CURRICULUM VITAE

Richard A. Vierling, Ph.D.
314.308.5404 rtvierling@att.net

Professional Summary

Professional Experience

Director of Research & Business Development 2010 to Present
National Corn Growers Association

Director of the Indiana Crop Improvement Genetics Program 2002 to 2010
Adjunct Professor of Agronomy
Purdue University

Director of the Indiana Crop Improvement Genetics Program 1997 to 2002
Adjunct Associate Professor of Agronomy
Purdue University

Manager of the Genetics Laboratory 1992 to1997
Adjunct Assistant Professor of Agronomy
Purdue University

Education

Ph.D., Texas Tech University
M.S. Agronomy, University of Missouri
B.S. Biochemistry, University of Missouri

Professional Development and Continuing Education

Certificate in ISO Internal Auditing, DMACC, Des Moines, IA 2010
Leadership Development Academy, IN Seed Trade Assoc., Indianapolis, IN 2010
Gateways Entrepreneurship Program, Purdue Research Foundation 2006
Professional Science Masters in Applied Management Principles
Course work included leadership, management, managerial accounting, human resource management, financial accounting, marketing, strategic management, and entrepreneurship. Purdue University Krannert School of Management 2005
Logic Model Training, Center for Instructional Excellence Purdue University 2005
Lecturing Techniques, Center for Instructional Excellence, Purdue University 2005
Designing Instruction, Center for Instructional Excellence, Purdue University 2005
Certificate in Professional Grant Writing, The Grant Institute, Los Angeles, CA 2004

PROFESSIONAL EXPERIENCE

Director of Research & Business Development 2010 to Present
National Corn Growers Association

Reports to the Vice President of Production & Sustainability and serves as lead staff for the Research and Business Development Action Team. Provides leadership and management regarding research and policy priorities.

Responsibilities include increasing economic opportunities (business development) for farmers and agricultural companies, writing the vision and business plans for the research team, and coordinating national and state research programs and initiatives.

Lead all aspects of research advocacy with federal agencies and technical staff for Congressional lobbying. Managing national research programs including evaluation and approval of grants, yearly budget development management of and management of consultants.

Responsible for the Corn Utilization & Technology Conference. The 2014 CUTC had over 250 attendees from 11 countries. When surveyed, 96% of the 2014 attendees said they will attend the 2016 conference.

Business Development

- Raised $5.0 M from 18 investors for the incorporation of the National Agricultural Genotyping Center Inc.(NAGC) www.genotypingcenter.com, which is a collaborative effort between NCGA and Los Alamos National Laboratory. Responsibilities included writing the business plan, by-laws and incorporation. Led the team that was responsible for distributing the request for site selection proposals and the site selection team.
- Raised >$1.0 M from private equity for the formation of Food Safety Technology LLC, a wholly owned subsidiary of NAGC
- Increased yearly royalties 300% by increasing marketing efforts at investor meetings
- Oversee NCGA's equity investment portfolio and management of existing investments Review audited financial statements and year end reports from investments
- Performed over 100 due diligence analyses on potential new investments
- Advises state farmer organizations on potential investments, which includes business plan evaluation and holding educational workshops for state staff
- Advises Kentucky and Tennessee economic development organizations on potential agricultural investments, which includes business plan evaluation and mentoring early stage start-up companies

Professional Experience – continued
National Corn Growers Association – continued
Business Development - continued

Negotiated business joint venture, licensing, manufacturing or distribution agreements with the following:

- Los Alamos National Laboratory
- Department of Homeland Security
- Pacific Northwest National Laboratory
- Department of Energy
- USDA-ARS
- Monsanto
- Sigma-Aldrich
- Becton-Dickenson
- Agilent
- Amprion
- American Qualex International
- CytoDiagnostics
- Archer Daniels Midland
- Texas A & M University
- Iowa State University
- University of Guelph
- Michigan State University
- Tuskegee University

Strategic Planning

Responsible for writing the research and business development sections and contributing to the entirety of NCGA's Strategic Vision 2020. Responsible for the writing and implementation of the Research & Business Development Team business plans.

- Contributed to the NCGA Vision 2020 plan
- Wrote two (2) vision plans for IN Crop Improvement
- Collaborated with USDA-ARS in writing 5-year strategic plans for national programs
- Led and drafted Kentucky Ag Council's strategic plan 2014 to 2018
- Conceived and wrote the vision plan for the National Sorghum Growers

Manage Research Funding

Responsible for NCGA's external research program including review of proposals, selection and assessment of research progress. Also responsible for collaborative research with state corn organizations, other commodity groups, universities, and state and federal granting agencies. Lead and advise state organizations on research priorities.

- Increased grant program funding 45% by expanding the research portfolio and growing existing programs
- Lead assessment of over 50 programs from nine (9) states and national programs providing evaluation and recommendation of funding requests

Professional Experience – continued
National Corn Growers Association – continued
Manage Research Funding - continued

- Led the Plant Phenotyping Technology Development Initiative that is developing the platform for the inclusion of phenotypic data into the Maize Genome Database. Besides NCGA, the group includes six (6) universities, CIMMYT, CGIAR, five (5) biotech companies and *i*Plant Consortium
- Formed Cross Commodity Research Group, to bring together research directors from corn, cotton, sorghum, soybean and wheat to align production research
- Member of Monsanto's Insect Management Knowledge Program (2012 to Present), reviews proposals, makes funding recommendations and makes assessments of funded research
- Member Center for Biorenewable Chemicals a consortium of eight (8) universities supported by a 10-year NSF grant. Advise on research and business development
- Restructured the NCGA Research Portal, a database where state employees can search and view research funded by other states
- Manage NCGA federally-awarded research grants (Dept. of Energy $1,233,000)
- Manage the Aflatoxin Mitigation Center of Excellence, a consortium of seven (7) land-grant universities and NCGA that funds and coordinates corn aflatoxin research
- Responsible for the Corn Utilization & Technology Conference an international, biennial research conference focused on corn new uses. Responsibilities include site selection, chairing the planning committee, fund raising and assisting in securing scientific speakers

Research Funding Advocacy

Responsibilities include promoting the importance of research to members of Congress, state legislators, legislative staffers and the general public. This includes collecting and analyzing technical, economic, regulatory, political and social information to set national research priorities. Effective advocacy requires daily communicate with NCGA lobbyists in Washington D.C.

