FORAGE-LIVESTOCK FIELD DAY REPORT - 1998

TEXAS A&M UNIVERSITY AGRICULTURAL RESEARCH and EXTENSION CENTER at OVERTON

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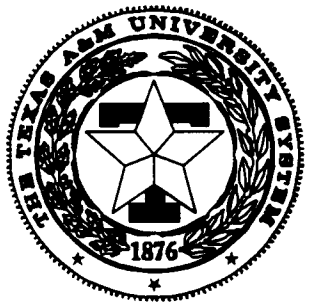

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SELECTION FOR TOLERANCE TO *PHYTHIUM ULTIMUM* ROOT ROT IN ANNUAL RYEGRASS

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Background. Annual ryegrass is commonly used in combination with annual clovers for overseeding warm-season perennial grasses in the southeastern United States. Together, ryegrass and clovers provide high quality forage during the late winter and early spring months. Disease-causing (pathogenic) organisms, such as fungi, live in the soil and attack germinating seed and emerging seedlings under wet growing conditions. *Pythium ultimum* is one of the pathogenic fungi responsible for the poor establishment of arrowleaf clover observed recently. Many clover seedlings are killed before emergence, when they are most vulnerable. Because clovers and ryegrass are sown together, our objective was to determine whether annual ryegrass was similarly affected by *Pythium ultimum.*

Research Findings. A laboratory procedure developed to examine clover seed germination in the presence of pathogenic fungi was used to evaluate TAM 90 annual ryegrass for susceptibility to *Pythium ultimum.* In this study, annual ryegrass was able to germinate and emerge in the presence of *P. ultimum.* However, roots exhibited symptoms of disease: stunting, tan discoloration, and/or tip "burn" (dark brown root tip, indicating death of growing point). Root lengths were measured and recorded for each plant. Distribution of root lengths under disease pressure generally fell into three categories, indicating the tolerance level of plants to *P. ultimum* root rot (Table 1). High tolerance was exhibited by lack of disease symptoms on roots, and root lengths similar to the average root length of a healthy plant. Intermediate and low tolerance levels indicated slight to severe root rot symptoms and shorter root lengths. Thirteen percent of the TAM 90 plants were highly tolerant of *P. ultimum.* These plants were transplanted to 6-inch pots and allowed to mature, flower, and cross-pollinate to produce SYN-1 seed. In SYN-1, the number of plants in the high tolerance category had almost tripled (37%). From this group of highly tolerant plants, we have chosen the top two-thirds to use for SYN-2 seed production.

Application. Selecting for tolerance to *P. ultimum* root rot in annual ryegrass should lead to improved stand establishment and productivity. Use of tolerant ryegrass may also reduce the incidence of *P. ultimum* disease in annual clovers because fewer susceptible plants would be present to harbor the pathogenic organism. The rapid population shift towards increased tolerance to root disease indicates that resistant cultivars can be developed.

Table 1. Distribution of root rot tolerance categories for TAM 90 and SYN-1 ryegrass populations infected with *Pythium ultimum*.

	Percentage of population (%)		
Cultivar	High tolerance	Intermediate tolerance	Low tolerance
TAM 90	13	34	50
SYN-1	37	30	33