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Endophytic Fungal Diversity in Corms of *Amorphophallus sylvaticus* (Roxb.) Kunth

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Abstract: ***In present investigation Amorphophallus sylvaticus (Roxb.) Kunth Commonly called as Jangali suran is a monsoon perennial cormatus plant species first time studied for endophytic fungal diversity of corm. The different corm sample were collected from two different sites namely Pota and Nageli sites in Nanded district of Maharashtra. The 45 corm samples were screened for colonization of different endophytic fungi on czapek-dox agar medium. The different corm samples show different endophytic fungal genera the isolated and identified genera includes Fusarium, Cladosporium, Alternaria, Helminthosporium, Curvularia, Rhizoctonia and Drechslera.***

Keywords: *Amorphophallus sylvaticus*, corm and endophytic fungi.

1. Introduction

Endophytic fungi are important components of plant micro-ecosystems. They spend their whole life by colonizing intra or inter-cellularly within the healthy tissues of the host plants, without showing any symptoms of disease (Zhang *et al.* 2006). Endophytes are found in a wide variety of plant tissue types such as roots, stems, leaves, tubers, buds, ovules, seeds, fruits, xylem and bark (Tan and Zou, 2001).

Study revealed that approximately, there are near to 300,000 plant species on the earth having host to one or more endophytes, and many of them may colonize different hosts. (Strobel & Daisy 2003, Huang *et al.*, 2007).

Plant endophytic fungi are novel and important for production of natural bioactive compounds with their potential use in agriculture, medicine and food industry. The various important bioactive compounds from entophytic fungi isolated which shows antimicrobial, insecticidal, cytotoxic and anticancer activities. An anticancer taxol isolated from *Colletotrichum gloeosporioides* of concentration from 0.005 – 0.05 µm induced increased cell death against human cancer cell through apoptosis (Gangadevi & Muthumary, 2008). They produces anticancer enzyme L-asparaginase (Yiing and Adeline, 2014). The production of bioactive compounds which shows antimicrobial activity against different pathogenic microbes (Jingfeng *et al.*, 2013, Tanmayee *et al.*, 2015). Endophytes having ability to produce different enzymes like amylase, cellulase, protease, lipase, and laccase. Endophytes like *Aspergillus terreus* produces lovastatin used in treatment of coronary heart diseases, renal diseases, Alzheimer's disease, bone fractures etc (Praveen *et al.*, 2014). Endophytic fungus *Pestalotiopsis microspora* from *Terminalia morobensis* to show antioxidant activity to scavenge superoxide and hydroxyl free radicals (Harper *et al.*, 2003). The endophytic *Aspergillus* sp., *Phoma* sp.produces Antidiabetic drug 2, 6-di-tert-butyl-p-cresol and Phenol, 2, 6-bis [1, 1-dimethylethyl]-4-methyl which Reduce blood glucose level (Dhankhar and Yadav 2013).

There are plenty of reports on endophytic fungal diversity of different plants like *Cymbopogon citratus, Murraya koenigii, Oldenlandia diffusa* and *Pereskia bleo* (Yiing *et al.*, 2014), Roots of *Salvia miltiorrhiza* Bunge (Jingfeng *et al.*, 2013), Stem of Rose plant and leaves of Mango tree (Tanmayee, *et al.* 2015).*Urginea indica* (Shiva *et al.*, 2015), orchids like *Anacamptis pyramidalis* (L.), *Orchis sancta* L., *Ophrys fusca* Link. and *Serapias vomeracea* subsp. *orientalis* (Greuter) from roots and tubers (Yuksel and Rengin,2009), tuber of *Solanum tuberosum* (M. O'Callaghan *et al.* (2004). The rhizospheric fungi associated with the corms of *Amorphophallus sylvaticus* (Roxb.) Kunth were isolated (Mulani and Sayyad, 2015).

There is a no report on endophytic fungal diversity of *Amorphophallus sylvaticus* (Roxb.) Kunth, so the present investigation was undertaken.

2. Materials and Methods

2.1. Collection of corms

Corms of *Amorphophallus sylvaticus* (Roxb.) Kunth were collected from fields of village Pota, Tq. Himayatnagar and village Nageli, Tq. Mudkhed of Nanded district during winter (November, 2014). These corm samples were collected in sterile polythene bags and brought to the laboratory used for the investigation of endophytic fungi.

2.2. Isolation of Endophytic Fungi

Endophytic fungi were isolated by following methods employed by Hallman *et al.* (2007) and Selvakumar *et al.* (2014).

The collected corm samples were washed in running tap water to remove the debris and epiphytic microorganisms and soaked in 0.1 % mercury chloride subsquently surface sterilized by using ethanol. Followed by sterilizing agent, such as 2% Sodium hypochloride solution for 2-4 minutes and then by sterile distilled water. The Sterile corm were then chopped into 3-4 mm x 0.1 cm lengths and inoculated in petridishes containing potato dextrose agar (PDA) medium supplemented with streptomycin. The petridishes

were sealed and incubated at room temperature (28±2˚C) for 15 days. Fungal growths growing out of the corm pieces were sub cultured on separate PDA plates and slants before use for the identification.

