

a closer look at 2012



Boyce Thompson Institute
for Plant Research



WILLIAM BOYCE THOMPSON founded BTI in 1924 because he believed that basic plant research would lead to real benefits for human welfare. Today, BTI hosts 17 faculty-run laboratories, housing more than 150 researchers from 27 countries. Whether studying human health, plant nutrition, plant disease or environmental response, BTI scientists are bringing William Boyce Thompson's dreams to life every day. This work has the potential to improve food crops through increased yield and quality, to increase sustainability through reduced use of fertilizers and pesticides, to demystify plant and human immune systems, and to lower barriers to implementing alternative sources of energy. These discoveries are made possible because of one man's dream and the thousands after him, who believed in his vision.

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president's message

Nearly 100 years after William Boyce Thompson founded BTI, the institute remains committed to basic research—the foundation genesis of virtually all real-world applications. In seeking the answers to fundamental questions about living things, plants, insects, microbes, and fungi, BTI scientists are building the foundations that make progress possible, whether in agriculture, human health, or bioenergy.

Since the discovery of DNA, scientists have longed to unravel the precise genetic codes, or genome sequences, of all living things. These sequences are the blueprints for life, but until recently, technological limitations and prohibitive cost made this dream unrealistic. In 2000, the first plant genome sequence was completed — a project that took more than four years and over \$78 million. Since then, remarkable advances in laboratory and computing technologies have simplified the process to the point that an entire plant or human genome can be sequenced within days and for well under \$1,000.

The plant science community as a whole, and many laboratories in BTI have taken advantage of the plummeting cost of DNA sequencing, resulting in an exponentially growing library of genetic information. The cumulative quantity of data is truly staggering, yet it must be easily accessed, and tools must be created to retrieve and analyze what is required for any given scientific question. This creates profound intellectual and computational challenges not just for plant biologists, but also across many scientific fields.

BTI is well positioned to profit from advances in informatics, because among its faculty are both computational and biological experts. In 2012, BTI scientists and their collaborators determined the complete genome sequences of several plants, with three “headline” accomplishments being tomato, watermelon, and a strain of tobacco used specifically for research.

A sequence is only a beginning: as you'll read in *the year in review* section of this report, everything from the flavor to disease resistance of fruits can be positively impacted by detailed genetic knowledge. Sequences provide ideas about plant characteristics that can be tested with further experiments. Ultimately, scientists would like to be able to predict a plant's growth and development from sequence alone, but this will also require equally deep knowledge of plant chemistry, gene function, and environmental interactions, which are also topics of intensive study at BTI. If predictive ability is achieved, it will usher in an era of research results contributing to society, and insights into plant functions will be made far more efficiently and quickly.

BTI's success in research depends on scientific creativity and excellence, but also on its state-of-the-art facilities. BTI is a first-class place to analyze small molecules, visualize structures within plant cells, and grow plants under precise conditions. BTI prides itself on providing a premier training environment, by investing in career-oriented activities for its postdoctoral associates and doctoral students, and by hosting a nationally-recognized education program that brings a diverse contingent of high school and undergraduate interns to BTI each summer, and develops plant biology and bioenergy curricula for New York state schools. BTI also provides its scientists support to identify and promote discoveries that have the potential for societal benefit, through its Office of Technology Transfer.

To stay in touch with the rest of world, BTI has increased its presence on the web: look for us on Twitter, Facebook, and through an all-new website. BTI not only makes discoveries, it communicates them to the world. After all, research is a truly international venture, just as our challenges in agriculture, health, and environment know no national boundaries. Thank you for your support and interest in the Boyce Thompson Institute.



Sincerely,

David Stern

12.21.2012

SCHROEDER LABORATORY FOUND THAT WORMS HIJACK RNA BUILDING BLOCKS TO CONTROL DEVELOPMENT, CREATE UNIQUE SUGAR IN THE PROCESS

Assistant Professor Dr. Frank Schroeder and Dr. Ralf Sommer from the Max-Planck Institute reported that the roundworm *P. pacificus* regulates the morphology of its offspring through exposure to a potent cocktail of small-molecule signals, turning genetically identical juveniles into very different types of adults.

