

INSIDE — INTSORMIL



March, 2002

Publication 02-03

Newsletter of the Sorghum/Millet Collaborative Research Support Program

Comments from the Associate Director

Since INTSORMIL's newsletter in January 2001, many positive things have occurred. In response to INTSORMIL's request for an extension of the grant supporting our collaborative research, education, training, and networking, the U.S. Agency for International Development (USAID) has extended the 1996-2001 grant an additional five years until June 30, 2006. As is customary with USAID programs and projects, annual funding of the INTSORMIL grant by USAID will be dependent upon funds available to the Agency from the U.S. Congress. The matching funds provided for INTSORMIL collaborative research and education by U.S. land grant universities and INTSORMIL partner institutions in developing countries continue to be evidence of the value of this international, collaborative research-and-education program which focuses on sorghum and pearl millet. These two grains, besides making the difference between starvation and health for 500 million people who directly consume sorghum and 300 million people who directly consume pearl millet, have great potential as the energy source in poultry and animal feed, particularly in developing countries. The livestock revolution is gaining momentum in developing countries, and sorghum and pearl millet are uniquely adapted to capture solar energy to be used as food for humans, but also as feed for poultry and livestock in both the semi-arid tropics and temperate zones. During the next five years, INTSORMIL research will continue to focus on alleviating constraints to production of the two cereals, but INTSORMIL is sharpening its focus to better meet the needs of users and consumers of sorghum and pearl millet. INTSORMIL scientists and others recognize that research on sorghum and pearl millet can

contribute to health and economic well-being only if these important crops are made more economically useful.

INTSORMIL's 2001-2006 global strategy is intended to contribute to the shift of sorghum and pearl millet from subsistence crops to value-added, cash crops and proposes to produce scientific knowledge and technologies to:

- Contribute to economic growth and market development by developing new uses and increasing the supply of sorghum and pearl millet grain and forage with improved quality and properties for processing and end use.
- Improve nutrition and alleviate malnutrition through better utilization of sorghum and pearl millet for human food, feed for poultry, and feed and forage for livestock by improving nutritive value for food, feed and forage.
- Increase yield of grain and forage of sorghum and pearl millet while conserving or improving the natural resource base.
- Improve institutional capability of national agricultural research systems to meet global, regional and national needs, while facilitating the shift to open-market economies and providing the human capital for long-term agricultural development and economic growth.

Thomas W. Crawford, Jr.
Associate Director



John D. Axtell

John D. Axtell Memorial Fund in Plant Breeding and Genetics

In December 2000, Purdue University lost one of its most distinguished faculty members, Dr. John D. Axtell. An eminent research scientist, Dr. Axtell was a member of the National Academy of Sciences and internationally renowned for his work in sorghum genetics. His contributions to agricultural sciences and to global sorghum improvement research to improve the quality of life in the developing countries are a profound legacy. To honor his life and extend the legacy of his work, Purdue University has established the John D. Axtell Memorial Fund in Plant Breeding and Genetics in the Department of Agronomy.

If you would like to contribute to this fund please send your check payable to: **Purdue Foundation** and write “John Axtell Fund” on the memo line of your check. Send your memorial gift to:

Purdue Foundation
1801 Purdue Memorial Union
West Lafayette, In. 47907-9988

For additional information about this fund please contact:

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Grant Extension Proposal

On March 27, 2001, INTSORMIL presented its grant extension proposal for 2001 - 2006 to the Strategic Partnership for Agricultural Research and Education (SPARE) committee, which is composed of representatives of universities and the U.S. Agency for International Development (USAID). The proposal was presented by Drs. Bruce Maunder (INTSORMIL External Evaluation Panel Chair), C.W. (Bill) Herndon (INTSORMIL Board of Directors), John Yohe (INTSORMIL Program Director), Gary Peterson (INTSORMIL Technical Committee Chair), Thomas Crawford (INTSORMIL Associate Program Director), Ouendeba Botorou (Coordinator of the West and Central African Pearl Millet Research Network), and Mr. Dan Shaw (Washington Representative of the National Grain Sorghum Producers). The SPARE committee recommended to the Board for International Food & Agricultural Development (BIFAD) that INTSORMIL's 1996 - 2001 grant be extended an additional five years. BIFAD, in turn, advised the Administrator of USAID, recommending that the extension be granted. The Agency concurred and the INTSORMIL Grant has been extended to June 30, 2006.

