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 virus resistance, developed by Beachy, 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, little disease 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 their life 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 the non-infected control plants."

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, all 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.

Anatomy of a discovery

In 1981, Beachy conceived the idea of resistance to TMV, and by 1983 he and Washington University colleagues Barun De and Patricia Powell Abel had isolated the TMV gene that encodes the coat protein of TMV — a protein enmeshing the virus. The coat protein was then inserted into the chromosomes of tobacco and tomato plants using the molecular engineering techniques that were developed by Monsanto researchers Robert T. Fraley, Ph.D., Stephen G. Rogers, Ph.D., and Robert Horwich, 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 re-peated 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."

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 one of the earliest descriptions of the mosaic disease of tomatoes, later to be identified as TMV. In the 1960s and early '70s, Washington University biologist Barry Commoner continued the TMV tradition; he and his colleagues studied the disease and described various physical and biological traits of the virus.

Then, in the early 1980s, Washington University biologist Mary-Dell Chilton, now with Ciba-Geigy Corp., helped develop the gene-transferring system involving the bacterium Agrobacterium Tumefaciens, a cornerstone of plant genetic engineering.

Enter Beachy, who, in 1985, announced at an American Society of Agronomy meeting in Chicago, Ill., that he had developed tobacco plants resistant to TMV and soon would have...
Running back breaks career rushing record

This article is part of a continuing series profiling Washington University students.

After making nine moves with his family, living as far east as New York and as far west as Oregon, Tom Polacek qualified the University football team's version of the "Travelin' Man." That moniker applies because Polacek's performance on the gridiron as well. The senior running back has covered more ground than any player for 2,494 yards. Polacek, who chose from a grab bag of possibilities to list Ada, Okla., as home, has spent four years in pursuit of one of the most enduring records in the Bear's annals — the career rushing record. And he achieved that goal during the Oct. 24 Homecoming game against Hofstra University. Don Polkinghorne, a 1975 graduate, previously held the record.

"I'm doing that well," he said in an interview, "I set individual goals," he says, "I think in my opinion," he says, "Washington University has become the perfect place to mesh athletics and academics. "Tom has great vision and a sense of making the right cut at the right time," adds Bear Head Coach Ken Woody. "He is not blessed with great speed, but his running ability makes it impossible to stop him one-on-one in the open field." Polacek is quick to point out that he's had some help along the way. "In my opinion," he says, "Washington University has become the perfect place to mesh athletics and academics. You can't go to a better school than this, and you can't play for a better overall program. I'll always be glad I came to Washington U." Bear fans add a collective, "Like-wise." David Moessner

Vast Implications

As an example of how predictable the gene-transfering work is, Beachy notes that the virus-resistant tomatoes are identical to other tomatoes except for three genes — he and his colleagues know the exact sequence of those genes, how they work and what they do. The result is new plants "with new traits for disease resistance that will benefit growers and farmers around the world," Beachy says.

Philosopher Wellman named Levin professor

Carl P. Wellman, Ph.D., professor of philosophy at Washington University, has been appointed the first Hortense and Tobias Levin Distinguished Professor in the Humanities. John H. Levin, performing dean of the Faculty of Arts and Sciences, has announced.

"I am very pleased that Wellman is generously acknowledged as a major ethical philosopher by his peers in the philosophy profession and for his scholarly research. 'He is a superb teacher on the undergraduate level and insists on a rigorous beginning for each year so that his influence on undergraduate education may continue,'" said Levin.

Wellman holds important posts in numerous academic associations and has written five major books on ethics and the philosophy of law, and has edited a sixth. He has published numerous scholarly articles, and has been a participant in many national and international meetings.

"Wellman started his career with Washington University in 1968 after serving as chair of the philosophy department at Lawrence University. He received his undergraduate degrees from the University of Arizona, and his graduate degrees from Harvard University, including a Ph.D. in 1954. He also did graduate work at the University of Cambridge. The Hortense and Tobias Levin Distinguished Professor in the Humanities was established in April 1987 by Tobias Levin, Washington University alumnus and retired chairman of the Tobery Color Card Co.

Levin is a 1932 graduate of the University's School of Law. Hortense Levin's philanthropy also included a gift to Washington University from 1934 to 1958, first in the College of Arts and Sciences and later in the School of Fine Arts.

Tomatoes

continued from p. 1

Carl P. Wellman

"We are hopeful that someday this genetic engineering, however, is far from over. He has made and presented numerous presentations and has had hosts of requests from researchers and government officials interested in utilizing his laboratory to learn relevant genetic engineering techniques. Among the developing countries that have expressed interest in his work are Zimbabwe, Egypt, Zambia, China, Thailand and India.

"We are hopeful that someday this mechanism will help provide protection to all people from different viruses, not only a minimum number of genes," Beachy says. "If it works, it would revolutionize yields of tomato crops and more versatility for growers.

"Gene engineering, however, is not without its critics. Some people with dark visions of technology gone astray feel, 'It's not wise to fool with Mother Nature.' But Beachy and his collaborators believe the new technology is not only sustainable and a faster version of methods that began with Gregor Mendel, considered the father of plant breeding.

