EMPOWERING STUDENT SUCCESS

a chronicle of distance learning

MASTER *of* SCIENCE *in* AGRONOMY
DISTANCE EDUCATION PROGRAM

10

CELEBRATING **10** YEARS

2007

IOWA STATE UNIVERSITY

PHOTO BY CHARLIE LITCHFIELD/IOWA STATE DAILY

LETTER *from the* IOWA STATE UNIVERSITY AGRONOMY CHAIR

IT IS MY PLEASURE to congratulate the Masters of Science in Agronomy Distance Education Program on achieving ten years of student success.

Since the Iowa Board of Regents approved the degree in 1997, the program has been a showpiece for the department, college, and university.

Through its continued commitment to providing student professionals with a quality, flexible master's degree program in agronomy, it has allowed an entirely new segment of the population to achieve higher degrees and advance their careers.

The M.S. in Agronomy program has built and strengthened our department, college, and university relationships with partners in the agricultural industry. By offering employees a way to continue their education without leaving their full-time positions, both the student/employees and their employers benefit. Representatives from industry also have provided valuable input in the creation of the curriculum and its ongoing improvement.

In addition to their careers, the students involved in the program advance the science of agronomy, much like other master's degree students, through their research and creative components. Faculty and course developers are heavily involved in the science of education and are using state of the art educational delivery methods soundly based in pedagogical principles. The program often sets the standard for excellence in distance education delivery.

It is unique to find one program that supports university and college strategic themes so completely, while meeting the needs of unique students who otherwise would not be served. This exemplary program is truly worthy of celebrating.

Sincerely,

Kendall R. Lamkey

MILESTONES

1992

Baker Council established to provide guidance to the Department of Agronomy

1995

MARCH

College of Agriculture Planning Committee report is published, Entering the 21st Century Planning for Progress

APRIL

Agronomy Department Head Ron Cantrell appoints a committee to develop a M.S. degree program accessible to students off campus and relevant to their professional development

JULY

Agronomy faculty conduct a survey of Iowa State University College of Agriculture alumni to assess student need for a distance education masters of agronomy program

SEPTEMBER

Survey results and proposal are presented to the Baker Council

1996

FEBRUARY

The committee creates and presents the curriculum proposal to the Agronomy Faculty and faculty discuss within panels

JUNE

The curriculum is reviewed during an Agronomy faculty meeting

AUGUST

Delivery technologies are selected and courseware and other instructional media are developed

SEPTEMBER

The proposed curriculum is presented to the Baker Council

OCTOBER

The curriculum is approved by the Iowa State University College of Agriculture Curriculum Committee and Graduate College Curriculum and Catalog Committee

NOVEMBER

The curriculum is approved by College of Agriculture faculty

DECEMBER

The curriculum is revised and the second version is approved by the Faculty Senate Curriculum Committee

1997

JANUARY

Program budget is approved and coordinator is hired. The program contracts with TREG for instructional development assistance and is approved by Faculty Senate Academic Affairs Council

MARCH

The program is presented, discussed, and approved by Faculty Senate

JUNE

Iowa Board of Regents approves the degree

DECEMBER

The advisory board is assembled and has its first meeting

1998

MARCH - JULY

Program Associates are hired

JULY

A pre-pilot study is conducted, the first student enrolls in the program

AUGUST

A pilot group orientation is conducted

Instruction begins for Agronomy 501, 502, and 503

1999

AUGUST

Program made available for open enrollment

2001

JANUARY

100th student is enrolled in the program

MAY

First two students graduate from the program

"Tell me and I'll forget. Show me and I may not remember. Involve me, and I'll understand."

–NATIVE AMERICAN SAYING

2005

JANUARY

200th student is enrolled in the program

DECEMBER

20th student graduates from the program

2006

APRIL

Program wins the Innovator's Award from the Iowa Distance Learning Association

2007

JANUARY

Program wins the ISU College of Agriculture Team Award

AUGUST

34 program graduates to date

OUR LOGO

The M.S. in Agronomy Program Logo was created by Lisa Fontaine of the Iowa State University College of Design. Fontaine developed the logo in 2001 and spent numerous hours revising and fine-tuning the image to communicate its symbolism.

"The logo presents the field of agronomy as a holistic blend of human and natural elements. The hand reaches out to make its impact on the land; the result of this impact is shown through the green rows of crops. Water flows through the center of the land forms; its form is left open to imply a continuity of movement. The sun is integrated into the sky, and visually harmonizes with the other elements through its curved sun rays. Another aspect providing visual harmony is the similarity of the fingers and the crop rows; this similarity not only unifies the visual elements but makes a subtle suggestion of the connection between humans and plants. The various forms are 'enclosed' in an implied circle, which represents both the earth and the cyclical nature of plant growth."

–LISA FONTAINE

THE CONTRIBUTORS

*The following individuals have contributed to the M.S. in Agronomy program since 1995. All of the individuals are Iowa State University faculty and staff members unless otherwise noted. *Denotes current contributor.*

"I not only use all the brains I have, but all I can borrow."

– WOODROW WILSON

ADMINISTRATION

Kendall Lamkey - Department Chair*
Ken Moore - Program Director*
Tom Loynachan - Admissions Director*
Ann Thompson – External Evaluation Director*
Jesse Drew - Program Coordinator*
Tom Schultz - Media Coordinator*
Ron Cantrell – Administration
David Topel –Administration
Richard Shibles – Administration

FEASIBILITY COMMITTEE

Rick Cruse
Randy Killorn
Allen Knapp
Ken Moore
Mike Owen
Dick Shibles
Elwynn Taylor

CURRICULUM DEVELOPMENT COMMITTEE

Lee Burras
Arden Campbell
Rick Cruse
Elaine Hall
Randy Killorn
Allen Knapp
Ken Moore
Mike Owen
Dick Shibles
Elwynn Taylor

COURSE ORGANIZERS

CROPS:

Arden Campbell
Dale Farnham
Allen Knapp
Deborah Muenchrath
Margaret Smith
Mary Wiedenhoeft

SOILS:

Rogerio Borges
Richard Cruse
Dan Ressler

CLIMATE:

Dick Carlson
Elwynn Taylor
Dennis Todey

INTEGRATED PEST MANAGEMENT:

Scott Heuchelin
Gary Munkvold
Mike Owen
Jon Tollefson

QUANTITATIVE METHODS:

Matt Harbur
Ken Moore
Ron Mowers
Dennis Todey

COURSE CONTRIBUTORS

CROPS:

Steve Barnhart
Arden Campbell
Kathleen Delate
Dale Farnham
Lance Gibson
Allen Knapp
Matt Liebman
Ken Moore
Deborah Muenchrath
Ricardo Salvador
Dick Shibles
Margaret Smith
Dennis Todey
Keith Whigham
Mary Wiedenhoeft

SOILS:

Rogerio Borges
Lee Burras
Richard Cruse
Tom Fenton
Mahdi Al-Kaisi
Randy Killorn
Tom Loynachan
Antonio Mallarino
Dan Ressler
Fred Troeh

CLIMATE:

