

Evaluating host resistance to *Macrophomina* root rot in strawberry

M. G. Alvarez Arredondo, S. S. Hewavitharana, and G. J. Holmes

The ninth consecutive field trial evaluating host resistance to *Macrophomina* root rot was conducted during the 2024–25 fall growing season at field 35b on the Cal Poly, San Luis Obispo campus (Fig. 1). This year's trial included 81 strawberry genotypes from eight breeding programs/nurseries: Crown Nursery, Driscoll's, Good Farms, Lassen Canyon, Pinnacle Berry Genetics, Planasa, Plant Sciences, and UC Davis. Plots consisted of 20 bare-root transplants per genotype, with slight variation in some plots due to plant availability. Each genotype was replicated across four randomized blocks. Standard 64-inch beds were used, with four rows of plants per bed and three lines of drip tape for irrigation and fertigation. Most transplants were planted on 31 Oct 2024, with additional plantings for UC Davis and select Driscoll's entries on 5 Nov 2024. On 20 Nov 2024, each plant was inoculated with 5 g of cornmeal-sand inoculum containing *Macrophomina phaseolina* at 1,034 CFU/g, applied around the crown and upper root zone (Fig. 2A). To promote disease expression under stress conditions, irrigation was reduced by 25% starting 9 Jun 2025. Plant mortality (Fig. 3 and 4) and canopy loss per day (Fig. 5) were assessed weekly. Plants were recorded as dead when all above ground foliage was necrotic. Pathogen presence was confirmed in host tissue using standard plating techniques. Due to cooler weather conditions during the 2025 growing season, disease expression has been less severe so far compared to previous years. As a result, Figures 3 and 4 show many zero values for plant mortality, reflecting delayed disease development across most genotypes.



Figure 1. Aerial image of the *Macrophomina* root rot host resistance field trial on 15 Mar 2025, located in field 35b on the Cal Poly SLO farm. Plants in the area outlined in blue were inoculated.

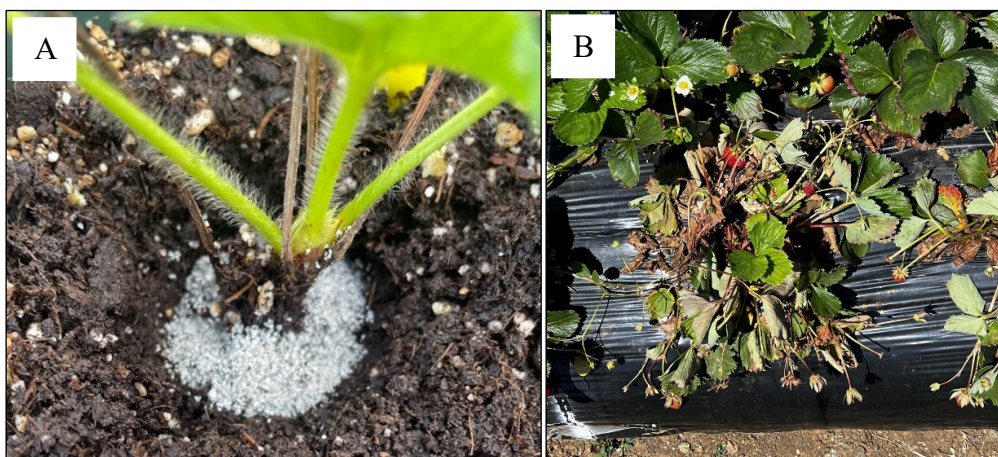


Figure 2. A) Transplant inoculation with *Macrophomina phaseolina*. B) Symptoms of *Macrophomina* root rot.