2001 Board of Directors Meeting

The May, 2001 Board of Directors (BOD) meeting was hosted by Dr. Bill Herndon at Mississippi State University. Participants included, Drs. Robert Hudgens (Kansas State University), Aberra Debelo (Ethiopia/Host Country Representative), Frank Gilstrap (Texas A&M), David Sammons (Purdue University), Harold Kauffman (University of Illinois - Urbana), Darrell Nelson (University of Nebraska), Bill Herndon (Mississippi State University), Gary Peterson (Texas A&M), John Swanson (USAID), John Yohe and Thomas Crawford (INTSORMIL ME). The committee approved a motion to retain Drs. Hudgens, as chair and Herndon as vice chair of the BOD for 2001/2002. Dr. Robert Hudgens offered to host next years BOD meeting at Kansas State University. INTSORMIL would like to express their thanks to Dr. Herndon and the Mississippi State University staff for their outstanding hospitality.

2001 Technical Committee Elections

We extend our thanks to the Principal Investigators (PIs) who served on the Technical Committee (TC) this past year. Each of them is commended for providing effective leadership to our program. The term of Dr. Medson Chisi (Host Country Regional Coordinator for Southern Africa) expired and by election he was replaced by Dr. Peter Esele (Host Country Regional Coordinator for the Horn of Africa - Uganda). We wish to thank Dr. Chisi for his two years of excellent leadership and service on the TC. We welcome Dr. Esele for a term of two years (2001/2003) in service on the TC. At the April 2001 meeting the TC approved adding a breeding discipline to the committee, and Dr. Wayne Hanna was elected to represent this discipline. We welcome our new TC members whose term began July 1 2001:

Technical Committee Membership 2001 - 2002:

John Sanders - Agronomy/Physiology

*Wayne Hanna - Breeding

Bruce Hamaker - Economics/Utilization

Henry Pitre - Entomology/Pathology

Gebisa Ejeta - Host Country/Regional Program Coordinator

Gary Peterson - Host Country/Regional Program Coordinator

Steve Mason - Host Country/Regional Program Coordinator

Aboubacar Tourè - Host Country Coordinator

*Peter Esele - Host Country Coordinator

* denotes new members to the committee effective July 1, 2001

National Stakeholders' Workshops on Rural Development Sector Strategy for Nigeria

Dr. Thomas Crawford represented the nine CRSPs at the National Stakeholders' Workshops on Rural Development Sector Strategy for Nigeria, February 1-3, 2001 in Abuja, Nigeria. He addressed participants in the workshop, describing what the CRSPs are and giving some examples of CRSP activities. In addition, he briefed personnel of the USAID Mission to Nigeria regarding potential for CRSP activities in Nigeria and linkages which the CRSPs can help develop between Nigerian agricultural scientists and scientists of neighboring countries and the United States.

2001
National Grain Sorghum Producers (NGSP)
Conference

The National Grain Sorghum Producers (NGSP) and the Sorghum Improvement Conference of North America (SICNA) held their annual meeting on February 18 - 20, 2001 in Nashville, Tennessee. Attendees from INTSORMIL included Drs. Bruce Maunder, Gary Peterson, Gebisa Ejeta, Darrell Rosenow, Bruce Hamaker and Thomas Crawford. In addition, INTSORMIL collaborating scientists from Central America attending were: Ing. René Clará, sorghum breeder from the Centro Nacional de Tecnología Agropecuaria y Forestal (CENTA) in El Salvador, Ing. Rafael Obando of the Centro Nacional de Investigación Agropecuaria, and Ing. Sergio T. Pichardo Guido, Vice Dean of the Agronomy Faculty, Universidad Nacional Agraria in Nicaragua.

First National Forum on Millet
and Sorghum in Niger

From September 12 through 14, 2001, the Ministry of Rural Development (MDR) called a wide array of professionals in Niamey, Niger to discuss past, present and future issues relating to the significance of millet and sorghum in the country. As a result of the forum, the Institut National de Recherches Agronomiques du Niger (INRAN) has set up a national organizing committee to deal with issues relating to sorghum and millet in the future, a high priority for the MDR. The proceedings of the forum are currently being edited. The following summary covers principal areas of discussion and decisions taken as published in the overall minutes of the workshop.

