

DISEASE NOTES OR NEW RECORDS

First report of stem rot and wilt of chickpea caused by *Sclerotinia minor* in Queensland, Australia

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Abstract. *Sclerotinia minor* is reported for the first time in Queensland on chickpea. Koch's postulates were fulfilled.

Sclerotinia minor is a soilborne plant pathogen that causes substantial losses in several crops such as peanut (*Arachis hypogaea*), sunflower (*Helianthus annuus*) and lettuce (*Lactuca sativa*) (Melzer *et al.* 1997). The pathogen has a wide host range including at least 94 species (Melzer *et al.* 1997), many of which also host *Sclerotinia sclerotiorum*. Nene *et al.* (1996) and Melzer *et al.* (1997) did not list chickpea (*Cicer arietinum*) as a host of *S. minor* although Marras (1964) and Matheron and Porchas (2000) reported it on chickpea in Sardinia and Arizona, respectively.

In Australia, three closely related *Sclerotinia* species, *S. sclerotiorum*, *S. trifoliorum* and *S. minor*, infect chickpeas (Bretag and Mebalds 1987). *S. minor* isolates from chickpea have previously been lodged in Victorian (VPRI 14737a) and New South Wales (DAR 34055, 34088, 52537, 54892, 60350, 70195) herbaria (Kevin Moore, Trevor Bretag, personal communications). In Western Australia, *S. minor* is suspected to cause significant losses in certain years (Bill Macleod, personal communication).

In June 2001, seeds of chickpea cv. Jimbour were sown in five rows in a small plot (1 × 2 m) at a site infested with *S. minor* at the QDPI Bjelke-Petersen Research Station near Kingaroy, Queensland. The plants were irrigated using sprinklers several times over the following months. In September 2001, wilting of stems and leaves, stem necrosis and bleaching near the soil surface were observed on several plants. White mycelium was evident on diseased tissue and small, black irregularly shaped sclerotia (0.5–2 mm) were observed on stems and in pith tissue. In the same month, bleached areas on the basal portions of stems were observed on wilted plants in a dryland commercial crop of chickpea cv. Sona near Tullooona, northern New South Wales. The disease was localised in denser areas of the crop. Sclerotia, similar to those described above, were present on diseased parts of the stems.

Sections of diseased plant tissue from both localities were washed thoroughly and blotted dry on sterile paper. Sections (5 mm) were transferred to potato-dextrose agar (PDA) amended with 0.01% streptomycin sulphate. Isolation plates were incubated in the dark at 23°C for 5 days. Colonies exhibiting sclerotial morphology of *S. minor* were transferred to fresh plates of PDA. Isolates from Kingaroy (BRIP 28138) and Tullooona (BRIP 28139) were lodged at BRIP (Queensland Department of Primary Industries herbarium).

Isolate BRIP 28138 was selected for pathogenicity testing. PDA blocks (5 × 5 mm) containing actively growing mycelium were removed from a 3-day-old culture of *S. minor* grown at 23°C. Five 6-week-old chickpea plants cv. Jimbour were inoculated by placing an infected PDA block adjacent to the stem at soil level. Three plants inoculated with agar plugs only were used as controls. The pots of chickpeas were incubated in a controlled environment cabinet at 100% humidity, 21 ± 1°C and with a 15 h light/9 h dark cycle for 7 days and then moved into a glasshouse for further observation. Inoculated stems developed symptoms of wilt and necrosis, with white-fluffy mycelium and sclerotial formation on the surface of the stems, whereas control plants remained healthy when examined after 7 days. *S. minor* was re-isolated from the diseased stems of five plants.

Stem rot and wilt of chickpea caused by *S. minor* could pose a threat to chickpeas across a significant portion of Australian production areas in certain years, particularly where other host crops such as canola, sunflower and peanut are part of the rotation. *S. minor* was recorded from chickpea in Victoria (Lockington) and New South Wales (Trangie, Narromine and Warren in the Dubbo area, Darlington Point in the Griffith area and Walgett in the north-west of the state) (DAR and VPRI herbarium records). The present report includes isolations from Tullooona (NSW) and Kingaroy

(Qld). Many weeds, including those in the Family Brassicaceae, which are common in Australian chickpea production areas, are also hosts of *S. minor* (Melzer *et al.* 1997). The wide host-range coupled with the longevity of its sclerotia may mean that inoculum-reducing strategies are difficult to achieve in rotations incorporating dicotyledonous crops.

Ekins *et al.* (2002) mapped the distribution of *S. minor* and *S. sclerotiorum* on sunflower and other hosts within Australia. According to their study, both species occur, or have the potential to infect susceptible hosts, in most of the Australian chickpea production areas, particularly south of the Queensland border. A predictive model using CLIMEX showed that carpogenic germination of *S. minor* could potentially occur from southern Queensland to Tasmania, with some likelihood in the south-west corner of Western Australia (Ekins *et al.* 2002). However, southern Australia had the highest potential, and Ekins *et al.* (2002) considered that carpogenic germination would be a rare event in the northern regions. A study of infection of canola petals by *Sclerotinia* species in central and southern New South Wales also provided circumstantial evidence for carpogenic germination of *S. minor* sclerotia in chickpea growing areas (Hind *et al.* 2001). In the two crops we examined, the appearance of lesions on the basal parts of stems at ground level suggests that infection occurred after myceliogenic

germination of sclerotia. It is possible that *S. minor* is a common pathogen of chickpea in northern Australia, and it may occur at the same time and in the same crops as *S. sclerotiorum*.

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