- Meet with members of Congress in DC and have traveled to meet with Senators and Representatives in their home districts to advocate for agricultural research funding
- Write testimony and position papers to be submitted or presented at Congressional hearings to elucidate NCGA's position on issues

Professional Experience – continued
National Corn Growers Association – continued
Research Funding Advocacy - continued

- Organize efforts with other commodity and export organizations to inform policymakers regarding the importance of research
- Write white papers to be submitted to federal agencies and policy makers
- Develop and maintain good relationships with federal agency staff, from under-secretaries to national program leaders, to influence research agendas and funding decisions.
- Develop and maintain good relationships with the research community through attendance and presentations at scientific meetings and conferences
- Provide technical leadership to the Department of Homeland Security for food, feed, fuel and fiber biosecurity

Effective Internal and External Communication

- Write weekly executive briefings for the CEO, Board of Directors and state executives
- Produced weekly New of the Day, distributed to over 900 media outlets, with the communications department
- Given >300 interviews for radio, print and digital outlets
- Organize and oversee writing for web sites, blogs, twitter feeds, pod casts, radio and television
- Write weekly updates that are distributed to farmers and state organizations
- Write the research section of the annual World of Corn
- Regular contributor on the Commodity Update (The Ag Network) news program that is heard both over the air and on Sirius radio
- Write copy for the following NCGA affiliated websites
    - Common Ground www.findourcommonground.com
    - Corn Farmers Coalition www.cornfarmerscoalition.org
    - US Farmers and Ranchers Alliance www.fooddialogues.com
- Oversee production of 10 pod casts per year

Director ICIA Genetics Program 1992 to 2010
Adjunct Professor of Agronomy
Indiana Crop Improvement Association and Purdue University

ICIA Responsibilities

Hired to turn around the struggling (losing money) genetics testing program and be an adjunct faculty member in the Dept. of Agronomy at Purdue. By state law, ICIA's budget must be separate from Purdue's budget, therefor this position is designated adjunct but was a voting member of the faculty and was a member of the graduate faculty and successfully went through the standard Purdue University promotion system. The position reported to the Executive Director of ICIA and the Associate Dean of Ag Research at Purdue. Laboratory management included 11 ICIA staff members and three (3) Purdue staff.

ICIA Management

- Increased revenue from <$50,000 to >$1,000,000 per year
- Revenue exceeded expenditures in 17 out of 18 years
- Increased customers from 2 to >75
- Increased services from 3 to >30 that were marketed to the ag industry
- Implemented Quality Management System; wrote ISO documentation and member of management committee. I also am responsible for setting ISO performance goals and implementing metrics to measure our improvement
- 50% increase in lab efficiency by implementing metrics to measure all lab functions
- Negotiated and signed testing agreements with Monsanto, Dow AgroSciences, DuPont, Syngenta, Bayer, USDA and US Fish & Wildlife
- Resolve extension inquiries related to seed production and testing from industry
- Answer extension inquiries related to seed, traits and genetics from farmers

ICIA Strategic Planning

- Wrote 2 strategic plans and multiple business plans to execute the ICIA Strategic Plans (1995, 2004)

ICIA Business Development

- Negotiated and signed technology acquisition agreements with Los Alamos National Laboratory, NASA and Indiana State Chemist's Office
- Negotiated and signed patent licensing agreements with American Qualex, Los Alamos Technology Transfer, Plant Access Technology and others (confidential)

Professional Experience - continued
ICIA and Professor - continued

Purdue Responsibilities

- First research laboratory to be ISO 9000:2001 certified. Wrote and implemented the ISO documentation and routinely met with ISO auditors. Certified ISO internal auditor and was responsible for internal audits.
- Prepared reports and helped write the overall accreditation documents for CREES review. Twice was selected for the committee that met with the accreditation committee members.
- Served on the following Purdue University committees:
    - College of Agriculture Grievance Committee (2001 to 2003)
    - Field Day (1993 to 2000)
    - F.L. Patterson Memorial Lecture Series (1994 to 2010)
    - Center for Enhancing Food to Protect Health (2004 to 2010)
    - Birk Nanotechnology Steering Committee (2006 to 2010)
- Served on graduate committees for students in Agronomy, Botany and Plant Pathology, Agricultural Economics, Entomology, and Food Science

External Committees

- Research Board of the American Seed Research Foundation (2004 to 2010)
- American Seed Trade Assoc. Corn & Sorghum Annual Conference Planning Committee (2003 to 2009)
- American Seed Trade Assoc. Intellectual Property Rights Committee (2008 to 2010)
- American Seed Trade Assoc. Molecular Markers for DUS Testing

Building Multidisciplinary Research Teams and Developing Collaborations

- NASA selected team leader for three (3) experiments performed on space shuttle missions, built a team consisting of scientists from two (2) NASA centers, industry and three (3) universities. The first plant transformation experiment was performed on STS-95, which was the launch on space shuttle Discovery in December 1998 (Senator John Glenn performed the experiment). The second experiment was launched in April 2000 (STS-101) and the third experiment (STS-107) was lost aboard Space Shuttle Columbia. After the disaster NASA discontinued the program
- Led the soybean research group that won the Dean's Team Award (2001) for interdisciplinary research at Purdue University
- Soybean pest resistance licensed technology won the 2000 FinOvation Award as the best new ag technology

Professional Experience - continued
ICI and Professor – continued
Building Multidisciplinary Research Teams and Developing Collaborations - continued

- Member of the following research teams at Purdue University; Enhancing Foods to Protect
- Health, Birk Nanotechnology Center, IMPACT
- Developed the USDA-RMA Biotech Endorsement (USDA, 11 insurance providers and three (3) technology providers) testing program that allowed producers to receive a 20% discount on their federal crop insurance if they plant certain transgenic corn hybrids
- Indiana State Chemist's Office/ICIA – access to each groups' analytical capabilities
- U.S. Fish & Wildlife/ICIA – forensic services
- USDA-APHIS – plant pathogen detection

Curriculum Development and Teaching

Curriculum Development

- Agriculture Teaching Advisory Council, IVY Tech Community College System (2008 to 2010). This council was responsible for developing and integrating curriculum at Purdue and Ivy Tech for the Purdue/Ivy Tech Pathway Program. This program allows for Ivy Tech associate of applied science-agriculture graduates to seamlessly transfer to College of Agriculture degree programs and be on track to graduate with bachelor degrees within two (2) years. The goal was to boost enrollment, increase retention and improve student success.
- Tippecanoe County School Corporation Textbook and Curriculum Review Committee (2005 to 07)

