


THE MCKNIGHT FOUNDATION

Collaborative Crop Research Program

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CCRP Quarterly Newsletter

To: CCRP grantees

From: Office of the Program Director

Reporting period: July-September 2003

News

- On July 31, Ramiro Ortega of the Andean tubers (Peru) project sent us a report on their project's Second Annual Meeting, which was held in Cusco, Peru on 26 to 30 May, 2003.
- Bob Goodman and Rip Rapson participated in an initiative to promote sharing of public-sector intellectual property (IP) related to agriculture. In a recent break-through, a group of universities and foundations announced their intention to package and share their IP for the benefit of "orphan crops" and developing countries. Information on this development was shared with grantees through the CCRP Literature Service.
- In their latest progress report, the tef (Ethiopia) project initiated participatory breeding activities.
- In July/August, Rebecca Nelson and Rachel Bezner Kerr traveled to Kenya and Uganda to explore existing initiatives related to edible legumes in E. and C. Africa. This is in relation to a proposed call for proposals on this topic.
- In late August, Almiro Blumenschein and Rebecca Nelson visited the maize/sorghum (Brazil/Kenya) project in Sete Lagoas, Brazil.
- Kelly Lindsay is developing a tool for improving navigation of the CCRP Web, which will soon be implemented. See the CCRP Web section below for details.
- The Bill and Melinda Gates Foundation made a grant of \$25 million for biofortification (enhancing nutritional value of food crops), which includes a component for sweetpotato research. A workshop entitled "Sweetpotato biofortification challenge program planning meeting" was held 15-17 September in Mukono, Uganda. Simon Gichuki, Regina Kapinga and Robert Mwanga were among the participants. A copy of the report, provided by Simon Gichuki, is available upon request.

Project Reports, Updates, and Issues

- Annual reports have been received from the potato (Chile/Brazil), tef (Ethiopia) and sweetpotato (Uganda) projects.
- Three consultation processes are being developed to inform our next funding cycles. Here is a brief summary of what was in progress during this reporting period:
 - Final preparations were underway through the end of September for a consultation workshop entitled “*Improving Food Security in the Andes: Lessons Learned and Ways Forward*” held at PROINPA’s headquarters in Cochabamba, Bolivia, in October.
 - Announcements in English and Spanish can be found on the [Andes workshop page](#).
 - Participants are from the research, development and farmer sectors of Ecuador, Peru and Bolivia.
 - Alvaro Paz and Jeff Bentley conducted an “inventory” study as a backgrounder for the workshop. They investigated what is currently being done in crop research related to food security in the Andes. The results of this study were presented during the workshop, and (hopefully) published as a research paper. This study is available from R. Nelson upon request.
 - OC members, the EC, PROINPA staff, and several others have contributed to developing the workshop. The organizing committee includes: Antonio Gandarillas (general manager of PROINPA), Steve Sherwood (World Neighbors-Ecuador), Julio Kalazich, Kathy Rysted and Rebecca Nelson.
 - At PROINPA, Alvaro Paz, Ana Maria Cortez and Antonio Gandarillas have provided support as hosts of the event.
 - At Cornell, graduate students Rachel Bezner Kerr and Cristina Santa Cruz have worked closely with Rebecca Nelson in planning the details of the workshop. Rachel is a Ph.D. candidate in Development Sociology, and Cristina is finishing her M.Sc. in Education.
 - Hans Caycedo and Steve Vanek served as facilitators for the Andes workshop. They made considerable efforts to design a workshop process and schedule that would lead to the desired outcomes.
 - A consultation workshop, entitled “*Millet and Sorghum-Based Systems in West Africa: Current Knowledge and Enhancing Linkages to Improve Food Security*” will be held at the ICRISAT station in Niamey, Niger, in January of next year.
 - Announcements in English and French can be found on the [West Africa workshop page](#).
 - A workshop planning committee is actively laying the groundwork for the workshop. The committee consists of Bruno Gerard (ICRISAT-Niamey, our host), Rachel Bezner Kerr, Kathy Rysted, Rebecca Nelson, and Mohamed Ag Ayoya (a Malian M.D. now pursuing a Ph.D. in nutrition at Cornell).

- The workshop will focus on three themes: 1) enhancing productivity on P-deficient soils; 2) Striga management and 3) participatory deployment of cereal and legume genotypes.