The colonization frequency (CF) percentages of Endophytic fungi were calculated using the method (Kumar & Hyde 2004).

2.3. Colonization Frequency

$$CF\% = \frac{\text{No of species isolated} \times 100}{\text{No of segments screened}}$$

2.4. Identification of Isolated Fungal Organisms

The identification of endophytic fungi was done by using the culture characteristics like fungal culture shape, color, pattern and microscopic characteristics like arrangement of the mycelium, conidial arrangement, types of spore etc. by consulting relevant literature. The pure cultures of isolated fungal strains were maintained on PDA slants at 28^0C during the study.

3. Results & Discussion

In present investigation a total forty five small corm segments were screened for isolation of endophytic fungi on Czapex dox agar medium. The total seven endophytic fungal genera were isolated and identified from corms of *Amorphophallus sylvaticus* (Roxb.) Kunth. The isolated genera include *Fusarium*, *Alternaria*, *Helminthosporium*, *Cladosporium*, *Curvularia*, *Rhizoctonia* and *Drechslera*.

The species colonization consist of *Fusarium 9.25* %, *Alternaria 12.96* %, *Helminthosporium* 5.55 %, *Cladosporium* 7.4 %, *Curvularia* 5.55 %, *Rhizoctonia* 3.7 %, and *Drechslera* 5.55 % (Table.1 and Fig.1)

Similarly different researchers have isolated endophytic fungi from different plant parts, mainly Maria *et al.* (2013) isolated *Monilia* sp., *Aureobasidium* sp., *Moniliella* sp., and *Sporothrix* sp. from tubers of *Dahlia variabilis.* Yuksel and Rengin (2009) isolated *Rhizoctonia*, *Fusarium* and *Papulaspora* from roots and tubers of orchids. Chanda *et al.*, (2013) isolated endophytes include *Aspergillus sp, Nigrospora sp, Mucor sp., Curvularia sp., Fusarium sp., Alternaria sp., Stemphylum sp.* and *Chetomium sp.* O'Callaghan *et al.*, (2004) isolated endophytic fungal genera include *Chaetomium*, *Cladosporium*, *Fusarium*, *Gliocladium, Paecilomyces, Phomopsis and Rhizoctonia* from tuber of *Solanum tuberosum*. Tanmayee *et al.*, (2015) isolated Total, 5 fungal isolates of endophytes were obtained from Rose stem. The less endophytic fungal diversity may be due to medicinal property of plant that affect colonization due to secretion of some antifungal compounds (Rajgopal *et al.*, 2010).

Table 1: Frequency colonization of endophytic fungal genera from corm segments of *Amorphophallus sylvaticus* (Roxb.) Kunth.

Sr. No	*Name of fungal Endophytic genera*	*Number of isolates*	*Frequency of colonization*
1	*Fusarium*	5	9.25 %
2	*Alternaria*	7	12.96 %
3	*Helminthosporium*	3	5.55 %
4	*Cladosporium*	4	7.4 %
5	*Curvularia*	3	5.55 %
6	*Rhizoctonia*	2	3.7 %
7	*Drechslera*	3	5.55 %

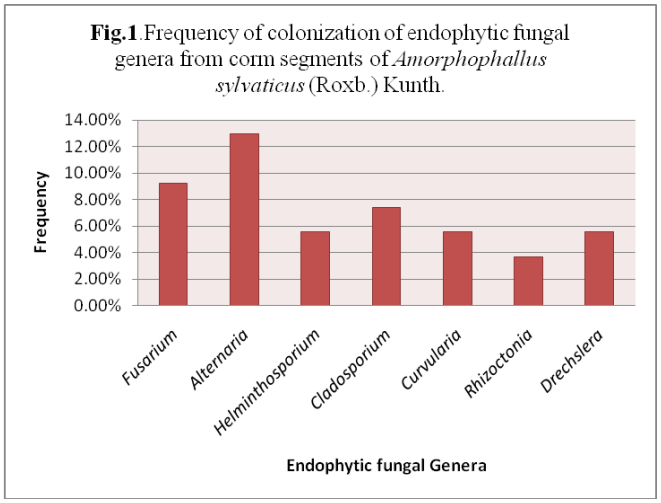

Fig.1 Frequency of colonization of endophytic fungal genera from corm segments of *Amorphophallus sylvaticus* (Roxb.) Kunth.

4. Conclusion

In present investigation the total seven endophytic fungal genera were isolated and identified from different corms of *Amorphophallus sylvaticus* which will be further used for production of some bioactive compounds which is essentially used in medicine, agriculture and food industry.

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