11.25.2012

BTI RESEARCHERS FIND CLUES INTO MORE DISEASE RESISTANT WATERMELONS, GENOME DECODED

An international consortium of more than 60 scientists, including Associate Professor Dr. Zhangjun Fei, published the genome sequence of watermelon (*Citrullus lanatus*). This information could dramatically accelerate watermelon breeding towards production of a more nutritious, delicious, and resistant fruit.

10.22.2012

BTI INTERN PRESENTED AT SOCIETY FOR ADVANCEMENT OF CHICANOS AND NATIVE AMERICANS IN SCIENCE, INC (SACNAS)

Elena Cravens, a 2012 Plant Genome Research Program intern and winner of BTI's Best Scientific Presentation award, presented her summer research *Functional dissection of the VIM1 protein and its role in cytosine methylation in Arabidopsis* at the SACNAS conference in October. Elena talked about her BTI experience, "I know the skills and knowledge I gained at BTI over the summer will help me in future endeavors. The program exposed me to many different aspects of plant research separate from my project and gave me an accurate picture of what plant biology research entails." SACNAS awarded Elena a travel scholarship based on her 10-week research experience working in the BTI laboratory of VP for Research Dr. Eric Richards.

07.18.2012

DR. MARIA HARRISON, CO-PRINCIPAL INVESTIGATOR ON \$6.5 MILLION NSF AWARD

Dr. Maria Harrison is a co-principal investigator on a research project that aims to understand and enhance symbioses between legumes and other plants that are crucial for sustainable agriculture. Many current agricultural practices require significant amounts of nitrogen and phosphorus fertilizers, which are restrictive, financially and environmentally. Understanding any possible beneficial symbioses between legumes and other plants could provide a more efficient use of these main fertilizer materials.

04.02.2012

SUGAR COULD BE A SWEET WAY TO CONTROL INSECT PESTS

Dr. Georg Jander worked with Cornell University's Angela Douglas to study the effects of sugar on insects, with the goal of controlling plant pests.

03.05.2012

AFRICAN SWEET POTATO DEVASTATION: BTI RESEARCH EXPANDED UNDERSTANDING OF VIRUSES

Dr. Zhangjun Fei was awarded a \$700,000 grant to work with a team of researchers to explore viruses that devastate sweet potato crops in Africa.

year in review

With over 90 publications a year, BTI's halls are consistently filled with news and conversations on recent discoveries achievements, and collaborations. Here is a selection of stories from 2012 coming from the laboratories highlighting BTI research, awards, and outreach.

11.30.2012

THREE RESEARCHERS HONORED AS AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS) FELLOWS

Dr. Maria Harrison, Dr. Georg Jander, and Dr. Daniel Klessig were awarded honors of distinction by AAAS. The three selected scholars brought the number of BTI fellows to nearly 50% of BTI's faculty.



11.13.2012

FACULTY WORK WITH USDA, ARS TO DEVELOP GLOBAL DISTRIBUTION MAP OF TOMATO VIRUS

Dr. Zhangjun Fei and his collaborators at USDA, ARS were awarded support from the The National Institute of Food and Agriculture's Specialty Crop Research Initiative (SCRI) to generate a comprehensive global virus distribution map for tomatoes and to develop breeders' tools to enhance virus resistance.

07.05.2012

POWERFUL SCREENING EXPOSES THE ROLES OF SALICYLIC ACID

Dr. Zhangjun Fei, Dr. Daniel Klessig, and Dr. Sorina Popescu worked together to identify proteins that bind the plant hormone salicylic acid. This knowledge will potentially lead to a better understanding of the hormone—a close relative of aspirin—and its many physiological effects by unraveling its role in how plants respond to abiotic and biotic stresses.

06.29.2012

RESEARCHERS DISCOVERED LINK BETWEEN TOMATO RIPENING, COLOR, AND TASTE

Cornell University graduate student Cuong Nguyen from BTI's Giovannoni laboratory and researchers at UC Davis found a gene that influences sugar, carbohydrate, and carotenoid levels in tomatoes, and also controls fruit ripening.