Workshops, Conferences, Meetings, and Site Visits

2003

July/August

28-8/9 Meetings with legume-related groups in East Africa, Nairobi, Kenya

30 Meeting with Simon Gichuki and the sweetpotato (Kenya) group, Nairobi, Kenya
Rebecca Nelson visited the [sweetpotato \(Kenya\)](#) project.

August

3 Meeting with Robert Mwangi, Entebbe, Uganda

6 Meeting with Simon Gichuki and the sweetpotato (Kenya) group, Nairobi, Kenya
Rebecca Nelson and Charity Kabutha visited the [sweetpotato \(Kenya\)](#) project.

26-27 Maize/sorghum (Brazil/Kenya) site visit, Sete Lagoas, Brazil

Upcoming Events

2003

October

30 Meeting with Drs. Yan, Lynch, and Kochian, Cornell University
Xialong Yan and Jonathan Lynch of the soybean (China) project will visit Rebecca Nelson and Leon Kochian at Cornell University in lieu of a site visit cancelled due to concerns about SARS.

November

11-12 Finger millet (India) site visit, Bangalore, India
Roz Naylor and consultant Brigitte Courtois (plant breeder) will visit the [finger millet \(India\)](#) project.

13-14 Chickpea (India) site visit, Pune, India
Roz Naylor and consultant Brigitte Courtois will visit the [chickpea \(India\)](#) project.

2004

January

27-30 Workshop: Millet and Sorghum-Based Systems in West Africa: Current Knowledge and Enhancing Linkages to Improve Food Security, Niamey, Niger. The workshop will serve as a broad-based consultation with scientists, government, NGOs and community groups, to serve as the basis for the design of a focused call for proposals. The workshop will focus on three themes: 1) enhancing productivity on P-deficient soils; 2) Striga management and 3) participatory deployment of cereal and legume genotypes. For more information about this workshop, click [here](#).

*April*Tef (Ethiopia) site visit, Debre Zeit, Ethiopia

Charity Kabutha and another person will visit the [tef \(Ethiopia\)](#) project.

*May*Soybean and Wheat (China) site visits, Guangzhou and Nanjing, China

Daowen Wang and Mac Binger will visit the [soybean](#) and [wheat](#) (China) projects (tentative).

*July*Legumes (South Africa) site visit, Cape Town, South Africa

Two OC members will visit the [legumes \(South Africa\)](#) project.

*November*6-10 2004 Grantee conference, The Netherlands

The biennial grantee conference will be held at the Dolce Kasteel Vaalsbroek in Maastricht, The Netherlands on November 6-10. This conference center is located on the borders of Germany, Brussels, and The Netherlands and has room for 130 guests.

CCRP Web

Kelly Lindsay has continued to update the CCRP Web on a regular basis, and is now in the process of incorporating a new menu layout. The CCRP Web has 1255 files, 437 of which are individual web pages. With all of that information available, navigating the site can sometimes be confusing! The menu design developed by B-Swing worked very well initially. As more web pages were added, however, the menu structure became more difficult to manage. A new menu layout is currently being developed in the hope that it will facilitate navigating the site. If this new design accomplishes such, it may be implemented publicly by the end of the year.

Kelly's next round of site developments include:

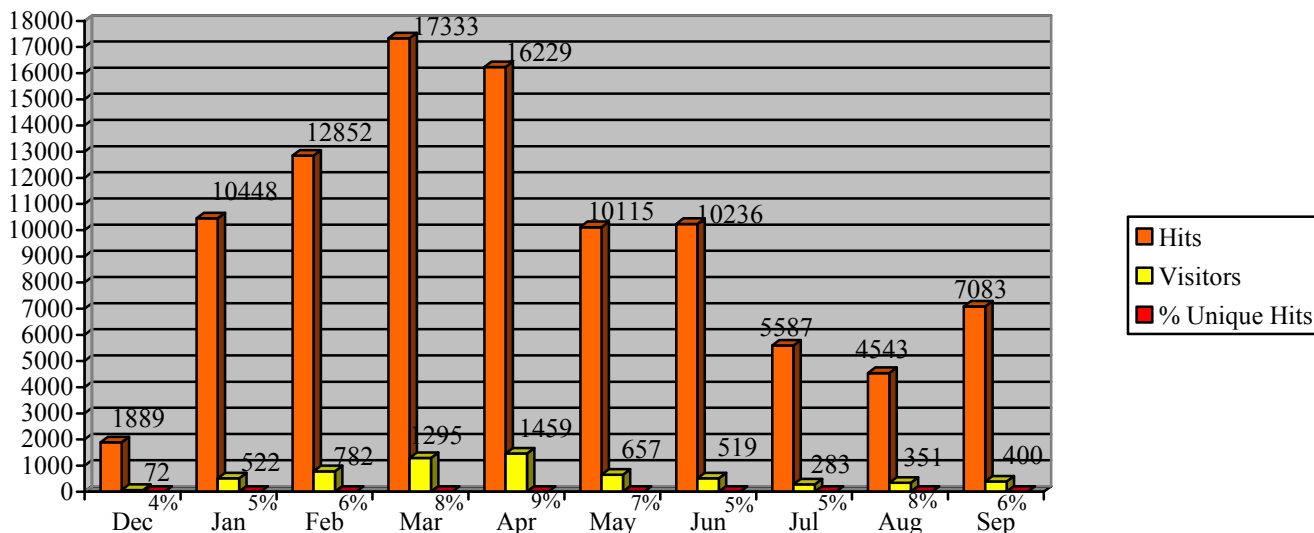
- *Literature lists.* Kelly will update the literature database with another round of new and relevant references obtained through BIOSIS literature searches. These "elite" lists will be generated and made available in both text document and HTML, linked from the appropriate topic and project pages.
- *Keyword hierarchy.* Continued efforts are in place to assemble and refine the existing keyword hierarchy. The hierarchy will allow users to search the CCRP Web for information and literature appropriate to their topic of interest.

An important component to any website is feedback. Please contact [Kelly Lindsay](#) for any questions, comments and/or concerns you may have. Your input is valuable to us!

CCRP Web Statistics Summary

Webalizer is a free log file analysis program that can instantly generate a web site usage report in HTML format that is readily viewable from a standard browser window. Over the past few months, we have been using Webalizer to interpret the CCRP Web's log files to determine how many hits, visitors, and countries have visited the web site.

Hits and Visitors to the CCRP Website



Hits: Total number of times the site was visited. This is every single request made to the server.

Visitors: Total number of unique IP address requests made to the server.

% Unique hits: What percentage of hits were from unique users.

To view full web statistics reports by month, click [here](#).

CCRP Literature Service

On August 1, an important change was made to the CCRP Literature Service. Due to budget adjustments, we have lowered the allocated amount of literature service funds per project from \$625 to \$500 a year. An extra category was added for miscellaneous orders/requests. Accounts have been reset, and summaries are available to each project upon request from [Kelly Lindsay](#).

The past three months have shown a slower trend in literature service usage. The literature database is still in its developing stages, awaiting the refinement of the keyword hierarchy to enhance its functionality. We recently requested from the PI's names of interested students, researchers and others associated with the projects that might benefit from the literature service, and have received a few responses. We hope to augment their research with literature relevant to their areas of study. We encourage program affiliates to experiment with it so that we can determine its strengths and weaknesses; as well as letting us know if we need to refine or add keywords for better results.

We would like to give thanks to all of the projects that used our literature service last quarter..

CCRP Literature Service Patronage

- Requests since last report: 13
- Requested articles since last report: 33
- Requests to date: 166
- Articles sent to date: 267
- References in database: 6496

Number of requests by project*:

- Chickpea (India): 1 (11)
- Finger millet (India): 2 (17)
- Legumes (South Africa): 2 (11)
- Potato (Chile/Brazil): 3 (6)
- Quinoa (Bolivia): 2 (24)
- Sweetpotato (Kenya): 1 (8)
- Tef (Ethiopia): 1 (14)
- Wheat (China): 1 (6)

*Number in parenthesis indicates YTD (year-to-date) amount

Period of activity by month (articles/invoices):

July: 0/0
 August: 1/1
 September: 12/33

Updates from the CCRP Projects

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

Andean tubers (Peru):