Dick Carlson
Elwynn Taylor
Dennis Todey

INTEGRATED PEST MANAGEMENT:

Anthony Boughton
Scott Heuchelin
Don Holland
Stephen Lefko
Gary Munkvold
Mike Owen
Jon Tollefson
Shawn Wright

COURSE INSTRUCTORS

Rogerio Borges – Agronomy 502, 512, & 532
Lee Burras – Agronomy 502
Arden Campbell – Agronomy 511*
Allan Ciha – Agronomy 501, 514,* & 533*
Richard Cruse – Agronomy 502 & 532*
Dan Dobill – Agronomy 502*
Steve Fales – Agronomy 592*
Scott Heuchelin – Agronomy 513, 514, 533, & 594
Allen Knapp – Agronomy 501* & 592
Tom Loynachan - Agronomy 512*
Laura Merrick – Agronomy 511
Ken Moore – Agronomy 513 & 531
Ron Mowers – Agronomy 513*
Deborah Muenchrath – Agronomy 501 & 531
Dan Ressler – Agronomy 502 & 512
Richard Shibles – Agronomy 501
Byron Sleugh - Agronomy 531*
Margaret Smith – Agronomy 531, 591, & 592
Elwynn Taylor - Agronomy 503*
Dennis Todey – Agronomy 503, 513, 593, & 594
Mark Westgate – Agronomy 501 & 594*
Mary Wiedenhoeft – Agronomy 591*

COURSEWARE DEVELOPERS

Jesse Drew*
Thomas Schultz*
Ramkumar Bhuvaneswari*
Monica Carolan*
Eric Klaus*
Maria Lux*
Braden Miller*
Pooja Ramesh*
Glenn Wiedenhoeft*
Kevin Born
Matt Brooks
Kirk Christie
Dan Dobill
Tessa Hackenmiller
Marvin Howard
Ji-Won Lee
Joel MacDonald
David Moore
Swetha Sadananda
Scott Seitz
Anurag Sharda

COURSEWARE DEVELOPERS *(cont.)*

Namrata Singh
Christy Snyder
Misty Vogel
Jee-Young Won
Kang-Ming Wong
Kristen Wright
Amanda Zenor

EVALUATION TEAM

Ann Thompson
Ching-Chun Shih
Jesse Drew
Dan Dobill

SUPPORT STAFF

Robbie Kerkove
Jill Litwiller *
Jaci Severson*
Donna Williams

PILOT STUDENTS

*(** denotes program graduate)*

Brett Blanchfield, Churdan, Iowa
Michael Dillon, Sumner, Iowa
John Eveland, Fort Dodge, Iowa**
James Hill, Garner, Iowa
Brett Iverson, Polk City, Iowa
Mark Johnson, Gilbert, Iowa**
Jason Levan, Waukee, Iowa
Michael Parsons, Ankeny, Iowa**
Mark Riedesel, Davenport, Iowa
Brian Ritland, Hubbard, Iowa**
Adda Sayers, Des Moines, Iowa**
Jeffrey Sernett, Kelley, Iowa**
Mark Vosseller, Williamsburg, Iowa
Anthony Weis, Ida Grove, Iowa**
Brent Wilson, Ankeny, Iowa**
Bill Winkelman, Johnston, Iowa
Neil Wubben, Osage, Iowa**

ADVISORY PANEL

Bob Beck, Agriliance LLC.
Marty Braster, Rathbun Regional Water Assoc.
Richard Carter, former Director of ISU Brenton Center
Allan Ciha, former Technical Development Manager for Monsanto
Joe Ellerbach, John Deere
Jim Gulliford, EPA
Ron Heck, Iowa Soybean Promotion Board
Brian Lang, Iowa State University Extension
Lowell Moser, former Agronomy Department Chair, University of Nebraska
Jim Penny, Heart of Iowa Coop







HISTORY AND PROGRAM OVERVIEW

THE MASTERS OF SCIENCE IN AGRONOMY

Distance Education Program at Iowa State University was the first degree program in the world designed to provide working professionals an outlet for earning a master's degree in agronomy on-line. It allows students to gain the technical agronomic knowledge and professional skills necessary to be successful in a highly competitive marketplace.

ADDRESSING STUDENT NEED

Iowa State University Agronomy Professors Dick Shibles, Allen Knapp, and Ken Moore saw the need for a distance education master's degree program first hand in their students who commuted to Ames for master degree programs in 1995. David Topel, who was Dean of the College of Agriculture at the time, found alumni were confirming the need for such a degree. In addition, the needs of non-traditional students were presented in the College of Agriculture Planning Committee report, Entering the 21st Century: Planning for Progress, which identified an increasing number of non-traditional students who needed courses at night and on weekends, both off- and on-campus.

It was clear that the time was right to find a way to serve the needs of such students. To find out how, the Department of Agronomy surveyed over 3,000 Iowa State University graduates residing in Iowa who graduated with a B.S. degree in an agronomy-related field since 1980. Based upon the survey responses the department concluded there was sufficient interest in a master's degree to pursue its development, the use of multimedia technology was an acceptable form of delivery, and some non-traditional subject matter was necessary to meet the needs of working professionals.

Program courseware has undergone three major redesigns as well as countless improvements over the past ten years, and this summer a new interface will be implemented to allow greater integration of technology and content.

STUDENT-CENTERED PROGRAM DESIGN

In response to the results of the study, Ken Moore and Dick Shibles led a team of Agronomy faculty and staff in the development of the Master of Science in Agronomy distance education program. Private gifts facilitated the development of the master's program using state-of-the-art technology. As a result of their discussions with Agronomy faculty members, Ray and Mary Baker made the inaugural gift to establish the program. Courses were designed to be delivered via the Internet or CD-ROM so students could access the information from home anytime within the constraints of their professional and personal schedules.