05.30.2012

TOMATO GENOME FULLY SEQUENCED – PAVING THE WAY FOR HEALTHIER FRUITS AND VEGETABLES

Dr. James Giovannoni, Dr. Zhangjun Fei, Dr. Greg Martin, Dr. Lukas Mueller, and Dr. Joyce Van Eck played a major role in successfully decoding the genome of tomato (*Solanum lycopersicum*), marking an important step toward improving yield, nutrition, disease resistance, taste, and color of the tomato and other crops. The project, highlighted as the cover article in the May 31, 2012 issue of *Nature*, was a joint effort by the Tomato Genomics Consortium, a group with members from 16 countries. BTI produced a short video highlighting the project, which can be found on our YouTube channel (BTI Science) and our website. To date, it has had almost 800 views.

02.25.2012

ASSOCIATION OF INDEPENDENT PLANT RESEARCH INSTITUTES (AIPI) ANNOUNCED FIRST ROUND OF COLLABORATIVE GRANT AWARDS

Leaders from BTI, the Department of Plant Biology at the Carnegie Institution for Science (Stanford, CA), the Donald Danforth Plant Science Center (St. Louis, MO), and The Samuel Roberts Noble Foundation (Ardmore, OK) formed AIPI to increase national awareness and support for plant research and to foster collaborations between the participating institutions.

An important initiative instituted by AIPI was a seed grant program that funds cooperative projects among scientists from the member organizations. Awards in this program occur twice a year and offer \$10,000 to \$50,000 to support innovative projects involving researchers from two or more member organizations. Eligible projects are designed to produce proof-of-concept data or planning activities to facilitate preparation of applications for larger grants from other sources. In 2012, three collaborative awards were granted.

01.09.2012

COMPARATIVE METABOLOMICS REVEALED BIO-GENESIS OF ASCAROSIDES, A MODULAR LIBRARY OF SMALL MOLECULE SIGNALS IN *C. ELEGANS*

Dr. Frank Schroeder demonstrated the utility of applying MS/MS-based comparative metabolomics to a series of mutant strains for characterizing the biosynthetic pathway of small signaling molecules called ascarosides.

11.29.2012

BTI ASSISTANT PROFESSOR WORKING WITH CORNELL UNIVERSITY ON DATABASE FOR NEXTGEN CASSAVA PROJECT

BTI's Dr. Lukas Mueller began working on the NEXTGEN Cassava project at Cornell University in the fall of 2012. The project is an international consortium of seven institutions from the United States, Nigeria, and Uganda who are working together to improve cassava productivity and build human and technical capacity for plant breeding in sub-Saharan Africa. The Mueller laboratory is developing the central database, which will make the data accessible to all collaborators and plant breeders.

10.22.2012

HARRISON LABORATORY DISCOVERED INSIGHTS TO PLANT ROOT BEHAVIOR

Dr. Maria Harrison, BTI Professor and William H. Crocker Research Scientist, collaborated with researchers from Cornell University to image root growth using a 3-dimensional laser sheet imaging technique.

08.30.2012

BTI RESEARCHERS PUBLISHED A DRAFT GENOME OF AN EXPERIMENTALLY IMPORTANT STRAIN OF TOBACCO

BTI researchers Dr. Greg Martin, Dr. Lukas Mueller, Dr. Aureliano Bombarely, Dr. Hernan Rosli, Dr. Julia Vrebalov, and Université de Sherbrooke researcher Dr. Peter Moffett worked together to generate the sequence of *Nicotiana benthamiana*. The sequence contains information on more than 90% of the plant's genes and has been one the top downloaded articles on the website, Molecular Plant-Microbe Interactions.

outreach & education

TRAINING TOMORROW’S SCIENTISTS...

An important part of our mission entails communicating scientific knowledge to the public. To do so, BTI established a Center for Plant Science Teaching and Learning, which hosts an extensive education and outreach program that includes professional development for teachers, research experience for undergraduates, and educational involvement in the local community. The Center's overall goal is to engage students and teachers in authentic plant science research.

The center, directed by Tiffany Fleming, provides alternative models in plant science education that connect scientists to teachers and students. In 2012, over 125 science teachers attended seminars and field trips, conducted classroom lab activities, and designed inquiry-based lesson plans for their students. Participants also joined the BTI teacher network, an online community where teachers share student data, curriculum plans, and interests in science education while receiving reciprocal support for meeting their teaching goals.