- Homologation of 604 morphotypes of Andean tubers identified previously in 2526 samples, resulted in the identification of 72 morphotypes of oca, 68 of mashua, and 29 of ulluco grown in the villages of Picol, Matinga, Queccayoq, P'oques, Chumpe, and Sayllafaya. Some are commonly grown in the six villages, others on the other hand are rarely done in only one village. This would suggest that, whereas the first group could be maintained on-farm, the second group could be maintained ex situ.
- Farmer's schools were established in the villages of Picol, Matinga, and Queccayoq to promote both growers' decision making, and innovation for a sustainable agriculture. Additionally, farmers have been taking into account combination of their local knowledge with modern one.
- The unknown binomial name of oca weevil which had been under obscurity for more than 30 years, was finally identified as *Ariodistus tuberculatus* Voss. This finding would optimize our work on integrated management of the pest.

Chickpea (India):

- Host pathogen interaction (Chickpea-F.oxysporum system): Forty differentially expressed transcripts were identified in the resistant chickpea cultivar inoculated with F. oxysporum. Their sequencing & homology with database to ascertain its functional role is in progress.
- Exploitation of novel proteinase inhibitors in conferring resistance to insect (*Helicoverpa armigera*) attack: A Ph.D. scholar from NCL, Ajay Srinivasan who is presently working at University of Durham, UK purified an isoform of HGPI from chickpea & showed its MALDI profile similar to alpha Fucosidase from *C.arietinum* & *P. sativum* having strong homology to Kunitz type inhibitor.

Finger millet (India):

- Participatory Evaluation of 27 finger millet lines involving 40 farmers was carried out. Ten lines were preferred by farmers for yield and fodder quality. Two lines included in All India National Screening Nursery.
- Apart from yield, farmer's in general preferred short duration, semi-compact, medium length, disease resistant and drought tolerant varieties. Hence, farmer preference for varietal attribute is being used in identifying genotypes of farmer's choice from among the RILs developed.
- The average technical efficiency of farmers in finger millet cultivation is lower in the state. Accelerated achievement of technical efficiency depends highly on sustained investment on finger millet research and extension.
- Collected about 600 blast infected finger millet leaf and neck samples in South Karnataka and purified, isolated 60 single spore isolates for use in major gene and QTL for finger millet blast resistance.
- SSR markers development is in progress and two EST-SSRs have been mapped.
- cDNA AFLP work is in progress to detect polymorphism between parents of the mapping population.
- 30 elite lines and 300 RIL's were evaluated/ being evaluated for field resistance to blast disease and root morphological traits. 300 RIL's were evaluated by inoculating with single spore isolates for identification of major genes and QTL.
- Parental survey of the RIL's is in progress using RAPD, Rice SSRs and Candidate genes.

Potato (Brazil/Chile):

- Research done within the frame work of the project indicates that might be a positive relationship between Polyphenol Oxidase (PPO) levels present in Trichome A on the leaves and tuber resistance to Potato Tuber Moth (PTM). It is necessary to make clear though that trichomes are not expressed on tubers but chemical constituents may. These findings have opened a new window to investigate possible factors involved on tuber resistance to PTM, which are unknown until now. Investigations to unravel these secrets are under way.
- Good results on the use of pheromones to control PTM in North Chile in the framework of the McKnight project. Research results of this project indicates that pheromones are as effective as 4 insecticide sprays to control PTM. The cost of the pheromones is \$144 per hectare compared to a range of \$182 to \$570 per hectare for insecticides in 4 farmers. These results have attracted the interest of a consortium of European pheromone manufacturers who have convened with INIA-Chile in a series of experiments on different pheromone treatments which may result in a massive programe to control the pest in Elqui Valley in the near future with all the favorable consequences for the farmers, their families and the environment. The control of PTM using pheromones may be expanded then to other areas where the pest is a big problem if the consortium succeed in the control of the pest in Chile.
- Germplasm resistant to PTM developed by the project in Chile have been sent to be tested in Nepal, Brazil, Argentina and Italy. Pending an import permit germplasm will be sent to Bolivia, Peru, Ecuador, Colombia, Venezuela and Islas Canarias in Spain. In all these countries PTM is an important pest, but also they have another devastating pest called *Tecia solanivora* with no genetic control identified so far to which this germplasm may prove resistant. Any other country which is interested in getting this germplasm (either in vitro or true seed or both) may contact the project in Chile (Julio Kalazich - jkalazic@remehue.inia.cl). The best germplasm with high

levels of resistance to PTM so far selected is Q115-6 which is shown in the picture, which besides its attractive tuber type is a good (frier).



