

THE MCKNIGHT FOUNDATION

Collaborative Crop Research Program

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CCRP Quarterly Newsletter

To: The McKnight Foundation grantees
From: Office of the CCRP Program Director
Reporting period: October-December 2004

CCRP News

- In early November, the third biennial grantee conference was held in Vaals, The Netherlands. The ~120 participants, representing 22 countries, included grantees, Oversight Committee members, invited speakers, and Foundation and program staff. The conference featured plenary talks, parallel research updates, small group sessions, a panel discussion and a poster display that featured over 100 posters submitted by conference participants. Most of the talks, group outputs and posters will be available on a CD that will be sent out to all invited participants this quarter.
- On November 5, the Oversight Committee met to select proposals aimed at improving food security in the Andes. Of the 23 invited full proposals, seven projects were selected for site visits and possible funding. Four site visits were conducted in mid-December, three were conducted in mid-January.
- Thirty-six pre-proposals for the RFP focusing on millet- and sorghum-based systems in West Africa were received by the December 1 deadline and sent out for translation.
- A consultation workshop will be held in September on edible legumes in east and central Africa, as part of the development of a call for proposals on this topic.
- Renewal proposals will be solicited for projects initially funded in 2001/2002. South-south collaboration and impact on food security will be emphasized for renewals. Guidelines for renewal proposals will soon be released.
- The new design of the CCRP Web was announced on December 23. See the CCRP Web section for new design features and information regarding the new CCRP Policies page.
- See the last section of this update for news from each of the CCRP projects.

Upcoming Events *[This list does not include all steps in the grant selection process]***2005***January*

- 11-17 Site visit to Andes projects by Drs. Blumenschein and Kalazich.
- 31 Annual report, budget and workplan for next year, and financial reports due for:
 _ Andean tubers (Peru)
 _ Rice biodiversity (Thailand)
 _ Soybean roots (China)
 _ Wheat scab (China)

February

- 20-25 Workshop on phosphorus in Sete Lagoas, Brazil
 The Cereal roots (Brazil/Kenya) project will hold a project workshop in Sete Lagoas, Brazil.
- 28 Annual report, budget and workplan for next year, and financial reports due for:
 _ Legumes (South Africa)

April

- 1-3 Oversight Committee meeting, Bellagio, Italy
 The Oversight Committee will meet as part of the grant selection process for the west Africa RFP. Pre-proposals will be reviewed and a subset selected for solicitation of full proposals.
- 30 Annual report, budget and workplan for next year, and financial reports due for:
 _ Cereal roots (Brazil/Kenya)
 _ Chickpea (India)

May

- 31 Annual report, budget and workplan for next year, and financial reports due for:
 _ Sweetpotato diversity (Kenya)

June

- 30 Annual report, budget and workplan for year 4, and financial reports due for:
 _ Finger millet (India)

August

- 31 Annual report, budget and workplan for year 4, and financial reports due for:
 _ Tef (Ethiopia)

September

Oversight Committee meeting (venue to be announced)
 The Oversight Committee will meet as part of the grant selection process for the west Africa RFP. Full proposals will be reviewed and the final set chosen to be recommended to the McKnight board for funding.

Consultation Workshop on Legume Utilization in East and Central Africa (dates and venue to be announced)

CCRP 2004 Grantee Conference From Partnerships to Community: The Arc of Change in the CCRP



Conference participants outside of the Dolce Kasteel Vaalsbroek, a restored castle with conference facilities.

The CCRP's third biennial grantee conference was held November 6-10 in Vaals, The Netherlands. The meeting focused on making the connection between research and impacts on food security.

In addition to formal presentations and research updates from the CCRP grantees, three related workshop sessions allowed the grantees to map out their project strategies, elaborate their plans for monitoring and evaluation, and consider issues relating to the concept of "community of practice."

The conference's 120 participants also enjoyed a wine and beer tasting and a trip to Aachen for a short tour and visits to local restaurants.

