



Cercospora leaf spot of cowpea

Mycosphaerella cruenta



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First symptoms with discrete spots, reddish, not restricted by veins



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Leaf spots merge as leaves go yellow and die. Photos are of cercospora leaf spot on Phaseolus vulgaris, common bean, which has similar symptoms to cowpea.

SUMMARY: Cercospora leaf spot is a fungal disease. It has a widespread distribution and occurs all over Africa. It causes leaves to fall off and serious yield losses of up to 40% in cowpea. There are many resistant varieties but also susceptible ones, so care is needed in identifying suitable varieties for farmers. The disease occurs on other legumes, including closely related plants such as mung bean, 'true' beans (*Phaseolus*) and soybean. The disease is not seed transmitted but carried over to the next growing season on alternative hosts, as well as crop remains. Fungicides can be used to dress (clean) seeds and manage outbreaks. The disease is important in countries where cowpeas are widely planted, such as Nigeria and Niger. Resistant varieties appear to have limited losses in many countries but vigilance is needed to prevent future outbreaks and limit the damaging effects of this disease.

KEY SIGNS

Cercospora leaf spots of cowpea begin as small, lighter coloured areas, almost yellow. Later they become bronze to dark grey, roughly circular to more elongated and up to 10 mm across. The fungus produces masses of wind-borne spores on the lower surface of the leaf giving the spots a distinctive grey to dark powdery appearance. When held up to the light the older leaf spots are darker, more reddish and often with a distinct ring. Dead areas fall out, giving a shot-hole appearance. The leaf withers as the spots join together. Leaves die and fall off.

The fungus also attacks the stems and pods but here lesions are less prominent and damage less significant.

The leaf spots vary in shape, size and colour and could be confused with other similar symptoms. Check with a hand lens: septoria leaf spots, caused by another fungus, do not have a powdery appearance; ascochyta blight, another damaging fungus disease of cowpea, has leaf spots with circles within circles (concentric) and no powdery surface. Other fungi may sporulate on diseased leaves and give it a powdery appearance but with a different colour to Cercospora. Note the angular leaf spots restricted by veins on common bacterial blight and yellow haloes.

MANAGEMENT

Prevention – what to do before signs are seen

Cultural approaches: Much work has been done in identifying resistant varieties, the main and most important method for controlling this disease. In Sierra Leone varieties such as Slipea 1, 2 and 3 are recommended. VRB-10 is completely resistant to Cercospora leaf spot while VRB7 is highly susceptible, so care should be taken in choosing varieties to plant. Consult the local extension office or research station for advice on available cowpea varieties.

Manual seed cleaning, to remove plant debris, will prevent carry-over of the fungus and should be encouraged, given the many farmers who save seeds for the next season.

Intercropping by planting alternate rows of cowpea and another suitable non-legume crop, such as maize or sorghum, will limit spread of the disease within a field but not eliminate it.

Burying or destroying the remains of a cowpea harvest will reduce the amount of fungus able to infect new crops, as will removing alternative hosts, but these are costly and time-consuming measures which may not appeal to, or be feasible for, all farmers.

Chemical approaches: Some experts recommend seed treatment with mancozeb as a preventative measure although, given lack of evidence to support seed transmission of the fungus, the justification for this is not clear-cut.

Control – what to do after signs are seen

Chemical approaches: Fungicides are used to control outbreaks if favourable conditions or choice of cowpea varieties enable the disease to become established and the risk of major losses is high. The disease flourishes on older leaves and early monitoring of a crop is unlikely to reveal much, particularly since the first symptoms could be difficult to distinguish from other types of damage. Mancozeb should be applied after the crop has flowered and pods are starting to develop, with a maximum of 2-3 applications per planting season. It is unclear, however, whether this would be cost-effective in all circumstances.

CAUSE

Cercospora leaf spot is caused by the fungus *Mycosphaerella cruenta*. Originally there were thought to be two closely related leaf spots associated with *Cercospora canescens* and *Pseudocercospora cruenta*, but these are now considered to be the same fungus. It produces air-borne spores on the underside of the leaf and is carried over from one season to the next in left-over planting material. Seed transmission has yet to be confirmed.

The fungus has a wide host range, attacking other legumes such as 'true' beans (*Phaseolus*), soybean and bambara groundnut. These alternative hosts extend the reservoir of plants which can carry over infections to the next growing season.

IMPACT

Crop losses of between 20 and 40% occur as a result of defoliation, even though this usually occurs late in the growing season. The disease spreads rapidly through air-borne spores. The importance of Cercospora leaf spot of cowpea appears to have diminished over the last 15-20 years, presumably because of the availability of resistant varieties. But the constant presence of the disease across Africa coupled with a wide host range, the potential heavy losses and the risk of new fungal strains means that extension services should be vigilant and responsive.

DISTRIBUTION

The disease occurs around the world and is most prevalent in warmer areas of the sub-tropics and tropics. It is recorded from Sierra Leone to Nigeria and also Niger. Also present from Sudan to South Africa, Cercospora leaf spot is likely to occur in all countries in Africa where cowpea is grown. The apparent absence of the disease from several countries (e.g. Kenya, Burundi) could indicate low incidence or lack of published records.

FURTHER READING

Plantwise (www.plantwise.org)

Crop Protection Compendium online (www.cabi.org/cpc).

Regular international conferences are held on cowpea. Earlier proceedings and papers have been published as books. The most recent conference in 2010 has abstracts available online (<http://cowpea2010.iita.org>). Check this website and that of IITA (www.iita.org) for current information about cowpea generally.

Much of the information about cowpea diseases comes originally from a chapter in Allen et al's excellent book on diseases of food and pasture legumes, though there have been important scientific advances since its publication in 1998, particularly in breeding.

Allen, DJ, Lenné JM (editors) 1998. The Pathology of Food and Pasture Legumes. CAB International, Wallingford.

Singh B, Mohan Rah DR, Dashiell KE, Jackai Len (editors) 1997 Advances in Cowpea Research. IITA, Ibadan, Nigeria.