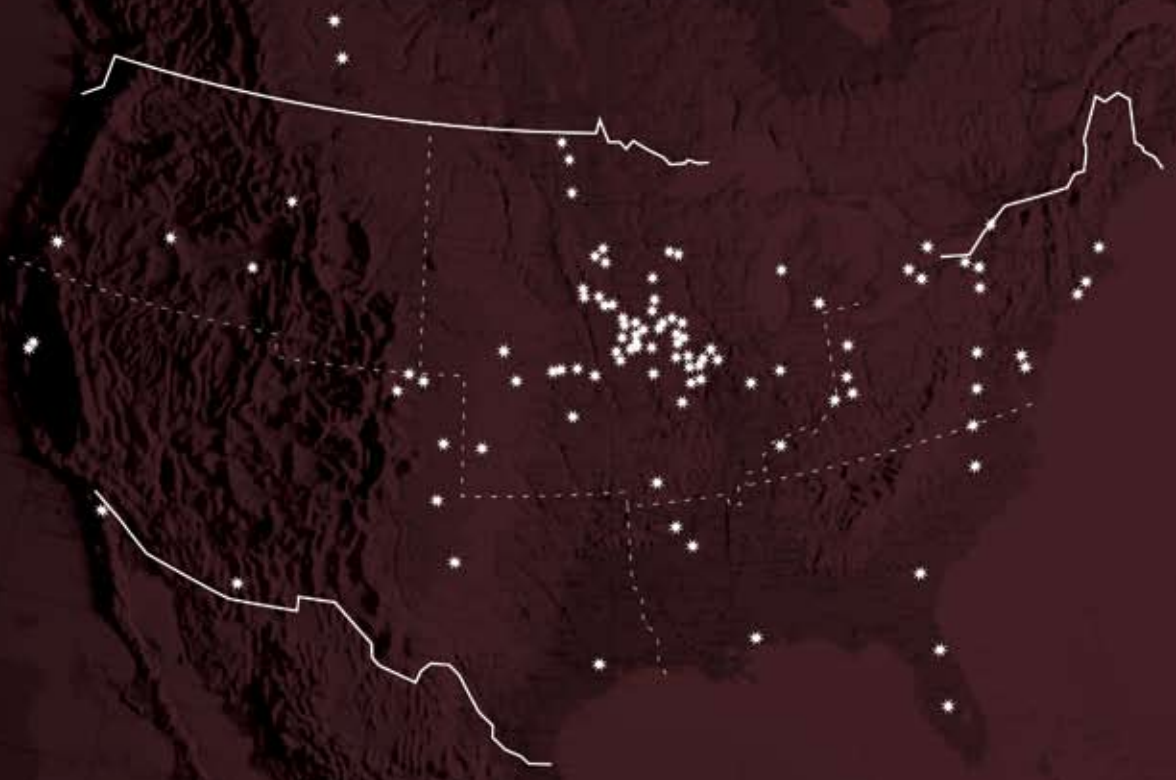
An advisory panel comprised of industry and extension professionals helped steer the course of the program. The team did not extend the existing agronomy curriculum, but rather developed a new curriculum specifically for working professionals. Every course was developed specifically for this degree and was based on a large matrix of learning outcomes the team created for the program. In fall of 1998, with three courses to choose from, the pilot class of 15 students began working on their M.S. in Agronomy degrees. Enrollment was opened to all qualified applicants in the fall of 1999.

Today, the curriculum consists of 36 credits from specified courses, a one-credit workshop, and a three-credit creative component. In the first 31 credits of the curriculum, emphasis is placed on technical knowledge and applications in the areas of climatology, crop production, soil and water management, and integrated pest management. The remaining credits focus on the integration of knowledge and development of problem-solving and professional skills.

Course materials are available to students via the Internet and CD-ROM. Students are encouraged to visit campus for an optional orientation session and are required to attend a four-day workshop and present their creative component seminars on the Iowa State campus. Most students enroll in one or two courses per semester while working full time and complete the degree in three to five years. On average, students typically invest 8-12 hours per week for each course.

DISTRIBUTION *of* ACTIVE STUDENTS
by region, summer 2007

NORTHWEST	4
SOUTHWEST	8
MIDWEST	73
SOUTHEAST	10
NORTHEAST	16
ALASKA, HAWAII	2
OUTSIDE U.S.	4
TOTAL STUDENTS	117



MAP *of* GRADUATES *and* ACTIVE STUDENTS
summer 2007

TEAM COMMITMENT

Currently, 12 instructors teach the 13 courses in the program. Student evaluations have consistently indicated students are very pleased with the amount and quality of interaction they have with their instructors. This is due to the outstanding level of commitment M.S. in Agronomy instructors show to the program, many who do so in addition to their on-campus teaching responsibilities. Faculty have stated they spend between 6-12 hours per week on courses. Evaluation comments also illustrate students appreciate the on-going course development by faculty and staff.

TEAM SUPPORT

In 2007, the ISU College of Agriculture Team Award was given to the M.S. Program. In addition to faculty members, the program is supported by 14 staff members, undergraduate student employees, and administrators.

PHOTO BY BOB ELBERT.

BUILDING RELATIONSHIPS

The M.S. in Agronomy program has built strong relationships with influential companies in the agricultural industry. From its infancy, the program fostered open communication with industry representatives by engaging them in the development of the degree. Robert Beck, a former advisory panel member and former instructor who is now with Agriliance, said in addition to meeting the needs of adult students, the program addressed several problems from industry's point of view by supplying qualified students to fill openings and allowing current employees to improve their skills without leaving their company to pursue a degree full time.

SATISFIED STUDENTS

In the 2004 Program Survey, **100%** of the current students and graduates reported, "**My educational goals are being met through this program.**" (see table for more details)

BUILDING RELATIONSHIPS *(continued)*

The program fostered its relationships with those in industry by providing leadership in the Lifelong Learning Summit hosted by Iowa State University and Pioneer Hi-bred International in May 2004. The summit, "Learning for Life," brought together leading agricultural professionals to discuss lifelong learning and to identify strategies for developing and enabling lifelong learners. Participants discovered and characterized emerging trends relative to the lifelong learning needs, reviewed and discussed current lifelong learning programs and initiatives offered by the College of Agriculture, and most importantly developed strategies and partnerships for better serving the lifelong learning needs of students.

SURVEY RESULTS

In 2004, The M.S. in Agronomy program conducted a program impact survey to measure participants' career mobility and economic status. Thirty-four of the 53 participants completed the survey.

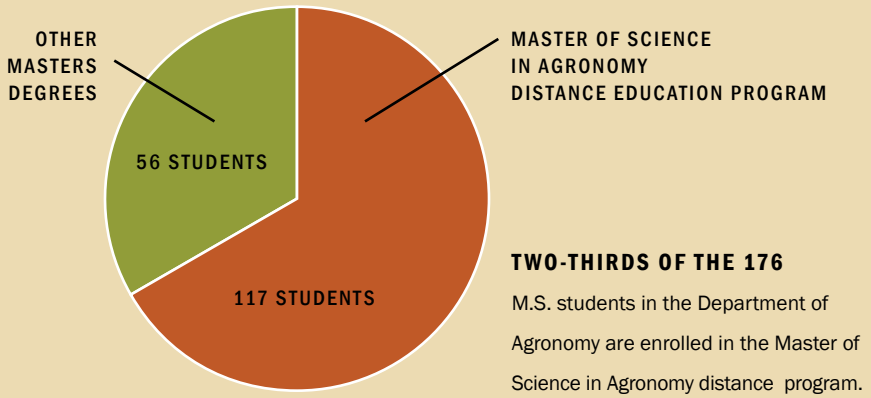
2004 PROGRAM IMPACT SURVEY

EVALUATION ITEM	CURRENT STUDENT RESPONSES	GRADUATE RESPONSES
I will earn more income in my current position	**30.4%** of the Current Students reported either "**Agree**" or "**Strongly Agree**"	**81.8%** of the Graduates reported either "**Agree**" or "**Strongly Agree**"
My skills and knowledge will be worth more income in the marketplace	**95.6%** of the Current Students reported either "**Agree**" or "**Strongly Agree**"	**All** of the Graduates reported either "**Agree**" or "**Strongly Agree**"
My earning potential will increase	**78.2%** of the Current Students reported either "**Agree**" or "**Strongly Agree**"	**91%** of the Graduates reported either "**Agree**" or "**Strongly Agree**"
I will have more potential for promotion within my own company	**52.1%** of the Current Students reported either "**Agree**" or "**Strongly Agree**"	**All** of the Graduates reported either "**Agree**" or "**Strongly Agree**"
I will be more marketable and desireable by other companies	**91.3%** of the Current Students reported either "**Agree**" or "**Strongly Agree**"	**All** of the Graduates reported either "**Agree**" or "**Strongly Agree**"

