NBS-LRR GENE EXPRESSION OF BUFFALOGRASS CHALLENGED WITH LEAF SPOT PATHOGEN

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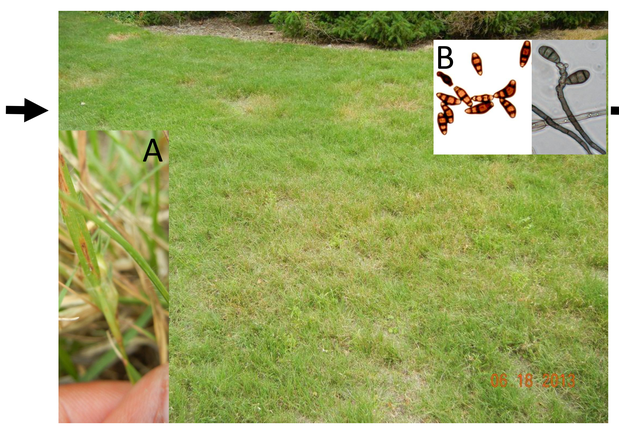
Background/introduction

Buffalograss [*Buchloë dactyloides*] is a warm-season turfgrass native to the Great Plains of North America. It has exceptional drought, heat, and cold tolerance. Buffalograss is widely used as a turfgrass in arid and semi-arid areas of the USA. Leaf spot caused by *Curvularia inaequalis* is an important disease of buffalograss reducing visual quality. Conventional breeding for disease resistance based on inoculation, rating, and selection is difficult and time consuming. Molecular assisted screening is a viable alternative to the traditional method, and molecular strategies enhance the efficiency of a breeding program. Plant disease resistance is often conferred by *R*-genes. The interaction between the host and the disease often results in a hypersensitive reaction or localized cell death in the plant. Candidate *R*-genes have been previously identified and cloned from buffalograss, but the expression of these candidate genes in response to leaf spot disease was not tested.

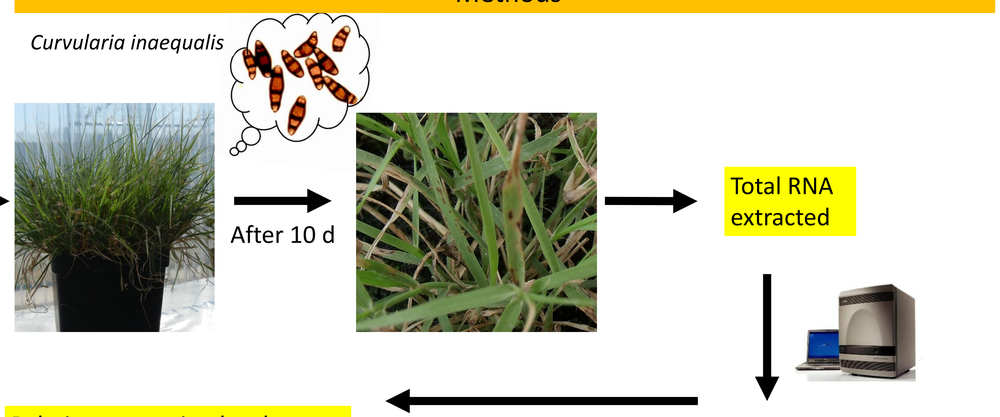
Objective

The present study was conducted with leaf spot resistant and susceptible buffalograss lines challenged with *C. inaequalis* to quantify the activity of seven previously described R-genes (Budak et al., 2006).

Fig. 1 A buffalograss lawn with leaf spot symptoms. Inset A: Leaf spot symptoms on an individual leaf. Inset B: Conidia of *C. inaequalis.*



Methods



Results

Fig. 2 Relative expression of defense related genes P1, P2, P5, and P6 following infection by *C. inaequalis*. Prestige (a), and NE-BFG-7-3453-50 (d) are susceptible to leaf spot. 95-55 (b), and NE-BFG-7-3459-17 (c) are leaf spot resistant lines.

