

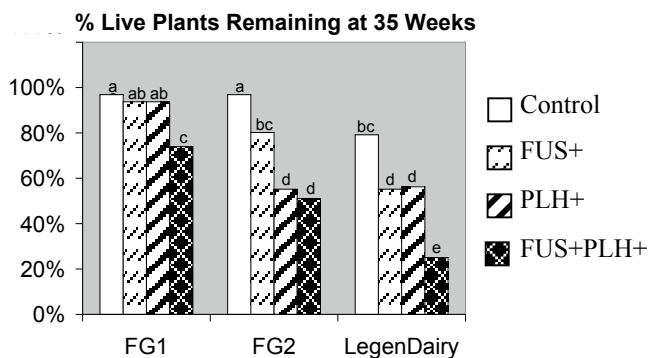
Effects of Potato Leafhopper Injury and Fusarium Crown Rot on Three Alfalfa Populations

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A greenhouse experiment was undertaken to investigate the possible interaction of potato leafhopper (*Empoasca fabae*) and Fusarium crown rot in alfalfa in three populations. Population FG1 was designated crown rot resistant based on preliminary experiments and possessed the glandular haired trait conferring a degree of potato leafhopper resistance. Population FG2 was also designated crown rot resistant and lacked glandular hairs. The third population used was the variety 'LegenDairy', which was designated crown rot susceptible and lacked glandular hairs. Treatments consisted of 1) *Fusarium* inoculated plus potato leafhopper infested (FUS+PLH+), 2) *Fusarium* inoculated (FUS+), 3) potato leafhopper infested (PLH+), and 4) uninoculated, uninfested (control). Potato leafhoppers were introduced onto caged plants at five weeks and removed at ten weeks immediately prior to the first harvest. An Ohio isolate of *Fusarium oxysporum* known to cause crown rot was used to inoculate plants at ten weeks, coinciding with the first harvest. Five additional harvests were then made at five-week intervals.

There was no significant plant loss associated with either the PLH+, FUS+, or control treatments in the FG1 population, however the FUS+PLH+ treatment resulted in 26% average plant loss compared to 3.1% in the control. In FG1, the combined stresses of *Fusarium* inoculation and PLH infestation resulted in what appeared to be a synergistic effect with regard to plant numbers; however, the lack of any significant *Fusarium* by PLH by population interaction indicates that overall, the nature of the effects of *Fusarium* and PLH were additive. The FG2 population had no significant difference in the average number of live plants per pot remaining at 35 weeks between the FUS+PLH+ and the PLH+ treatments. In FG2, the FUS+PLH+ treatment resulted in 49% plant loss and 44.8% in the PLH+ treatment while the FUS+ treatment resulted in 19.8% plant loss at 35 weeks. In LegenDairy, the FUS+PLH+ treatment resulted in 75% plant loss while the FUS+ and the PLH+ treatment resulted in 44.8% and 43.8% plant loss, respectively. In all three populations, in the treatments where significant plant loss occurred, most plant loss was observed between the first and third harvest, with plant loss largely ceasing by the third harvest and remaining roughly static through the sixth (final) harvest.

Average crown plus root fresh weight per plant was significantly reduced in the PLH infested treatments when compared to PLH uninfested treatments in all populations. The average crown plus root fresh weight in FG1 and FG2 in the PLH uninfested treatments were roughly the same; however, both were significantly greater than the LegenDairy uninfested treatment. *Fusarium* inoculated treatments across all populations resulted in lower average crown plus root fresh weights than the *Fusarium* uninoculated treatments. Average crown rot rating at 35 weeks across *Fusarium* inoculation treatments showed no significant difference between the PLH infested and PLH uninfested treatments in FG1. Conversely, the PLH infested treatments in FG2 and LegenDairy had higher crown rot ratings than the uninfested treatments. The *Fusarium* inoculated treatments across all populations resulted in higher average crown rot ratings than the uninoculated treatments.



There was a significant reduction in total dry matter yield (six harvests) for *Fusarium* inoculated treatments across all populations with and without potato leafhopper. Total dry matter yield was significantly reduced in all populations in the PLH infested treatments when compared to the PLH uninfested treatments across *Fusarium* inoculated treatments.