2004 PROGRAM IMPACT SURVEY *(continued)*

EVALUATION ITEM	GRADUATES & CURRENT STUDENT RESPONSES
I would pursue this degree if it were offered only on campus	**67.6%** of the Graduate and Current Students reported either "**Disagree**" or "**Strongly Disagree**"
My educational goals are being met through this program	**All** of the Graduates and Current Students reported either "**Agree**" or "**Strongly Agree**"
I would or already have recommended this program to others	**97%** of the Graduates and Current Students reported either "**Agree**" or "**Strongly Agree**"

STUDENTS ENROLLED IN MASTERS DEGREE PROGRAMS
in the Iowa State University Department of Agronomy - 2007



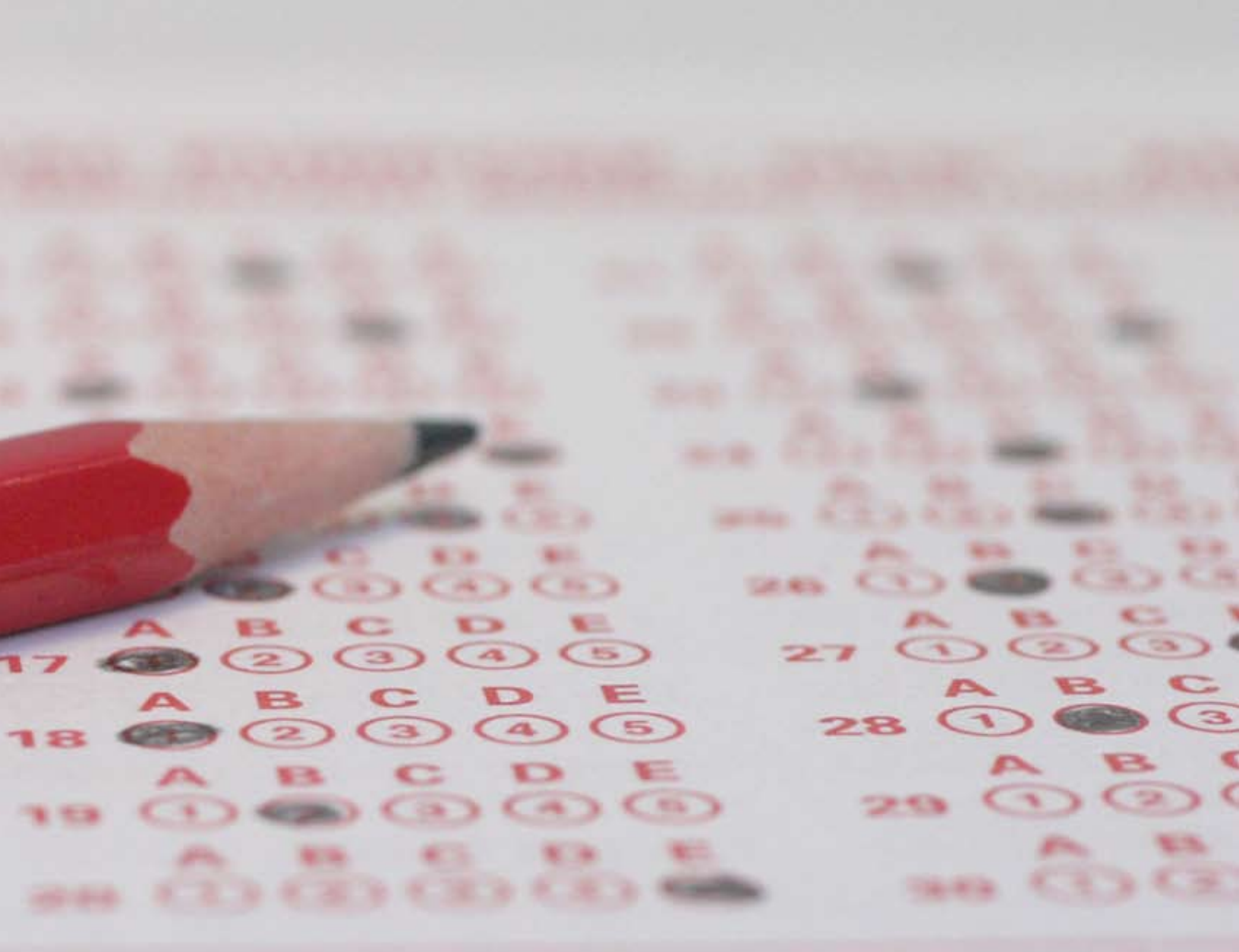
TWO-THIRDS OF THE 176 M.S. students in the Department of Agronomy are enrolled in the Master of Science in Agronomy distance program.

CONTINUED STUDENT SUCCESS

Interest in the program has exceeded expectations. Enrollment trends in the Master of Science in Agronomy program continue to be positive. The program is having a major impact on graduate enrollment in the Iowa State University Department of Agronomy and College of Agriculture. To date, 246 students have enrolled in the program and 117 are active in the program, accounting for over two-thirds of the students enrolled in master's degree programs in the Department of Agronomy and over one fourth in the College of Agriculture. Students in the program are mainly employed by the seed industry or work for extension or the government. Most of the students live in the US, and 33% are from Iowa. In total, students have hailed from 41 different states, 3 Canadian Provinces, and Mexico. Thirty-four students have graduated from the program.

"One of my educational goals was to honestly just learn. I just didn't just want to get the degree. I needed to learn the information to do my job. It wasn't that I was going to get a raise if I got the master's degree or have some status increase. I needed the information. I need to learn to translate to what I was doing at work. This program met one of my educational goals and is of utmost quality, although the program did take some time to complete. However, I believe if you want to do anything of quality it's simply going to take some time. If it hadn't taken time, it wouldn't have been worth doing."

DIANE DE JONG
PROGRAM REPRESENTATIVE, UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION, SUMMER 2006 GRADUATE



EVALUATING AND ENHANCING

The Master of Science in Agronomy team takes considerable effort to ensure the program is making progress towards meeting specified outcomes and educational goals. Early in the development of the program a unique and very productive collaboration was developed with the Center for Technology in Learning and Teaching in the College of Education. The Program Evaluation Team led by Ann Thompson, professor in the Department of Curriculum and Instruction, was developed to assess effectiveness of instructional materials and delivery technologies. The result has been documented improvement in performance for each year the program has been offered. The research impacts Thompson and her curriculum and instruction colleagues—none of whom are agronomists—as well by contributing to the knowledge base of distance education, particularly in the area of advanced degrees.

by Ann Thompson, Department of Curriculum and Instruction

Ann Thompson
is a University Professor of Curriculum and Instruction and the Founding Director/Senior Advisor for the Center for Technology in Learning and Teaching in the College of Education at Iowa State University.