Traditional and Non-traditional Teaching

- Taught sections in the following courses Plant Genetics, Plant Breeding, Advanced Plant Breeding, and Seed Technology
- 38 extension workshops that are teaching to non-traditional students

Mentoring

- Mentored junior faculty at Purdue University
- Mentored recent college graduates, American Seed Trade Assoc. Future Seed Executives Committee (2008 to 2010)
- Initiated employee development and continuing education programs. ICI employees included the world's first Registered Genetic Technologist, leaders in industry and university faculty members

Professional Experience - continued
ICI and Professor - continued

Intellectual Property Management and Technology Transfer

- Member ICIA Intellectual Property Rights Committee
- Wrote ICIA's intellectual property policies
- Responsible for implementing systems to protect confidential business information
- Licensed soybean cyst nematode resistant technology

  Dr. Vierling, in collaboration with Drs. Virginia and John Ferris, and Dr. Jamal Faghihi, developed the world's first useable, broad-based, complete soybean cyst nematode (SCN) resistant germplasm. The SCN resistant material was highlighted in a 1999 Purdue Research Foundation report as one of the top 10 commercialized technologies from Purdue University. Wrote the U.S. patent and foreign patents
- Licensed soybean peroxidase technology for diagnostics

  The soybean peroxidase conjugate for medical diagnostics has been licensed to American Qualex and is now available to medical researchers and diagnostic kit manufacturers. Dr. Vierling wrote the patent applications and continually works with licensees to aid their efforts to use the technology
- Member American Seed Trade Association's Intellectual Property Rights Committee (2006-2010)
- Licensed a patented enzyme technology to the human clinical diagnostic testing industry

Entrepreneurship

- Co-founder and Chief Scientific Officer for Multiplexed Molecular Diagnostics (Kansas City, MO founded 2014) a technology company that licenses intellectual property and supplies assays to the human clinical diagnostic industry.
- Advisor and mentor for Ag Innovation Development Group (Memphis, TN 2014 to Present)
- One of the founders and Vice President of R & D of Producers' Natural Processing (Brookston, IN founded 1996), a value-added processing company that sold products to the pharmaceutical, cosmetic and health industries. The company was sold in 2003.
- Consultant hired to perform technology/intellectual property/business assessments for AgriCapital (NY), MidAmerica Capital (MO), AQLS, Inc. (CA) and Marubeni (Japan).

Research Grants and Contracts

1. Consortium of eight (8) seed companies. RFLP Analysis of Proprietary Corn Inbreds. $18,500 awarded R.A. Vierling. 1992
2. Agricultural Alumni Seed Improvement Assoc. RFLP Analysis of Elite, Popcorn Lines. $2,400 awarded R.A. Vierling. 1992
3. ABI Research and Gutwein Seeds. RFLP Analysis of Proprietary Corn Lines. $10,080 awarded R.A. Vierling. 1993
4. USDA. Isozyme Data Base of Eastern Gamagrass Population PMK-24. Funding for one year. $2,000 awarded R.A. Vierling. 1993
5. Indiana Soybean Development Council. Development of Value Added Soybean Cultivars High in Seed Coat Peroxidase. Funding for three years. $50,888 awarded R.A. Vierling and J.R. Wilcox. 1993
6. Indiana Soybean Development Council. Development of Value Added Soybean Cultivars: A Gene Expression System. Funding for three years. $99,112 awarded R.A. Vierling. 1993
7. Indiana Institute of Agriculture, Food and Nutrition. A Soybean Value Added Gene Expression System. Funding for one year. $29,991 awarded R.A. Vierling. 199
8. Indiana Soybean Development Council. Soybean Research. Funding for three years. $12,066 awarded R.A. Vierling. 1993
9. Consortium of Seed Companies. Corn Research. Funding for one year. $10,298 awarded R.A. Vierling. 1993
10. Cargill Hybrid Seeds. Cotton Microsatellites. $250 awarded R.A. Vierling. 1994
11. Consortium of seed companies. Corn Research. $18,000 awarded R.A. Vierling. 1994
12. American Maize Products. Mapping of endosperm traits for specialty corn starch. $12,500 awarded R.A. Vierling. 1994
13. Pau Seeds. Corn Research. $180 awarded R.A. Vierling. 1994
14. Indiana Soybean Development Council. RFLP Mapping of Soybean Cyst Nematode Resistance. Funding for three years. $330,000 awarded to R.A. Vierling, J. Ferris and V. Ferris. 1994
15. Cargill Hybrid Seeds. Cladistic Research. $2600 awarded R.A. Vierling. 1994
16. Weaver Popcorn. Gene Mapping. $3400 awarded R.A. Vierling. 1994
17. Indiana Institute of Agriculture, Food and Nutrition. Implementation of Soybean Peroxidase Technology. Funding for one year. Funding for one year. $20,300 awarded R.A. Vierling. 1995.
18. Cargill Hybrid Seeds. Cladistic Research. $500 awarded R.A. Vierling. 1995
19. Missouri Soybean Merchandising Council. Measurement of Genotype X Environment and Environmental Effects on Soybean Peroxidase Production. Funding for three years. $12,850 awarded R.A. Vierling, B. Wiebold and H. Minor. 1996
20. Indiana Soybean Development Council. Development of High Peroxidase Germ Plasm. Funding for two years. $25,030 awarded R.A. Vierling and J.R. Wilcox. 1996

