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The harvest is in and results are excellent for 280 tomato plants genetically engineered for resistance to tobacco mosaic virus (TMV), an important disease of tomatoes and other vegetables. Field trials conducted at a research plot near St. Louis showed good yields and high levels of resistance to TMV, the first conclusive proof that the genetically engineered tomatoes are resistant to TMV.

Roger Beachy, Ph.D., professor of biology at Washington University, fashioned the transgenic tomatoes through a molecular genetics breakthrough. While successful genetic manipulation of tomato and tobacco plants for resistance to a herbicide and an insect has been previously accomplished, Beachy's work is the first of its kind with viral disease resistance. He worked in collaboration with researchers from Monsanto Co. in St. Louis.

Beachy's success with tomatoes is expected to open the door for higher yields in commercial tomatoes. More importantly, the method of inducing virus resistance, developed by Beachy and Monsanto scientists, should be applicable to other viruses afflicting a wide range of crops, including the cereal grains, although the grains have been difficult to work with in genetic engineering experiments.

High yields, little disease

"We've proven that the transgenic plants can take high doses of TMV at different points in the growing cycle — 14 days post-planting in one experiment and 26 days in another — and show high resistance to the virus," Beachy says. "In addition, yields of the transgenic plants were outstanding. Infected transgenic plants yielded as much as 30 percent less than non-infected controls. The control plants were the variety VF-36, a once-popular variety that fell back to World War I."

Infected control plants yielded 25 percent less than non-infected controls. The control plants were the variety VF-36, a once-popular variety grown in California with little or no resistance to TMV. The transgenic plants are offspring of VF-36 with minor genetic changes.

Two separate experiments were performed with the tomatoes, planted June 3. In the first, plants were inoculated with a liberal dose of TMV (10 micrograms per milliliter on three leaves) and harvested 75 days later. The infected controls were 100 percent diseased while only 10 percent of the transgenic plants showed disease. In the second experiment, the dose was boosted four-fold. Again, the controls showed symptoms of TMV; 5 percent of the transgenic plants had symptoms.

"In the (transgenic) plants, we saw that the few plants with disease had milder symptoms, and the virus did not replicate as much as it did in the control plants," Beachy says. "We plan to continue our experiments with other vegetables, rice and cereal grains."

Link in research chain

Beachy's virus resistance research is the latest link in a Washington University research chain that stretches back to World War I. In 1917, Washington University biologist George Freiberg provided the basis for the modern understanding of viruses. Freiberg showed that the TMV virus is a single-stranded RNA virus that replicates in the cell nucleus, as opposed to viruses that replicate in the cytoplasm. Freiberg's work led to the development of the first vaccine against a viral disease, the plague virus.

In 1981, Beachy conceived the idea of resistance to TMV, and by 1983 he and Washington University colleagues Barun De and Patricia Powell Abed had isolated the TMV gene that encodes the coat protein of TMV — a protein essential for infection by the virus. The coat protein was then inserted into the chromosomes of tobacco and tomato plants through a molecular genetics technique that were developed by Monsanto researchers Robert T. Fraley, Ph.D., Stephen G. Rogers, Ph.D., and Robert Horsh, Ph.D.

The transformed cells were then regenerated into whole plants. These plants and their offspring were inoculated with TMV. They were resistant to infection and either did not become diseased or the disease symptoms were much less severe than the disease on the non-transformed plants.

Beachy's technique to produce TMV resistance has since been repeated by collaborators at Monsanto and the Rockefeller University to produce plants that are resistant to alfalfa mosaic virus, cucumber mosaic virus and potato virus X. "We believe the genetic engineering approach we have used will be applicable to many different viruses and plants," Beachy says. "We plan to continue our experiments with other vegetables, rice and cereal grains."

First U.S.-Japan genetics research agreement signed

Washington University and the Institute of Physical and Chemical Research (RIKEN) of Japan have signed an agreement to share expertise that may eventually enable scientists to map and sequence the entire genetic structure of humans.

The three-year agreement, signed Oct. 27 at Washington University, involves a collaborative effort of the Tsukuba Life Sciences Center of RIKEN and the newly established Washington University Center for Genetics in Medicine. David Schlessinger, Ph.D., professor of microbiology and immunology at Washington University, is director of the center; Maynard Olson, Ph.D., professor of genetics at the University, is associate director.