The global objective of the forum read: to improve food security through all partners interested in millet and sorghum, and improve incomes in rural households in a sustainable manner. The meeting was overseen by two key advisors of MDR with over 120 participants including farmers, seed producers (national seed trade association -APPSN), food processors, grain traders, NGOs, consumer organizations (INRAN, University of Niamey, ICRISAT), and their partners: INTSORMIL, ROCAFREMI, ROCARS, and the IFAD project 'Millet and Sorghum Regional Initiative'. The participants reviewed critical aspects of production, processing, marketing, and consumption of the two cereals, and developed elements for national strategy on food security.

The meeting produced a thorough picture of constraints and opportunities in millet/sorghum production and economy in Niger. The experts presented very detailed information, and more global perspectives came from the presentations of INTSORMIL and the IFAD project. Principal conclusions of the forum were on the subjects of:

1. Importance of millet and sorghum,
2. Research and technology transfer,
3. Production,
4. Marketing,
5. Processing and Consumption,
6. An inter-professional center for improving the status of millet and sorghum.

Further information regarding the workshop and its consequences may be obtained from Dr. Issoufou Kapran (E-mail: sormilni@intnet.ne).



Mr. Chaibo Ango (left), seed producer and first head of the Niger Seed Trade Association and Dr. Issoufou Kapran (right), INRAN sorghum breeder at INRAN, Niamey, Niger

Progress of the Hybrid Seed Program in Niger

From 1990 through 2000, about 2 million ha of sorghum were grown in Niger with an average yield of less than 300 kg per ha. Niger research scientists have estimated that 2000 tons of seed are necessary to cover just 10% of the area cropped with sorghum, which in turn would require production on 1000 ha of good land under adequate supervision. Yet at the present time, the capability to even partially satisfy the demand is still nonexistent in Niger. In 1989 INRAN sorghum research scientists demonstrated the technical feasibility of hybrid seed production in an isolated field (Sorghum hybrid NAD-1), with potential seed yield of up to 1500 kg/ha. Sorghum hybrid NAD-1 which was released in 1990 is now well known throughout the country. Demand for this seed is high, as judged by requests placed to INRAN and private producers at the beginning of each growing season.

In order to provide for adequate seed, a seed trade association, 'Association des Producteurs Privés de Semences au Niger' (APPSN) was formally created in 1999 and is legally operational. APPSN was rapidly identified by the government and many bilateral donor agencies as a valuable partner in the critical seed issue, particularly following bad production years.

Development of local capability and experience in seed production and marketing has also been initiated. This project has successfully trained small farmers organized in coops to become highly skilled hybrid seed producers. Farmer ability to comprehend and apply hybrid seed production techniques has been demonstrated. Fields of hybrid seed production can be observed in farming communities. Farmers receive hands-on training during crop season but also formal training using a manual initiated by INTSORMIL consultant Lee House and INRAN sorghum breeder Issoufou Kapran. Hundreds of technicians and farmers have participated in the training over the past 4 years.

The manual was recently translated into two local languages of Niger for a more efficient training including direct farmer to farmer transfer of knowledge. Farmer experiences with NAD-1 seed production range from Gidan Iddar farmers who today produce and market hybrid seed on their own albeit in small fields (2 ha), to irrigated plots (6-10 ha) at Konni, Galmi, Moulela and Djirataoua, to farmers at Tiaguirire on the Niger River (4 ha), and at Say on dryland farms (10 ha). It is probable that many of the small farmers will eventually serve as contract growers for larger producers. It must also be noted that INRAN involvement, with INTSORMIL support, has attracted collaboration with other agencies supporting community seed production including the IFAD project on millet and sorghum technology transfer at Gidan Iddar, the PSNII-FIDA at Tillabery, and the WINROCK-ONFARM project at Tiaguirire. Overall, this project has demonstrated that farm-level hybrid seed production at a low cost, with high quality and easy access, is feasible in Niger. However its expansion to meet greater demand will need support for improved land and water management.