In formal presentations, guest speakers provided insights on the connection between research and development. The keynote address, given by Prof. Jules Pretty (The University of Essex, U.K.), was one of the highlights of the conference. Plenary session talks included guest speakers Dindo Campilan (UPWARD Network, International Potato Center-SE Asia), Saa Dittoh (Univ. for Development Studies, Ghana), Andy Hall (UN University, INTECH, Netherlands), Victoria Henson-Apollonio (IPGRI, Italy), Neeran Rajbandhari (CIMMYT-Nepal), and Steve Sherwood (World Neighbors-Andes), Rachel Bezner Kerr (Cornell University) and Kristin Batson (The McKnight Foundation).



The poster room featured over 100 posters and was also deemed a great success. We will make more time for posters at the next conference!



A CD featuring the following will be sent out to all invited participants this quarter:

- Most of the talks;
- Group outputs;
- Posters presented; and
- Photographs of the conference and environs.

CCRP Policies page changes

One of the Vaals conference sessions focused on administrative issues. Some of the issues discussed involve policy changes. The new policies can be found on the policies page of the CCRP Web (<http://mcknight.ccrp.cornell.edu/about/policies.html>). Because of the importance of these issues, we provide the revised policies here.

- Annual reports must be received within **one month** of the award “year-end” or the award may be subject to cancellation and return of all unreported funds.
- Reports should include the following papers:
 1. An official financial report from each grantee institution that is signed by the institutional representative. Please show actual expenditures, in U.S. dollars, by categories established in last year’s budget. The project report should also include a composite list of expenditures by all partners in the project.
 2. A progress report that describes the research and development work undertaken during the past year, including progress toward achieving the goals outlined in your workplan. It should include the following components:
 - a. Cover page with the title of the project, names of principal investigators (P.I.) contributing to the report, executive summary of no more than 300 words;
 - b. Narrative, limited to 30 pages (please send figures and appendices as a separate document);
 - c. Listing of all publications and abstracts;
 - d. An email or letter from each P.I., indicating their contribution and agreement to the report. The report should be suitable for publication on your project’s page of the CCRP-Web. We ask that you note any confidential information, which you feel should not go on the Web.
 3. A workplan and budget for the next year. The workplan is considered a platform for ongoing discussion, planning, and negotiation, and should indicate any proposed changes of strategy and/or objectives. The budget should provide a detailed summary of expenses for each partner during the next year.
- When preparing your reports, you must use document templates provided by the Foundation for the financial reports, budget, and workplan. They can be downloaded [here](#).

CCRP Web

<http://mcknight.ccrp.cornell.edu>

Collaborative Crop Research Program THE MCKNIGHT FOUNDATION

Home Projects Crops Topics

-select a project- -select a crop- -select a topic-

helping the world feed itself

The McKnight Foundation Collaborative Crop Research Program seeks to increase food security in developing countries. The program supports agricultural research aimed at improving food production and the nutritional content of crops important to the developing world.

News and events

- What's New? -

- Events -

Program information

-About the CCRP-

-Resources-

User portals

Potential Grantees

Grantees

Oversight Committee

Welcome to the newly redesigned CCRP Web. For information about changes, see the updated [site map/guide](#).

This site is a resource for program grantees, potential grantees, other scientists and the general public. By creating opportunities, the program seeks to encourage young scientists to focus on crops important in their home countries. In turn, these scientists can train others, building scientific expertise and infrastructure to address their region's food priorities.

To learn more about The McKnight Foundation, visit their website at <http://www.mcknight.org>.

[Fact sheet](#)

[Frequently asked questions about the CCRP](#)

Highlights

Intellectual Property	Information for Applicants	Literature Database
The purpose of the CCRP is to conduct research that	Proposals for funding are	The CCRP strives to disseminate scientific

The new design of the CCRP Web has been implemented, tested, and finally announced to the public on December 23, 2004, four days after the two year anniversary of the site's first appearance on the internet.

