

BeanCAP

Coordinated Agricultural Project

USDA-NIFA



Education Component

Juan M. Osorno – NDSU

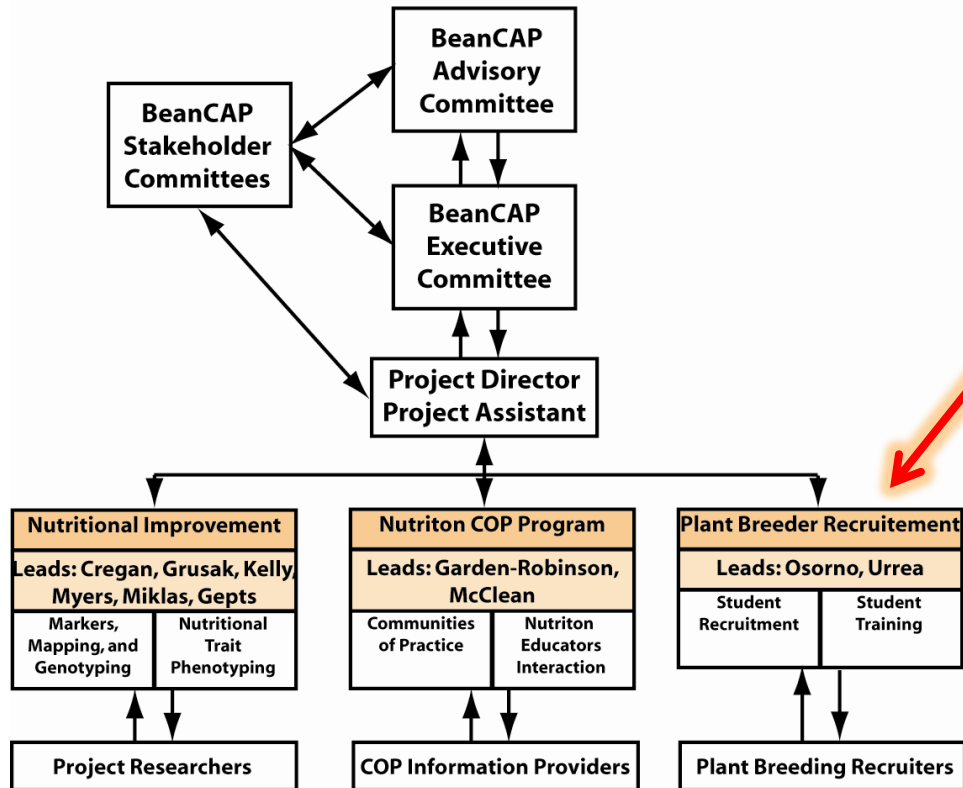
Jim Kelly - MSU

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San Diego, CA

How the BeanCAP Will Work

BeanCAP Organizational Chart



Who and Where?

- Dr. Mark Brick, Colorado State University, Fort Collins, CO.
- Dr. Jim Kelly, Michigan State University, East Lansing, MI.
- Dr. Juan M. Osorno, North Dakota State University, Fargo, ND.
- Dr. Carlos Urrea, University of Nebraska, Lincoln (Scottsbluff station).

Collaboration/Advising

- Other BeanCAP members.
- BeanCAP Advisory Committee.
- Dr. Linda W. Beaver, University of Puerto Rico, Mayaguez.
- Other plant breeders at each institution.
- Private sector.

How this idea started?

(The Facts)

- “I’m a plant breeder because I was exposed to it”.
- Informal conversations with faculties:
“undergraduate students get exposed to plant breeding during their junior/senior years, when it is maybe too late”.
- There has been a decline in students interested in plant breeding careers:
 - Lack of appropriate funding in public programs.
 - Students opt for more “appealing” areas such as molecular biology and genomics.

How this idea started? (The Facts)



- Public/Private sector have expressed a concern about not having enough plant breeders to fill their positions.
 - Private Recruiter: “We are scratching the bottom looking for breeders”.
 - Many plant breeders will be retiring in the next coming years.
- Private sector have expressed concern in regards of a lack of an “integrated scope” (field and lab techniques) in most of the new graduates.



An **Endangered** Species?

