



## Rosaceae Nemesis

### Strawberry Root and Crown Rot Diseases

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Strawberry is plagued by several pathogens that cause root and crown rot (abbreviated RCR), which can lead to reductions in plant vigor, yield loss and even plant death. The responsible organisms vary across the U.S. and depend on climate, soils, and presence of pathogen inoculum. In California, *Verticillium dahliae*, *Fusarium oxysporum* f. sp. *fragariae* and *Macrophomina phaseolina* are the primary organisms contributing to RCR, whereas in Florida they are *Phytophthora cactorum*, *Colletotrichum* spp., and *Macrophomina phaseolina*.

In both regions, which lead national production, symptoms are similar and disease impact equally devastating and producers struggle with RCR management, mainly due to the recent loss of methyl bromide and restrictions on other soil fumigants. Improved disease resistance will be a significant contribution to integrated management strategies less reliant on fumigants.

Initial symptoms of RCR include discoloration of foliage, stunting, production of small leaves, and reduced vigor.



Figure 1. Collapse and decline of strawberry due to root and crown rot.

Symptoms become more apparent as the growing season progresses, especially when plants start producing fruit. At this stage, plants may wilt rapidly, collapse and die (Fig. 1). Examination of the crown and roots often reveals discoloration, internal browning (Fig. 2), and poor root growth. Fruit rot may also occur.



Figure 2. Internal browning due to root and crown rot.

Photo: J. Mangandi and V. Whitaker, UF.

Although knowledge of the field history and cultivar susceptibility can be helpful, accurate diagnosis of the causal organism(s) is best done through laboratory isolation, culture, and microscopic examination. Identification of the pathogen(s) is required for mitigating further disease damage, as different RCR pathogens respond differently to chemical and cultural control.

While all root and crown rots are potentially devastating, RosBREED will be focusing particularly on *Phytophthora* root and crown rot. This disease is particularly problematic in Florida, where rainfall, saturated soils, and warm temperatures favor the development of

*Phytophthora*. Symptoms of this disease are usually most readily observed in low, poorly drained areas of a field and extend to other areas as the season progresses. The disease cycle begins when overwintering oospores germinate to form structures that subsequently produce motile spores (zoospores) capable of swimming through wet areas towards host tissue. Once infection of host tissue occurs, the pathogen can reproduce and infect neighboring plants.

These mobile zoospores and overwintering oospores that persist in the soil for many years make crop rotation ineffective. With such daunting management challenges, it is no wonder producers have placed

priority on cultivars that combine disease resistance with high fruit quality.

Breeders and pathologists are collaborating in RosBREED to identify sources of resistance and incorporate it into breeding programs.

The deliverable to industry? Superior new cultivars with excellent horticultural quality and durable resistance to a devastating Rosaceae nemesis!

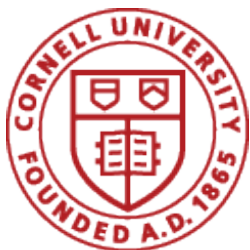
# RosBREED

DISEASE RESISTANCE × HORTICULTURAL QUALITY → SUPERIOR CULTIVARS



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WAGENINGEN UR For quality of life



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