The new site design features include:

- Public access to all pages
- Drop-down menus for more fluid navigation
- An updated site map and user's guide
- Rolling images on every page (must be using IE 6.0 or above, will not work in Mozilla)
- Updated Policies page

This new design has been tested on a variety of browsers (Internet Explorer, Mozilla, Firefox, Camino, Safari) and platforms (Windows, Mac) and seems to function well on all. Many thanks to everyone who submitted updates and suggestions! As always, user feedback is critical to making any website truly useful. Please contact [Kelly Lindsay](#) for any questions, comments and/or concerns you may have. Your input is valuable to us!

Thanks to those project leaders who provided updates for their respective Project Pages. Thanks to Kelly for greatly improving the Web site!

Updates from the CCRP Projects

The updates below are published as received. Minimal edits have been made.

Andean tubers (Peru)

1. Three workshops were held in the rural communities (2 in Matinga, and 1 in Sayllafaya) to strengthen sustainability of our results. The first one was a farmer to farmer workshop, and took place in the village of Matinga on 1-2 October 2004 where 43 farmers of Matinga itself, and those of Pícol, Queccayoq, Chumpe and Sayllafaya attended the event on integrated management of Andean tuber crops.

The second farmer to farmer workshop was also held in the village of Matinga on 11 October 2004. Leading farmers of Matinga interacted with 33 authorities and leaders of neighboring communities such as Llaq'uepata, Rayanniyoc, Ccaccacollo, and Ch'ita Papam. The topics treated were the strategies developed by the Andean tuber project for efficient management of tuber crops such as cultivar identification, sprouts handling, utilization of repellent plants and the entomopathogenic *Beauveria bassiana* for weevil management.

A third workshop was held in the village of Sayllafaya on 15 October 2004. As in the former case, 101 leading farmers of Sayllafaya and neighboring communities of Chumpe, Huarqui, Huanco Mullmuncos, Huata, Sayhua, Janac Chuquibamba, Jachuy Qosqo, Chuquibamba, Huancco, and Inquilpata participated in the meeting. The topic treated were also the same as in the former workshop.

2. The Andean tuber project supported the initiative of 46 farmers (18 of Matinga, 18 of Queccayoq, and 12 of Pícol) to launch the Association of Organic Growers of Andean Tubers. The main objective is to have comparative advantages once farmers market their andean tubers in the touristic city of Cusco. Our technicians have been supervising farmer's initiative taking into consideration the strategies that have been developed for integrated crop management.

3. Eighteen project participants, technicians, lecturers of Cusco University, and students participated in the XLVI Peruvian Convention of Entomology held in Arequipa, Peru from 7 to 11 November 2004. Three project participants, and three students presented their findings. The others presented posters. The main papers presented were: "Potential of the native entomopathogenic *Heterorhabditis* sp. for Andean weevil control", "collection, multiplication and preliminary pathogenic tests of entomopathogenic nematodes on different pests of Cusco", "natural enemies of Andean weevils, utilization of the fungus *Beauveria bassiana* in oca stores for control of *Microtypes* sp."

Cereal roots (Brazil/Kenya)

- Last year's report ended with the high resolution mapping of the *Alt_{SB}* gene using the flanking markers, ctg29, and m181, that co-segregated with *Alt_{SB}* in 354 RILs BR007 x SC283 (please refer to section 4.19.1, figures 4.14 and 4.15 of Year Two Annual Report).
- Progeny testing of selected recombinants allowed us to resolve the position of *Alt_{SB}* with regards to m181 and to define a single sorghum BAC that harbors *Alt_{SB}* by anchoring one of the BAC ends to the *Alt_{SB}* high-resolution map.