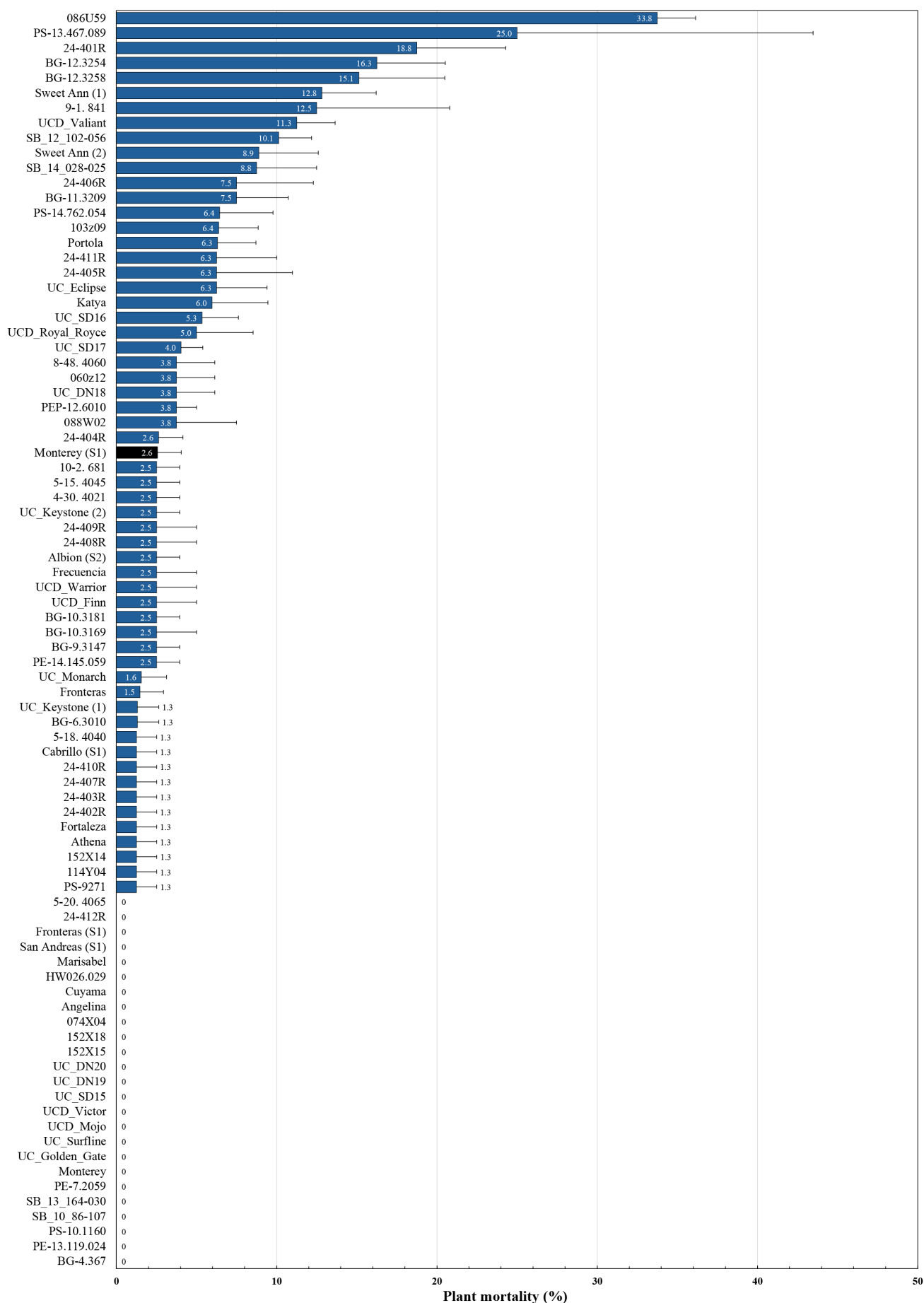


Figure 3. Average percent plant mortality due to *Macrophomina* root rot as of 03 Jul 2025. Error bars represent standard error from four replicates per genotype (n=4). UC_Keystone (1) and UC_Keystone (2), as well as Sweet Ann (1) and Sweet Ann (2), are from the same source but are duplicate entries in the trial. S1 and S2 represent different plant sources/nurseries.



