Biotechnology, Fact and Fiction: What Does the Future Hold?

By Dr. G. A. de Zoeten

"Any day now. . . ." is the expectation that many have for the application of biotechnololgy in production plant agriculture. Uninhibited extrapolation from exciting laboratory results form the basis for these expectations.

There are several categories of exciting technological advances with their attendant promise of application in plant agriculture.

•Recombinant DNA techniques, by which agriculturally useful plant or microbial genes are identified, isolated and moved into the chromosomes of target plants provide a methodology with a bright future.

A cautionary note may be called for. At this time our molecular biologists are just learning to transfer single gene traits in to mostly experimental model plant systems such as tobacco. However, many of the agriculturally desirable characters, such as nitrogen fixation are controlled by many host as well as bacterial genes.

•Currently tissue culture methodologies are used in the experimental exploitation of somatic embryogenesis (artificial seed), somaclonal variation (variation occurring in plant cells due to genetic pressure in tissue culture), and somatic hybridization (protoplast fusion) of species that cannot be crossed sexually. Although promising laboratory results have been obtained it is hard to predict when benefits of these new technologies will reach the turf grass grower. This assessment is mainly based on the fact that grasses and in general monocotyledonous plants have been extremely difficult to regenerate from single cells currently a prerequisite for biotechnological advances in plant agriculture.

The claimed advantage of the application of recombinant DNA and tissue culture techniques is time savings over traditional plant breeding. At this stage of development of the methodologies it is questionable that the application of these technologies to plant agriculture can bypass the conventional plant breeding approaches completely and produce an acceptable variety of any crop.

•Diagnostic application of recombinant DNA techniques and serological techniques based on monoclonal antibody methodology hold the only promise of immediate useful application in agriculture.

It is the profit margin and the value of a commodity that determine the financial space in which both the biotechnology firm and the agricultural producer can maneuver. Thus, high value crops and high cost items in the production of medium to low value crops will be targets for biotechnology. Turf grass disease diagnosis because of the high replacement costs of turf grass stands have been targeted by some companies for development of diagnostic kits. The Pro Turf detection kits for golf course turf managers developed by Agri-Diagnostics Associates are being marketed by O. M. Scott and Sons, Inc. and seem among the first products of biotechnology that found their way to practical plant agriculture.

Since services to agricultural producers traditionally available free of charge from extension and other federally supported programs are being cut drastically, commercialization of the "do it yourself diagnostic kits" for agriculture may be helped greatly.

Although the promises of biotechnology in agriculture are great and the possibilities for their realization within 10-20 years are real (facts), the expectation of "any day now. . . ." is mainly fiction.

Editor's Note: Dr. Gus de Zoeten has been a Plant Pathology professor at the University of Wisconsin since 1967. A native of Holland, Dr. de Zoeten earned his Ph.D. degree in plant pathology at the University of California — Davis in 1965. His research in the department includes viral multiplication and translocation, and the mechanism of cross protection.

Wisconsin Golf Course Superintendents Association Officers and Directors 1985 — 1986

Mr. William R. Roberts
President
SENTRYWORLD Sports Center
2200 North Point Drive
Stevens Point, WI 54481

Mr. Roger Bell
Vice President
North Shore Golf Club
Box 337
Menasha, WI 54952

Mr. Rod Johnson
Secretary
Sheboygan Country Club
Box 1066
Sheboygan, WI 53081

Mr. Bruce Worzella
Treasurer
West Bend Country Club
5858 Highway Z
West Bend, WI 53095

DIRECTORS

Mr. Carl Grassl
10633 West Burleigh
Wauwatosa, WI 53222

Mr. Danny H. Quast
Milwaukee Country Club
8000 N. Range Line Road
Milwaukee, WI 531209

Mr. Randy Smith
5901 Malabae Lane
Madison, WI 53711

Mr. Monroe S. Miller
Immediate Past President
Blackhawk Country Club
P.O. Box 5129
Madison, WI 53705

Mr. Dale E. Marach
Clintonville Riverside Golf Club
Box 188
Clintonville, WI 54929