- Further efforts enabled us to identify additional polymorphisms in the region, which made it possible to narrow down the *Alt_{SB}* region to only 76 Kbp (less than half of the BAC size).
- One ORF corresponding to a gene family likely to be related to citrate efflux, our best-supported hypothesis for the Al tolerance mechanism encoded by *Alt_{SB}* has been identified.
- This gene was dramatically overexpressed in root tips of the tolerant *Alt_{SB}* near-isogenic line ATF10 with respect to the sensitive counterpart ATF8B.
- Furthermore, the *Alt_{SB}* gene candidate is clearly Al inducible and appears to be inducible over time of exposure to Al as well.
- Considering our physiological investigations, these results are highly correlated with those expected from *Alt_{SB}*.
- We are now moving to sorghum/maize transformation to verify this candidate gene as *Alt_{SB}*.

Maize and Sorghum Transformation

- The general purpose of this line of research is to develop, through genetic transformation, plant interventions that are activated in the root in environments of Al and/or P stress and that will improve P acquisition efficiency and tolerance to Al toxicity. The specific objectives are develop transformation protocols that produce and analyze maize and sorghum transgenic plants containing the citrate synthase and/or organic acid transporter gene expression directed using different promoters: i) constitutive promoters, CaMV35S and / or Ubiquitin, and ii) a root specific promoter, inducible by P stress, isolated from *Arabidopsis thaliana* - AtPT2.
- 22 maize transgenic plants from ten different events using the maize elite line (L3), harboring the construct 35S.CS.NOS (CaMV35S promoter directing the expression of citrate synthase) have been generated.
- 47 maize transgenic plants from 23 different events using the construct Ubiquitin.CS.NOS (Ubiquitin promoter directing the expression of citrate synthase) have been generated.
- The transgenic maize plants are in the greenhouse at different stages of development, molecular analysis are been performed to confirm the transformation, seeds have been produced and physiological studies to verify any improvement in P acquisition efficiency and tolerance to Al toxicity are being initiated.
- A sorghum tissue culture regeneration protocol has been optimized using immature sorghum embryos and inflorescences from 11 different sorghum varieties.
- This regeneration protocol was used to optimize the parameters to genetically transform sorghum successfully.

- The anthocianin reporter gene with the gene construct Ubiquitin.CS.NOS (Ubiquitin promoter directing the expression of citrate synthase) was used to optimize ballistic parameters such as helium pressure, microcarrier flying distance, number of shots and osmotic pressure.
- Three transgenic sorghum plants (PCR analysis) have been recovered, two events were generated using embryos produced from immature inflorescence using the following parameters; bombardment with a helium pressure of 1000psi, a microcarrier flying distance of 3 cm, 1 shot per plate and 4 hours in an osmotic medium; and one event was generated when the explants were bombarded with a helium pressure of 1400psi, a microcarrier flying distance of 6 cm, 1 shot per plate and 4 hours in an osmotic medium.
- Southern blot experiments to confirm transformation are programmed for the next quarter. These plants are in the greenhouse in the final stage of seed maturation.
- These experiments have been repeated to confirm and validate the sorghum transformation protocol developed. This successful sorghum transformation protocol will contribute significantly to meeting our project objectives to develop new plant interventions to improve P acquisition efficiency.

Bio-prospection and Molecular Diversity of Microbial Communities associated with Bio-solubilization of Phosphorus (P)

- Bio-prospection, characterization and selection of useful microorganisms can contribute to the development and innovation of new technologies for more sustainable agriculture.
- 200 microorganisms (fungi, bacteria and actinomycetes) collected from rhizosphere soil of P efficient maize cultivars and/or from the Embrapa Maize and Sorghum microorganism collection demonstrated a high degree of genetic diversity and several were characterized that had a high potential to solubilize (85%) insoluble forms of P.
- Selected isolates have been characterized (taxonomically) and named using molecular methodologies.
- Selected isolates are being used in greenhouse experiments with low P soils fertilized with insoluble forms of P (Ca-phosphate, Al- phosphate and Fe-phosphate).
- The preliminary results are very promising and could have a significant impact on the use of locally available rock phosphates with normally low P solubility

