First report of *Sclerotinia* blight caused by *Sclerotinia sclerotiorum* in Quang Nam, Vietnam

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Abstract. *Sclerotinia* blight, caused by *Sclerotinia sclerotiorum* is reported from Quang Nam Province, Vietnam, for the first time. The disease is common in cool wet winter and spring seasons on dwarf and climbing beans, peanuts and occasionally on chilli plants. A serious epidemic occurred in peanuts in some communes in spring 2008, following a period of cool wet weather after the crop canopy had closed and when flowering was well advanced.

Sclerotinia sclerotiorum is an important foliar pathogen affecting a wide range of vegetable and field crops in many countries. Ly *et al.* (2002) first reported *Sclerotinia sclerotiorum* in Vietnam, on cabbages near Hanoi. They also observed apothecia (pictured on page 111 in Burgess *et al.* 2008). More recently Dang Vu Thi Thanh (2008) has cited the occurrence of *S. sclerotiorum* in Ha Noi, Ha Tay, Nam Ha and Lao Cai provinces in her compendium on fungal diseases of crop plants in Vietnam.

In January 2006, the authors found *Sclerotinia* blight (stem rot) in dwarf beans and climbing beans (*Phaseolus vulgaris*) in Dai An commune, Dai Loc district, Quang Nam, Vietnam, following a period of cool wet weather. The disease was observed during systematic surveys of diseases of vegetable crops, as part of the training program in a capacity building project funded by the Australian Centre for International Agricultural Research (ACIAR) (Burgess and Burgess 2009). Apothecia were commonly associated with the occurrence of diseased plants. Samples of diseased stems were collected for isolation studies in the laboratory. The stems were washed thoroughly in tap water, surface-sterilised by dipping briefly in 70% ethyl alcohol, immediately rinsed in sterile water and damp-dried on sterile paper tissue. Small segments from the margins of healthy and diseased tissue were plated on water agar. Fungal colonies that developed from the segments were sub-cultured to potato dextrose agar (PDA). All colonies recovered were typical of *S. sclerotiorum* and produced abundant large black sclerotia on PDA. A representative colony was purified by hyphal tipping (Burgess *et al.* 2008), and the pure culture accessioned as QN10 in the culture collection at the diagnostic laboratory of the Quang Nam Plant Protection Sub-Department (PPSD). This culture was used to inoculate dwarf beans using the stem-inoculation technique described in Burgess *et al.* (2008). Typical stem rot was reproduced and the pathogen formed sclerotia on the diseased tissue. The fungus was isolated from

the inoculated plants into pure culture, completing Koch's postulates.

Beans are usually planted in late December in Quang Nam, following the end of the wet season. The beans flower during January when cool wet conditions are common, which favour the germination of sclerotia and the formation of apothecia. As the release of ascospores can coincide with the dropping of old flowers into leaf axils, ideal conditions for infection may be present. The role of senescent flowers in the infection process of *S. sclerotiorum* has been documented (McLean 1958; Cook *et al.* 1975; Abawi and Grogan 1979).

Field meetings were held with district staff and farmers to explain the disease cycle and the importance of crop rotation to reduce inoculum levels in soil, and the timely application of fungicide so as to ensure effective penetration of the crop canopy before the onset of wet conditions. There is potential for host resistance to contribute to an IDM strategy for this disease in peanuts in the future (Cruickshank *et al.* 2002).

Sclerotinia stem rot was also observed in chilli in Dien Quang Commune, Dien Ban District, Quang Nam in 2007. However the incidence was quite low.

In Quang Nam in 2008 cool wet conditions prevailed from January to early March, by which time peanuts planted in January had developed a closed canopy. The monthly rainfall for January, February and March in 2007 was 217 mm, 10 mm, and 207 mm respectively, with corresponding mean monthly temperatures of 21°C, 19°C and 23°C. Peanuts in some areas were planted on land cropped regularly to peanuts and dwarf beans. *Sclerotinia* blight (Figs 1, 2) was reported from the northern districts, namely Dien Ban, Dai Loc and Duy Xuyen Districts by the district staff of the Quang Nam PPSD. However, it was particularly common and severe in Dai Hong Commune, Dai Loc District, with crop losses of up to 80%. Apothecia were present in all diseased crops surveyed in this commune (Figs 3, 4). *S. sclerotiorum* was

Fig. 1. Peanut crop affected by Sclerotinia blight caused by *Sclerotinia sclerotiorum* in Quang Nam Province, Vietnam.

Fig. 2. Peanut plant affected severely by blight caused by *Sclerotinia sclerotiorum*, from a crop in Quang Nam Province, Vietnam. Note typical white fluffy mycelium, and water-soaking of diseased stem, indicated by arrow.

Fig. 3. Apothecia of *Sclerotinia sclerotiorum* adjacent to a peanut plant affected severely by Sclerotinia blight, Quang Nam Province, Vietnam.

successfully isolated into pure culture using the methods described above.

This appears to be the first serious epidemic of Sclerotinia blight caused by *S. sclerotiorum* in peanuts in Quang Nam. As the blight developed in lower stems and branches under the crop canopy, the severity of the disease was not realised until warmer weather increased transpiration rates causing sudden and severe wilting and plant collapse. At this time it was too late for effective fungicide application.

Dai Hong Commune was not included in earlier disease surveys by the ACIAR project team in Quang Nam. Consequently the history of the occurrence of Sclerotinia blight in this commune is not known. However, it is assumed that sclerotial levels in soil had increased gradually over several years to relatively high levels. The weather in the growing season in 2007 was cool and wet similar to that in 2008. In 2008 the coincidence of cool wet weather and a closed

canopy with dead flowers provided ideal conditions for an epidemic. We also observed sclerotia of *Sclerotium rolfsii* on the bases of several plants affected severely by *S. sclerotiorum*.

It is noteworthy that *S. sclerotiorum* was the only *Sclerotinia* species observed in the field based on size of sclerotia and the abundance of apothecia. This finding contrasts with the situation in the USA where *S. minor* is reported to be the dominant species causing Sclerotinia blight in peanuts (Kokalis-Burelle *et al.* 1997). However, in Australia both *S. sclerotiorum* and *S. minor* are considered important pathogens of peanuts (Cruickshank *et al.* 2002). The differences in the relative importance of the two species as pathogens of peanuts in different regions may reflect differences in cropping systems or subtle differences in climatic conditions during the growing season. The popularity of dwarf and climbing beans in Quang Nam may have favoured a build-up of sclerotia of *S. sclerotiorum* as these crops are quite susceptible to this pathogen (Schwartz

Fig. 4. Typical apothecium with apothecial stalk of *Sclerotinia sclerotiorum* removed from peanut soil in Quang Nam Province, Vietnam.

et al. 2005). Further surveys are warranted in Quang Nam and other peanut-growing provinces to determine if *S. minor* is present in peanuts or indeed, in other crops, in Vietnam.

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