Research Grants and Contracts - continued

21. Indiana Soybean Development Council. Development of Constructs for Pharmaceutical Production in Soybean. Funding for two years. $85,273 awarded R.A. Vierling. 1996
22. Consortium of Seed Companies. Corn Research. Funding for one year. $5,200 awarded R.A. Vierling. 1996
23. Indiana Soybean Development Council. Mapping of Resistance Loci to Soybean Cyst Nematode. Funding for one year. $145,440 awarded to R.A. Vierling, J. Ferris and V. Ferris. 1997
24. Indiana Soybean Development Council. Mapping and Isolation of Resistance Genes to Soybean Cyst. Funding for one year. $80,000 awarded to R.A. Vierling, J. Ferris and V. Ferris. 1998
25. Indiana Soybean Development Council. Production of Human Therapeutics in Soybean Seed Coats. Funding for two years. $60,960 awarded to R.A. Vierling. 1998
26. Indiana Soybean Development Council. Production of Human Therapeutics in Soybean Seed Coats. Funding for two years. $80,000 awarded to R.A. Vierling. 1999
27. Indiana Soybean Development Council. Mapping and Isolation of Resistance Genes to Soybean Cyst Nematode. Funding for two years. $120,000 awarded to R.A. Vierling, J. Ferris and V. Ferris. 1999
28. ProSeed Technologies. Antioxidant Screening of MIR Treated Seeds. Funding for one year. $1,200 awarded to R.A. Vierling. 1999
29. IN Value Added Grant. Functional Foods and Nutraceuticals Developed from IN Agricultural Products. Funding for one year. $40,000 awarded to R.A. Vierling, R. Singh, and B.A. Watkins. 2000
30. 21st Century Research Fund. Center for Designed Foods to Protect Health. Funding for two years. $2,000,000 awarded to B.A. Watkins, P. Brown, J. Burgess, N. Carpita, S. Donkin, B. Hamaker, K. McNamara, J. Simon, R. Singh, J. Turek, R.A. Vierling, D. Waters. 2000
31. Indiana Soybean Development Council. Mapping and Isolation of Resistance Genes to Soybean Cyst Nematode. Funding for one year. $60,000 awarded to R.A. Vierling, J. Ferris and V. Ferris. 2001
32. Japan Cellfoods Ltd. Allergenic Protein and Anti Nutritional Protein Analyses. Funding for one year. $12,000 awarded R.A. Vierling 2001
33. Indiana Soybean Development Council. SCN Resistance. Funding for one year. $30,000 awarded R.A. Vierling 2002
34. 21st Century Fund. Gene Cloning. Funding for three months. $20,000 awarded R.A. Vierling 2002
35. Indiana Soybean Development Council. SCN Resistance. Funding for one year. $30,000 awarded R.A. Vierling 2003
36. Indiana Soybean Development Council. Micro array analysis of SCN resistance. Funding for one year. $40,000 awarded R.A. Vierling 2004
37. ICIA. Soybean Research. Funding for one year. $1,700 awarded R.A. Vierling 2004

Research Grants and Contracts - continued

38. Soybean Cyst Nematode Testing Fund. Soybean Research. Greater than $470,000 awarded to R.A. Vierling and V. Ferris 2002
37. Indiana Soybean Development Council. Micro array analysis of SCN susceptibility. Funding for one year. $20,000 awarded R.A. Vierling 2005
38. Indiana Soybean Alliance. SNP Discovery. Funding for one year. $15,000 awarded to R.A. Vierling 2006
39. Rye Seed Board. Effect of Fall Seed Rye on Field Populations of Soybean Cyst Nematode. Funding for one year. $10,000 awarded R.A. Vierling and V.R. Ferris 2008
40. Rye Seed Board. Effect of Fall Seed Rye on Field Populations of Soybean Cyst Nematode. Funding for one year. $7,000 awarded R.A. Vierling and V.R. Ferris 2009
41. University of Arkansas. Soybean Mosaic Virus Resistance Mapping. Funding one year. $10,000 awarded R.A. Vierling 2009
42. Garden Genetics. Tomato Disease Resistance Genes. $4800 awarded to R.A. Vierling 2009
43. Luminex Corporation. Design of multiplexed assays. Funding for three years. $100,000 awarded R. A. Vierling 2009
44. California Citrus Board. Development, validation, and deployment of rapid, inexpensive, multiplex assays for simultaneous detection and strain characterization of multiple citrus pathogens. $311,000 awarded to P.S. White, A. Desphande, J. Song, M. Vuyisich and R.A. Vierling 2009
45. DOE. Non-fuel Uses of Ethanol. $1,223,000 awarded R.A. Vierling 2013

Publications

Refereed Papers

1. Vierling, R.A. and Nguyen, H.T. 1990. Heat-shock protein synthesis and accumulation in diploid wheat. Crop Sci. 30:1337-1342
2. Vierling, R.A. and Nguyen, H.T. 1992. Heat-shock protein gene expression in diploid wheat genotypes differing in thermal tolerance. Crop Sci. 32:370-377
3. King, S.W., Vierling, R.A. and Nguyen, H.T. 1992. Changes in mRNA species during drought stress in winter wheat. Crop Sci. 32:822-825
4. Vierling, R.A. and Nguyen, H.T. 1992. Use of RAPD markers to determine genetic diversity of diploid, wheat genotypes. Theor. Appl. Genet. 84:835-838
5. Vierling, R.A., Xiang, Z., Joshi, C.P., Gilbert, M.L. and Nguyen, H.T. 1994. Genetic diversity among elite sorghum lines revealed by restriction length polymorphisms and random amplified polymorphic DNA. Theor. Appl. Genet. 87:816-820