Rice biodiversity (Thailand)

1. We (Chanya Maneechote et al) launched a campaign to establish the problem of invasive weedy rice on the national agenda, with the following activities.
 - A national workshop involving about 120 rice research and extension personnel from the national rice research and extension system hosted by Plant Protection Research and Development Division of the Department of Agriculture, on October 20, 2004.
 - A paper '*Khao Hang, Khao Daeng, Khao Daeng* (awned rice, red rice, jumping rice), threat to rice farming' (in Thai) by Chanya Maneechote, was published as the 'Farmers' Think-mate

Feature' in September-October 2004 (77: 6-15) issue of Kasikorn Newspaper, a bimonthly periodical for farmers from the Department of Agriculture, Ministry of Agriculture and Agricultural Cooperatives.

- A short communication 'weedy rice' (in Thai) were published by Chanya Maneechote, as DOA Newsletter in October (7: 5-7) issue of Phli Bai, a monthly periodical for researchers from the Department of Agriculture, Ministry of Agriculture and Agricultural Cooperatives.
 - A series of interviews on national television and radio programmes on the problem and control methods featuring Chanya Maneechote, some of our collaborating farmers through November and December.
 - Special report on 'Weedy rice: serious weed in the rice fields' were published in Thai newspapers during October 2004-January 2005.
 - Farmers' meeting in Chachoengsao province where weedy rice becomes a noxious weed.
2. We (on-farm and genetics teams) have established contact and conducted consultation with extension workers regarding possibilities to introducing local varieties into the local seed system being established at the Community Rice Centres. Pilots involving gall midge resistant *Moey Nong* and deep water rice for different flood regimes with good grain quality were discussed.
 3. Kulvadee Kansuntisukmongkol completed her PhD studies at the University of California at Davis in December 2004 with a thesis entitled "Changes in rice landraces in response to declining productivity in shifting cultivation".
 4. PI (Benjavan Rerkasem) has been elected a fellow of the American Association for the Advancement of Science (AAAS) for her contribution to research in rice biodiversity and training of young Thai scientists.

Soybean roots (China)

- Seven members of the China-soybean project, including Drs. Xiaolong Yan, Yaoguang Liu, Mantong Mei and Hai Nian from SCAU and Drs. Jonathan Lynch, Rob Weaver and Miss Amelia Henry from PSU, attended the 2004 Biennial CCRP Grantee Conference. In addition to the scheduled program by CCRP, the project team had several discussions concerning the strategy for the next phase of the project that will be focus on having an impact in Africa.
- In November and December of 2004 Dr. Jonathan Lynch (PSU) traveled to Mozambique and Colombia to discuss the second phase of the China-soybean CCRP project with team members and collaborators.
- An annual project report meeting was held at the Root Biology Center of SCAU on December 31, 2004, during which the PIs of each research module reported research progress in the past year and proposed plan for the next year.

Publications:

1. Wang L., Liao H., Yan X. et al., 2004. Genetic variability in root hairs as regulated to phosphorus status in soybean. *Plant and Soil*. 261 (1-2): 77-84.
2. Dong D., Peng X., Yan X. 2004. Organic acid exudation induced by phosphorus deficiency and/or aluminum toxicity in two contrasting soybean genotypes. *Physiologia Plantarum* 122:190-199

Sweetpotato breeding (Uganda)

