showing the fungal organisms which were isolated from the three locations of the Munneru River

Alternaria alternate
(1)

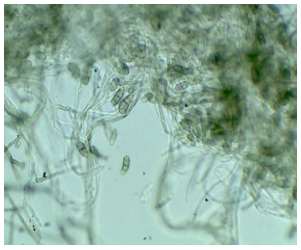


Aspergillus flavus
(2)



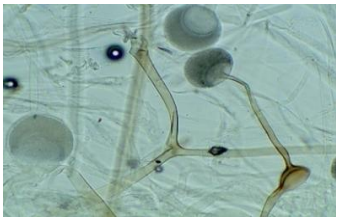
Aspergillus fumigatus
(3)

Aspergillus niger
(4)

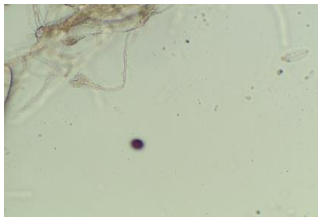


Curvularia luna
(5)

Fusarium oxysporum
(6)



Mucor globossum
(7)



Penicillium chrysogenum
(8)

Rhizopus spp
(9)

Minimum number of extra-aquatic and pathogenic fungal members were isolated from the Kaamanchkal area, this area contain normal range of pollution had recorded than Dornakal Eru and Daanavayigudem. Due to the domestic sewage, polluted water and other wastes have been mixed into the bank of kaamanchkal. Less number of fungal members was recorded in Dornakal Eru when compared to the other two areas Kaamanchkal and Daanavayigudem. Usually people use this water for domestic purposes and Agriculture.

Heterotrophic fungal organisms are usually present in nature of the aquatic environment (Goh *et al.*, 2003). Aquatic fungi contribute to the energy flow and productivity of ecosystem by their active role in the utilization and bio deterioration of organic materials (Khuble, 2001). These fungi also possess the ability to parasitize aquatic plants and animals including fishes under certain condition (Cooke, 1977).

In conclusion all the 3 places of Munneru River in Khammam district, Telangana, India, maximum frequency of fungi *Aspergillus spp, Curvularia spp, Drechslera spp, Fusarium spp, Pencillium spp, Rhizopus spp, Mucor spp, Trichoderma spp* were recorded from the Daanavaayigudem, it was severely polluted area when compared to the other other two banks of Dornakal Eru and Kaamanchkal. Which leads health hazards to the plants and animals.

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