In 2012, BTI's Plant Genome Research Program provided 27 students with an intensive 10-week research-based internship. Working alongside seasoned scientists, students acquired laboratory techniques, developed scientific writing skills, attended guest lectures by scientists, and presented their research at the annual BTI Student Symposium. In its 11th year, the program gave students an opportunity to participate in hands-on plant science research in our research laboratories.

107 programs	27 Presentations and Trainings
	10 Total Classroom Visits
	70 Experiment Kits (distributed and explained)
5,441 participants	125 Teachers
	3,589 K—12 Students
	111 BTI and Cornell Faculty, PGS, Staff
	1,616 Undergraduate Students
134 volunteers	21 Community Volunteers
	72 University Faculty
	41 Graduate and Postdoctoral Students



external relations

FOR THE ADVANCEMENT OF SOCIETY...

To help achieve BTI's mission of having a positive impact on society, the Office of Technology Transfer works to identify potential partners who are interested in commercializing technologies discovered or developed by Institute scientists. Paul Debbie, Director, Technology Transfer and Licensing and Karen Kindle, Principal Liaison for Technology Marketing and Licensing, showcased BTI technology to more than a dozen corporate partners. Our staff establish the following types of associations: 1) Licensing agreements, which allow licensees a fee-based usage of specific BTI technologies; 2) Collaborations, in which industry and institute scientists collaborate on industry-funded research to advance early technology to the point where it is ready to be developed into a product; and 3) Consulting agreements, which introduce potential partners to particular BTI scientists, where their expertise may be valuable to specific projects.

Technology development occurred at a brisk pace in 2012, with thirteen new invention disclosures submitted to the office and six new patent applications filed on BTI technology. In addition, BTI executed over forty materials transfer agreements, which govern the sharing of research resources.

communication in numbers

Below is a brief summary of activity for BTI's online presence. Facebook and Twitter accounts were activated in April of 2012.

www....	WEBSITE BTI.CORNELL.EDU	104,861 52,528 306,067	Website visits Unique visitors Page visitors
f	FACEBOOK BoyceThompsonInstitute	160 27,118 294,427	Fans Content <i>likes</i> Viewers of <i>liked</i> BTI content
🐦	TWITTER BTIsience	250 450	Followers Tweets

RAISING AWARENESS AND SUPPORT...

Prior to the 20th century, most scientific research was performed and paid for by patrons or by individual scientists—usually through personal funds. In the United States, the Morrill Acts of 1862 and 1890 also brought essential funding to colleges and universities for agriculture education and research. Today, BTI still benefits from these types of funds. Since the early 1900s, corporations' research and development units, government programs, and private donations have provided additional funding for scientific research.

Despite the obvious benefits of investment in research, public funding has stagnated in recent years as the country endured a recession and became focused on deficit reduction. The result is missed scientific opportunities, low funding success rates (even for highly creative ideas) and discouragement among the next generation who might otherwise opt for careers in plant research. To mitigate these obstacles, it is becoming more important for organizations to have strong mechanisms to maintain and nurture diverse funding sources. To that end, in 2012, BTI reshaped its external relations and development department with the goal of increasing public awareness of our research programs and examining ways to expand support from foundations, corporations, and individuals.

Led by Director of Development and External Relations Bridget Rigas, the 2012 focus was building departmental infrastructure and enhancing awareness of BTI's research. We increased outreach to national and international media, established social media pages (Facebook, Twitter, LinkedIn, YouTube, and Tumblr), increased local knowledge on BTI through support of local public radio stations, and redesigned our website to be more engaging to the public, educators, and potential collaborators and to provide a sharper message on BTI.



charitable giving

GIVING TO THE BOYCE THOMPSON INSTITUTE

From William B. Thompson's cornerstone contribution in 1924 to the support we receive today, BTI science is made possible, in part, through the generosity of donors who appreciate the importance of basic research and its usefulness in solving larger global issues.

We take this opportunity to thank and recognize the following individuals and organizations who made gifts in 2012. To learn more about the benefits associated with giving to BTI, as well as designated opportunities, such as sponsoring a laboratory, specific research projects, or student interns, please call our development office at (607) 254-2923.