FOR THE ENTIRE 10-YEAR HISTORY of the Master of Science in Agronomy at a distance program, evaluation has played a major role in program development. From the beginning, the project leaders were deeply committed to obtaining continual feedback from program participants, the Advisory Board, and program faculty members. The feedback obtained from all these sources is used annually to make program adjustments and improvements.

The strong commitment to evaluation is evident in the number and type of annual evaluations requested from program participants. Program students complete evaluation questionnaires on individual courses each semester and the overall program each year. In addition, program students participate in face-to-face focus group sessions that are designed to obtain additional feedback on the program. Students in the program become accustomed to the frequent requests for feedback and understand that their feedback is vital to the continuous improvement of the program.

Similarly, the program Advisory Board has been used regularly to obtain information about curriculum development. These external advisors are from business and industry, and they provide suggestions of how the program can best serve their needs. Each year, Advisory Board members participate in focus groups designed to obtain their feedback on the relevance of the curriculum and the need for new topics and approaches in the program. Feedback from this group has been consistently positive and encouraging, as the advisors see the program as meeting a major need for young agronomy professionals. At the same time, this group has provided specific suggestions for keeping the curriculum current and relevant to the needs of business and industry. The group has also expressed appreciation for the fact that the development team has responded to their suggestions for program content and made annual revisions based on feedback from the advisory committee.

The faculty in the program are also involved in program evaluation and change. Through both informal discussions and questionnaires, the faculty members are encouraged to provide suggestions and insights for program improvement.

Taken together, the numerous evaluation data sources from the program have been instrumental in developing a rigorous, relevant and timely curriculum for students. The fact that collected data are used for program change and improvement is highly appreciated by program participants and gives them a strong sense of ownership in this high quality graduate experience.

“Enrolling in the Master of Science in Agronomy Distance program has been one of the best decisions I made in my life. I experienced greater job satisfaction due to helping my clientele, as well as an increased earning potential that I would not have had otherwise. I believe the success of the M.S. in Agronomy program lies with excellent teaching by the faculty, great program design and development, and innovation in technology. I will recommend this program to anyone interested in advancing their career and personal aspirations and goals!”

MIKE JANSSEN,
TECHNICAL SERVICE AGRONOMIST,
GOLDEN HARVEST SEEDS INC.,
2006 GRADUATE

EVALUATING AND ENHANCING

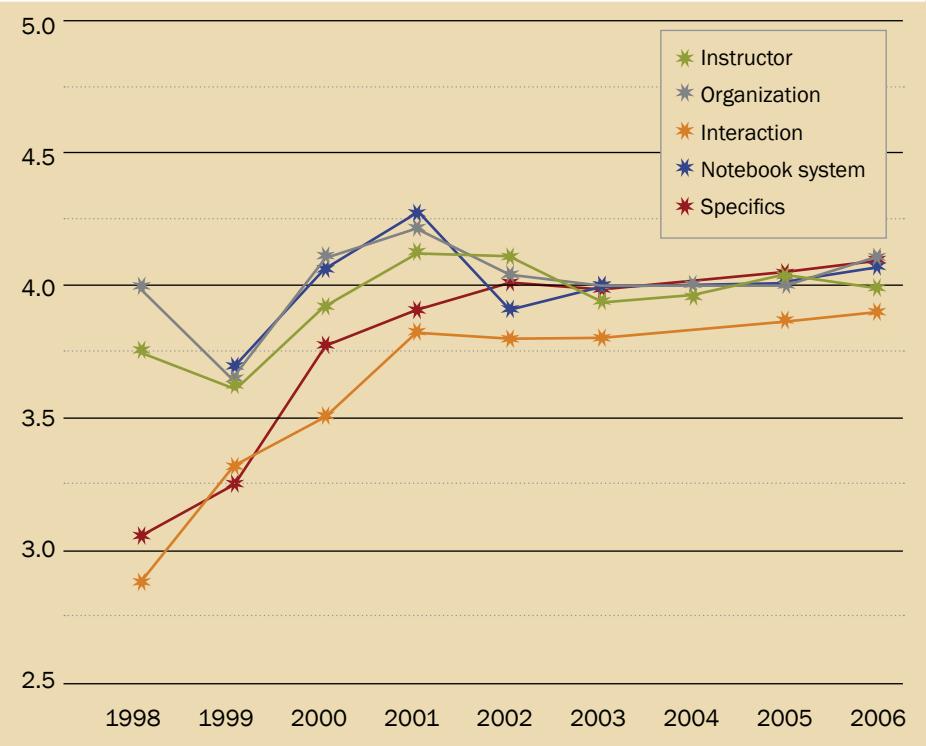
In addition to specific suggestions that lead to changes in curriculum and pedagogy in the program, student evaluation feedback over the 10 years of the program has revealed several consistent themes that characterize the program. These themes include:

- the program provides access to graduate level higher education otherwise unattainable by this audience of students who, in general, are employed in full time professional positions in the agriculture industry
- each of the courses in the program is an extremely rigorous and demanding academic experience, generally requiring more student time investment than comparable on-campus courses
- students and faculty members report extensive interaction time with each other; professors indicate that they spend approximately 30 minutes per week per student in individual interactions
- students value the quality of the lessons, with special appreciation for the interactive features and the direct connections to their professional lives
- there is a strong sense of ownership and teamwork among the program students, professors and the Advisory Committee
- students report that the graduate program has opened up professional advancement opportunities for them
- students give high marks to the amount and relevance of the learning in the program and indicate they are learning more than in a face-to-face course

It should also be noted that even after 10 years, there is still room for improvement in the Master of Science in Agronomy program. Although students rate the amount of interaction with their professors as approximately the same they would in an on-campus class, they still miss the face-to-face interactions with faculty and their fellow students. Emerging video technologies may help program staff address this need in the near future.

In summary, the evaluation data make it clear that entering its 10th year, the Master of Science in Agronomy program provides a rigorous, relevant, and pedagogically sound graduate experience for working students who would not otherwise be able to pursue a degree. Each course in the program is designed to emphasize interactive, challenging experiences for students. Student evaluations of the program are collected each semester and are overwhelmingly positive. Students report especially high satisfaction with the amount they are learning in the program, the relevance of the curriculum to their professional lives, the career advancement opportunities enabled by their participation in this advanced degree program and the careful design of the courses. Their main criticism of the program is that it requires more work than they expected and that courses are very demanding.

