LETTUCE DISEASES CAUSED BY SCLEROTINIA SCLEROTIORUM
AND PHYTOPHthora PORRI AND THEIR CONTROL

by

DJIMAN SITEPU Ir (Agr.)

Department of Plant Pathology
Waite Agricultural Research Institute
The University of Adelaide
South Australia

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SUMMARY

The study of vegetable diseases in smallholdings in the Northern Adelaide Plains, South Australia, revealed that lettuce has many diseases which cause substantial yield losses. The most important disease is Sclerotinia rot (Sclerotinia sclerotiorum) which is also very destructive to other major vegetable crops in the area. Other important diseases are: Phytophthora stem rot (Phytophthora porri), grey mould (Botrytis cinerea), downy mildew (Bremia lactucae), anthracnose (Harssonina panattoniana), and lettuce necrotic yellows (LNYV).

Phytophthora stem rot of lettuce, a disease newly discovered in this project, and causing significant yield losses, presents a serious hazard to growers in the Northern Adelaide Plains. Lettuce crops were the only vegetable plants affected by the disease, and pathogenicity tests in the laboratory and glasshouse confirmed that lettuce was the only host plant for the pathogen. Phytophthora porri from lettuce shows some differences from P. porri Foister including host plant, optimum temperature for growth and pathogenicity.

A saprophytic fungus Fusarium lateritium inhibits the germination of ascospores and the growth of mycelia of Sclerotinia sclerotiorum, and protected young plants in pot experiments in the glasshouse. Experimental evidence indicated that S. sclerotiorum, its ascospores in particular, requires organic matter as a prerequisite for initial infection of healthy lettuce plants. Results suggested that F. lateritium conidia or mycelia inhibited S. sclerotiorum on such media.

Several sclerotial parasites and antagonists were found in the soils of the vegetable growing areas. Coniothyrium mimitans, was isolated from
all sampled fields, Trichoderma spp. including T. harzianum, Gliocladium sp. and Fusarium spp. were also abundant. Trichotheicum sp. was found in only one field. C. minitans and T. harzianum possibly decompose the sclerotia of S. sclerotiorum in the field. One isolate of Streptomyces sp. inhibited the growth of S. sclerotiorum in vitro.

Environmental conditions such as excessive rainfall, high soil water content, cold and moist air, dense weeds together with plant condition (dense and fully grown), favoured the development of S. sclerotiorum which then caused severe damage. In some lettuce fields yields were reduced by more than 85%.

There were indications from a survey of vegetable crops that the incidence of disease might be reduced by: (1) intensive mechanical action by removing infected plants; (2) thorough and clean cultivation; (3) regular preventive spraying with effective fungicides; (4) crop rotation and (5) good soil drainage.

It was concluded that the two important pathogens of lettuce cause considerable yield losses in the Northern Adelaide Plains, and both pathogens were prevalent during winter crops. Improved control can probably be achieved immediately by using fungicides, sanitation and cultural practices. This project has indicated that further control can be achieved by the using of biological control agents such as F. lateritium against Sclerotinia rot of lettuce and the use of tolerant cultivars.