Recuperation of fungi from Sclerotia of broad bean wilt pathogen, *Sclerotium rolfsii,* in kitchen garden soil of Imphal, Manipur

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PERTHOPHYTISM is a phenomenon in which the parasite kills host cells before they are colonized. It bridges the area between parasitism and saprophytism. One of the common example is *Sclerotium rolfsii.* The perthophyte, *S. rolfsii* being a pathogen of broad bean, causes a great loss to broad bean an economically important plant. The disease incidence ranges from 8.72% to 10.59% (Singh & Singh, 1987, 1990a). Thus, it was thought worthwhile to study the mycoflora of sclerotia with a view to find out the fungi associated with these sclerotia and to detect the possible way of biological control.

In the present investigation, the test sclerotia were produced on an sterilized Czapeck dox Agar media by an isolate of *Sclerotium rolfsii* that had previously been recovered from diseased broad bean plants. Sclerotia were separated from the plate by picking out the sclerotia by forceps. Sclerotia were placed on filter paper, air dried. The sclerotia were surface sterilized in 2% sodium hypochlorite and rinsed three times in distilled water. The sclerotia, thus prepared were placed in a nylon bag (approximately 3x2cm) which was previously autoclaved. Twenty such bags were buried in the soil at 1-2 cm deep randomly in the test field.

In another test, 20 bags were buried at different depths, i.e., 1-2cm, 2-5 cm, 5-10 cm and 10-15cm for testing the survivability of sclerotia.

After the lapse of 3-5 weeks, the bags were removed and examined. Sclerotia from 5 bags were surface sterilized with 2% sodium hypochlorite and plated on PDA and Czapeck dox Agar. Sclerotia from the remaining bags (15 bags) were placed onto the above media without surface sterilization. After 3-7 days of incubation at room temperature, fungi growing out from the sclerotia were examined and identified.

It is evident from the present investigation that the fungi were consistently associated with the sclerotia of *S. rolfsii.* In all, 35 species of fungi belonging to 17 genera were isolated (Table 1) from the surface of sclerotia. *Fusarium oxysporum* f.sp. ciceria, *Rhizoctonia betaticola, Operculata padwickii, F. solani* f. sp. caeruleum, etc. on sclerotia of *S.rolfsii* have been reported earlier as regular and dominant coloniser (Subrahmanium, 1986; Sen & Maiti, 1984).

The survivability test of sclerotia after 5 weeks, in different depth showed that 15-30% of sclerotia survived in 2-5cm depth soil. About 70-86% of sclerotia survived in the soil about 1-2cm depth. However, the percentage of survival was less in 5-10 and 10-15cm depth with a range from 8-10% and 5-7% respectively. The finding was in agreement with that of Smith *et al.* (1989) and this data is useful in practising mechanical and cultural practices of disease control.

The result being presented here in Table 1 also shows that sclerotium buried in the soil (1-2cm depth) of kitchen garden traps a large number of fungal types which grow deep on the suface of the sclerotium. Singh and Singh (1987) reported that *S. rolfsii* in association with *Fusarium solani* and *Sclerotinia sclerotiorum* caused the complex wilt of broad bean. The present finding confirmed the nature of *S. rolfsii,* which have a close affinities with many fungal types. With disease incidence in broad beans, fields have very irregularity in the correlation of disease incidence and disease intensity (Singh & Singh,

Table 1. Fungal types trap from surface sterilized and unsterilized sclerotia of *Sclerotium rolfsii*

Sl. No.	Fungal species	Surface unsterilized	Surface sterilized.
1.	*Curvularia verruculosa* Tandon & Bilgrami ex MB Ellis	+	+
2.	*C. geniculata* (Tracy & Earle) Boedigin	+	+
3.	*C. lunata* (Wakker) Boedijin	+	-
4.	*Cheatomium funicola Cooke*	+	+
5.	*C. globosum* Kunze	+	-
6.	*Cladosporium cladosporioides* (Fres) de Vries	+	-
7.	*Absidia corymbifera* (Cohn) Sacc & A. Trottol	+	+
8.	*Aspergillus niger* V. Tieghen	+	+
9.	*A. flavus* Link.	+	-
10.	*Epicoccum nigrum* Link.	+	-
11.	*Alternaria alternata* (Fr.) Keissler	+	+
12.	*Fusarium monoliforme* Neish & Leggett.	+	+
13.	*F. pallidoroseum (Cooke) Sacc.*	+	+
14.	*F. oxysporum* Schl.	+	+
15.	*F. solani*	+	+
16.	*F. equiseti* (Corda) Sacc.	+	+
17.	*F. graminearum* Schwabe.	+	-
18.	*Gliocladium roseum* Bainier	+	-
19.	*Penicillium purpurogenum* Stoll	+	+
20.	*P. crustosum* Thom.	+	-
21.	*P. funiculosum* Thom.	+	-
22.	*P. italicum* Wehmer	+	-
23.	*P. wortmanii* Klocher	+	+
24.	*Mucor racemosus* Fres.	+	-
25.	*Mucor* spp.	+	-
26.	*Phoma herbarum* Westend	+	+
27.	*P. sorghina* (Sacc) Boerema *et al.*	+	-
28.	*Sclerotinia sclerotium* (Lib) de Bary	+	+
29.	*Trichoderma viride* Pers Fr.	+	+
30.	*T. harzianum* Rifai	+	+
31.	*Verticillium albo-atrum* Reinke & Berthold	+	+
32.	*V. glaucum* Bonorden	+	-
33.	*Pythium aphanidermatum* (Edson) Fitzpatrick	+	+
34.	*Pythium* spp.	+	+
35.	*Trichothecium roseum* Link.	+	+

+ = Present; – = Absent;

1987, 1990b). The irregularity in trap crop may be due to the effect of synergistism among the associated fungal species and host fungi, i.e., the causal organism of broad bean wilt. The antagonist fungi could check the mortality of host plant caused by *S. rolfsii* in favourable conditions (Coley-Smith & Cooks, 1971). In the present study, out of the total 35 fungal species found on the surface of sclerotia of *Sclerotium rolfsii*, a large number of fungal types have been reported to be parasitic (Koehl & Schloesser, 1989; Elad *et al.*, 1983; Fang *et. al.*, 1988).

The investigation has led to a great significance for long term studies on *S. rolfsii* in associationship with other fungal types as these saprophytic and parasitic fungi may predisposed the host plants to infection. Further the recuperation of fungi from sclerotia of *S. rolfsii* indicates the lime light for biological control to broad bean diseases caused by *S. rolfsii*, e.g., collar rot, seed rot, root rot, wilt, etc.

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