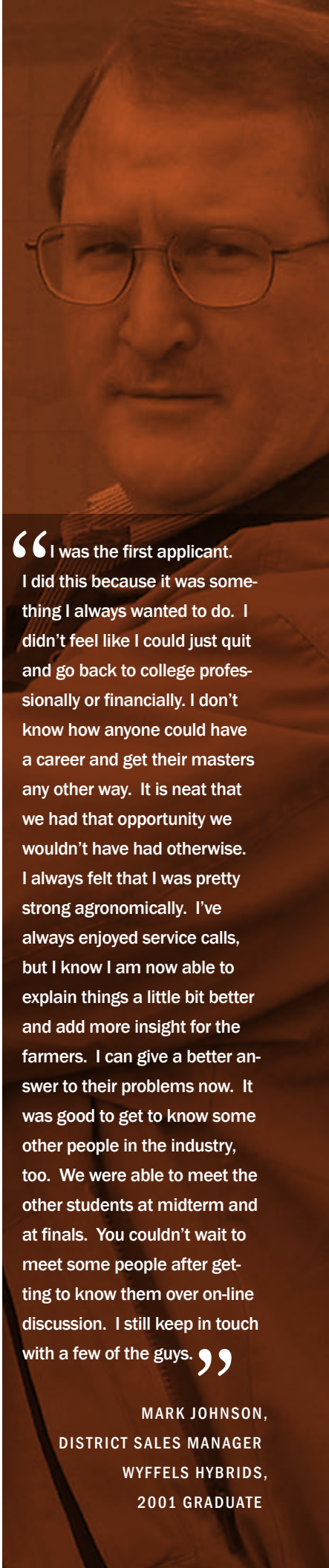
STUDENT EVALUATIONS



Scale: 1.0 = Strongly Negative; 2.0 = Negative; 3.0 = Neutral; 4.0 = Positive; 5.0 = Strongly Positive
*Data for Interaction, Notebook System, and Specifics not obtained for 2004 due to Impact Survey given in place of program evaluation

COMPREHENSIVE EVALUATIONS have been conducted on every course taught since instruction began in 1998. The evaluation instrument has changed over the years as more has been learned about assessment strategies. The number of questions asked has varied over time, but the five categories of questions has been consistent. The trend in composite scores for all categories has been positive over the life of the program. Clearly, the investment in assessment has paid handsome dividends in the quality of the program, as improvements have been made based upon feedback from students, faculty, and the Advisory Committee.

The evaluation component of the program has been led by faculty and graduate students in the College of Human Sciences and findings from the evaluations have been used to contribute to knowledge in the field of distance education. Numerous journal articles and presentations at national meetings, both in agronomy and education, have shared the data and the story of the program with others. In a time when many higher education institutions are compromising educational quality to provide distance education, the Iowa State University Master of Science in Agronomy program continues to create and maintain rigorous, high quality, interactive distance education graduate programs.



"I was the first applicant. I did this because it was something I always wanted to do. I didn't feel like I could just quit and go back to college professionally or financially. I don't know how anyone could have a career and get their masters any other way. It is neat that we had that opportunity we wouldn't have had otherwise. I always felt that I was pretty strong agronomically. I've always enjoyed service calls, but I know I am now able to explain things a little bit better and add more insight for the farmers. I can give a better answer to their problems now. It was good to get to know some other people in the industry, too. We were able to meet the other students at midterm and at finals. You couldn't wait to meet some people after getting to know them over on-line discussion. I still keep in touch with a few of the guys."

MARK JOHNSON,
DISTRICT SALES MANAGER
WYFFELS HYBRIDS,
2001 GRADUATE

“This program was unique in the sense that it focused a lot on real-world agricultural situations that helped me use it at work. I really enjoyed the case study classes and believe they had the greatest impact for me. I improved my management decisions skills and development of management plans for farmers and producers. With my current career position, I work closely with producers and they are always asking, “What should I do?” Those classes definitely helped me a lot. My employers always respected this degree and respected me for finishing it. They have always been supportive, and as far as my customers, producers, they as well thought it was great what I was doing. . . . I think it helped my credibility with producers a lot to finish the program up.”

PAIGE JOHNSON,
AGRONOMIST AND SEED SPECIALIST,
NORTH CENTRAL COOPERATIVE,
SUMMER 2006 GRADUATE

ADVANCING STRATEGIC THEMES

The Master of Science in Agronomy program supports every theme envisioned in the current university and college strategic plans through the following efforts.

ACHIEVING EDUCATIONAL EXCELLENCE

The program is a leader in the application of asynchronous learning technologies in distance education and is contributing significantly to the scholarship of teaching and learning at a distance. In addition to its agronomic course rigor, the program focuses on strengthening students’ critical thinking, problem-solving abilities, creative abilities, and communication skills. This cutting-edge approach to education and commitment to quality attracts and retains top-notch faculty, staff, and students.

ENHANCING STUDENT SUCCESS AND QUALITY OF LIFE IN IOWA

Graduates of the program often find they are more marketable in their chosen career and are able to reach higher positions with greater compensation. They are poised to become leaders in the agriculture industry. Most importantly, the program is fulfilling the fundamental Land-Grant promise of providing educational opportunities to Iowans, many of whom would otherwise not have such an opportunity.

IMPROVING IOWA

Around 33% of students in the program are from Iowa, reinvesting their new knowledge directly to agriculture in this state.

UNIQUE BACKGROUNDS

Whether out in the field or working in industry, M.S. students bring a wide range of professional experience to class discussions.

EXPANDING DIVERSITY

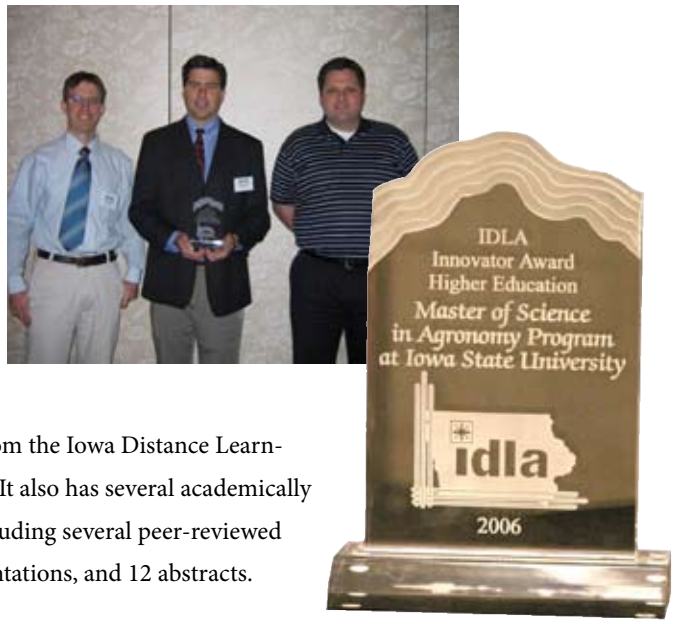
Given students' varied professional experiences and geographic locations, the diversity within the student population contributes greatly to learning within the program. Faculty encourage students to share their diverse viewpoints and experiences, both personal and professional, to help educate one another. As a result, graduates are well prepared to live and work in today's global society.

". . . VARIED GEOGRAPHIC LOCATIONS AND PROFESSIONAL EXPERIENCES"

In total, students have hailed from 41 different states, 3 Canadian Provinces, and Mexico. Though many students work in the seed industry, extension, or government, the program also attracts producers, consultants, and professionals in other varied occupations. This variety of backgrounds gives our student community a breadth of knowledge unique to the distance learning environment.