Publications - continued
Refereed Papers – continued

6. Kindiger, B. and Vierling, R.A. 1994. Comparative isozyme polymorphisms of North American Eastern Gamagrass, *Tripsacum dactyloides* var. Dactyloides and maize, *Zea mays* L. Genetica 94:77-83
7. Faghihi, J., Vierling, R.A., Halbrendt, J.M., Ferris, V.R. and Ferris, J.M. 1995. Resistance genes in a Williams 82 x Hartwig soybean cross to an inbred line of *Heterodera glycines*. J. Nematol. 27:418-421
8. White, P.S., Gilbert, M.L., Nguyen, H.T. and Vierling, R.A. 1995. Maximum parsimony accurately reconstructs relationships of elite sorghum lines. Crop Sci. 35:1560-1565
9. Vierling, R.A., Faghihi, J., Ferris, V.R. and Ferris, J.M. 1996. Association of RFLP markers with loci conferring broad-based resistance to soybean cyst nematode (*Heterodera glycines*). Theor. Appl. Genet. 92:83-86
10. Vierling, R.A. and Wilcox, J.R. 1996. Microplate assay for soybean seed coat peroxidase activity. Seed Sci. & Tech. 24:485-494
11. Vierling, R.A., Palmer, R., and Wilcox, J.R. 1998. Nonenzymatic oxidation of guaiacol. Seed Technology 20:91-93
12. Vierling, R.A. and TeKrony, D.M. 1999. The effect of storage conditions on peroxidase activity. Seed Technology 21:37-40
13. Bula, R.J., Vierling, R.A. and Goldman, S.L. 2000. Genetic engineering in a microgravity environment. Chem. Innovations 1:30-34
14. Chen, H. and Vierling, R.A. 2000. Molecular cloning and characterization of soybean peroxidase gene families. Plant Science 150:129-137
15. Vierling, R.A., Nesbit, L., Lopez-Rebot, J.L., and Morrow, K.J. 2000 An improved immunoassay procedure based on the use of a soybean anti-peroxidase monoclonal antibody. Plant Peroxidase 15:59-68
16. Faghihi, J., Jiang, X., Vierling, R.A., Goldman, S. L., Sharfstein, S., and Erhardt, P. 2001. Reproducibility of the high-performance liquid chromatographic fingerprints obtained from two soybean cultivars and a selected progeny. J Chromatography A. 915:61-74
17. Sairam, R.V., Wilber, C., Franklin, J., Smith, B., Bazil, J., Frutiger, K., Blakey, C.A., Vierling, R.A., and Goldman, S.L. 2002. High frequency callus induction and plant regeneration in *Tripsacum dactyloides* (L.). *In vitro* Cell. & Dev. Biol. 48:435-440
18. Rozzi, N.L., Sing, R.K., Vierling, R.A., and Watkins, B.A. 2002. Supercritical fluid extraction of lycopene from tomato processing by-products. J. Agric. Food Chem. 50:2638-2642
19. Sairam, R.V., Wilber, C., Franklin, J., Smith, B., Bazil, J., Vierling, R.A., and Goldman, S.L. 2003. High frequency callus induction and plant regeneration in *Zea mays* (L.). Genome 46:323-329
20. Chen, H., Hogue, P.K., Miller, K.L., and Vierling, R.A. 2005. Using SSR as an alternative to isozyme for corn hybrid purity testing. Seed Technology 27:157-160

Publications – continued

Refereed Papers-continued

21. Chen, H., Hogue, P.K., Miller, K.L., Faghihi, J., Ferris, V.R., and Vierling, R.A. 2005. A linked to the major QTL of SCN resistance. Seed Technology 27:269-272
22. Melgar, J., Abney S. and Vierling, R.A. 2006. Peroxidase activity in soybeans following inoculation with *Phytophthora sojae*. Mycopathologica 61:37-42
23. Faghihi, J., Vierling, R.A., Santini, J.B., and Ferris, J.R. 2007. Effects of selected fungicides on development of soybean cyst nematode. Nematropica 37:259-266
24. Chen, H. and Vierling, R.A. 2009. Promoter analysis of soybean seed coat peroxidase gene *Ep*. Seed Technology 31:144-155
25. Shi, A., Vierling, R., Grazinni, R., Chen, P., Caton, H., and Weng, Y. 2010. Development of single nucleotide polymorphism (SNP) markers for selection of *Ve* gene of tomato *Verticillium* wilt resistance. Int. Res. J. Plant Sci. 1(2):34-42
26. Shi, A., Chen, P., Vierling, R., Zheng, C., Li, D., Dong, D., Shakiba, E., and Cervantez, I. 2011. Multiplex Single nucleotide polymorphism (SNP) assay for detection of soybean mosaic virus resistance genes in soybean. Theor. Appl. Genet. 122(2):445-457
27. Shi, A., Grazzini, R., Vierling, R., Caton, H., and Panthee, D. 2011. Molecular markers for Tm-2 alleles of tomato mosaic virus resistance in tomato. Amer. J. Plant Sci., 2:180-189.
28. Shi, A., Vierling, R., Grazzini, R., Chen, P., Caton, H., and Panthee, D. 2011. Identification of molecular markers for Sw-5 gene of tomato spotted wilt virus resistance. Amer. J. Biotech. Mol. Sci. (1): 8-16
29. Shi, A., Chen, P., Vierling, R., Li, D., and Zheng, C. 2013. Identification of soybean mosaic virus resistance alleles in Jindou 1 soybean. Euphytica, 192:181-187

Proceedings and Technical Reports

1. Nguyen, H.T., Krishnan, M., Burke, J.J., Porter, D.R. and Vierling, R.A. 1989. Genetic diversity of heat-shock protein synthesis in cereal. p. 319-330. *In* Cherry, J.H. (ed.) Environmental tolerance in plants: Biochemical and physiological mechanisms. NATO, ASI Series. Springer-Verlag, Berlin
2. Vierling, R.A. 1996. Soybean peroxidase: Beginning a new industry. p. 37-40. *In* Proceedings 6th Annual Identity Preserved Conference. AOSCA, Champaign, IL
3. Vierling, R.A. 1996. Soybean peroxidase: Immunochemical Uses *In* Practical Powers of Immunodetection. American Chemical Society, Washington D.C.
4. Vierling, R.A. 1998. Soybean new uses. p. 64-72. *In* Proceedings of the Twenty-eight Soybean Seed Research Conference 1998. American Seed Trade Association, Washington D.C.
5. Vierling, R.A. 1999. GM traits: Sampling and testing issues. p. 34-36. *In* 10th Annual Identity Preserved Conference: Consumer-driven Identity Preserved. AOSCA, Champaign, IL
6. Vierling, R.A. 2001. Method validation and sampling for agricultural testing. 65:52-54. *In* J. Assoc. Food Drug Officials. Assoc. Food Drug Officials, New York
7. Faghihi, J., Vierling, R.A. and Ferris, V.R. 2002. CYSTX® varieties and management of soybean cyst nematode. *In* Proceedings of the Thirty-first Soybean Seed Research Conference 2001. American Seed Trade Association, Washington D.C.
8. Shi, A., Chen, P., Vierling, R.A., Cervantes, I., and Shakiba, E. 2009. Development of a multiplex SNP assay for soybean mosaic virus resistance genes. World Soybean Conference VIII, Beijing, China

Patents and Copyrights

1. Vierling, R.A. 1998. A soybean peroxidase gene family and an assay for detecting soybean peroxidase activity. 5,840,558
2. Vierling, R.A. 1999. Soybean peroxidase gene sequences. 5,866,695
3. Vierling, R.A., Ferris, J.M., Ferris, V.R., and Faghihi, J. 2000. Methods for conferring broad-based soybean cyst nematode resistance to a soybean line. 6,096,944
4. Vierling, R.A. 2003. Soybean promoter elements. 6,586,583

