

Sunflower monoculture's days are numbered



By AJ Steyn, agronomist, Pioneer Hi-Bred SA

Due to the late summer rainfall and the relatively low maize price, sunflower was planted in many fields in the western production areas. This includes fields on which sunflower was cultivated during the previous season.

Producers should inspect their fields during grain filling and ripening to identify possible head diseases. It is important to know which types of head rot occur, as it will impact future management practices.

Prof Bradley Flett of the Agricultural Research Council (ARC) Potchefstroom, says a lot of sclerotinia stalk and head rot occurred in the Northern Free State and North West the last season. It was a late season with flowering and grain filling for sunflower in cool, moist conditions. In certain fields, up to 90% sclerotinia head rot occurred.

Favourable climatic conditions

After having flowered, sunflower has a relatively long grain filling period and the cool, wet conditions in autumn favours the development of sclerotinia. Should a large-scale outbreak occur, it will pose a real danger to sunflower production in the west. Stalk rot occurring in but a few plants on a field is not a major problem, but sclerotinia head rot can cause more severe damage and more inocula are transferred to the next season.

In wet, saturated topsoil, the sclerotia germinate and form apothecia (fruiting bodies). They produce spores that are spread by the wind. These spores can land on dead flower parts or wounds found, for instance, on the back of flower heads. The germinating spores use the dead organic matter as food source. The fungus develops from these spores and infects the entire head. More sclerotia are formed, thus completing the lifecycle.

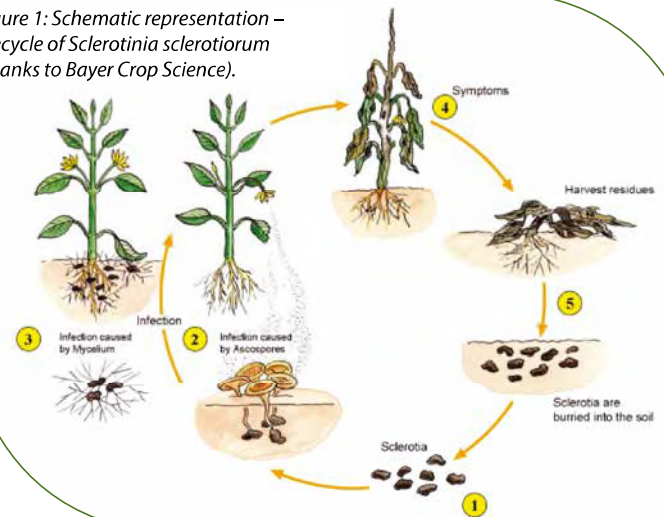
Infected fields can be deeply ploughed after harvesting so as to bury the

sclerotia as deep as possible. This must be followed by a choice of crop (non-host) and cultivation practices must be adjusted so that the soil is not overturned again.

Crop rotation

A crop rotation interval of four to six years provides the best control, but does not guarantee zero sclerotinia outbreaks. The suggested norm (for infected fields) is to avoid planting sunflower for five to eight years. A team effort by all producers is needed to ensure that no spores are produced that can be carried to clean fields.

Figure 1: Schematic representation – lifecycle of *Sclerotinia sclerotiorum* (thanks to Bayer Crop Science).



The pathogen can survive on a series of broadleaf weeds, vegetables, beans (especially soya beans), canola, lupins and volunteer sunflowers. It is crucial to keep the fields clean from these host plants. Maize is an appropriate rotation crop for the area, but sunflower offers an outstanding rotation crop choice that needs protection against this threat.

No resistance

Prof Flett says certain lines in the US are exhibiting tolerance to the fungus, but sclerotinia resistance does not exist (such as in soya beans). Local cultivars will have to be subjected to tests to determine the tolerance levels.

Seed companies use fungicides on seed to prevent infected seed from infecting clean fields. For peace of mind, buy your sunflower seed from a recognised seed company.

Bayer supplies a biological agent called Contans. It contains spores of the fungus *Coniothyrium minitans* that attack the sclerotia in the soil. This prevents the sclerotia from germinating and developing into apothecia and spores. The earlier it can be sprayed on already infected fields, the more effective it is.



Sclerotinia infection extending into a developing sunflower head. (Photographs by André Nel, ARC-GCI)



Fibrous strands at the upper end of a stalk and head as a result of sclerotinia head rot damage.

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