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Evaluation of fungicide resistance of *Sclerotinia sclerotiorum* causing cabbage white mold in Sri Lanka

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Incidence of severe white mold disease was extensively observed in upcountry commercial cabbage fields of Sri Lanka in early 2014. The pathogen was identified as *Sclerotinia sclerotiorum,* a nectrophic soil borne fungus that can infect more than 400 plant species worldwide. Chemical control is the most effective method available to date due to lack of complete resistant cabbage varieties. However, improper fungicide applications can lead to the development of fungicide resistant isolates. In Sri Lankan small scale upcountry vegetable production system, more than one crop species is grown per year and most of these crops serve as hosts for the pathogen *S. sclerotiorum*. Frequent fungicide and pesticide application is also a common practice. Therefore, it was hypothesized that resistant *S. sclerotiorum* isolates against commonly used fungicides are present in Sri Lankan pathogen population. Objectives of this study were to determine the variation in insensitivities of the pathogen against commonly used fungicides in upcountry vegetable production systems, to search for the presence of resistant isolates and to determine if there are signals of positive cross resistance for the fungicides in Sri Lanka. Pathogen population was tested against three selected fungicides, carbendazim and thiophanate methyl (benzimidazole fungicides) and tebuconazole (triazole group fungicide) using *in vitro* plate assay. Firstly, a discriminatory concentration, which showed the highest variance in percentage inhibition of mycelial growth of a few randomly selected *S. sclerotiorum* isolates were determined as 0.25 µg/mL for carbendazim and 0.5 µg/mL for both thiophanate methyl and tebuconazole. Later, all of the 34 isolates were assayed for their insensitivities using fungicide amended PDA at the above concentrations with three replicates per isolate and fungicide unamended PDA plates were used as the control. Colony diameters were measured after 36 hr of incubation and percentage inhibition was calculated. While only 12% of the isolates showed > 50% inhibition for thiophanate methyl, the majority of the isolates (63 %) showed > 50% inhibition for the fungicide, carbendazim. The highest variance observed in percent inhibition of the pathogen population for carbendazim indicated that the pathogen population has the potential to adjust to the challenging environments, in this case fungicide applications. Based on the *in-vitro* plate assay, thiophanate methyl was found to be the least effective fungicide than the other two. Twelve isolates exhibited <50% inhibition to both carbendazim and thiophanate methyl and nine isolates showed <50% inhibition to all three fungicides. Results indicated that there is a potential to develop cross resistance and hence farmers should be prudent in selecting the fungicide regime for cabbage cultivation. Molecular basis of the resistance is yet to be elucidated.

Keywords: Cabbage white mold, Fungicides, *Sclerotinia sclerotiorum*

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