There are two sides to variety development: lab work and field work, and it seems the latter is dying out. Training in classical or field breeding is essential to gather the knowledge and skill of selecting plants for a breeding program. Molecular biology or biochemistry are important components of a field breeder's repertoire, but the ability to select plants only comes from hands-on experience. Unfortunately, young science students seem to be foregoing plant breeding training for the more sexy pursuits of molecular biology or biochemistry.

By Stephanie Fehr

The Startup

- Dr. Linda W. Beaver, University of Puerto Rico, Mayaguez, and Dr. Richard Horsley, North Dakota State University:
 - Successful project funded by USDA-CSREES through the Agricultural Hispanic Serving Institutions program.
 - UPRM students being summer interns at NDSU breeding programs.
 - Recruiting activities in high schools in Puerto Rico.
 - More than 25 undergraduate students exposed to plant breeding.

BeanCAP Mission Statements

The **BeanCAP** will **broaden the plant breeding applicant pool** by initiating a **training program** focusing on **early career recruitment** and practical **breeding/genomics training**.

Education Objective

Objective 5. Initiate a modern plant breeding training program that focuses on early career recruitment and provides practical training that illustrates how the integration of genomic and phenotypic data can be used to improve nutritional traits in plants.



Activity 1: Internships



- High School summer internships:
 - 12 weeks (40 hours/week)
 - 1 student per location/year (4 total)
 - Activities involving field and lab work
- Undergraduate internships:
 - 2 year-round interns per location/year (8 total)
 - Spring/fall
 - 10 hours/week
 - Activities involving greenhouse and lab
 - 1 summer internship
 - 12 weeks (40 hours/week)
 - 1 student per location/year (4 total)
 - Activities involving field and lab work



Activity 1: Internships



- Curriculum will be developed so activities at the four locations remain relatively similar
- Mentoring made by the main breeder and graduate students using a “hands-on” approach
- Internships will be designed to ensure an educational experience instead of becoming just “additional labor” for the projects.
- Direct involvement with the research and extension components of the BeanCAP.

Activity 2: High School Visits

- Visits and presentations in at least three local/regional high schools at each location per year.
- We estimate that around 1,200 students will be reached during the four years.
- Reverse visits from high schools to breeding programs at each university.
- An effort to have a balance between urban and rural schools will be made.

Activity 3: Development of Plant Breeding Materials

- Development of flyers, brochures, banners, posters, and other type of printed material to be distributed in all the recruiting activities.
- Leveraged by using some of the materials previously developed by other projects.
 - Other CAP projects (e.g. WheatCAP)
 - Plant Breeding Coordinating Committee (PBCC)
 - Global Initiative for Plant Breeding (GIPB)
 - UPRM-NDSU
 - Other university websites
- Integration with the Extension component to develop videos and animations.
- BanCAP website will have all education materials available.

Activity 4: Recruiting Efforts at National/Regional Meetings

- Education leaders will attend appropriate student and scientific meetings to promote plant breeding as a career and also to do recruiting activities.
- Presentations and recruiting booths.
- Work with existing networks/groups:
 - Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS)
 - ASA/CSSA regional/national meetings
 - PBCC annual meetings
 - Graduate student fairs
 - Other suggestions?

BeanCAP Reverse Site Visit
Summary of Answers to
Panels Education/Extension Questions

18. Involving non-rural, community college, and minority students
- Work with existing networks
 - Michigan State University
 - Professional Development Diversity Endowment
 - NDSU
 - Tribal College Liaison (Julie)
 - University of Puerto Rico relationship
 - MANRRS program
 - Minorities in Agriculture, Natural Resources, and Related Sciences program
 - University of Nebraska
 - Scottsbluff Community College

Expected Outreach



- ~300 high school students per year
- At least 4 high school students per year directly involved as interns (16 total)
- 12 undergraduate students per year directly involved as summer or year-round interns(48 total)
- Additional outreach at meetings, conferences, and other recruiting activities.

What has been done so far?

- Colorado State University (CSU):
 - We have identified two undergraduates that are interested in the internship for 2010 and one high school student.
 - After the beginning of the spring semester, we will bring together these individuals and start their internships by designing weekly activities.
 - Identification of two high schools that will provide contact visits in 2010.

What has been done so far?

- Michigan State University (MSU):
 - Recruited two undergraduate students: one in Horticulture (Junior) and one in Crop and Soil Sciences (Freshman). The students worked 10 hours/week during the fall semester and are involved in aspects of DNA extraction, running SCAR markers, greenhouse crossing and disease inoculation under guidance of technical staff in the bean breeding program.