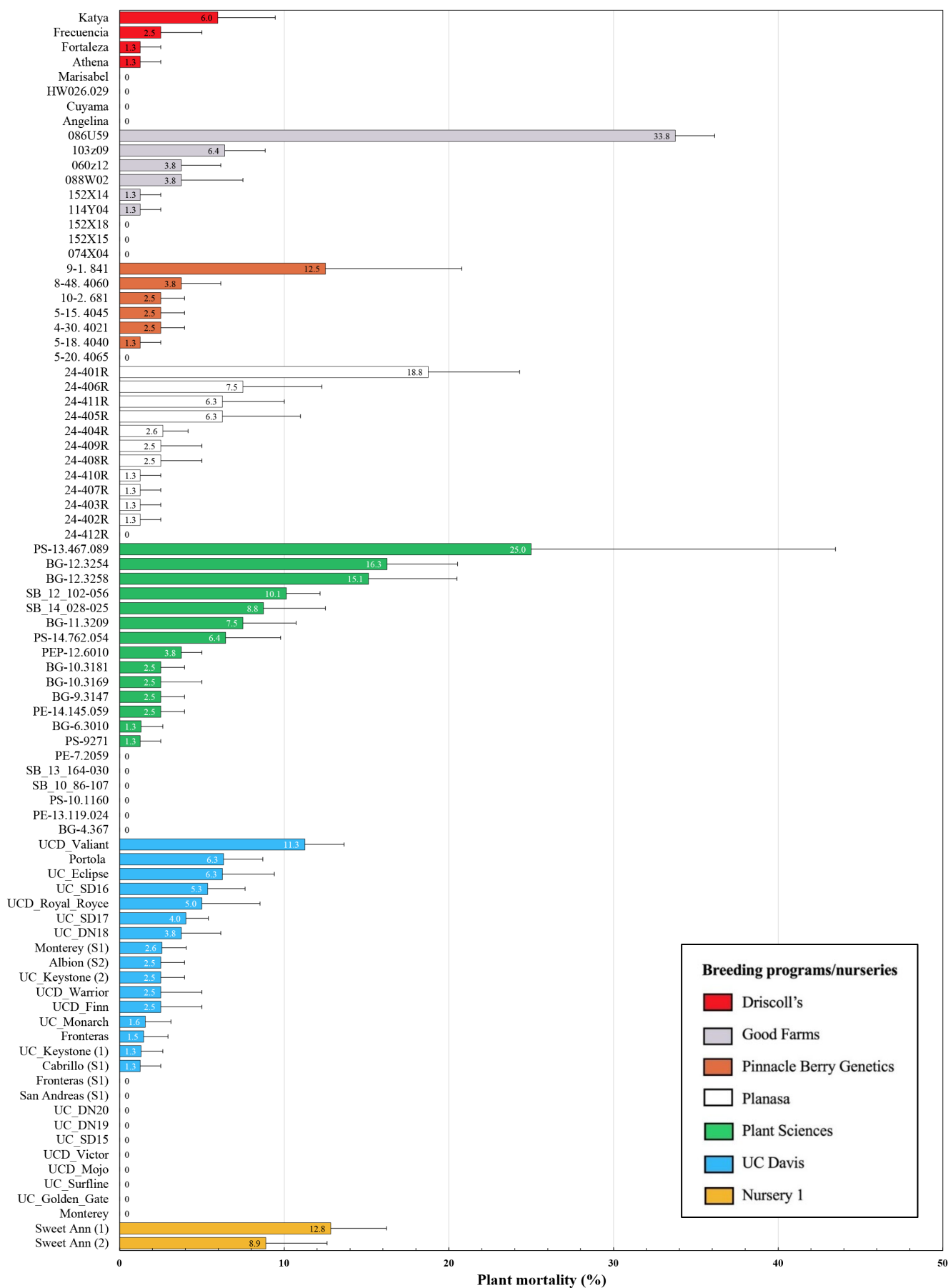


Figure 4. Average percent plant mortality due to *Macrophomina* root rot (sorted by breeding program) as of 03 Jul 2025. Error bars represent standard error from four replicates per genotype (n=4). UC_Keystone (1) and UC_Keystone (2), as well as Sweet Ann (1) and Sweet Ann (2), are from the same source but are duplicate entries in the trial. S1 and S2 represent different plant sources/nurseries.



