

Evidence for *Aphanomyces euteiches*, Race 3 on Alfalfa

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Aphanomyces root rot on alfalfa (caused by *Aphanomyces euteiches*) causes stunting, chlorosis and poor stand establishment in seedlings as well as chronic stunting of established stands. The disease is favored by poorly drained, saturated soil conditions. A soil assay for detecting root rot pathogens is available to determine the presence of *A. euteiches*, and choosing resistant alfalfa varieties is the best form of disease management, should the field be infested. Two races of the pathogen are prevalent, and alfalfa varieties with resistance to both Races 1 and 2 are available.

Soil assay and field observations have shown that resistant alfalfa varieties are failing, indicating that a new race may be overcoming resistance. The current study used eight Race 2-resistant varieties, a susceptible variety (Vernal) and recently isolated *A. euteiches* isolates. The Race 2-resistant varieties included one each from seed companies A, B, and C; 4 from seed company D; and one created at University of Wisconsin-Madison (WAPH-5). The aim of this work was to examine the isolates' effect on differences in disease severity between Race 2-resistant varieties of alfalfa in order to distinguish a potential third race of the pathogen. The study used mycelium grown on Potato Dextrose Agar as inoculum and included a non-inoculated susceptible check. Experiments were evaluated using a Disease Severity Index (DSI) with a rating scale of 1 to 5, where 1 indicates a healthy seedling and 5 indicates a dead seedling. DSI calculations weighted the number of seedlings at each rating level by the rating category itself, where the sum of the weighted categories was then divided by the total number of seedlings recorded at emergence.

Experimental results showed that a number of different isolates demonstrated significantly different ($p < 0.05$) DSI ratings between Race 2-resistant varieties, providing evidence of at least one new race (see Figure 1). Furthermore, the variety WAPH-5 performs statistically better than all other Race 2-resistant varieties when inoculated with these isolates, indicating that WAPH-5 may have a novel source of resistance that should be further studied.

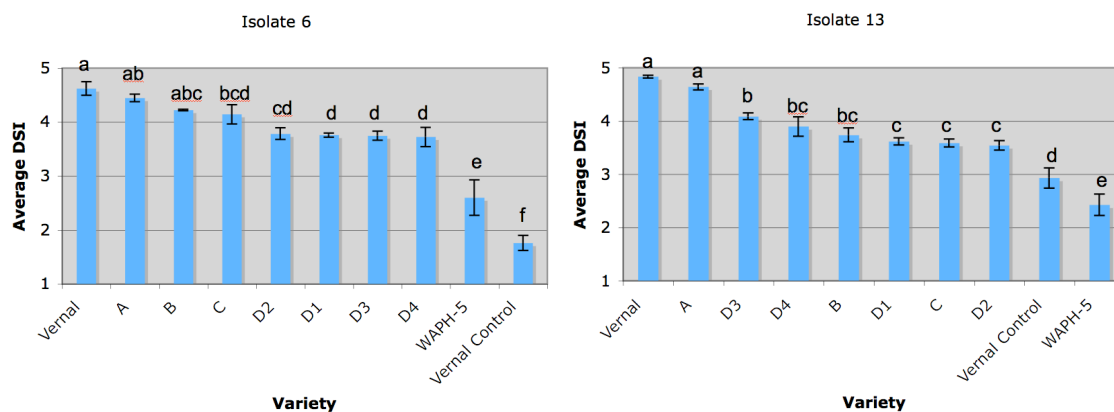


Figure 1. These graphs from two selected experiments illustrate the statistical differences in average DSI between alfalfa varieties (with Race 2 resistance: A, B, C, D1-4, WAPH-5; and the susceptible Vernal and Vernal Control (not inoculated)). One isolate of *A. euteiches* was used for each—Isolate #6 on the left and Isolate #13 on the right.