INCREASING THE VISIBILITY OF SUCCESSFUL PROGRAMS

The M.S. in Agronomy program has been drawing positive attention for years by receiving awards from the American Society of Agronomy in its Educational Materials national award program and receiving the Innovator's Award from the Iowa Distance Learning Association in 2006. It also has several academically impressive outcomes including several peer-reviewed journal articles, 28 presentations, and 12 abstracts.



"I was always interested in agronomy and felt that this program would help me achieve my goals. Agronomy has always been one of my favorite topics and I always felt that I could do a better job with clients if I had more training. This program provided me an opportunity to learn more technical knowledge that allowed me to do both."

NEIL WUBBEN,
IOWA STATE UNIVERSITY
COUNTY EXTENSION DIRECTOR,
SPRING 2006 GRADUATE

"[RAYMOND BAKER] *not only made a tremendous contribution to Pioneer, he made a tremendous contribution to agriculture, not only to U.S. agriculture, but to world agriculture. The fact that he mentored all these breeders—and corn yields went from the 30's for about an average of about 30 bushels an acre, they're now on the average in the U.S. about 140 bushels. When he retired probably 25% of corn planted in the U.S. had been developed under his direction."*

– OWEN NEWLIN, SENIOR VICE PRESIDENT, PIONEER HI-BRED (RETIRED)

RAYMOND F. BAKER:

A PIONEERING PLANT BREEDER

PHOTO COURTESY PIONEER HI-BRED INTERNATIONAL, INC.

Raymond and Mary Baker made the inaugural gift to establish the M.S. in Agronomy Program

by Marcia Minear

Raymond F. Baker (BS Agronomy 1939) was an extraordinary leader in Iowa's agricultural history. His work as a corn breeder, researcher, and leader at Pioneer Hi-Bred, International helped to foster a revolution in agronomy. Baker was instrumental in developing the superior hybrid corn cultivars that made Pioneer one of the leading seed corn companies in the world and helped to bring about enormous changes in farming. In 1988, the year Baker retired from Pioneer's Board of Directors, it was estimated that 25% of the corn grown in the United States were descended from varieties developed under his direction.

To understand Raymond Baker's impact on agriculture, we must look back at farming practices in the United States during the early 1900's. Farming was a very labor-intensive endeavor. Horsepower literally came from horses, and farm chores started before dawn. Corn was hand planted and hand picked. At harvest time, farmers selected their best looking ears of corn and saved those seeds for planting the next season. Corn yields averaged about 30 bushels an acre. The economic livelihood of a farm family was precarious.

Baker's interest in corn breeding began when he was an agronomy student at Iowa State College, now Iowa State University. During a Corn Day Program held at the Armory Building in 1926, Baker met Henry Wallace who had begun experiments with breeding high-yielding corn. When Baker expressed an interest in growing some hybrid corn, Wallace gave him some samples of several lines of seeds and urged him to run a small experimental program, instructing him on the processes for breeding hybrid corn. A Baker and Wallace hybrid, developed from that gift, won the Banner Trophy in the 1928 Iowa Corn Yield Test with a phenomenal yield of 90 bushels per acre. That spring, Henry Wallace asked Baker to become the second employee of his newly launched Hi-Bred Corn Company, later to become Pioneer Hi-Bred. Baker saw this as a unique opportunity and one he could not pass up. "I was due to graduate in June, but I skipped that last quarter, because I wanted to get into the seed corn business while it was new," said Baker. Wallace taught Baker the techniques and procedures of corn breeding and, in 1933, when Wallace became U. S. Secretary of Agriculture, Baker was promoted to direct Pioneer's research program.

"Corn breeders have continually experimented with some simpler way to evaluate the performance of new hybrids. I know of no substitute for the careful detailed work of planting and harvesting these hybrids under all types of soil and weather conditions. Here more than any place else, systematic detailed work by careful technicians is most important."

–RAYMOND F. BAKER

PHOTO COURTESY PIONEER HI-BRED INTERNATIONAL, INC.

The purchase of hybrid corn seed by farmers continued to be a hard sell, until, in the mid 1930's, a severe drought brought disaster to the Corn Belt. Drought-tolerant hybrid varieties developed by Raymond Baker increased the demand for hybrid corn and, by the 1940's, nearly 100% of corn grown in the Midwest were hybrids. Under Mr. Baker's guidance, the research budget at Pioneer grew dramatically from the $2000 allotted in 1932 to $54,484,000 in 1988, the year he stepped down from the Board of Directors. The success of Pioneer's research department can be attributed both to Baker's commitment to scientific rigor and to his strong leadership qualities. Arnel Hallauer, Agronomy Distinguished Professor Emeritus at Iowa State, wrote of Baker, "His personal development of outstanding hybrids and his ability to assemble and direct a high-quality plant breeding staff formed the base for rapid expansion of Pioneer Hi-Bred, International." Raymond Baker believed that cultivars with high quality traits could be developed only through careful research and considerable hard work. Baker said, "I know of no substitute for the careful detailed work of planting and harvesting these hybrids under all types of soil and weather conditions. Here more than any place else, systematic detailed work by careful technicians is most important." During his more than 50 years of corn breeding, Baker initiated the practices of comparison test plots, cold germination testing, and breeding for insect and disease resistance, procedures now standard in corn breeding and hybrid seed production.

Baker's passion for plant breeding extended to his hobby of developing the perfect watermelon. He grew inbred lines of melons and crossed them into excellent watermelon hybrids. His sons, Lee and Larry, were recruited on weekends to conduct taste and quality testing as a part of Baker's watermelon project. He often gave out packets of his best seeds to lucky colleagues.

Raymond Baker was born near Beaconsfield, Iowa in Ringgold Country, but lived most of his adult life in Johnston, Iowa, near the headquarters of Pioneer Hi-Bred. He had two sons, Lee, born in 1930, and Laurence (Larry), born in 1933. Lee joined the Marines as a young man and then farmed the Beaconsfield farmstead with his grandfather, the same land that Raymond used to plant those first hybrid seeds. Larry graduated from the University of Minnesota with a Ph.D. in statistics. He established a very successful career in computer

PLANTING SEEDS FOR THE FUTURE

1906
Raymond F. Baker born near Beaconsfield, Iowa in Ringgold County.

Met Henry Wallace at Iowa State College Corn Day Program and worked experimental plots of hybrid seed on his father's farm

Won Banner Trophy for highest yielding corn in Iowa Corn Yield State Championship

Recruited by Henry Wallace to become 2nd employee at Pioneer Hi-Bred Corn Company

Mid 1930's Baker's work on drought-resistant corn convinced farmers of value in planting corn hybrids

Promoted to Lead Plant Breeder when Henry Wallace becomes U. S. Secretary of Agriculture in Roosevelt administration

Completed Bachelor of Science in Agronomy degree from Iowa State University

Initiated research assistantships for ISU students studying corn breeding

systems and died, tragically, at age 49. The Laurence H. Baker Center for Bioinformatics and Biological Statistics at Iowa State was established in his memory.

