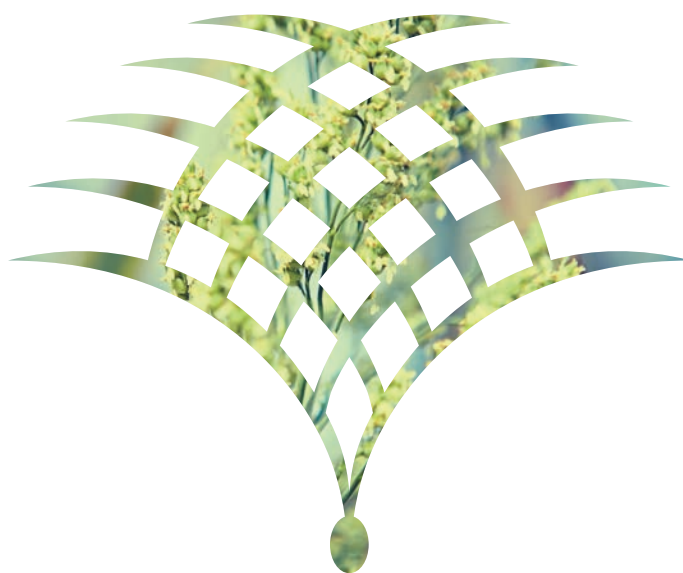


Institute for International Crop Improvement

ANNUAL ACHIEVEMENT HIGHLIGHTS / 2013



DONALD DANFORTH
PLANT SCIENCE CENTER

SCIENTISTS MADE

100

CANDIDATE PLANT
VARIETIES TO TEST
FOR IMPROVEMENT
OF VITAMIN A AND
IRON CONTENT.



INSTITUTE FOR INTERNATIONAL CROP IMPROVEMENT

DISCOVERY

Scientists at the Institute seek to translate key discoveries in plant disease and pest management, genomics, advanced breeding, and nutrition to staple crops that contribute to food security, and that are underserved by commercial agriculture. Recent work has focused on cassava, sweet potato, groundnuts, cowpea, sorghum, banana and millets.

COMMUNITY

The Institute works in partnership with international research institutions, NGOs, funding agencies and regulatory agencies. Members of the Institute are involved in 18 international collaborations, connecting leading scientists and cutting-edge technologies, training international scientists, and providing regulatory, biosafety and project management services.

IMPACT

The Institute is committed to delivering products to communities where improved crops are needed most, and where they will have disproportionate impact. Enhanced staple crops will provide improved food security, nutrition and economic stability to smallholder farmers and their families.



THE DONALD DANFORTH PLANT SCIENCE CENTER: AN INTERNATIONAL CENTER FOR PLANT SCIENCE

DANFORTH CENTER SCIENTISTS HAVE ESTABLISHED COLLABORATIVE RELATIONSHIPS AROUND THE WORLD. THESE GLOBAL ALLIANCES EXPAND THE QUALITY AND IMPACT OF DANFORTH CENTER RESEARCH, WHETHER INTERNATIONAL SCIENTISTS REMAIN IN ST. LOUIS OR RETURN HOME TO SHARE NEW KNOWLEDGE. THE FLAGS DISPLAYED ABOVE OUR CENTER ATRIUM REPRESENT THE HOME COUNTRIES OF SCIENTISTS AND STAFF WORKING AT THE CENTER DURING THE PREVIOUS CALENDAR YEAR.



COMPLETED

55

FIELD TRIALS TO DATE

AWARDED

\$5M

IN GRANTS TO DEVELOP STAPLE
CROPS WITH IMPROVED
NUTRITION, DROUGHT TOLERANCE
AND DISEASE RESISTANCE

18

COLLABORATIONS
ACROSS THE GLOBE



2013 HIGHLIGHTS

CROP DISEASE AND PEST MANAGEMENT

Conducted confined field trials in partnership with scientists in Uganda and Kenya, demonstrating that improved cassava plants were resistant to cassava brown streak virus.

Established a new laboratory for trait discovery to improve resistance to cereal stem borer insects and the parasitic plant *Striga* in sorghum.

Obtained government approval to conduct field trials of virus resistant sweet potato in Uganda in 2014, an important step in improving yield of this significant staple crop in the developing world.

Initiated new research program for development of resistance to cassava bacterial blight disease.

Initiated two USAID-funded collaborations for enhancing cassava disease resistance, bringing the total number of IICI collaborations to 18.

IMPROVEMENT OF NUTRITIONAL QUALITY

Generated over 100 new candidate varieties to screen for improvement of vitamin A and iron content.

Conducted four field trials of cassava with elevated pro-vitamin A in Puerto Rico with collaborator at the University of Mayaguez.

Established a research cooperation with the Iowa Corn Promotion Board to develop technologies to improve the productivity and nutritional value of corn and food security crops for underdeveloped regions.

FIELD TRIAL AND BIOSAFETY SUPPORT

Cooperated in the evaluation of Golden Rice in Indonesia and Bangladesh.

Conducted or assisted with eight field trials in the U.S., Puerto Rico, Africa and the Philippines, bringing the total trials to 55 with crops under development.