What has been done so far?

- North Dakota State University (NDSU):
 - We have gathered some information already available in other CAP websites and other places in order to avoid duplication.
 - After speaking in several classes about the internships, seven students with different backgrounds have contacted us interested in the year-round internships that start this Spring semester.
 - We participated in a NDSU graduate school fair representing our department and the opportunities available in plant breeding and genetics.
 - One rural high school has been contacted for visits.

What has been done so far?

- University of Nebraska, Lincoln (Scottsbluff Station):
 - Multicultural Youth Leadership Conference High school Career Fair on September 18, 2009 hosted by Western Community College, Scottsbluff, NE. Career opportunities in Agronomy, Horticulture , and Plant Breeding were presented.
 - Western Community College was contacted to identify potential undergraduate students to be working during the 2010 school year on BeanCAP and other breeding activities.
 - Gering High School students visited the molecular bean lab on October 2009. Students were exposed to DNA extraction. Some students expressed their interest in working during 2010 summer.

What needs to be done (Future Plans)

- High Priority (Early Spring):
 - Printed materials
 - Curriculum development for internships
 - Schedule presentations at meetings
- Medium Priority (Mid-Spring):
 - Schedule high school visits
 - Build student database
- Low Priority (Summer):
 - High school interns
 - Undergraduate interns

Deliverables for 1st year

- **Promotional materials** such as brochures, flyers, and posters describing plant breeding will be developed for the high school audience.
- **Collating and delivery** of advanced learning materials from other CAP projects on the BeanCAP WWW site.
- **Curriculum** for summer and year-round internships will be developed.
- **Summer and year-round internships** will be offered by each participating university.
- **Intern program database established** to track students from their college experience to graduate school to a plant breeding career.
- **Contacts** established with local high schools.
- **High school visits** completed with a target of 300 students (75 students at each of 4 locations).
- **Visits to breeding programs** at each of the four locations by local high school students.
- Leaders will **attend national agricultural conferences to announce the BeanCAP education program.**

