

***Cercospora beticola*: The intoxicating lifestyle of the leaf spot pathogen of sugar beet**

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ABSTRACT

Cercospora leaf spot, caused by the fungal pathogen *Cercospora beticola*, is the most destructive foliar disease of sugar beet worldwide. This review discusses *C. beticola* genetics, genomics, and biology and summarizes our current understanding of the molecular interactions that occur between *C. beticola* and its sugar beet host. We highlight the known virulence arsenal of *C. beticola* as well as its ability to overcome currently used disease management strategies. Finally, we discuss future prospects for the study and management of *C. beticola* infections in the context of newly employed molecular tools to uncover additional information regarding the biology of this pathogen. **Taxonomy.** *Cercospora beticola* Sacc.; Kingdom Fungi, Phylum Ascomycota, Class Dothideomycetes, Order Capnodiales, Family Mycosphaerellaceae, Genus *Cercospora*. **Host range.** Well-known pathogen of sugar beet (*Beta vulgaris* subsp. *vulgaris*) and most species of the *Beta* genus. Reported as pathogenic on other members of the Chenopodiaceae (e.g., lamb's quarters, spinach) as well as members of the Acanthaceae (e.g., bear's breeches), Apiaceae (e.g., *Apium*), Asteraceae (e.g., chrysanthemum, lettuce, safflower), Brassicaceae (e.g., wild mustard), Malvaceae (e.g., *Malva*), Plumbaginaceae (e.g., *Limonium*), and Polygonaceae (e.g., broad-leaved dock) families. **Disease symptoms.** Leaves infected with *C. beticola* exhibit circular lesions that are coloured tan to grey in the centre and are often delimited by tan-brown to reddish-purple rings. As disease progresses, spots can coalesce to form larger necrotic areas, causing severely infected leaves to wither and die. At the centre of these spots are black spore-bearing structures (pseudostromata). Older leaves often show symptoms first and younger leaves become infected as the disease progresses.

Management. Application of a mixture of fungicides with different modes of action is currently performed although elevated resistance has been documented in most employed fungicide classes. Breeding for high-yielding cultivars with improved host resistance is an ongoing effort and prudent cultural practices, such as crop rotation, weed host management, and cultivation to reduce infested residue levels, are widely used to manage disease.

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