THESIS TITLE : CHARACTERIZATION OF *Sclerotium rolfsii* Sacc. ISOLATES DERIVED FROM SOME ECONOMIC CROPS

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ABSTRACT

Stem and collar rot disease causal agent, *Sclerotium rolfsii* Sacc. of some economic crops were collected in Khon Kaen and Loei provinces. There were at least ten host plants infected by the stem rot causal agent: stakeless yard long bean, cowpea, cucumber, kenaf, mungbean, lady's slippers, peanut, pepper, soybean and tomato. The pathogen was isolated from all host plants in a total of twenty isolates for which the growth and sclerotial production on an artificial medium (potato dextrose agar, PDA) were studied. The result revealed that all isolates grew rapidly on PDA covering the medium in 4-5 days. The rapid growth isolates were collected from kenaf (K1), mungbean (Mu1) and lady's slippers (O1). However, when the amount of sclerotia developed on fungal colony during growth was considered, it was found that the hyphal growth had no correlation with the amount of sclerotia per Petri dish. In this experiment, stem rot pathogens isolated from kenaf and stakeless yard long bean produced most sclerotia in a Petri dish 1,049 and 1,004 sclerotia, whereas the diameters of the colony were 88.8 mm. and 71.8 mm., respectively.

All isolates of *S. rolfsii* were determined qualitatively on the pectolytic activities: pectinase and pectate lyase activity, and were able to produce the enzymes pectinase and pectate lyase, however the Mu1 and P5 isolates, showed high pectolytic activities detected by a clear zone around the fungal colony. The pectinase activities of isolates Mu1 and P5 were 56.0 mm. and 57.0 mm. whereas pectate lyase activities were 51.0 mm. and 50.0 mm., respectively.

The pathogenicity test on different host of different isolates were performed by cross inoculation. It was clear that all *S. rolfsii* isolates tested were able to infect all host plants under screen-house conditions with a 100 percent infection rate.

The hyphal interaction of all isolates of the stem rot pathogen was also undertaken, it was clear that all isolates showed self compatibility. Isolates B1, B2 and B3 from stakeless yard long bean, Pe1 and Pe2 from pepper and T1 and T2 from tomato showed compatible interaction with isolates collected from different host plants while some isolates collected from peanut (P1 and P2) and isolates from soybean (S1 and S2) showed compatible interaction within the same host plant.

The differences in protein pattern and multiple esterase zymogram of all isolates were studied using sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) for sclerotial protein and PAGE for esterase classification. The protein pattern of sclerotia of all isolates tested was similar. The seven major bands of protein showed molecular weights as follows: 97.4, 58.0, 49.0, 37.0, 26.0, 23.0 and 15.5 kDa, respectively. There were three bands of esterase in the zymogram indicated in all the isolates tested, except for isolate Mu1 from mungbean which showed four bands of esterase.

The result of this study suggests the potential infectivity of the stem rot pathogen in a wide host range, moreover the stem rot of lady's slippers, *Paphiopedilum concolor* (Batem.) Pfitz. was first reported in Thailand. Characterization of isolate diversity of *S. rolfsii* according to growth, pectolytic activity, pathogenicity, hyphal interaction, sclerotial protein and esterase patterns were also discussed.