Quinoa (Bolivia):

- Alejandro Bonifacio and Jorge Rojas visited BYU for several weeks during the summer of 2003. The BYU group had developed some useful microsatellite markers for quinoa, which display highly informative polymorphisms in Metaphor agarose gels. Jorge and Alejandro used these markers to characterize a sample of germplasm accessions from the current Bolivian core collection. They then took the primers with them to Bolivia for application to the entire collection.
- In August, Bolivian scientists from PROINPA successfully participated in the biodiversity exhibit of Andean crops held in Tiahuaçu, the place where Tiahuanacota culture flourished before Incan culture emerged.
- In September, PROINPA organized and conducted an internal workshop on procedures and requirements in certification of organic quinoa.
- In September, BYU scientists completed the first genetic map of quinoa in a mapping population developed by PROINPA scientists. The map contains 256 DNA markers in 35 linkage groups spanning 1020 centiMorgans with an average marker density of 4 centiMorgans. This map is a key starting point for genetic dissection of important agronomic characteristics in quinoa, including disease resistance, seed protein, seed saponin content, resistance to drought and frost, grain yield, and maturity. Efforts are underway to map additional markers and to identify linkages with genes known to confer resistance to mildew for marker-assisted selection.

Soybean (China):

- A project seminar was held at the Root Biology Center of the South China Agricultural University (SCAU) on August 20, 2003. Totally 20 project participants at SCAU (including both staff members and students) attended the seminar, during which updates and future workplan were presented for each of the five research modules (i.e., conventional breeding, physiology, molecular biology, agro-ecology, and agro-economics).

- Ms Ruibin Kuang, a graduate student supervised by Dr. Xiaolong Yan at SCAU, went to Dr. Jonathan Lynch's lab at the Pennsylvania State University (PSU) on July 16, 2003 for a 6-month training in physiological studies on phosphorus and nitrogen interactions in soybean. Reciprocally, Mr. Raul Jaramillo, a graduate student supervised by Dr. Jonathan Lynch of PSU, is now at SCAU for agroecological studies on soybean P nutrition in the field.
- Dr. Xiaolong Yan, the PI of the project, is visiting PSU from September to October, during which he closely interacted with his PSU partners to further strengthen the partnership. During his stay at PSU, he also summarized research progress and delineated future plans for both sides. He also had a telephone conference with Dr. Robert Shaffert, the PI of the Brazil-Soil project, to discuss issues concerning inter-project research collaborations and joint efforts in research extension to African countries. Before he returns to China, Dr. Yan will also visit Dr. Rebecca Nelsen, the CCRP program leader, at Cornell University for updates of the project.

Sweetpotato (Uganda):

- There has been a lot of debate on genetically modified (GM) crops in Uganda. Fortunately, the Minister for Agriculture and his deputy, the officials in the Uganda National Council for Science and Technology, and the President of Uganda are aware of the benefits biotechnology and GM crops can contribute to alleviation of food shortage and poverty in the country. On August 23, 2003, the President opened a biotechnology laboratory at Kawanda Agricultural Research Institute, eight kilometers north of Kampala. He spent quite some time at the point where the gene gun is to be used in genetic transformation. He apparently grasped how foreign genes are introduced into crop species. He gave very positive comments on biotechnology and GM organisms (GMOs) and caution to protect the country against depending on imported GMOs. Crops specifically high-lighted to benefit Uganda in the alleviation of hunger and poverty due to advances in biotechnology and genetic modification if properly deployed included sweetpotatoes, cassava, potato, maize, sorghum, coffee. Forest plantations and woodlots, and livestock were also highlighted. The event was widely publicized in newspapers, television and radio. The on-going debates in Uganda on GMOs, and establishment of rules on biosafety and GMO regulation are currently being worked on for tabling in Parliament.
- A three-day sweetpotato (SP) *Harvest Plus* or the Bio-fortification Challenge Program (BCP) meeting was organized by the International Potato Center (CIP) through its liaison office in Kampala in collaboration with the National SP Research Program of the National Agricultural Research Organization (NARO) based at Namulonge, Kampala, Uganda. The SP BCP Planning Workshop, held 14-17 September 2003 at Colline Hotel, Mukono, East of Kampala, was attended by over 60 participants representing various disciplines from 20 countries on five continents. The BCP is a global initiative designed and managed jointly by the Future Harvest International Agricultural Research Centres (CIAT and IFPRI). The program aims at improving the health of poor people by breeding staple food crops that are rich in micronutrients mainly Iron, Zinc and Vitamin A. The forecast that the *Harvest Plus* Program will result in substantial reductions in micro-nutrient malnutrition and lead to improved health, improvements in plant nutrition, agricultural productivity and high returns on investments (perhaps up to \$100 million over ten years). This project will contribute directly to at least three of the millennium development goals of (1) eradicating extreme hunger, (2) reducing child mortality and (3) improving maternal health by the year 2015. Sweetpotato is among the first six tier crops