Mary Morrison Collier Baker was born in 1904 in Fremont, Iowa. She was a gifted student and earned a degree in mathematics and science from Des Moines University in 1927. After graduating, she taught business at high schools in Spirit Lake and Greenfield. She also worked part-time in the actuarial department of Bankers Life Insurance, where, because of her gender, she was discouraged from pursuing a career in actuarial science. This bias prompted her toward a life-long interest in expanding opportunities for women. Later in her life she worked for the Department of Agriculture in Washington D.C. and Des Moines. Mary and Raymond Baker were married in 1967 and enjoyed spending time with friends and family and traveling. Their honeymoon was spent in Hawaii, a part of the time spent touring the islands looking at possible sites for growing corn. She was active in the American Association of University Women and served as President for the Des Moines University Alumni Association. Mary and Raymond were both quite active members of their church.

IOWA STATE UNIVERSITY LIBRARY / SPECIAL COLLECTIONS

Raymond Baker was committed to advancing the profession of plant breeding for future generations. He was a Fellow in both the American Association for the Advancement of Science and the American Society of Agronomy and was instrumental in establishing the National Council of Commercial Plant Breeders. In 1946, he initiated, through funding from Pioneer Hi-Bred, a research assistantship for Iowa State University students studying corn breeding. In addition, Raymond and his wife, Mary, were generous benefactors to the Lion's Club of Iowa, Variety Clubs International, and, through several initiatives, Iowa State University. The Raymond F. Baker Center for Plant Breeding, a part of ISU's Plant Sciences Institute, was named in his honor and strives to continue and promote the art and science of plant breeding.

"Whenever there was corn, he'd be out tromping around and keeping an eye on it. There had to be an awfully good reason for him to skip a day in the corn field."

–JOE BAKER, GRANDSON OF RAYMOND F. BAKER

Raymond Baker recognized the advantages that improved crops could bring to the citizens of Iowa and to the world. He was a man who devoted his life to advancing his profession for the benefit of science and the larger community.

Named a Fellow in the American Society of Agronomy and the American Association for the Advancement of Science

Retired as Pioneer's corporate Vice President and head of the corn research department, but continued work as corn breeder

Named National Chairman of the Iowa State University Achievement Fund and member of the Iowa State University Foundation Board of Governors

Awarded the Alumni Medal from the Iowa State University Alumni Association

Retired from Pioneer Hi-Bred International Board of Directors

Received Honorary Doctorate of Humane Letters, the first such degree awarded at Iowa State University in 26 years

1999
Died at age of 92

LETTER *from the* DIRECTOR

MEETING THE CHALLENGE OF EXCELLENCE

KEN MOORE, PROGRAM DIRECTOR

"Looking back at the years gone by like so many summer fields"

– JACKSON BROWNE

THE OCCASION OF OUR TENTH ANNIVERSARY is a time to celebrate our success, reflect on our past and also a time to look ahead to our future. Thinking back to those early days when the Agronomy M.S. program was simply an idea reminds me how far we have reached beyond our early aspirations. It all began with the recognition that there was a group of students not being well served by the graduate programs we offered in Agronomy. These were mostly people working in industry that wanted to advance their careers through education and were not in a position to take a timeout to do so. They struggled with commuting to campus and many ultimately never completed a degree. This was mid-nineties, the Internet revolution had just begun, and we were beginning to realize its potential as a medium for teaching and learning. When a few of us pitched the idea of offering an M.S. degree at a distance to our Chair Ron Cantrell, his immediate reaction was "we have to do this."

We knew from interviews and a survey that our students wanted a different type of program than we were currently offering. They were looking for a professional degree that would integrate knowledge of crops, soils, climate, and pest management. It seems ironic, but we did not offer any graduate program in agronomy at the time. They were all specialized programs aimed at developing research expertise and did not provide the breadth necessary for a professional agronomist. In retrospect, this turned out to be a great thing because it made us focus on the unique needs of our intended population of learners. It forced us to develop a curriculum specifically for them, which we did.

When we started developing the program we had no idea what it would cost or where the money would come from. Along the way we were asked to present the idea to the Baker Council, an external advisory panel for our department that was charged at that time with evaluating initiatives funded by a trust set up by Raymond and Mary Baker. Mr. Baker and his son Lee both had experienced the trials of pursuing graduate degrees while working full time. Thus the idea of providing an online program resonated with them and they were immediately supportive. For them it always was and still is about the students; about creating opportunities for others that were facing similar challenges that they had experienced. With their generous support and the approval of the Board of Regents we were able to begin development of courses in 1997.

Looking back at the program timeline it looks like we did everything well and perfectly in order, and to some extent we did. But to be honest, some of it was luck and things could have gone awry at many points. At times we stumbled and I can recall early conversations after the pressure was on about whether or not we would be able to pull the program off. In thinking about it, there are several reasons the program was ultimately successful. First and foremost were the people involved. There is always a lot of excitement around doing something novel and the program has always attracted the very best people. There is no finer teaching faculty anywhere. Our students get the very best we have to offer. Our development team has been extraordinary. In three years time they created thirteen new courses developed specifically for our program. At last count the courseware supporting these courses consisting of 6,421 web pages supporting 532 learning objectives. These pages

include 9,055 graphic images, 213 movies, and 281 interactive modules and contain 64,800 internal and external hyperlinks. When printed to paper the course materials developed for the Agronomy M.S. program run to over 12,000 pages!

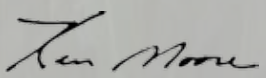
Beyond engaging the imagination and dedication of a large number of creative people, other elements of our success were a shared vision, teamwork, persistence, and commitment to excellence. We shared a common commitment to the Land Grant Mission of creating educational opportunities for working people. We worked together in teams, each one doing their part to realize the collective vision of the project. We never gave up, we never settled for less, and we rarely backed down even when at certain times it would have been far easier and perhaps prudent. We had the advantage of being naïve in that we did not understand the scope of what we were taking on and did not know we were doing what had been impossible for others.

Among the many fortuitous events that seemed to come our way was the development of a relationship with the Center for Teaching and Learning. Under the gifted leadership of Ann Thompson, they helped immeasurably with the early design of our instructional technology, but more importantly they created a culture of continuous assessment and improvement that abides today. Through a number of means they have consistently and systematically identified paths to improving the quality of the program. Without their efforts the program would not have achieved the level of excellence it has; we might not have fully understood that as good as we think our program is, we can always make it better. That mindset is what it takes to become truly excellent.

We plan to continue our pursuit of excellence into the future. In the coming year we plan to launch a new program interface that besides providing a fresh look and feel to our courseware, will better integrate the many tools and functions we provide to students online. The concept is to optimize the virtual learning environment from the students' perspective. This is a never-ending challenge as the technology we work with evolves rapidly creating ever new and interesting possibilities. Up until now, we have been conservative in marketing the program trying to keep student numbers to a manageable number. Our goal now is to find creative solutions to these limitations and grow the program to a larger and more diverse global population of students.

We are proud of the Agronomy M.S. program and especially proud of our students. The program has always been focused on our students and creating value for them. They have challenged and energized us and their successes in the program and in life make everything we do for them worthwhile. They are the reason we created the program and the reason we are committed to making it the best that it can possibly be.

Ken Moore



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