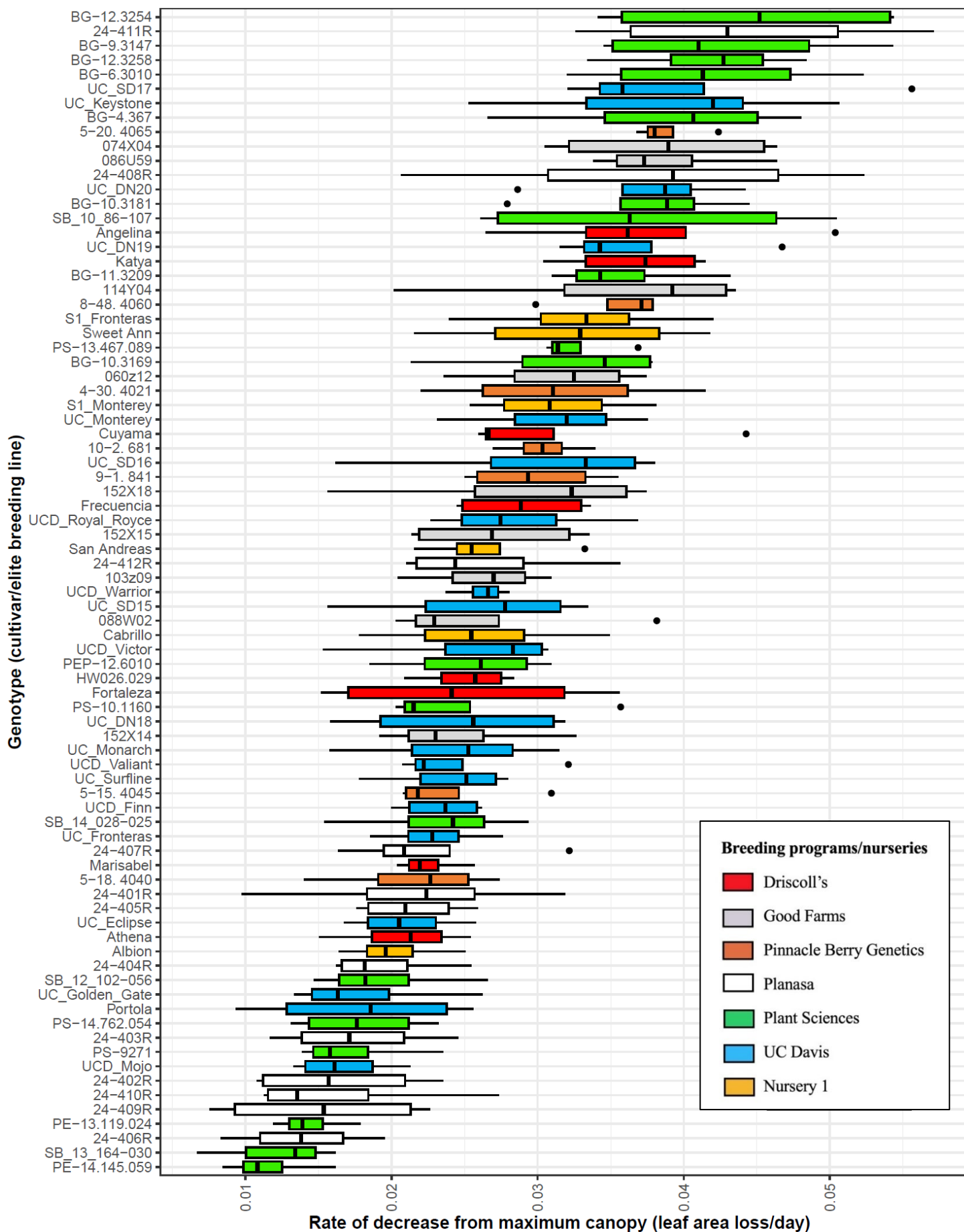


Figure 5. Bar and whisker chart showing the rate of canopy loss using Leaf Area Index (LAI) per day from peak to minimum in the *Macrophomina* root rot, up to 27 Jun 2025 (figure by Kaitlin Rim, Aerial-Plot).

