



NEWS

Volume 2, No. 1, January 13, 2005 Larry Murdock & Idah Sithole-Niang, editors

We want NGICA News and our new NGICA Website to be a source of information, ideas and other resources and thereby to evoke, provoke, enable or facilitate creative interactions within and outside the community -- for the benefit of African cowpea farmers and consumers

The NGICA Website

We take pleasure in announcing that the NGICA website is now available at:

<http://www.entm.purdue.edu/ngica/>

Have a look. We hope it is useful to you. It's just a beginning, of course.

Before we tell you more about the website, we want to acknowledge that it was created with the encouragement and funds from the Rockefeller Foundation. We are truly grateful to Rockefeller, especially to Deborah Delmer and Joe DeVries for supporting NGICA activities – or activities that led to the formation of NGICA – over the last several years. Chad Craighill designed the basic framework, and we had input from Idah Sithole-Niang and several others; thanks go to Jody Geller and Scott Charlesworth for organizing the files and assembling the components into the present website.

Sections of the website include:

Constraints - We intend to develop detailed descriptions of all of the constraints that reduce the availability of cowpea as a source of food, fodder or income. The initial part deals only with insects, but this section will grow steadily.

Opportunities/Needs - This page is dedicated to analysis of the entire spectrum of problems confronting cowpea. What are the researchable problems? What should we be giving particular attention to? What important things are being neglected? Jess

Lowenberg-DeBoer, Ousmane Coulibaly, and Joan Fulton put their heads together and wrote an opportunities/needs piece on cowpea marketing and economics. We invite others to compose their own thought-provoking essays about their specialty areas.

Photo Gallery - We hope to use the website to make available to you some of the best cowpea-related pictures in the world. That requires that YOU contribute your best photos and give us permission to use them. At the moment we have put up only a few photos on the Photo Gallery page, but we will be steadily adding more. If you have something for us such as a photo related to cowpea (a plant, an insect, a disease, a process, a market, a cowpea farmer, etc.) that you are particularly proud of or that provides an excellent example, please send it along – for details, see Jody Geller’s January 6, 2005 email. Jody’s email address is gellerj@purdue.edu. Several of you have already responded – thanks very much!

Links - The Links page gives you access to a lot of excellent websites. Idah Sithole-Niang went to a lot of work digging these out and providing descriptions of what you will find if you click on a link – our special thanks to Idah for her work. The list of links is incomplete, of course, but it will grow. Please help us identify additional ones – and help us by writing a brief summary of what each contains. The NGICA website is your website – please help us build it.

NGICAns - The NGICAns page provides key information about individual NGICAns, their expertise, how to reach them, and in some cases a dash of their philosophy. Some 20 NGICAns – a distinguished group it is – have already taken the trouble and provided their input. If you haven’t done it, please do!

Reports - There are a lot of reports available dealing with cowpea or cowpea-related matters. Most of them are not best-sellers, and they tend to gather dust on a few bookshelves, read by few because they are hard to find. Nevertheless, they always contain valuable information and insights about the cowpea scene. We are going to publish new trip reports, meeting reports and other documents that may be of interest to NGICAns but are otherwise difficult to find. If you know of documents that ought to be available to a larger audience, call them to our attention.

Bulletin Board - The idea of the bulletin boards grew out of a suggestion from George Bruening some time back that there ought to be a central site where people working on cowpea transformation could privately share data, discuss ideas, and generally participate as members of a community. Access to that site would be by permission only – the privilege of participation being awarded by the webmaster. We can create any number of limited access Bulletin Boards, e.g., cowpea transformation, cowpea breeding, marketing and economics, marker-aided selection, etc. And we stand ready to do this but in each case it will take a volunteer to be the leader of a particular bulletin board user group. Contact Larry Murdock if you are interested in starting a discussion group using the NGICA website.

You’ll also be able to access all old issues of NGICA News, which we will post as PDF files.

We welcome comments on how to make the website more useful!

Some News

Thanks to George Bruening of UC Davis, we call your attention to a potentially very important new resource that some may be interested in using, namely:

A new cowpea BAC genomic library

The cowpea genome, at 600×10^6 base pairs, is of small to medium size compared to the genomes of other crop plants. A useful tool in plant molecular biology is a genome library, a set of molecular clones which together represent all or almost all of the sequences of the genome. The most generally useful type of library uses bacterial artificial chromosomes, BACs. BAC libraries are useful in cloning individual genes and for the preparation of DNA markers for marker-assisted selection. Jafar Yaghoobi and Jinliang Gao in the Bruening laboratory at the University of California, Davis, have prepared the first cowpea genomic BAC library. The library consists of more than 70,000 BAC clones, which corresponds to more than a 5-fold coverage of the cowpea genome. Hence, the probability of any cowpea genomic sequence not being represented in the library is very low.