New sorghum hybrids continue to be developed and tested at INRAN research stations. Using the NAD-1 experience, elite hybrids are now selected only if they have high yield with acceptable grain quality, and their parents must belong to the same maturity group and show good adaptation traits. Presently a very narrow list of parental inbreds originating from the INRAN research program and from INTSORMIL collaborative research in the United States (Purdue University, Texas A&M University and the University of Nebraska, Lincoln), are used as testers in our advanced hybrid experimentations. Their activities also include the development of continued awareness of hybrid potential through demonstrations and field days. In 2001, two field days showcased INRAN hybrids at the ICRISAT Sahelian Center, and at Lossa/Tillabery INRAN stations. Visitors were able to appreciate hybrid productivity in large-scale demonstration plots, as well as production of female parents and hybrid seed in isolated fields. Farmers, members of APPSN, and NGOs, extension staff, congressmen and advisers of the minister of agriculture, as well as numerous INRAN and ICRISAT staff all attended the field days.

Issoufou Kapran
INRAN

NASULGC Reception

On March 26, 2001, an exhibition, entitled “Agricultural Research and Education Serving the Nation in Food and Health: A University Exhibition and Reception on Capitol Hill,” presented by the National Association of State Universities and Land Grant Colleges (NASULGC) was held in the Rayburn Office Building. Drs. John Yohe and Thomas Crawford represented INTSORMIL at the exhibition and reception in Washington, D.C. INTSORMIL contributed images and information which were part of a display entitled, “Collaborative Research Support Programs (CRSPs) - Food and Health Promotion by U.S. Universities and Developing Countries” which was prepared by the Bean/Cowpea CRSP with input from all nine CRSPs.

BIFAD - CRSP Day

March 29 and 30, 2001: the BIFAD Board hosted a “CRSP Day” on Thursday, March 29. Dr. John Yohe, co-chaired the “CRSP Day” meeting of the BIFAD with Dr. Edward Schuh, Chair of the BIFAD. A number of oral presentations were made, and Dr. Yohe’s was entitled, “Why CRSPs Work Well.” Dr. Michael Roth, Program Director of the BASIS CRSP, and Dr. Thomas Crawford presented a talk entitled, “Benefits of U.S. Contributions to a Positive Harvest of What is Sown,” describing various aspects of the nine CRSPs’ educational and training activities.

Global Consortium of Higher Education and Research for Agriculture (GCHERA) Meeting

INTSORMIL was well represented at the meeting of the Global Consortium of Higher Education and Research for Agriculture (GCHERA), July 12 - 14, 2001 in San Francisco, California. Dr. David Sammons, Purdue University representative to the INTSORMIL Board of Directors, was a key organizer of the conference that hosted representatives of institutions of higher education and research from approximately 140 countries. Dr. Aberra Debelo, coordinator of INTSORMIL activities in Ethiopia and formerly of the INTSORMIL Board of Directors, and Dr. Aberra Deressa, Director of the Nazret Research Station, who are active collaborators in INTSORMIL

agricultural research and technology dissemination in Ethiopia, represented the Ethiopian Agricultural Research Organization. Also attending the conference was Dr. Hamis Mohamed Saadan, an INTSORMIL collaborating scientist representing the Ministry of Agriculture and Food Security of Tanzania. Dr. Thomas Crawford, Associate Director of INTSORMIL presented a poster, “Collaborative Research Support Programs (CRSPs) - Higher Education and Research Link Scientists of Many Countries,” describing research and higher education activities of all nine of the Collaborative Research Support Programs (CRSPs). The conference was well attended and resulted in the formation of working groups to address issues of global interest to institutions of higher education and research.