Questions/Discussion

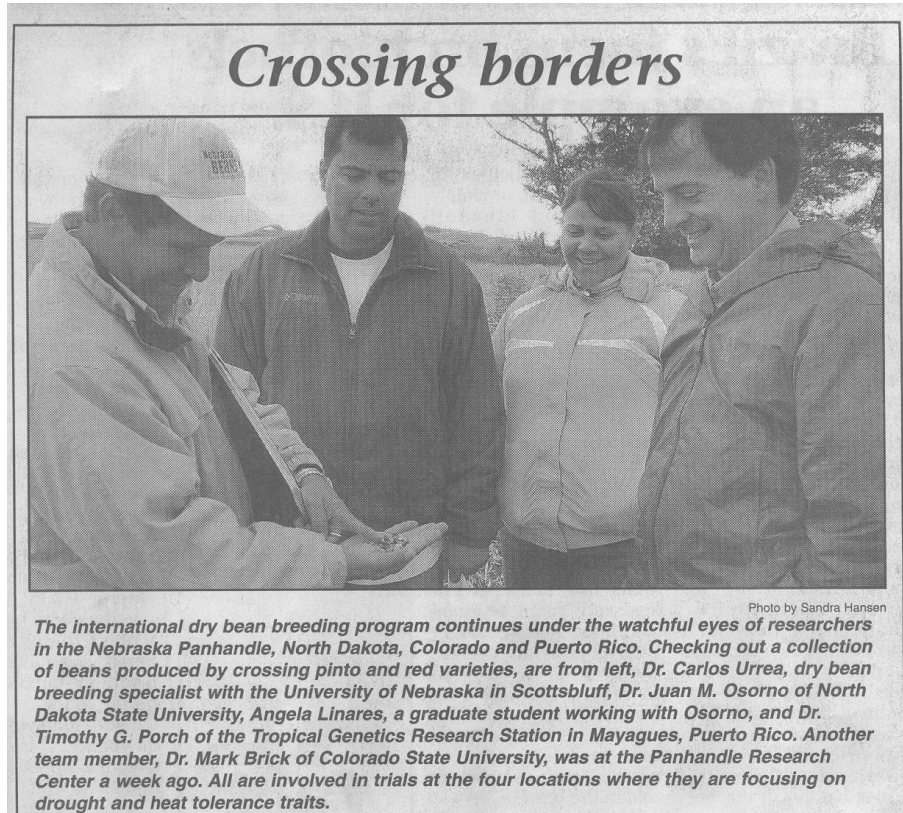
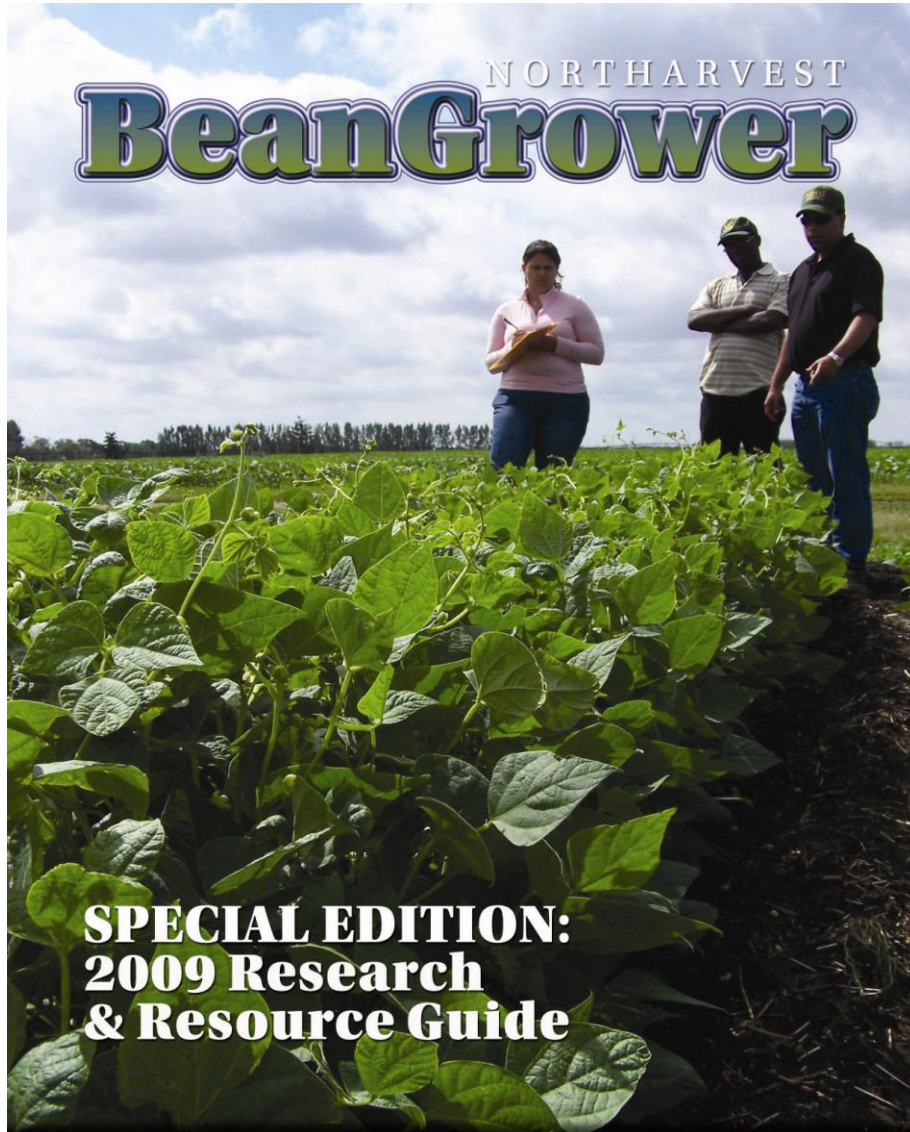


Photo by Sandra Hansen

The international dry bean breeding program continues under the watchful eyes of researchers in the Nebraska Panhandle, North Dakota, Colorado and Puerto Rico. Checking out a collection of beans produced by crossing pinto and red varieties, are from left, Dr. Carlos Urrea, dry bean breeding specialist with the University of Nebraska in Scottsbluff, Dr. Juan M. Osorno of North Dakota State University, Angela Linares, a graduate student working with Osorno, and Dr. Timothy G. Porch of the Tropical Genetics Research Station in Mayaguez, Puerto Rico. Another team member, Dr. Mark Brick of Colorado State University, was at the Panhandle Research Center a week ago. All are involved in trials at the four locations where they are focusing on drought and heat tolerance traits.