2013 ACTIVE GRANTS AND CONTRACTS

PROJECT DESCRIPTION	SPONSOR	START/END	TOTAL GRANT
Biocassava Plus	Bill & Melinda Gates Foundation	Sept. 2008 Sept. 2013	\$6,486,208
Biosafety Resource Network	Bill & Melinda Gates Foundation	Nov. 2008 Dec. 2013	\$5,345,895
A Cassava Breeding Community of Practice	African Agricultural Technology Foundation	April 2009 Mar. 2014	\$425,034
Production and validation of a universal plant virus microArray	US Department of Agriculture	June 2009 Dec. 2013	\$220,039
Virus Resistant Cassava for Africa	US Agency for International Development (USAID)	Sept. 2009 Oct. 2014	\$2,694,416
Production of data for the regulatory assessment of golden rice	International Rice Research Institute	Nov. 2009 Dec. 2014	\$120,000
Bt Cowpea	African Agricultural Technology Foundation	Aug. 2010 Aug. 2014	\$170,050
BioCassava Plus II	Bill & Melinda Gates Foundation	Nov. 2010 Nov. 2014	\$8,257,560
Bio-Fortified Sorghum for Africa	Howard G. Buffett Foundation	Jan. 2011 Dec. 2014	\$4,241,365
Virus Resistant Cassava for Africa II	Bill & Melinda Gates Foundation	April 2011 April 2016	\$5,548,750
Virus Resistant Cassava for Africa II	Monsanto Fund	June 2011 June 2016	\$5,299,944
An assessment of the social and economic impacts of deploying virus resistant cassava cultivars in East Africa	John Templeton Foundation	Mar. 2012 Mar. 2014	\$249,999
Virus Resistant Sweet Potato	Howard G. Buffett Foundation	Mar. 2012 Dec. 2013	\$269,968
Drought Tolerant Cereals	US Department of Energy	Sept. 2012 Sept. 2017	\$586,674
Regulatory development for HEG-modified mosquitoes	Foundation For The National Institutes of Health	Oct. 2012 July 2016	\$994,971
Program for Biosafety Systems	USAID	Oct. 2012 Sep. 2013	\$215,848
Deployment and validation of high beta carotene rice varieties to combat Vitamin A Deficiency	International Rice Research Institute	Jan. 2013 Dec. 2013	\$89,000
Commercial contract	Iowa Corn Promotion Board	Jan. 2013 Dec. 2014	\$68,805
Bio-Fortified Sorghum for Africa II	Howard G. Buffett Foundation	May 2013 April 2014	\$973,555
Regulatory support for Banana 21 project	Queensland University of Technology	Sept. 2013 Aug. 2016	\$622,874
Development of herbicide tolerant cassava	Bill & Melinda Gates Foundation	Nov. 2013 Oct. 2016	\$2,177,824
TOTAL			\$45,058,779

Peer-reviewed articles published by IICI scientists.

Gao, S.J., et al. (2013). Enhanced transgene expression in sugarcane by co-expression of virus-encoded RNA silencing suppressors. *PLoS One* 8, e66046.

Haggman, H., et al. (2013). Genetically engineered trees for plantation forests: key considerations for environmental risk assessment. *Plant Biotechnology J* 10.1111/pbi.12100.

Ashraf, M.A., et al. (2013). Molecular characterization and phylogenetic analysis of a variant of highly infectious cotton leaf curl Burewala virus associated with CLCuD from Pakistan. *Aust J Crop Sci* 7, 1113-22.

Beyene, G., Curtis, I., Damaj, M., Buenrostro-Nava, M., and Mirkov, T.E. (2013). Genetic engineering of *Saccharum*. In *Genomics of the Saccharinae*, A.H. Paterson, ed (Springer New York), pp. 223-54.

Henley, W.J., et al. (2013). Initial risk assessment of genetically modified (GM) microalgae for commodity-scale biofuel cultivation. *Algal Research* 2, 66-77.

Khan, A.J., Akhtar, S., Al-Matrushy, A.M., Fauquet, C.M., and Briddon, R.W. (2013). Introduction of East African cassava mosaic Zanzibar virus to Oman harks back to Zanzibar, the capital of Oman. *Virus Genes* 46, 195-8.

Okogbenin, E., et al. (2013). Phenotypic approaches to drought in cassava: review. *Frontiers in physiology* 4, 93.

Olasanmi, B., et al. (2013). Bulked segregant analysis identifies molecular markers associated with early bulking in cassava (*Manihot esculenta* Crantz). *Euphytica* 10.1007/s10681-013-0991-2, 1-10.

Parkes, E., Fregene, M., Dixon, A., Boakye-Peprah, B., and Labuschagne, M. (2013). Combining ability of cassava genotypes for cassava mosaic disease and cassava bacterial blight, yield and its related components in two ecological zones in Ghana. *Euphytica* 194, 13-24.

Afuape, S., Sayre, R., Tawanda, Z., and Kahya, S. (2013). Transgenic cassava lines carrying heterologous alternative oxidase (AtAOX1a) showed impaired quantitative and qualitative response to embryogenesis. *Afr J Biotech* 12, 4303-09.



INSTITUTE FOR INTERNATIONAL CROP IMPROVEMENT

The Institute for International Crop Improvement at the Donald Danforth Plant Science Center was established in 2012 with a generous gift from the JS McDonnell Foundation to improve the productivity and nutritional value of food security crops, and to advance delivery of improved crops to underserved regions.

Improve the Human Condition through Plant Science

www.danforthcenter.org



DONALD DANFORTH
PLANT SCIENCE CENTER

975 North Warson Road / St. Louis, Missouri 63132
314.587.1000



Printed with solvent-free inks & emission-free coatings on recycled stock that utilized 30% post-consumer recovered fiber paper.

©2014 Donald Danforth Plant Science Center