Evaluating host resistance to Macrophomina crown rot in strawberry  
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Introduction

Macrophomina crown rot, caused by the soilborne fungus *Macrophomina phaseolina*, is an emerging pathogen in California strawberry production (Koike et al., 2016). *M. phaseolina* can be difficult to manage due to its persistence in soil and crop residues as microsclerotia (Islam et al., 2012). Host resistance will be a critical tool for managing this disease in the post-methyl bromide era. The objective of this research was to evaluate the resistance of a wide range of currently available cultivars and elite selections to Macrophomina crown rot.

Materials and Methods

- A replicated field trial was conducted to evaluate 90 cultivars and elite selections for resistance to Macrophomina crown rot.
- Strawberry germplasm was selected from six public and private breeding programs: University California Davis, University of Florida, Driscoll’s, Plant Sciences, Planasa and Lassen Canyon.
- The trial was conducted at Cal Poly in San Luis Obispo during the 2016-17 growing season.
- The experimental design consisted of a randomized complete block with four replicate plots per cultivar; each plot contained 20 plants.
- Plants were artificially inoculated with 5 grams of a *M. phaseolina* infested cornmeal-sand mix at the crown-root interface.
- Plant mortality was assessed every four weeks, then every two weeks once symptoms were observed.
- Plant mortality was distinguished when plant foliage was 100% necrotic.

Results

**Figure 2.** Average percent plant mortality due to Macrophomina crown rot as of 24 Jul 2017. Error bars represent the standard error of the mean. Statistical differences by pairwise comparisons not shown.

Average plant mortality (%) due to Macrophomina crown rot as of July 24, 2017

Results Continued

- The first wilt symptoms due to infection by *M. phaseolina* were observed in March, roughly 210 days after planting.
- The majority of plant mortality occurred after 15 Jun, when air temperatures exceeded 32°C for several days.
- Of the cultivars tested, a wide range of susceptibility was observed.
- Elite selection UC-J and cultivar Ruby June where the most susceptible genotypes to crown rot, with more than 90% mortality by 24 Jul 2017.
- Elite selection UC-V and cultivars Manresa and Osceola were the most tolerant genotypes to Macrophomina crown rot, with less than 5% mortality by 24 Jul 2017.

Discussion

All breeding programs contained both tolerant and susceptible germplasm to Macrophomina crown rot. The plant response observed in this trial was in agreement with the literature (Zveibil et al., 2012) that damage due to Macrophomina crown rot occurred late in the season and was exacerbated by warm temperatures during the months of June and July. This inoculation method provided consistent, but not overwhelming, pressure for field evaluation of host resistance to *M. phaseolina*. This data can serve as both a guide to growers for managing Macrophomina crown rot, and for the development of new resistant cultivars for existing breeding programs.

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