The library is archived in 384 well plates and was spotted on sets of four nitrocellulose filters using standard methods in which each clone is spotted twice with a spacing and orientation that signifies the clone identifier number. In one application, a cowpea DNA sequence of interest, whether in a known gene or simply a DNA marker, is used to probe the filter by hybridization. Pairs of spots are observed representing clones with sequence corresponding to the probe. For a sequence that occurs only once in the cowpea genome, the expectation is that there will be about 5 paired spots, because of the 5-fold coverage of the library. The location and spacing/orientation of the each spot pair allows the original clone (i.e., bacterial isolate) to be recovered and increased from the corresponding 384 well plate. For example, if a DNA marker is known to be located close to a gene of interest, the BAC clones that encode that marker can be recovered. Determining the sequence of 500 or so base pairs at each end of the BAC clone is readily accomplished. These sequences may reveal additional DNA markers or may be used to identify other members of the BAC library. Proceeding from BAC to BAC in this fashion, i.e., chromosome walking, allows genes to be cloned. We have demonstrated that the cowpea BAC library is suited to both DNA marker production and chromosome walking. Using a single-copy gene, the 5-fold coverage of the library has been confirmed.

Sets of filters for the cowpea BAC library have been supplied to Ivan Ingelbrecht at IITA and to Michael Timko at the University of Virginia. Based on hybridizations performed in his laboratory, Michael Timko has requested, and we have supplied, individual BAC clones. UC Davis can supply filters to others interested in having them for the cost of filter preparation, which is estimated to be \$USD 600 or less. Contact gebruening@ucavis.edu.

Meetings – Accra (II)

One of the promising new tools of biotechnology involves the use of molecular markers instead of traditional markers. Thanks to the Kirkhouse Trust, a three-day meeting on marker-assisted selection (MAS) was convened in Accra, Ghana, to explore if and how MAS could be applied to cowpea improvement. Some 30 scientists from Africa and overseas were in attendance. AATF took the lead in organizing the meeting with the collaboration of NGICA. Full details of the meeting are expected in a forthcoming report, but some of the outcomes are clear and encouraging:

The consensus was that MAS has a lot to offer for cowpea improvement. The Kirkhouse Trust, represented by Professor Sir Ed Southern and Dr. Sonia Morgan, expressed interest in exploring possible applications of their successful Bangalore model to the African setting, and to cowpea. The Kirkhouse Trust may consider supporting one or two University centers that would provide, on a continuing basis, training opportunities in MAS for African scientists interested in any crop. In addition, Kirkhouse may consider supporting a few applications labs where cowpea work with the few markers currently available for cowpea could be initiated. The model for the training activity builds on the Kirkhouse Bangalore experience, with modifications that may be necessary because Africa has special needs or conditions versus India. The training center(s) might eventually evolve into marker-development facilities as well. NGICA will have a role in helping shape or recommend the project. Efforts are now underway to lay the basis for an education and research project to extend experience and training in MAS as well as promote cowpea improvement with this technology. Expect to hear more about this promising development in the future.

The meeting achieved other useful ends. T.J. Higgins shared his latest results with the genetic transformation of cowpea. With input from the group, there followed useful discussions about how the transformation work should proceed from here, how the technology would be transferred, and what the training components should be, and what it will cost.

Other good things that happened in Accra (II) included progress on the Intellectual Property (IP) front and contacts between Monsanto and AATF to resolve licensing and intellectual property issues for the *cryIAb* gene. NGICA received some positive recognition, which was gratifying. The cowpea community has gradually come to recognize that a project of this complexity needs to be led and held together somehow. CORAF expressed interest in making NGICA one of its networks – a concrete, positive development which we will be following up. AATF supports the “formalization” of NGICA, and plans are being made to move that process along. Several new faces were seen at our Accra (II) meeting, and bright ones they were! We’ll not mention names to save embarrassment, but it is heartening to see the gathering momentum.

People:



Visitor from the International Institute of Tropical Agriculture (IITA) at Davis Adebola (Bola) Raji of IITA visited the University of California at Davis for two and a half months in the autumn of 2004. Bola is a Biotechnologist in the Central Biotechnology Laboratory, headed by Ivan Ingelbrecht, at IITA Ibadan. At Davis, she worked in the laboratory of George Bruening in the Department of Plant Pathology and at the Plant Transformation Facility with David Tricoli and Kim Carney. Bola focused

primarily on cowpea transformation but also pursued her interests in DNA marker development, bioinformatics and tilling. Her PhD research was on cassava germplasm diversity and heterosis, as assessed by morphological and molecular markers, and her degree in Genetics was awarded by the University of Ibadan, Nigeria, in 2003. Previously, Bola was a visiting researcher at the Centro Internacional de Agricultura Tropica (CIAT) in Colombia, where she also worked on cassava genetic diversity, from August to December 2001.

Consumer Acceptance of GM Cowpea

One of the issues facing us is whether African consumers are (1) aware of the products of biotechnology and (2) whether they will be accepting of them. A preliminary study of this question by Saket Kushwaha and colleagues in northern Nigeria gives some interesting answers. The report of the new study is available via PDF file on the NGICA website www.entm.purdue.edu/ngica

Potential Funding Source

A lot of researchers in developing nations need to find money to finance their research. NGICANs may want to learn more about the International Foundation of Science (IFS). Larry Beach passed on the information that IFS will consider proposals for research from developing country scientists to address issues related to the sustainable management of biological resources. Proposals can address agriculture, soil and water matters. Research grants of up to \$12000 for a period of one to three years will be considered. Funds can be used for buying equipment, expendable supplies, etc. See the IFS website for details: http://www.ifs.se/Programme/granting_programme.asp