The pact involves the use of Olson's innovative genetic techniques — cloning human DNA in yeast cells — in conjunction with RIKEN sequencing technology, one of the most extensive gene-analyzing equipment in the world.

The agreement, which went into effect Nov. 1, is the first genetics collaboration signed between American and Japanese researchers and RIKEN's first genetics collaboration outside Japan. The research group also has international exchange agreements with the Pasteur Institute in Paris and the Academia Sinica in Shanghai, China. The agreement is expected to further establish Washington University in the forefront of world centers working on the genome project.

The agreement also may provide a model for internationalization, which is one of the exciting and, many think, necessary features of the human genome analysis," Schlessinger said.

The collaborative research initially will focus on determining the DNA sequence of an entire yeast chromosome. Further efforts will be based on the new cloning techniques that preserve large fragments of human DNA in yeast cells. Researchers then will use the yeast DNA as a reference for analyzing the DNA sequence of the human genome project. This will take on worldwide scope in recent years. The complete order and sequence of human DNA will have many potential benefits, including the determination of the genetic basis for as many as 3,500 diseases caused by genetic mutation as well as possible ways to correct many of the genetic defects.

Under terms of the agreement, research results during the collaboration are expected to be "freely disseminated in a timely manner."

Season's greetings

The Washington University Record will not be published during the winter break. This is the last issue of 1987; publication will resume Jan. 21, 1988. Best wishes for a joyous holiday season and a healthy and happy new year from the Record staff!
Tom Polacek personally when someone tries to tackle me. Sometimes I can't figure out why I'm going down. "I set individual goals," he says, "but there's no way I could achieve them without the unbelievable offensive line I have in front of me. It's anybody who deserves to give me credit for getting my picture in the paper all the time, it's them." Lesser known than Polacek's headline gridiron accomplishments are his classroom success. He is a nominee for academic All-American honors this year, and is in the running for a NCAA postgraduate scholarship. Law school seems to be in his immediate future.

"Tom Polacek embodies the NCAA's spirit of academic and athletic achievement working hand in hand," says Woody. "He is one of the senior achievement working hand in hand," says Woody. "I set individual goals," he says, "but there's no way I could achieve them without the unbelievable offensive line I have in front of me. It's anybody who deserves to give me credit for getting my picture in the paper all the time, it's them." Lesser known than Polacek's headline gridiron accomplishments are his classroom success. He is a nominee for academic All-American honors this year, and is in the running for a NCAA postgraduate scholarship. Law school seems to be in his immediate future.

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Professor Wellman named Lewin professor in Humanities

Carl P. Wellman, Ph.D., professor of philosophy at Washington University, has been appointed the first Hortense and Tobias Lewin Distinguished Professor in the Humanities at Washington University in St. Louis, acting dean of the Faculty of Arts and Sciences, has announced. Professor Wellman is a philosopher who has been widely recognized for his contributions to contemporary philosophy of science and philosophy of mind. He has been a prolific scholar and has written over 100 articles and books on various topics in the philosophy of science and mind.

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National competition ahead for law school's moot court team

A law school moot court team from Washington University won the Regional Moot Court Competition recently held in Kansas City, Mo. The three-person team will compete for the national title at the final rounds of the National Moot Court Competition to be held Jan. 25-28, 1988, in New York City.

The 38th annual New York competition, where 28 schools will compete, is the country's oldest and largest national moot court competition. It is sponsored by the Association of the Bar of the City of New York and the American Society of Trial Lawyers.

The third-year law students to compete in the national competition are: Debbie S. Champion of Chicago, Ky., and Tim Holstein and Peter C. Sisson, both of St. Louis. Holstein was presented a silver cup by the American College of Trial Lawyers as the best oralist in the final round of the regional competition. The students' faculty advisor is Roy D. Simon Jr., J.D., associate professor of law at Washington. The students' team went on to win four out of five rounds at the Nov. 20-21 regions, where 14 teams from seven schools competed.