William and Anne Thompson Society \$5000 + Anonymous Estate of Anthony "Andy" Grefig Estate of Leonard Weinstein	William Boyce and Gertrude Thompson Society \$2000 —4,999 Ithaca Garden Club Mr. and Mrs. Roy H. Park, Jr. Laura A. Phillips and John A. Elliot Carolyn W. Sampson	Chairperson's Circle \$1,000—1,999 Mary E. Clutter Ezra and Daphne Cornell Greg Galvin Philip and Anette Goelet Susan and Gregory Martin David and Karen Stern
President's Circle \$500—999 Anonymous Peter J. Bruns and Jennifer Shea Rich and Joan Curtiss Sophia and Nick Darling Maria J. Harrison Melissa and Eric Richards Bridget M. Rigas Donald and Marcia Slocum Kathryn W. Torgeson	Alder Society \$100—499 Klaus Apel Charles and Kathy Arntzen Dr. Richard C. Back Barbara Holowka Baird Andrew Bass Donald and Holly Beermann Brian Bell Patricia A. Johnson Judith A. Bishop Kathryn Jean Boor Maria G. Bulis Eleanor Storrs Burchfield James and Terry Byrnes Bruce and Tricia Cahoon Cayuga Landscape Co., Inc. Paul S. Chomet Charlie and Donna Claes Luke and Greta Colavito Mrs. Joanne S. Cutler Paul and Dorothy Debbie Dr. D'Maris Amick Dempsey Frederick and Nicky Falck	Friends of BTI \$1—100 Mrs. Joan M. Althaus Thomas J. and Judith A. Burr Anthony Carpi John Dyba Howard P. Hartnett Dr. Betty Fong Zuzolo Gift Designations In Support of Research Programs Dr. Richard C. Back Maria J. Harrison Kathryn W. Torgeson In Support of Educational Programs Dr. Richard C. Back Maria J. Harrison In Support of the Summer Internship Program Carolyn Sampson Ithaca Garden Club For the President's Discretionary Fund Barbara Baird Holowka Bridget M. Rigas

Building a Legacy:
Anthony "Andy" Grefig

Anthony "Andy" Grefig, who passed away in January 2009, began his BTI career in 1965 when the institute was still in Yonkers, NY. Hired as a research assistant with Dr. Lee Crisan, he worked on the biochemistry of fungi. In 1967, Andy took a position in Alan Renwick's analytical service lab, where he remained for the next 21 years, moving with BTI to Ithaca in the 1970s. After retiring in 1988, Andy continued to work as a volunteer for the institute for several years.

In small acts, like his daily kindness toward colleagues, and in grand gestures, like providing students free housing for over 25 years, Andy's life was dedicated to generously supporting BTI, its science, and his community. The depth of that generosity was proven by Andy's estate gift of \$250,000 to BTI's endowment in 2012. His gift will allow scientists the freedom to perform research directed through curiosity—where many great discoveries are born.

Having a strong and healthy endowment is key to producing a robust research program focused on the fundamental discovery of plant functions, and providing the grounds for solutions—through BTI research—to many of our global and society issues. Planned gifts to our endowment can be established in ways that benefit BTI as well as you, your family, or another charity. If you are interested in learning more about how to include BTI in your estate plans, please contact Bridget Rigas, Director of Development and External Relations at (607) 254-2923.

memorials

- In memory of Ralph E. Althaus
(gift from) Mrs. Joan M. Althaus
.....
- In memory of Donald G. Baird
Barbara Holowka Baird
.....
- In memory of Alan Bell
Brian Bell
.....
- In memory of Ursula Bruns, who loved plants of all kinds
Peter J. Bruns and Jennifer Shea
.....
- In memory of Dr. Harry P. Burchfield
Eleanor Storrs Burchfield
.....
- In memory of Dr. Horace G. Cutler
Mrs. Joanne S. Cutler
.....
- In memory of Irene Zachar Dyba
John Dyba
.....
- In memory of A. Carl Leopold
Lynn B. Leopold
.....
- In memory of Lawrence P. Miller
Dr. Robert C. Miller
.....
- In memory of Leonard Weinstein
Robert and Roberta Kohut
Sylvia Weinstein



financials

RESEARCH AND OTHER RESTRICTED SUPPORT

The Boyce Thompson Institute for Plant Research receives a substantial portion of their research funding through grants from the federal government, private foundations, corporations, and individuals. The following section lists new research awards received in 2012 and our fiscal year financial overview.