"Plant breeders have been altering the genetic pool of plants and introducing new genes for academic Ail-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 leaders of our upperclassmen advising program and has exhibited a genuine interest in the academic progress of our freshmen."

Despite all the setbacks and frustrations, Polacek has landed on his feet and is very pleased to be right where he is. "In my opinion," he says, "Washington University has become the perfect place to mesh athletics and academics. You can't go to a better school than this, and you can't play for a better overall program. I'll always be glad I came to Washington U." Bear fans add a collective, "Like-wise."
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, Ill., 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 adviser is Roy D. Simon Jr., J.D., associate professor of law at Washington.

The students, along with five others from the Law School, participated in an international moot court simulation meeting of the American Association for the Advancement of Slavic Studies, held Nov. 6 in Boston. Okenfuss, managing editor of the Jahrbucher fur Geschichte Osteuropas, also participated in events celebrating the 50th anniversary of the Russian Research Center at Harvard University.

The Washington University Record is featuring a series of profiles of new faculty this semester on the Hilltop. Pharmaceutical and biological research involves investigating the molecular and cell biology underlying glycoprofiding anchoring of membrane proteins, utilizing decay-accelerating factor (DAF) as a model. DAF, a complement regulatory protein present in many cell types, functions to prevent complement activation.

R. Lowry, instructor in political science, comes to Washington from Stanford University, where he is a doctoral candidate in political science. He received a master's degree in political science in 1985 from Stanford, master of business administration degree in 1983 from the University of Illinois at Chicago and a bachelor's degree, with high distinction, in business administration in 1979 from Indiana University. He is a fellow at the Brookings Institution in Washington, D.C. during his academic year.

Douglas M. Lublin, M.D., M.P.H., assistant professor of pathology and medicine, came to the School of Medicine in 1984 as a research fellow in the divisions of rheumatology and laboratory medicine in the departments of medicine and pathology. He received a doctorate in physics from Stanford University in 1976 and a medical degree from the University of California/Los Angeles School of Medicine. His research involves investigating the molecular and cell biology underlying glycoprofiding anchoring of membrane proteins, utilizing decay-accelerating factor (DAF) as a model. DAF, a complement regulatory protein present in many cell types, functions to prevent complement activation.

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Hugh J. Macdonald, Ph.D., Avis Blewett Professor of Music, comes from Glasgow University in Scotland where he is professor of music. He received a bachelor's degree in 1961, master degree in 1965 and a doctorate in 1969 all from Pembroke College, Cambridge University. He is the general editor of the New Berlioz Edition since 1965 and he has authored many articles and books.

Paul R. Messinger, instructor in economics, comes to Washington from the University of California/Berkeley, where he is enrolled in a doctoral program in economics. He earned a master's degree in statistics in 1986.

Have you done something noteworthy?

Have you: Presented a paper? Won an award? Received a promotion? Published a book? Become an officer of a professional organization?

The Washington University Record will help spread the good news. Contributions regarding faculty and staff scholarly or professional activities are gladly accepted and appreciated. Send a brief note with your full name, highest- attained degree, and from which institution the accomplishment was arrived at. The Record will publish your news along with a description of your noteworthy activity. Your write-up will appear in the Record.

Don't forget: Space is limited, so be brief.

A case of AIDS in St. Louis In 1969.

The Oct. 25 Chicago Tribune docu- mented the AIDS-related death of Robert R., a St. Louis teenager whose case raises more questions than answers about the disease and from where the virus arrived in this country. Memory Elvin, Lewis, Ph.D., professor of microbiology in biomedical sciences in the departments of medicine and pathology, followed Robert R.'s decline and death for more than a year. "He was my first patient," Elvin-Lewis recalls, "and I couldn't believe what I was seeing. His symptoms were so severe nobody could understand it." When he died on May 16, 1969, Elvin-Lewis and others were so overwhelmed by the samples that this year tested positive for AIDS. Similar versions of the story appeared in newspapers and magazines around the country, including The New York Times, Time, Atlanta Journal-Constitution, People, Boston Globe, Philadelphia Inquirer, Washington Post, Houston Post and Los Angeles Times.
Women's basketball team takes on challenging schedule with confidence

When the 1987-88 women's basketball team opened its home season Nov. 1 with a 96-50 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 .761 winning percentage—both school records.

"In order to be considered as a contender, you have to face the challenge of playing quality teams. I think if we develop some kind of consistency throughout the season we can match last year's winning percentage—both school records.

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 contest last season, but is recuperating from a painful bout with tendonitis in her knee.

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

That youth is personified in the team's three freshmen: center Marcella Moll, Springfield; guard Jodi May, Champaign; and guard Linda Miller, Orlando, Fla.

"Any time there's a conference championship involved, it becomes special. We want to be in a position to contest for it," Fahey said.

The Bears second home game will be at 5:30 p.m. Saturday, Dec. 12, in the Field House against the University of Missouri-St. Louis, with 10 home games remaining.

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 1985, 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 Kegough guided Washington to the First University Athletic Association championship, recording an 11-2-2 mark in league play. The Bears also managed a tie in Division I playoff action with the University of St. Louis.