English Training Program for INIA Mozambique Scientists

Nine Mozambican agricultural scientists from Mozambique’s national agricultural research institute, the Instituto Nacional de Investigação Agronómica (INIA), arrived in the United States in August 2001. Seven are currently studying English at the University of Nebraska in preparation for M.S. studies with principal investigators of various CRSPs in the United States. Mr. Rafael Uaiene, formerly the Director General of INIA is proficient in English and has begun graduate studies with Dr. John Sanders, INTSORMIL agricultural economist, at Purdue University last fall. Mr. Feliciano Mazuze, another agricultural scientist from INIA arrived in the United States in January 2002 to begin his studies for an M.S. degree in agricultural economics with Dr. Richard Bernstein at Michigan State University with the Bean/Cowpea CRSP. Also in January 2002, Mr. João Augusto completed his Intensive English Language training at the University of Nebraska and traveled to Tifton, Georgia to begin research as part of his M.S. program in peanut pathology with Dr. David Wilson of the U.S. Department of Agriculture’s Agricultural Research Service and the University of Georgia. INTSORMIL’s Management Entity is managing the \$1.2 million USAID grant which is supporting the graduate studies of the Mozambican scientists. Once they have completed their graduate studies, the Mozambicans are to return to INIA where they will conduct collaborative research with CRSP scientists with whom they studied in the United States.

INTSORMIL Requests for Proposals

INTSORMIL released requests for research proposals in July, 2001, with a submission deadline of September 2001. INTSORMIL received many excellent proposals, which were evaluated by a panel of external reviewers, the Technical Committee, the Board of Directors and the Management Entity. The projects that were awarded funding include the following:

Sustainable Management of Insect Pests in West Africa and the United States. Principal Investigator is Dr. Bonnie Pendleton, Entomologist at West Texas A&M University at Canyon, Texas.

Soil and Water Management for Improving Sorghum Production in Eastern Africa. Principal Investigators are Dr. Charles S. Wortmann, Nutrient Management Specialist and Dr. Martha Mamo, Soil Chemistry and Biochemistry, both at the University Nebraska-Lincoln.

Enhancing the Utilization of Grain Sorghum and Pearl Millet through the Improvement of Grain Quality via Genetic and Nutrition Research. This project is both multi-institutional and multi-disciplinary. Principal Investigators at Kansas State University include Dr. Mitchell Tuinstra, Sorghum Breeding & Genetics and Dr. Joe Hancock, Poultry & Swine Nutritionist; and at Texas A&M University include Dr. William Rooney, Plant Breeding & Genetics, and Dr. Clint Magill, Molecular Biology & Plant Pathology.

INTSORMIL Visiting Scientists

Mr. F. Percy Muuka, Zambia was supported by the INTSORMIL Southern Africa Regional Program to spend one month (7/30/01 - 8/30/01) visiting the pearl millet breeding and agronomy programs of Drs. Wayne Hanna and Jeff Wilson at the Coastal Plain Experiment Station, Tifton, Georgia and Professor Emeritus David J. Andrews, Dr. Ismail Dweikat and Dr. John Rajewski, University of Nebraska, Lincoln, Nebraska. Mr. Muuka received a M.S. degree through the SADC/ICRISAT/INTSORMIL long-term training program under Professor David J. Andrews in 1989. While at Tifton, Georgia, Mr. Muuka acquainted himself with studies on the relationship between hydrocyanic acid content and midge resistance in sorghum

and recent developments on the development of genetics and cytogenetics of pearl millet, its related species, turf and Bermuda grasses. Zambia is now part of the West Africa regional testing network, spearheaded by Dr. Wayne Hanna, which is in its second year in West Africa. Mr. Muuka initiated discussions with Dr. Jeff Wilson on collaboration on pearl millet pathology with himself and Mr. Godwin Kaula, Zambian plant pathologist. In Nebraska Mr. Muuka received training in breeding and biogenetics under Professor David Andrews and Dr. Ismail Dweikat. He initiated germplasm exchange and acquisition with the Nebraska program. Through the training program Mr. Muuka gained useful knowledge in seed storage management for improving and prolonging seed viability, crop management to improve nursery or data quality, pollen collection techniques, pollen processing and storage, making crosses, hybrid seed production and roguing in relation to breeding objective(s), data collection, development of A and R lines and their evaluation in the field, evaluating apomictics, and rapid methods for scoring diseases.

Ms. Yanet Gutierrez from Universidad Nacional Agraria in Managua, Nicaragua recently spent 3 weeks in the lab of Dr. Larry Claflin at Kansas State. This short course was devoted to identification of sorghum diseases and basic bacteriological protocols. Serological techniques and use of the Biolog and AgDia testing kits were also utilized. Nicaragua has no scientific expertise in plant pathogenic bacteria, and bacteria are very important pathogens in tropical environments. Ms. Gutierrez returned to Nicaragua with equipment, supplies and books that were purchased from INTSORMIL project KSU-211 in support of implementing diagnostic techniques in the laboratory of Ing. Sergio Pichardo.