2012 research grants awarded

GOVERNMENT	
National Science Foundation	\$ 2,762,589
US Department of Agriculture	\$ 602,515
FOUNDATIONS	
Triad Foundation	\$ 250,000
US-Israel Binational Science Foundation	\$ 126,500
CORPORATIONS AND OTHER SUPPORT	
Binational Agricultural Research & Development Fund	\$ 289,000
Next Generation Cassava Project	\$ 1,817,136
Corporate Funding	\$ 567,618
Other Support	\$ 114,325
Total New Research Grants Awarded	\$ 6,529,683

2012 annual financial report

INCOME SOURCES		%
Federal Government	\$ 6,822,000	50
Institutional Endowment	\$ 2,951,000	21
NYS Land Grant Provision	\$ 1,580,000	12
Foundations	\$ 222,000	2
Other Private Sources	\$ 812,000	5
Unrestricted Revenues	\$ 1,330,000	10
Total Operating Income	\$13,717,000	
EXPENSES		%
Research Activities	\$ 9,565,000	70
Research Support	\$ 1,221,000	9
Research Facility Expenses	\$ 388,000	3
Administration	\$ 2,055,000	15
Intellectual Property	\$ 305,000	2
Development & Communications	\$ 183,000	1
Total Operating Expenses	\$13,717,000	

scientific publications of 2012

Avila, J., Gregory, O.G., Su, D.Y., Deeter, T.A., Chen, S.X., Silva-Sanchez, C., Xu, S.L., Martin, G.B. and Deanevme, R.P. (2012) The subcellular localization of a complex is phosphorylated by the plant cell death suppressor Ats1. *Plant Physiology* **159**, 1277-1290.

Barry, C.S., Aldridge, G.M., Herzog, G., Ma, O., McQuinn, R.P., Hirschinger, J. and Giovannoni, J.J. (2012) Altered chloroplast development and delayed ripening caused by mutations in the mitochondrial gene *atp6* in the tomato. *Plant Physiology* **159**, 1088-1098.

Bennetzen, L.L., et al. (2012) Reference genome sequence of the model plant *Setaria*. *Nature Biotechnology* **30**, 555-561.

Berger, F., et al. (2012) Reading the second code: Mapping epigenomes to understand plant growth, development, and adaptation to the environment. *Plant Cell* **24**, 2523-2535.

Bombarely, A., Edwards, K.D., Sanchez-Tamborini, J., and Mueller, L.A. (2012) Deciphering the complex leaf transcriptome of the allotetraploid species *Nicotiana glauca* a phylogenomic perspective. *Mol. Genomics* **33**, 105.

Bombarely, A., Rossi, G.K., Wreblov, J., Moffett, P., Mueller, L.A. and Martin, G.B. (2012) Aerial genome sequence of *Nicotiana glauca* reveals a complex molecular plant-microbe biology interface. *Molecular Plant-Microbe Interactions* **25**, 1523-1530.

Boze, N., Ogawa, A., von Reuss, S.H., Yim, J.J., Ragdale, E.J., Sommer, R.J. and Schroeder, F.C. (2012) Complex small molecule architectures regulate phenology plasticity in a nematode. *Agarwala, C. Chemical Interactions* **51**, 1243-1243.

Ca, D.Y., Rodriguez, F., Teng, Y.W., Aze, C., Bonierbale, M., Mueller, L.A. and Spooner, D.M. (2012) Single copy nuclear gene analysis of polymorphism in wild potatoes (*Solanum section Petota*). *BMC Evolutionary Biology* **12**, 70.

Can, Y., Tang, X., Giovannoni, J., Xian, F. and Liu, Y. (2012) A novel RNAi-based method for RNAi-mediated gene silencing in fruit development and ripening. *BMC Plant Biology* **12**, 211.