(sweetpotato, rice, cassava, maize, common beans, and wheat) to be targeted for [improvement of beta-carotene (Vitamin A)] in the first phase of *Harvest Plus* due to start in 2004. The McKnight Foundation is supporting improvement of beta-carotene in sweetpotato in Uganda to improve nutrition. BCP participating countries will be: Uganda, Tanzania, Kenya, Rwanda, Ethiopia, Madagascar, Malawi, Mozambique, Zambia, South Africa and Ghana.

- The National Agricultural Research Organization (NARO) and the International Potato Center (CIP) jointly organized a practical training course on production and post harvest handling of sweetpotato for lead farmers of James Arwata Foundation (JAF). The course was held at the Namulonge Agricultural and Animal Production Research Institute (NAARI), Kampala, Uganda from 11 to 16 August 2003. There were 8 participants. JAF operates in Northern Uganda where the so-called Lords Resistance Army rebel group has caused insecurity for the last 17 years. JAF has done a lot in disseminating one of our orange-fleshed sweetpotato varieties (Kakamega) due to be released by the end of this year. Most of the funding for testing the variety (plus other varieties) across different locations in the country is supported by the McKnight budget.

Tef (Ethiopia):

- Mr. Solomon Chanyalew, a PhD student, has left for Cornell University in August to work on the molecular part of his studies.
- Researchers from the National Tef Research Coordination Center, Debre Zeit, visited two of the cooperating centers for the project work, Adet and Mekelle, during the last week of September. They discussed pertinent issues on specific activities and gave advices to solving problems encountered in executing specific experiments, particularly on participatory tef breeding approaches.

Wheat (China):

- From September 1st to Sept. 6th, Drs Dajun Liu, Peidu Chen, Zhengqiang Ma, Xiu-e Wang and Zhengzhi Zhang from CINAU attended the 10th International Wheat Genetics Symposium held at Paestum, Italy. Three oral presentations: “Development of wheat-*Haynaldia villosa* translocations using *Ph¹* genes from *Aegilops speltoides*,” “Mapping QTLs associated with FHB resistance in a Wangshuibai × Nanda2419 population,” and “Development and identification of *Triticum aestivum* L.-*Thinopyrum bessarabicum* LÖve alien chromosome lines”, were presented by Drs. Chen, Ma and Wang, respectively. Two posters: “Development of PCR-based markers for powdery mildew resistance gene *Pm4a* of wheat” and “Identification and genetic analysis of new germplasm with wheat spindle streak mosaic bymovirus (WSSMV) resistance” were also posted at the symposium.

Wolbachia (China):

- During the new rice season, caged experiments has been conducted to compare the insect population dynamics of small brown planthoppers carrying different level of *Wolbachia* symbionts, and the change of *Wolbachia* level during the season. Preliminary analysis of the data confirmed the great impact of *Wolbachia* on the success of its host insect.
- Data has also been collected to evaluate the effect of containment of the cages used in the above experiment. Planthoppers from a different geological site has been used in the experiment. These insects have specific genetic markers that can be used to distinguish them from local strains. Detailed analysis is underway and preliminary result did not find any escape of insect from the

cage to the environment, which proved that the current cage design and experimental procedures are proper concerning biosafety issues.

- A group meeting has been scheduled next month in Brisbane. During the meeting, researchers from China, Australia and United Kingdom will have chance to discuss about the progresses and problems, as well as the experiments to be conducted in next few months.