Book Chapters

1. Vierling, R.A. 2000. Method validation. *In* McDonald, M. and Copeland L. (eds) Seed Analyst's Handbook
2. Chen, H. and Vierling, R.A. 2000. Polymerase chain reaction. *In* McDonald, M. and Copeland L. (eds) Seed Analyst's Handbook
3. Chen, H. and Vierling, R.A. 2005. Polymerase chain reaction. *In* McDonald, M. and Copeland L. (eds) Seed Analyst's Handbook

Other Publications

1. Vierling, R.A. and Neuffer, M.G. 1986. Analysis of small plants from nitrosoguanidine treated pollen. Maize Genet. Coop. News. 60:44
2. Vierling, R.A. 2000. GM Trait: Sampling and Testing. Seed Today. 4:62-63
3. Faghihi, J. and Vierling, R.A. with Access Plant Technologies. 2004. CYSTX® IT WORKS! Educational CD
4. Faghihi, J. and Vierling, R.A. with Access Plant Technologies. 2004. Your SCN Solution Educational CD
5. Vierling, R.A. 2010. Method Validation and Sampling. Seed World Feb pg 10-12
6. Vierling, R.A. 2011. Research Glossary, NCGA, Chesterfield, MO

Research Abstracts

1. Krishnan, M., Nguyen, H.T., Burke, J.J., Vierling, R.A. and Porter, D.R. 1987. Genetic variation of heat-shock protein synthesis and its role in thermal tolerance of wheat. J. Cell. Biochem. 11:38
2. Vierling, R.A. and Nguyen, H.T. 1987. Genetic diversity of heat-shock protein synthesis and its relationship to thermal tolerance in diploid wheat. Plant Physiol. 83:69
3. Vierling, R.A. and Nguyen, H.T. 1988. Regulation of heat stress gene expression in diploid and hexaploid wheat. Agron. Abst. p. 174
4. Vierling, R.A., Weng, J. and Nguyen, H.T. 1989. Heat shock and photosynthetic gene expression in hexaploid wheat under temperature stress. Agron. Abst. p. 180
5. Nguyen, H.T., Vierling, R.A. and Weng, J. 1989. Genotype specific heat shock gene expression in wheat. EMBO Abst. p. 167
6. Vierling, R.A. and Nguyen, H.T. 1990. Relationship between heat shock proteins and thermal tolerance in diploid wheat. Agron. Abst. p. 203
7. Vierling, R.A., White, P.S. and Nguyen, H.T. 1993. Genetic diversity among elite sorghum lines revealed by RFLPs and RAPDs. Agron. Abst. p. 184
8. Faghihi, J., Vierling, R.A., Ferris, V.R. and Ferris, J.M. 1995. Genes for resistance to soybean cyst nematode in the soybean variety Hartwig. J. Nematol. Abst. p. 499
9. Chen, H. and Vierling, R.A. 1995. Molecular cloning and characterization of soybean peroxidase gene family. Agron. Abst. p. 167
10. Vierling, R.A., Faghihi, J., Ferris, V.R. and Ferris, J.M. 1996. RFLP markers for loci conferring broad-based resistance to soybean cyst nematode. Nematropica Abst. 26:325
11. Melgar, J.C., Vierling, R.A. and Abney, T.S. 1996. Peroxidase activity in hypocotyl tissues of *Glycine max* following inoculation with *Phytophthora sojae*. Phytopathology 86:S46
12. Vierling, R.A. and Morrow, K.J. 1996. Soybean peroxidase-antiperoxidase, a powerful new tool. American Chemical Society, Div. Of Agrochem. 51:87

Publications – continued
Research Abstracts-continued

13. Vierling, R.A., Faghihi, J., Ferris, V.R. and Ferris, J.M. 1997. Inbred nematodes elucidate relationships between different sources of resistance. Soc. of Nematol. Abst. 29:611
14. Vierling, R.A. and Morrow, K.J. 1997. An improved immunoassay procedure based on the use of an anti-soybean peroxidase monoclonal antibody conjugated to soybean peroxidase. Agron. Abst. 51:87
15. Chen, H. and Vierling, R.A. 1998. *In vitro* folding of bacterially expressed soybean seed peroxidase. Agron. Abst. 52:152
16. Faghihi, J., Vierling, R.A., Ferris, V.R. and Ferris J.M. 1998. Yield data for soybean lines with Hartwig resistance to SCN. J. Nematology 30:495
17. Faghihi, J., Vierling, R.A., Ferris, V.R. and Ferris J.M. 1999. Performance of germ plasm PUSCN14 with Hartwig resistance in a field highly infested with soybean cyst nematode. J.Nematology 31:534
18. Faghihi, J., Vierling, R.A., Ferris, V.R. and Ferris J.M. 1999. Yield data for soybean lines with Hartwig resistance to soybean cyst nematode. 1999 Global Soy Forum p. 468
19. Faghihi, J., Vierling, R. A., Ferris, V. R. and Ferris, J.M. 2001. Effect of resistant soybean lines with PUSCN14 on populations of soybean cyst nematode. Journal of Nematology 33: 256
20. Rudrabhatha, S.V., Wilber, C.W., Franklin, J.M., Smith, B., Bazil, J., Frutiger, K., Blakey, A.C., Vierling, R.A. and Goldman, S.L. 2002. Genetic engineering of *Tripsacum*. Plant Animal & Microbe Genome X Conf. Abst. p. 458
21. Faghihi, J., Vierling, R. A. and Ferris, V. R. 2002. Proteomic analysis of soybean cyst nematode (SCN) inoculated soybean roots. Nematology 4: 230
22. Faghihi, J., Quesada, H., Gazo, R., Vierling, R. A. and Ferris, V. R. 2003. New tools for high-throughput phenotypic greenhouse screening. Journal of Nematology 35:37
23. Faghihi, J., Vierling, R.A. and Ferris, V.R. 2004. Periodic fluctuations in the number of new SCN cysts observed in greenhouse studies. Journal of Nematology 36(3):316
24. Chen, H., R. A. Vierling, J. Faghihi, and V. R. Ferris. 2005. A SNP test for CystX® resistance to soybean cyst nematode. Journal of Nematology 37:361-362
25. Faghihi, J., R. A. Vierling and V. R. Ferris. 2006. Field and greenhouse evaluations of selected fungicides on development of Soybean Cyst Nematode. Journal of Nematology 38 (2): 271
26. Shi, A., Vierling, R.A., and Grazzini, R. 2009. Development of multiplex SNP assays for multiple disease resistance in tomato. Amer. Phytopath. Soc. Online
27. Shi, A., Vierling, R.A., Grazzini, R., Hogue, P., and Miller, K. 2009.Molecular markers for Tm-2 alleles of tomato mosaic resistance in tomato. Amer. Phytopath. Soc. Online
28. Shi, A., Vierling, R.A., and Grazzini, R. 2009. Development of 13 SNP multiplex assay for *I-2*, *Mi*, *Sw-5*, *Tm-2* and *Ve* disease resistance genes in tomato. 42nd Tomato Breeder Roundtable Conference. Online
29. Faghihi, J., R. A. Vierling and V. R. Ferris. 2010. Effect of fall annual rye grass seeding on SCN. Journal of Nematology