Caspi, R., Altman, T., Dreher, K., Fulcher, C.A., Subbaray, P., Keseler, I.M., Kothari, A., Krummenacker, M., Latendresse, M., Mueller, L.A., O'Leary, S., Papp, A., Sharkey, A.C., Travers, M., Weering, D., Zhang, P.F. and Karp, P.D. (2012) The MetaCyc database of metabolic pathways and enzymes and the Biocyc collection of pathway/genome databases. *Nucleic Acids Research* **40**, D101-D103.

Castaldi, R. and Araya, A. (2012) The nucleotide sequence of a driving force for the emergence of plant organelle RNA editing. *Journal of Molecular Biology* **418**, 120-125.

Casteel, C.L., Hansen, A.K., Walling, L.L. and Paine, T.D. (2012) Manipulation of plant defense responses by the tomato pathogen (*Bacterium coccovorum*) and its associated endophyte *Candidatus Liberibacter psyllorum*. *PLoS ONE* **7**, e35931.

Chen, Y., Zheng, Y., Liu, B., Zhang, S., Giovannoni, J.J. and Fei, Z. (2012) A novel method for RNAi-mediated small RNA-seq library preparation using a RNAi-seq 1.0 adenylated adapters. *Plant Methods* **8**, 1.

Chen, A., von Reuss, S.H., Kogan, D., Gasser, R.B., Platzer, J.E., Schroeder, F.C. and Stenberg, P.W. (2012) Azoarabidopsis is widely common among nematodes. *Current Biology* **22**, 772-780.

Dempsey, D.A. and Klessig, D.F. (2012) 505-100 map signals for protein acquired resistance. *Trends in Plant Science* **17**, 538-545.

Dong, S. and Bissard, G.W. (2012) Functional analysis of the *Arabidopsis thaliana* multiple nuclear polyphosphatase gene *AtPAP1* terminal fusion loops and interactions with membranes. *Journal of Molecular Biology* **418**, 967-978.

Donzelli, B.G., Krasnow, S.F., Sun-Moon, Y., Churchill, A.C.L. and Gibson, D.M. (2012) Genetic basis of desiccation protection in the entomopathogen *Microplitis croceipes*. *Genetics* **186**, 105-116.

Du, X.R., Xiao, M., Ma, X.R., Liu, Y.S., Kuhl, J., Martin, G.B. and Kuo, J.M. (2012) A novel method of cell death caused by an autophagic form of PIF1 is suppressed by co-expression of the PIF1-ERL1 domain. *Molecular Plant* **5**, 1093-1097.

Feiz, L., Williams-Carrier, R., Wostkoff, K., Belcher, S., Barkan, A. and Stern, D.B. (2012) Ribosome-1, a 5S ribosomal protein, is essential for chloroplast protein synthesis in *Arabidopsis thaliana*. *Plant Cell* **24**, 3305-3316.

Findes, M.A., Schroeder, F.C., McKee, T.D., Vagstad, D., Fraser, P.C., Creaser, S.P., Austin, W.F., Clardy, J., Wang, R., Selkoe, D. and Ekman, C.B. (2012) Discovery of a novel phytochemical accumulation class of plasma membrane monomers derived from the extract of *Arabidopsis thaliana*. *ACS Chemical Neuroscience* **3**, 94-101.

Forseth, R.R. and Schroeder, F.C. (2012) Correlating secondary metabolite production with growth using differential analysis of 2D-MS/MS spectra. *Methods in Molecular Biology* **964**, 207-219.

Gao, M., Wang, Q., Zhou, S.P., Bao, C.W., Wei, F., Fei, Z. and Ming, J. (2012) Identification of epigenetic repressor responsive genes in Chinese wild *Vitis quinquangularis*. *International Journal of Molecular Sciences* **13**, 1347-1359.

Gao, M., Wang, Q., Wan, R., Fei, Z. and Wang, X.P. (2012) Identification of genes differentially expressed in response to salinity stress in *Arabidopsis thaliana* using suppressive subtractive hybridization. *Plant Physiology and Biochemistry* **58**, 253-268.

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“I am going to build a laboratory to study some of the fundamental things. I want to do something to get at the bottom of the phenomena of life processes and I think a good place to study them would be in the realm of plants. Any principles concerning the nature of life that you can establish for plants will help you understand man, in health, and in disease.”

—COLONEL WILLIAM BOYCE THOMPSON



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