- The following three post graduate students based at the Namulonge Agricultural and Animal Production Research Institute (NAARI) registered with Makerere University, Kampala, Uganda, between November and December 2004:
 - (1) Mr. Moses Ekobu (MSc. Thesis topic: Development of bioassay technologies for the sweetpotato weevils (*Cylas puncticolis* and *Cylas brunneus*); Supervisors- Prof. Samuel Kyamanywa and Dr. Benson Odongo
 - (2) Mr. Benard Yada (MSc. Thesis topic: Characterization and evaluation of sweetpotato germplasm in Uganda using morphological and molecular markers; supervisors- Dr. Phinehas Tukamuhabwa and Dr. Robert Mwanga
 - (3) Ms. Harriet Muyinza (PhD thesis topic: Studies on variation in host resistance in sweetpotato varieties to *Cylas* spp; Supervisors- Dr. John Murumu, Dr. Benson Odongo, Dr. Philip Stevenson. All the students are supported by McKnight funds. Sweetpotato research activities on the major objectives have increased due to the graduate students thesis work.
- Mr. Amin El Zubeir, a PhD student registered at the University of Khartoum, Sudan, joined NAARI in the first week of March 2004, spent 8.5 months under the supervision of Dr. Benson Odongo. He worked on screening techniques for weevil resistance, use of pheromones in monitoring weevil populations, and integrated management (IPM) focusing on millet-bean-sweetpotato intercrop to control weevils. He went back to Khartoum in the third week of November 2004 to analyze his data, write up and defend his dissertation. The Third World Academy of Science (TWAS), PRAPACE Network, the International Potato Center (CIP), and the National Agricultural Research Organization (NARO) supported his study visit to Uganda. The technician that was assisting Amin with weevil rearing is supported by McKnight funding. The PRAPACE coordinator, Dr. Berga Lemaga, organized the whole arrangement.
- Two of our research team members, Mr. Emma Byamukama and Mr. Charles Niringiye, attended the 9th Triennial Symposium of the International Society for Tropical Root Crop- Africa Branch (ISTRC-AB) held in Mombasa, October 31 – November 5, 2004. They both presented papers on technology adoption. Emma is on a Department for International Development (DFID, UK) project working on sweetpotato phytosanitation and participatory breeding, while Charles is on the core team of the work funded by the McKnight Foundation. Their trip was supported by DFID and NARO, respectively.

Sweetpotato diversity (Kenya)

- The sweetpotato diversity group will meet in Kenya from February 14-18.

Tef (Ethiopia)

- In Ethiopia, we have successfully completed the survey (PRA) work at three districts on farmers' selection criteria and requirements of tef varieties. The results from Ada district were analysed and a poster was presented during the McKnight's CCRP grantee conference, The Netherlands, Nov. 06 – Nov. 10, 2004. The most important result is that white seed-color is the overriding selection criteria for market purposes proving that tef is a cash crop.

- The annual tef research review meeting was held at Debre Zeit from 22 -25 December 2004. The results from the CCRP-tef activities, particularly the participatory variety selection and breeding, were accepted with high enthusiasm. Based on the recommendations given during the mid-term evaluation in April 2004, our socio-economics team members have presented a new proposal to study the tef-market chain, which was approved.
- From our tef genomics study at Cornell University, we have done the following: a) The relationships for a collection of tef germplasm have been analyzed using tef EST-derived markers. So far, we identified 6 markers that discriminated i) *E. pilosa* and *E. tef* and ii) a group of tef cultivars developed in the US and 320 tef core germplasm accessions from Ethiopia based on the genetic distance matrix. We will be adding more information to characterize the molecular diversity of this tef germplasm collection. b) The comparative analysis of tef and rice was developed utilizing linkage map alignment and sequence similarity analyses. Several interesting features of structural relationships between tef and rice were observed: tef linkage groups 1, 2, 4 and 7 primarily match rice chromosomes 1, 8, 4 and 1, respectively. To enhance the comparative map between tef and rice, a total of 53 tef derived cDNA probes, which were developed for RFLP map, were sequenced. The sequences of those were analyzed for sequence similarity against rice genomic sequences. c) Cooperation has been developed between tef and the finger millet from University of Georgia who provided us with finger millet EST-derived marker primers and we tested them on tef. Of total 96 finger millet primers, 67 primers produced PCR amplicons with tef DNA. Polymorphism of finger millet primers on Tef will be tested soon. We also provided tef EST-derived markers to the finger millet group. We will keep exchanging our information for further research.