

**OCCURRENCE OF THE FUNGAL PATHOGENS
ASSOCIATED WITH FRENCH BEAN IN THE
ORGANIC FARMING SYSTEM OF MANIPUR,
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India**Abstract:**

A study was conducted to evaluate the fungal pathogens of french bean and incidences of the various diseases in the bean growing gardens of Manipur. The study has been carried out exclusively to the home garden cultivation as the garden cultivations could be considered as organic by default as there is a general trend of not applying synthetic chemicals and fertilizers in the home gardens. Though the products of the home garden do not contribute much for marketing yet few surplus were sent to the market and a substantial amount of their home consumptions has been made from the home garden. The study included survey and assessment of the disease. Survey was carried out during the march to june bean growing seasons in Manipur for three consecutive years, 2008, 2009 and 2010. Major disease observed in the study includes Alternaria leaf spot, Cercospora leaf spot, powdery mildew, rust, rhizoctonia root rot, Fusarium wilts, sclerotina root rot and sclerotina fruit rot . The study would help in understanding the prevalent fungal diseases of french bean in the home gardens of Manipur. This would enable to take up appropriate disease management practices for the diseases in the organic farming system. Again the study would help in understanding the fungal pathology of french bean managed through organic means.

Introduction

French bean is grown extensively in Manipur. It is grown in the home garden for home consumption in most households. Few surpluses were sold in the market. Two main bean varieties viz. pole type and bush type were sown. Also the pole type is more preferred by the people for consumption. Nowadays there developed farms for commercial bean production. In these farms they are usually produced through the conventional mode i.e. through the application of synthetic fertilizers and agrochemicals. But organic mode of agriculture is gaining momentum in the North East India and many cropping areas were still regarded as organic by default. The home gardens managed for home consumption were ideal sites for study of organically managed fields as most home gardens of Manipur were managed through organic means. Like other crops french bean is also infested with a wide range of pathogens. A wide array of fungi associated with french bean has been reported all over the world. But there is less study of french bean diseases in the organic environment. Hence work has been done to ascertain the fungal pathogens associated with the crop grown in the organic environment. The specific study of the fungal disease in the organic environment would help in further study of the relative prevalence of fungal disease in the conventional and organic farming system in future studies. It is felt that a study of the fungal pathology of french bean grown in the organic environment would definitely help farmers in mitigating the impact of the diseases on bean production. Study has been done with surveys on bean growing home gardens of Manipur for three years. Most household gardens being managed through organic means, it is assumed that the gardens were organic by default and study is done on such fields.

Materials and Methods

Surveys were conducted in four districts of Manipur namely:- Imphal east, Imphal West, Thoubal, Senapati. The sites were selected based on the convenience in access and the wide scale cultivation of the crops. During the sampling surveys diseased plant materials with characteristic symptoms were collected in polythene bags for proper identification in the laboratory.

Isolation and pathogenecity test

The pathogens were isolated with the techniques as described by Aneja (2003).The infected plant parts were washed with tap water and then with distilled






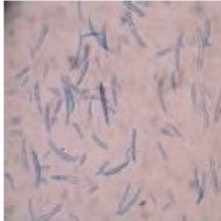

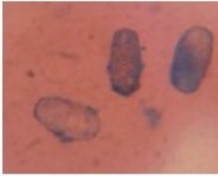
water then it is blotted dry. Piece of the infected parts with some healthy portion were taken from the washed plant parts and sterilized with 95% alcohol. The sterilized material is placed on freshly prepared PDA. And incubated in BOD incubators at $25 \pm 5^\circ\text{C}$. Observations were made each day for the mycelium around the infected portion. The mycelium was then aseptically transferred on fresh media for pure culture preparation and pathogenicity test.

Identification of Pathogens

Identification of the pathogens and diseases were made observing the characteristic disease symptoms associated and morphology of the pathogens. Literatures relevant to the fungal diseases of french bean has been consulted for studying the diseases of french bean. The literatures consulted for bean disease diagnosis and identification of the pathogens includes :-Barnett and Hunter(1972), Hagedorn and Inglis (1986), Schwartz and pastor-corrales(1989), Meronuck et al (1993),FAO regional vegetable IPM programme (2007) and mycobank of International mycological Association(IMA)

Results and Discussions

During the survey eight bean diseases has been observed in the fields. The diseases observed are represented in table 1. These are common to all the regions of the survey. Of the diseases four diseases were affecting mostly leaves(*Alternaria* leaf spot, *Cercospora* leaf spot, powdery mildew and rust). Three of the diseases are of roots (*Fusarium* wilts, *rhizoctonia* root rot, *sclerotinia* root rot) and one is affecting the pods (*sclerotinia* fruit rot). The data of disease incidence indicates that rust is showing maximum disease incidence, followed by *cercospora* and *alternaria*. Powdery mildew showed least disease incidence. Of the diseases affecting roots *fusarium* showed maximum disease incidence, followed by *Rhizoctonia* rot and *sclerotinia* rot showed least disease incidence. *Sclerotinia* fruit rot occurred during the rainy periods. As revealed by the data the difference in the disease incidence in the three years might be attributed to the difference in the climatic conditions in the three years. From the study it is observed that rust is the most prevalent disease on french bean. Also *fusarium* wilt and *rhizoctonia* rot are important diseases. Hence it would be helpful to take up measures to mitigate these prevalent diseases for reducing the impact of fungal diseases in the organic farming system.

Sl.no.	Disease name	Pathogen(Conidium /Conidia)	Affected Plant Parts
1	Alternaria leaf spot 	Alternaria alternata 	Leaves
2	Cercospora leaf spot 	Cercospora canenses 	Leaves
3	Fusarium wilt 	Fusarium oxysporium 	Roots
4	Powdery mildew 	Erisiphe polygoni 	Leaves


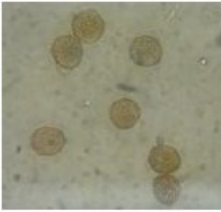

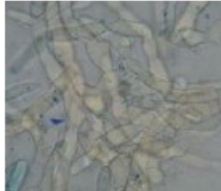

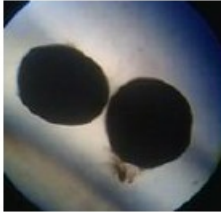


5	Bean Rust 	Uromyces Appendiculatus 	Leaves
6	Rhizoctonia Root Rot 	Rhizoctonia Solani 	Roots
7	Sclerotinia Rot 	Sclerotinia Rolfsii 	Roots
8	Sclerotinia Fruit Rot 	Sclerotinia Sclerotium 	Pods

Table 1: Diseases of French bean with their symptoms and associated pathogens

Reference

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