

## EVALUATION OF PEPPER BREEDING LINES AND CULTIVARS FOR PHYTOPHTHORA RESISTANCE, SKIN SEPARATION AND YIELD – RESEARCH RESULTS FOR 2005.

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Twenty-eight bell pepper cultivars and breeding lines were evaluated for resistance to the crown and stem rot phase of Phytophthora blight (*Phytophthora capsici*), for silvering of fruit and yield (boxes/A) at two sites in southern New Jersey in 2005. A randomized complete block design with four replications was set-up at Rutgers Agricultural Research and Extension Center (RAREC), Bridgeton, New Jersey and at an on-farm site in Vineland, NJ. Percentage of Phytophthora-infected plants ranged from 0 to 26% at RAREC and 0 to 80% at the on-farm site depending on pepper line (Table 1). In some cases, new breeding lines exhibited levels of Phytophthora-resistance comparable to Paladin the resistant cultivar. At the RAREC location, entries did not differ statistically for percentage of infected plants except two breeding lines (20404 and 20400) which had significantly more infected plants. At the on farm site, 16 entries had significantly fewer phytophthora-infected plants than the remaining entries. Among those were three of the named cultivars Paladin (11%), Aristotle (11%) and Revolution (25%).

The percentage of fruit with silvering ranged from 0 to 92% during first harvest, 1 to 56% during second harvest and from 5 to 35% during third harvest at RAREC, and from 0 to 22% during second and 0 to 16% during third harvest at the on-farm site (Table 1). The percentage of skin separation decreased with each harvest date for most entries at the RAREC location. The same trend followed at the on-farm location, but the percentage of skin separation was observed at a lower level. Silvering in Paladin was 66, 40 and 31% compared to only 0, 1 and 5% in Camelot (susceptible cultivar) during each harvest at RAREC and was 6 and 13% in Paladin compared to 0% in Camelot at the on-farm site. This same pattern was observed for breeding lines where those with a higher tolerance to phytophthora had a higher percentage of skin separation (Table 1).

Breeding lines such as 9584, 9583, 20404 and 20400 had intermediate levels of skin separation, but low levels of Phytophthora-resistance. Breeding lines 20394, 20407, 20402, 20405, 20394 had low levels of initial skin separation, but little or no level of Phytophthora-resistance. The only breeding lines which possessed low levels of skin separation and a high level of Phytophthora tolerance were lines 12643 and 7609 (Table 1).

Yield (boxes/A) varied significantly between breeding lines, harvest date and level of Phytophthora-resistance depending on site (Table 2 and 3). In general, at RAREC, with the exception of breeding lines 804C, 1126, and 5776D breeding lines with reduced levels of skin separation and little or no Phytophthora-tolerance yielded higher than breeding lines with Phytophthora-resistance and high levels of skin separation (Table 2). Phytophthora pressure at RAREC was extremely low in 2005 because of hot, dry conditions. At the on-farm site, breeding lines with some level of Phytophthora-resistance yielded more than breeding lines without Phytophthora-resistance, due to infected plant material (Table 3). Overall, breeding lines 12643 and 7609 performed best at both sites in regard to yield, Phytophthora-resistance and lack of skin separation development. Interestingly, in this study, skin separation tended to decrease with each successive harvest at both sites. Skin separation was also higher in peppers grown on black plastic mulch with drip irrigation (RAREC) compared to peppers grown on high-ridged bare soil beds with overhead irrigation (on-farm site).