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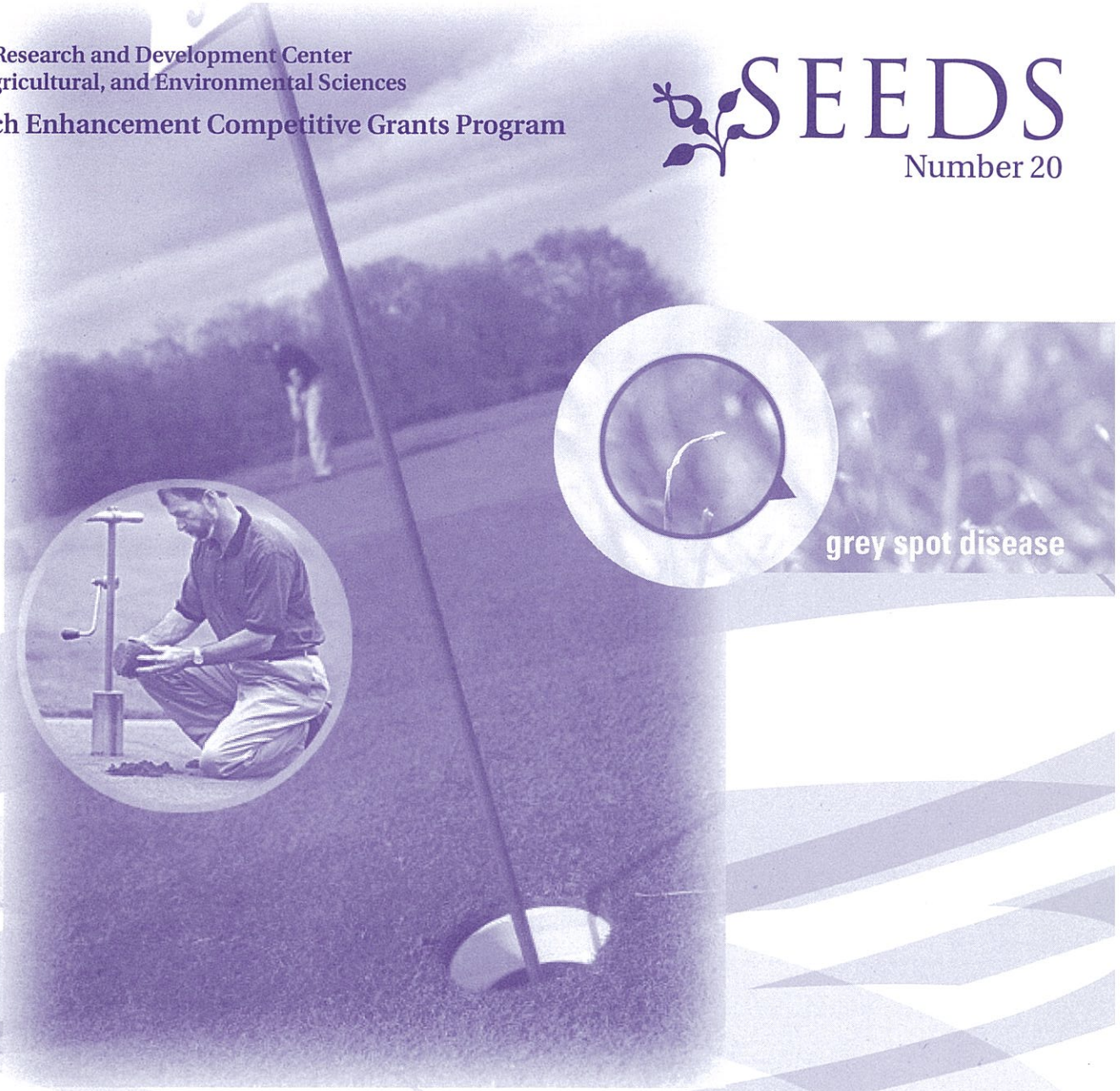

Resistance to Fungal Disease in Turfgrass and Rice

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Turfgrass is an important component of the urban landscape. It significantly improves the quality of life for millions each year by providing a backdrop for recreational activities and by filtering dust and pollen from the air. In addition, turfgrass contributes significantly to the economy. For example, a recent study by the U.S. Golf Association estimated that golf-course facilities impact the economy at an estimated $18 billion each year.

However, such benefits are not without a cost. Each year significant expenditures are made to establish and maintain high-quality disease- and pest-free turf. A recent survey estimated that economic expenditures on turf and turf-related products in Ohio accounted for early $1.2 billion per year. This clearly demonstrates the need for the development of more environmentally sound management practices that effectively rely on greater use of cultural and biological control practices and the use of genetically resistant cultivars.

Gray leaf spot, a disease of turfgrass, is becoming epidemic in Ohio and other states in the region due to high humidity in the summer. Evaluation of existing turf collections has not identified any cultivars that are highly resistant to the casual pathogen, *Magnaporthe grisea*. This fungal pathogen not only causes gray leaf spot of turfgrass but also causes rice blast, one of the most devastating diseases of rice. *M. grisea* costs rice farmers some $5 billion annually.

To understand the molecular basis of disease resistance to *M. grisea*, we initiated a project aimed at cloning one of the broad-spectrum blast resistance genes in rice. Due to the high level of DNA sequence conservation between rice and turfgrass, the results from rice will have application in controlling gray leaf spot in turfgrass. This project allowed us to complete high-resolution mapping and identify the candidate genes for transformation experiments.

OBJECTIVES

Our objectives were to complete high-resolution mapping and identify the candidate genes for transformation experiments that are necessary to fully understand the molecular basis of disease resistance in turfgrass.

ACHIEVEMENTS

We were able to complete the high-resolution mapping and identify the Pi2 candidate genes for transformation experiments. These results are the basis for us to begin the development of new disease control methods for gray leaf spot in turfgrass.

THE FUTURE

Sufficient data were collected from the completion of this project and some other separate but related projects to obtain $252,870 in additional funding from an industry partner. We will use this money to further analyze the candidate genes in the Pi2 region and begin developing new disease control methods that incorporate resistant cultivars and improved management practices.

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Photo courtesy Jodi Miller

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