

Final Report: Research conducted during summer visit at Rutgers.

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Herbarium Studies- Numerous grass specimens in the Chrysler herbarium were examined for the presence of endophytic fungi. This screening work focused predominantly on the genera Agrostis, Ammophila, Calamagrostis, and Poa. Endophytes were detected in several species of all genera, including Agrostis alba, A. hiemalis, A. perennans, A. scabra, Ammophila arenaria, A. breviligulata, Calamagrostis cinnoides, Poa aloides, P. autumnalis, P. palustris, P. paucispicula, and P. sylvestris.

Field Studies- Collections of several of the above listed grasses were secured, including Agrostis hiemalis, A. perennans, A. scabra, Ammophila breviligulata, P. autumnalis, P. palustris, and P. sylvestris. Representatives of these collections will be kept among the Rutgers breeding stock for turfgrass research. Plants are distributed between three greenhouses on the Cook College campus, including Plant Pathology (under care of Dr. Phil Halisky), Entomology (under care of Dr. Jane Breen), and Crops and Soils (under care of Dr. R. Funk).

Laboratory Studies- Endophytes were isolated from many of the fresh collections previously listed. These fungi were characterized culturally and identified to species. Isolates are to be utilized in the Department of Agricultural Biotechnology in research being conducted by Dr. Jane Breen and members of that Department.

Studies on physiology of choke formation by Acremonium endophytes were also conducted in collaboration with Dr. Funk's research team. Some comparative physiological studies were conducted on growth responses of Atkinsonella hypoxylon, Epichloe typhina, and Myriogenospora atramentosa on various sugars which are available in host plants. This research is part of a long term effort to understand the determinants of pathogenicity in endophytic fungi.

Some experiments to develop inoculation methods to infect turfgrasses with endophytic fungi were also conducted. This involved examining tissue culture techniques useful for culturing grasses. This work is still in progress.

Ongoing Collaborative Research- Several of the projects undertaken this summer will require continued cooperation between J. White and various Rutgers researchers. The molecular research being done in Ag. Biotech. will require further characterization of isolates as that project progresses. Additionally, collaborative projects are being planned with Dr.

Jane Breen on various aspects of the endophyte research and with Dr. Phil Halisky on beachgrass endophytes.

Potential Research Contributions- In collaboration with J. Breen manuscripts on aspects of this summers research are being prepared for Plant Pathology/Mycology Journals. Additionally, separate articles with Dr. Halisky in Plant Pathology are also being prepared, however these are expected to develop over the next year.

Suggestions for Future Endophyte Research- The Rutgers effort in endophyte research appears to exceed that of other comparable institutions. I was most impressed by the quality of support given by Rutgers Administrators to researchers both for their research and teaching. Real opportunities for increasing basic and applied knowledge and utilization of endophytes in grasses will be an outcome of this type of commitment.

Dr. Funk's turfgrass research grounds all basic research efforts and affords the opportunity to focus on real world problems. Efforts in Biotechnology may produce excellent results by working closely with the turfgrass group. Dr. Breen's involvement in the Biotech. research should facilitate that linkage. The first logical approach to the Biotech. initiative might be the development of methodology to characterize specific strains of endophyte for cultivar registration purposes. This would be an extremely valuable contribution to the growing turfgrass industry which is increasingly turning to endophytes as an answer to pest management problems. It is most probable that many important contributions to a basic understanding of the endophytes will be made in the process of developing such a system. It is also worth mentioning that probably no other group of researchers is in a position to develop such a system, simply because they lack the large endophyte-infected turfgrass assemblage available at Rutgers in Dr. Funk's collections.