Presentations

Scientific

1. Use of Molecular Markers for Varietal Identification, Midwest Seed Research Workshop, Champaign, IL, February 1992
2. RFLP and RAPD Polymorphism in Sorghum, USDA-ARS at Mayaguez, Puerto Rico, February 1993
3. Genetic Diversity in *Tripsacum dactyloides*, USDA-ARS at Woodward, OK, October 1993
4. Comprehensive Multidisciplinary Approach to the SCN Problem in Indiana, Indiana Crop Improvement Association Annual Meeting, Indianapolis, IN, February 1994
5. Soybeans as Biofactories, Soybeans for the 21st Century World Soybean Expo, Kansas City, MO, August 1994
6. Application of Cladistic Theory to Plant Breeding, Linkage Genetics, Salt Lake City, UT, October 1994
7. Evolutionary Theory and Plant Breeding, SIU, Carbondale, IL, April 1995
8. Soybean Peroxidase: Beginning a New Industry, 6th Annual Identity Preserved Crops Conference, Chicago, IL, November 1995
9. Use of Cladistic Theory for Determining Essential Derivation, American Seed Trade Association Intellectual Property Rights Committee, Chicago, IL, December 1995
10. Soybean Peroxidase Breeding, Soybean Breeders Workshop, St. Louis, MO, February 1996
11. Soybean Peroxidase-antiperoxidase: A Powerful New Tool, American Chemical Society Symposium, *Practical Power of Immunochemical Methods*, Orlando, FL, August 1996
12. New Uses of Conventional Soybean, 28th Soybean Seed Research Conference, Chicago, IL, December 1997
13. Specialty Soybeans, C-FAR Symposium, University of Illinois, March 1999
14. GM Traits: Sampling and Testing Issues, 10th Annual Identity Preserved Conference. AOSCA, Chicago, IL, November 1999
15. GM Traits: Segregation, tracking and testing records, IBC Symposium, Genetically Modified Foods, Washington D.C., November 1999
16. GM: What You Need to Know, 26th Annual CA Seed Meeting, Woodland, CA, April 2000
17. Lab Testing Grains for Biotechnology, Annual Conference of North Central Association of Food and Drug Officials, Grand Rapids, MI, October 2000
18. GMO Seed Testing, Indiana Seed Trade Association Annual Meeting, Indianapolis, IN November 2000
19. CYSTX, Indiana Crop Improvement Annual Meeting, Indianapolis, IN February 2001
20. Are We Ready for Bioengineered Foods? – A Laboratorian's View, Association of Food and Drug Officials (FDA) Annual Meeting, Atlanta, GA June 2001
21. Micro Gravity Plant Transformation, Bio2001, San Diego, CA June 2001

Presentations – continued

Scientific – continued

22. High-yielding SCN Resistant Varieties (CYSTX), 6th Annual Midwest Soybean Conference, Des Moines, IA August 2001
23. Do Our GMO Assays Answer the Questions We Are Asking and Can We Afford the Answers? American Society of Agronomy, *Symposium on Transgenic Gene Containment and Worldwide Seed Health*, Indianapolis, IN October 2002
24. Peroxidase for Medical Diagnostics, Meridian Biosciences Research Meeting, Cincinnati, OH July 2003
25. Trends in Biotechnology, Helena Chemical Annual Meeting, Indianapolis, IN November 2003
26. Accountability in Identity Preserved Programs - Sampling, Testing, Tracking, Tracing, Auditing and Other Issues, GEAPS-USDA Midwest Conference, Ft. Wayne, IN January 2004
27. Interpretation of PCR Assay Results, AOSA Annual Meeting, Tunica, MS June 2004
28. Biothreat Reduction in Agriculture. Joint AOSA/SCST Meeting, Indianapolis, IN June 2006
29. Application of SNP Genotyping to the Seed Industry. ICIA Annual Meeting, Indianapolis, IN February 2007
30. Identity Preserved: Is it what it is supposed to be? 2008 International Quality Grain Conference, Chicago, IL June 2008
31. Biothreat Detection: To Multiplex or Not to Multiplex That is the Question. 2008 International Quality Grain Conference, Chicago, IL June 2008
32. Agbio Applications. Sixth Annual Planet xMAP Multiplexing Symposium. Austin, TX April 2009
33. MOL-PCR: Multiplexing for Dummies. Ball State University, Muncie, IN September 2009
34. High-throughput Genotyping. IA Corn Research Meeting, Des Moines, IA June 2011
35. Corn Value Added Research, University of New Mexico, Albuquerque, NM August 2013
36. High Throughput Genotyping for National Security, National Center for Food Protection and Defense, Department of Homeland Security, December 2014