Central America

Regional Programs

The INTSORMIL Regional Program efforts were largely transferred from Honduras to El Salvador and Nicaragua in 2000. In this process, INTSORMIL developed memoranda of understanding with national agricultural research systems in El Salvador (CENTA), and Nicaragua (INTA) and with the Universidad Nacional Agraria (UNA) and the Universidad Nacional Autonoma de Nicaragua at Leon (UNAN-Leon) in Nicaragua. The sorghum research leaders from INTA, UNA and CENTA were hosted by INTSORMIL to participate in the National Grain Sorghum Producers Association Meeting February 19-20, 2001 in Nashville, TN, and then visited U.S. universities involved in INTSORMIL collaborative research in Central America. The objectives of these activities was to provide scientists

of these new collaborating institutions in Central America with an understanding of the potential and limits of collaborative research with U.S. universities participating in INTSORMIL and to meet U.S. scientists interested in grain sorghum research worldwide. At each university the Central American sorghum scientists met with INTSORMIL Principal Investigators, directors of International Programs Offices, and faculty with international interests in Central America, and at each university they presented a seminar on grain sorghum production in Central America. The research leaders participating were René Clará Valencia (CENTA, El Salvador), Rafael Obando Solis (INTA, Nicaragua) and Sergio Pichardo Guido (UNA, Nicaragua).

Student Symposium on Food Science and Technology

In March 2001, the Student Symposium on Food Science and Technology was held at the Monterrey Technological Institute (ITESM) in Monterrey, Mexico. Dr. Lloyd Rooney attended and presented a lecture on “Nixtamalization: Art or Science?” Nearly 200 people attended the symposium including Texas A&M graduates; Drs. Roderigo Loberia (scientist at Maseca, Monterrey, Mexico) and Ximena Quintero (principal scientist for Frito-Lay) who received Ph.D. degrees in May, 1999, Ms. Sara Guajardo (lecturer at ITESM, Monterrey, Mexico) who completed her M.S. in May, 1998 and Dr. Serna-Saldivar who completed his Ph.D. in 1984. Dr. Quintero also presented a lecture on “Development of New Products by Industry.” Dr. Rodriguez, Assistant Professor and Ph.D. graduate from Texas A&M University in 2000, was involved in planning the program. Dr. Rodriguez is developing a research and a teaching program in Food Science and Technology at the University of Coahuilla in Saltillo, Mexico.

Awards

Dr. Lloyd W Rooney, Professor, Cereal Quality Lab at Texas A&M University was inducted into the Mexican Academy of Sciences this past May, 2001. Dr Rooney was cited for his research involving nixtamalization of maize and factors affecting the quality of tortillas and related snack foods. He has served as committee chair or co-chair for more than 30 M.S. and Ph.D. thesis completed by Mexican students. In addition, he has lectured and consulted regarding post-harvest research on cereal technology in many Mexican institutions.

Food Sorghum Development in Japan

Dr. Lloyd Rooney, Texas A&M University, participated in U.S. Grain sponsored market development activities to promote food sorghums in Japan and a value-enhanced food sorghum seminar at the International Grains Program at Kansas State University. Four new snack foods made from U.S. white food sorghums were introduced by Japanese companies. Several containers of identity preserved sorghum have been sold to Japanese food companies. Milling and processing of white food sorghums from INTSORMIL’s program in sorghum improvement may become a reality in Japan and elsewhere.

New Snack Foods Book

Snack Foods Processing is a new book edited by Dr. Ed Lusas, retired and Dr. Lloyd Rooney, Texas A&M University, which was published in 2001. The book written by food industry personnel covers most snack foods including chapters on Japanese, Indian and Chinese snacks. Sorghum as a snack food ingredient is included.

Publications

The INTSORMIL 2001 Annual Report is now available. Copies may be obtained from the Management Entity.

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This publication is made possible through support provided by the U.S. Agency for International Development under the terms of Grant No. LAG-G-00-96-90009-00. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of the U.S.

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