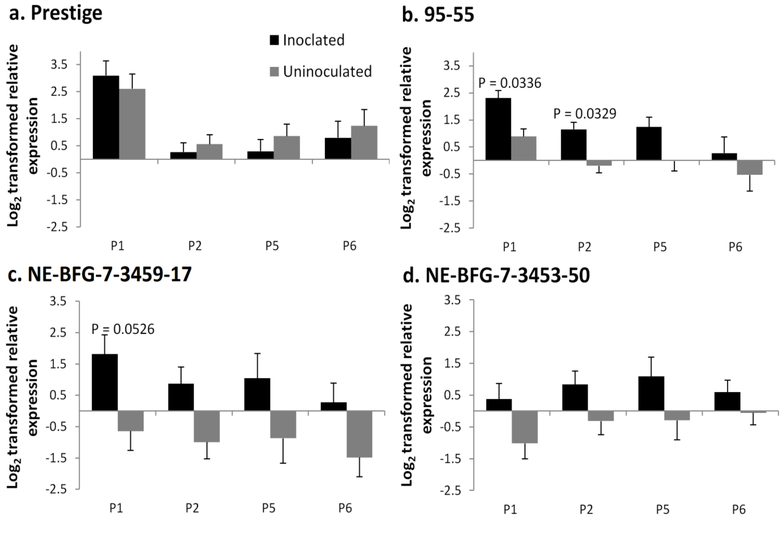


Fig. 3 a) Expression of P1 in inoculated and healthy 95-55 (leaf spot resistant) and Prestige (susceptible). b) Expression of P6 in inoculated and healthy NE-BFG-7-3459-17 (leaf spot resistant) and NE-BFG-7-7359-50 (susceptible).

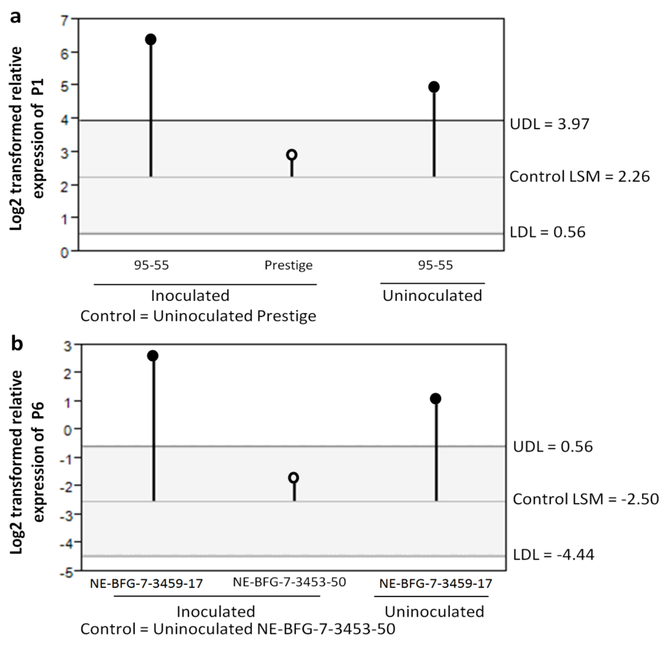
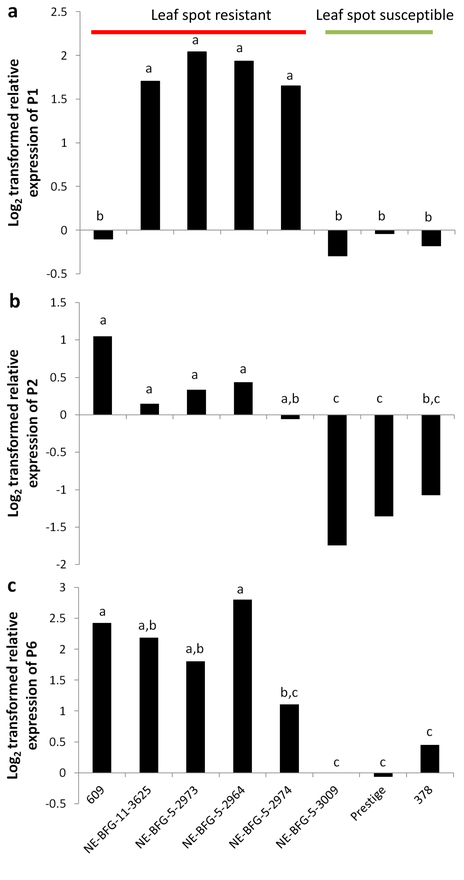


Fig. 4 Basal expression of defense related genes P1, P2 and P6 in eight buffalograss lines.



Summary

- P3, P4, and P7 primers did not amplify a PCR product.
- Susceptible lines did not show difference in expression of P1, P2, P5, and P6 when influenced by *C. inaequalis* (Fig. 2a and 2d).
- The two-way ANOVA performed on cultivar x treatment showed higher expression P1, P2 or P6 in the uninoculated resistant lines compared to the uninoculated susceptible lines (Figs. 3a and 3b)
- Though P1, P2, and P6 were not capable of differentiating all resistant and susceptible lines individually, they showed differential expression accurately in most lines (Fig. 4).

Conclusions

Analysis of basal expression of at least two amplicons (P1/P2/P6) in combination may provide a diagnostic tool for categorizing leaf spot resistance in unknown buffalograss lines.

Acknowledgments

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References

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