Washington University law students reached the quartermasters at the regionals. They are Jane M. Carricker of Webster Groves, Rachelle S. Loomis of Southfield, Mich., and Mark E. 126 of Olivette.

"All the students worked extremely hard this semester," says Simon. "They did a great job. I'm also grateful to the lawyers, judges and students who helped the teams prepare for the oral arguments.

At the regional and national moot court competitions, the students are assigned a factual case and present oral arguments to panels of judges.

This year's case involves a 20-year smoker who sued a tobacco company, alleging that the company failed to adequately warn him about the hazards of smoking.

During the American Bar Association's Regional Negotiation Competition held Nov. 21 in Kansas City, Washington's team placed third.

The third-year students who competed at the regional negotiation competition were Kimberly A. Hanaway of St. Louis and Mark V. Gurnik of Naperville Ill.

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Women's basketball team takes on challenging schedule with confidence

When the 1987-88 women's basketball team opened its home season Jan. 1 with a 96-0 win over Webster University, the players' experience and depth played a key factor. Twelve lettermen returned this season, including four of the top five scorers from last year, as well as the top two rebounders. In addition, seven newcomers are on the roster.

Second-year Head Coach Nancy Fahey is so confident in the Bears this season that she chose to beef up the slate with a handful of games against ranked Division III foes, as well as taking on a pair of Division II teams.

"We want to be challenged by each game we play," says Fahey, who last season coached the team to 16 wins and a 76-1 winning percentage — both school records.

"In order to be considered as a contender, you have to challenge people," Fahey says. "I think we have a lot to be pleased about. We can get our first win, and then we can start thinking about matching last year's winning percentage."

Leading the pack of Bear returnees is junior Karen VanMeter, Eldorado, Ill. The 5-10 forward led the team with 12.4 points and 7.2 rebounds per game last season, but is recuperating from a painful bout with tendinitis in her knees.

"Karen is coming back very strong," says Fahey. "She will have to score her 12-plus points a night for us to be successful. She's an impact player both defensively and offensively, and we need that experience on the floor before we're still a relatively young team.

That youth is personified in the form of two sophomores starters, forward Rochelle Meyers, Valparaiso, Ind., and center Jill Steinhard, Danville, Ky. The 5-11 Meyers averaged 6.9 points and 6.1 rebounds per contest as a freshman, and established a school record with a 508 field goal percentage. The 6-2 Steinhard averaged 7.5 points and 7.6 rebounds in her first year wearing the red and green.

Soccer team runner-up for title

When Washington University reaches another NCAA Division III soccer final, one thing is certain — the University of North Carolina-Greensboro will not be the Bears' opponent. And that's something to cheer about for Bears fans.

The Spartans, playing in their last NCAA Division III tournament, beat the Bears 6-1 in the championship final, held on Sunday, Nov. 22, in Greensboro, N.C. Beginning next fall, the Spartans will play in Division II before moving up to the Division I level in 1991.

North Carolina was the same team that knocked off the Bears in 1987, beating the Red and Green by a 5-0 margin. While this year's contest also ended in a five-goal spread, the score was not as lopsided as the final score indicated. In fact, the Bears came within a whisker of tying it at 2-2 five minutes into the second half when a shot by freshman Paul Wright hit the crossbar and bounced away. Seconds later, UNC-G scored the crushing goal that gave them a 3-1 lead and all the momentum.

Despite the loss, it was quite a season for the Bears — a team that one year ago finished 9-7-1. First-year Coach Ty Keguc guided Washington to the first University Athletic Association championship, recording a 5-1 mark in league play. The Bears also managed a tie with Division I playoff team St. Louis University.

In postseason action, the Bears won their fifth regional championship, defeating second-ranked Ohio Wesleyan 1-0 for this year's title.

In seven years of NCAA play, Washington is among the nation's leaders in winning percentage with a 17-8 record.

Calendar Deadline

The deadline to submit items for the Jan. 21-30 calendar of the Washington University Record is Jan. 7. Items must be typed and state time, date, place, nature of event, sponsorship and admission costs. Incomplete items will not be printed. If available, include speaker's name and identification and the title of the event, as well as include your name and telephone number. Address items to King McClery, calendar editor, Box 1070.