Extension

1. Application of Molecular Markers to Plant Breeding, Indiana Crop Improvement Association Molecular Marker Workshop, Indianapolis, IN, February 1992
2. Art and Science of Biotechnology, Golden Harvest Seed Company Research Conference, Estherville, IA, August 1992
3. Application of Molecular Biology to Plant Breeding, Independent Professional Seedsmen Association (IPSA) annual meeting, St. Louis, MO, January 1993
4. Application of Molecular Biology to Plant Breeding, IPSA annual meeting, St. Louis, MO, January 1994
5. Value Added Soybeans, Indiana Institute of Agriculture Food and Nutrition Annual Meeting, Indianapolis, IN, March 1994
6. Soybeans as Biofactories, invited by Indiana Lt. Governor's office to speak to US State Department emissaries, Brookston, IN, October 1994
7. Soybean Peroxidase: A New Commodity, IPSA Annual meeting, St. Louis, MO, January 1995
8. Peroxidase: Soybean's Other Valuable Trait, 28th Annual Purdue Top Farmer Workshop, West Lafayette, IN, July 1995
9. Value-added Soybeans, invited by Indiana Lt. Governor's office to speak to US State Department, Brookston, IN, October 1995
10. Peroxidase: Medical Diagnostic Uses, 29th Annual Purdue Top Farmer Workshop, West Lafayette, IN, July 1996
11. Value Added Crops, Indiana Ag Leadership Conference, West Lafayette, IN, September 1996
12. Value Added Soybeans, Woodford County, Illinois Economic Development Council, Woodford County, IL, September 1998
13. GMO Testing, Monsanto Cooperators, Dayton, OH, January 2000
14. GMO Testing, Monsanto Cooperators, Bloomington, IL, January 2000
15. Genetically Enhanced Grain: Testing and Certification Methods, IN Agribusiness Expo, Indianapolis, IN, January 2000
16. Method Validation, Midwest Seed Analyst's Meeting, Lafayette, IN, May 2000
17. Unicell Soybean, Japan Cellfood Press Conference, New York, NY, July 2001
18. SCN Resistance, Press Conference, Farm Progress Show, Lafayette, IN, September 2001
19. SCN Resistance, IPSA, St. Louis, MO, January 2002
20. BayTrak, ICIA Annual Conference, Indianapolis, IN, February 2002
21. SCN Resistance, AgriPro Research, Brookston, IN, August 2002
22. SCN Resistance, Illinois Soybean Board, Champaign, IL, September 2002
23. BayTrak, IPSA, St. Louis, MO, January 2003
24. SCN Resistance IPSA, St. Louis, MO, January 2003
25. SCN Resistance Cooperators Meeting, Purdue University, West Lafayette, IN, August 2003

Presentations – continued

Extension - continued

26. SCN Resistance Indiana Soybean Producers and Purdue University Soybean Field Day, West Lafayette, IN, September 2003
27. SCN Resistance ICIA Annual Conference, Indianapolis, IN, February 2004
28. Genotyping Workshop, ICIA, Lafayette, IN, August 2004
29. Sampling and Testing for IP, Post-harvest Education and Research Workshop, West Lafayette, IN December 2004
30. New Technologies, ICIA Annual Conference, Indianapolis, IN, Accepted invitation for February 2005
31. Future Trends in Research, Indiana Chapter of Agricultural Communication Writers, Lafayette, IN, February 2005
32. What is New? ICIA Annual Conference, Indianapolis, IN, February 2006
33. Plant Breeding Using Molecular Markers, ICIA, Lafayette, IN March 2006
34. Roundtable, Soybean Industry Summit & Transportation Needs Assessment, Indianapolis, IN April 2006
35. Testing for Genetically Modified Traits. ICIA Workshop, Lafayette, IN September 2007
36. What is New, ICIA Annual Conference, Indianapolis, IN, February 2008
37. Future Trends in Agriculture. ICIA Annual Conference, Indianapolis, IN, February 2009
38. Breaking Barriers Using New Technologies. Corn Belt Seed Conference, Indianapolis, IN February 2010

Cultivar and Germplasm Licensees

Soybean Cultivar

1. PUSCN14 (branded) a broad-based SCN resistant cultivar released in 1998

Broad-based SCN Resistant Soybean Germplasm

1. Five (5) sister lines of 97-51 released in 1997
2. 97-52 released in 1997
3. Two (2) sister lines of 97-53 released in 1997
4. Four (4) sister lines of 97-55 released in 1997
5. Three (3) sister lines of 97-59 released in 1997
6. 98-53-91 released in 1998
7. Three (3) sister lines of PUSCN14a released in 2001
8. PUSCN14a Dt released in 2004
9. VinCy 8-2 food grade in 2005
10. VinCy 8-3 food grade in 2005

Professional Service

- Invited panelist 2014 Lux Executive Summit. This is an invitation only meeting of the top 400 influencers in ag, food and biorenewable chemicals
- NCREC research advisory committee member (2010 to Present)
- ASPB panelist for new 10-year plant research strategic plan (2011)
- Associate Editor for *Seed Technology* (1999 to Present)
- Selected by the National Academy of Public Administration to evaluate the quality and significance of scientific research at NASA-Commercial Space Centers
- Panelist at two Food Biotechnology Symposia sponsored by the International Food Information Council based in Washington, D.C.
- Invited to CROPS 99, which produced a white paper for the Department of Agriculture.
- Member of SIMAC that was formed by the National Sorghum Growers Association to guide value-added research of sorghum
- Member of the Dow Institutional Biosafety Committee, which oversees genetic engineering research at Dow facilities (2000 to 2005)
- Served on the Fellows Selection Committee (1995 to 1997) for the Crop Science Society of America
- Advisor on the Independent Professional Seedsmen Association's Research Committee 1993 to 2000)
- Reviewed manuscripts for Crop Science, Theoretical & Applied Genetics, Transgenic Research, Canadian Journal of Plant Pathology, Seed Technology, and Biotechnology
- Reviewed research proposals for the NIH, USDA, Wellcome Trust (London, England), NCGA, eight (8) state corn checkoffs, Independent Professional Seedsmen Association, and American Soybean Association

References

Scott White, Ph.D.
Department of Homeland Security
Program Manager Integrated CBRN Terrorism & Bioterrorism Risk Assessment
Scott.White@hq.dhs.gov
202-254-6155

Scientific colleagues for over 25 years and Dr. White relies on Dr. Vierling to be his advisor for agricultural related questions. They routinely discuss technology and biosafety issues that pertain to protecting the U.S. food chain. Dr. Vierling is a frequent visitor to DHS HQ.

Jamal Faghihi, Ph.D.
Extension Nematologist
Purdue University
Department of Entomology
West Lafayette, IN 47907
jamal@purdue.edu
765-494-5901

Joint inventors and award winners of the SCN resistance technology and co-authors of numerous papers. Worked very closely together on field, greenhouse and laboratory experiments. Dr. Faghihi asked Dr. Vierling to speak at extension meetings.

Dan Moothart, MBA
President, American Qualex International
920A Calle Negocio
San Clemente, CA 92673
daniel.moothart@americanqualex.com
949-456-9662

Met mr. Moothart when Dr. Vierling was seeking to sublicense one of his technologies >15 years ago. Since then they have been actively involved in licensing and bringing new technologies to the market.