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TO: BIFAD, Dean Elmer Kiehl
AID/DS/AGR, R. I. Jackson

SUBJECT: Trip Report of Fred Miller (Guatemala)

FROM: Earl R. Leng *Earl R. Leng*

Enclosed herewith are ten (10) copies of a trip report by Dr. Fred Miller, Texas A&M. Fred traveled to Guatemala to confer with project staff and members of the Guatemalan National Agricultural Research Institute (ICTA). Specifically, he helped make selections and evaluate sorghum breeding material being grown in a cooperative Texas A&M-ICTA program.

The significant feature of Fred's report is his observation that some of the "tropical X temperate" sorghum derivatives are outstanding in yield and performance under the short-day, "cool season" growing conditions of the tests. One of these in particular yielded above 7000 lbs/acre, which is really an unheard-of performance level for this type of environment. Of course, further testing in different environments is needed, but it appears that the AID-funded Texas program has made a real breakthrough in combining high yield and desirable plant and grain characters with adaptation to the shorter-daylength tropical environment. If this performance is confirmed in other locations, the potential could be tremendous.

I suggest that this report, or an extract from it, should be circulated to senior people in AID/W (Tony Babb, LA Bureau, etc.) as an example of progress that can be made by plant breeding with specific objectives. The combination of skill, patience and adequate support for research really can produce a major payoff.

cc: INTSORMIL Technical Committee Members
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Dr. Earl Leng, Director
International Programs
Institute of Agriculture and
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The University of Nebraska-Lincoln
210 Ag. Hall, East Campus
Lincoln, NE 68583

Dear Dr. Leng:

Enclosed is a brief trip report on the travel to Guatemala, February 22-26, 1980. It was a very useful trip and with the selections made under these short days following intensive disease screening, we should have some very good material to work with. Once again the tropical adaptation phenomenon was so evident among those items with superiority. Those same materials are the ones which are also best in College Station and South Texas. We have a super thing going!

We are nearing the release of two and perhaps three materials jointly with ICTA and TAMU. I see strong interest and enthusiasm among the breeders, AID and ICTA people as well as local seedsmen for this material. We are on the right track with outstanding materials and support.

Thanks for your support.

Sincerely yours,

A handwritten signature in cursive that reads "Fred Miller".

Fred Miller
Associate Professor
Sorghum Investigation

FM:jm
Enclosure

CC: D. T. Rosenow
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Trip Report
Guatemala - February 22 - 26, 1980
Frederick R. Miller

Purpose of travel: The primary objective of this travel to Guatemala was to confer with ICTA (The Instituto De Ciencias y Tecnologia Agrícolas) and Dr. Albert Plant, TAMU/International Programs who is responsible for sorghum improvement and development through a USAID contract. A selected series of F_2 's with tropical adaptation, food potential and yield had been provided to Plant, who grew, selected in disease situations and had advanced the material to F_4 's in a nursery in El Oasis. Our goal was to select superior materials for further evaluation and utilization.

The F_4 nursery was planted on the experimental farm near El Oasis on November 6, 1979. These materials (2000 rows) had been harvested from an F_3 disease screening nursery in Cuyutia (on West coast) where they had been subjected to severe anthracnose, cercospora and fusarium infestation. In addition, the nursery was maturing during an extended period of rain. As a result the grain was severely evaluated for weathering resistance and preharvest germination in the panicle. Many of the F_4 rows suffered reduced total stand losses. Maturity was perfect for evaluation and allowed maximum efficiency in selection. The nursery was irrigated and fertilized very well. On about January 1, 1980, the last irrigation was applied, resulting in a sufficient amount of water for maximum plant growth and development but allowed for a separation in drought tolerance at maturity. Sorghum rust was the only disease present in the nursery but it was at a very high level. Most of the material in the nursery

was resistant or had pustules but there were families that showed extremely high levels of susceptibility. These were not selected. Generally crosses with 77CS3, SC0056-14 and Tx7000 in the R-lines and white Kafir, B5405, BTx399 and M35-1 in the B-lines were the most susceptible to rust.

Perhaps the significant thing about this nursery was the fact that those crosses which have tropical adaptation (the ability to produce a high and stable yeild under short day lengths and hot temperatures) in them were strikingly superior to anything I have ever seen in the tropics of the world. The same things which look excellent at College Station, Texas, were also the most outstanding here. We have without a doubt found the key to significantly increasing yields in the tropics. Any crosses which contained parentage of one or both of the following were striking in adaptation, yield and disease resistance; 77CS2, 77CS1, Tx430, TAM428, SC0056-14, SC0326-6, SC0108-14, Tx622, Tx623, Tx624, and (BTx3197x69M1490)Ts. The most outstanding material was found in crosses made among these items. The standard varieties such as Tx7000, Tx7078, BTx399, BTx378, Tx2536, White Kafir, B5405 contributed nothing to yield and adaptation here. These observations point out once again that there are major differences in yield capability under tropical and temperate regimes.

At the back of this nursery was a section containing a collection of A and B-lines from ICRISAT which had been treated in the same fashion as the rest of the field. More than 60% of this section had no germination. This collection is made up of mostly temperately developed Kafir types which suffer from weathering resistance problems. There were three (3) varieties in the section, however, which were very good.

In another area of the nursery was a Latin America sorghum performance trial run in about 12 countries by members of PCCMA. Contained in the test were a number of commercially available US hybrids. Yield was reduced as expected from that obtained at Lubbock, Texas, except for those involving Tx430 as a pollinator. There were 2-3 varieties in the test; one looked as though it came from GPR-148 and one other looked very much like SC0170-6- - . The hybrids showed the typical thin, spindly plant development generally evident under short day environments. As borders to the test there were several seedings of ICTAM777(ATx623xCS3541) which were impressive. Yield was in the 7000 to 7500 lbs/ac range with bright cream colored seeds on slightly open panicles. The grain was mature and ready for harvest. There was no evidence of lodging even though the population was high. There were over 200 selections involving BTx622,623 or (BTx3197x69M1490)Ts materials immediately behind the PCCMA test. This material as varieties was super impressive. Yields across this block were significantly greater than those produced by hybrids in the PCCMA trials. It is extremely encouraging that yields can be obtained with varieties that are superior or equal to the best available hybrids.

Approximately 2 acres of ICTAM777 was planted around the nursery for grain increase which will go to experimental food uses. There are at present three major areas of interest: 1) flour, 2) cereal and 3) baby food. Companies in each of the areas are interested. This is the reason for the increase of ICTAM777 and ICTAM950(ATx623x77CS1) both have been previously evaluated extensively for these foods.

In another field where B7504 (sister of BTx023) was being evaluated for yield, we observed an estimated yield of 6000-6500 lb/ac. The plants were undergoing tests for total grain yield, weight of leaves, culms and quantity of total solids in the culm. The latter ranged from 3.78 to 21.0 on the refractometer.

Selections with the greatest grain yield and highest solids readings will be selected for biomass utilization and for use in hybrid production of sugar for alcohol.

Final discussions were held for procedures and responsibilities of releasing jointly the hybrids ICTAM777 and ICTAM 950 as well as the high yield variety for the low income small farmer. In addition, we finalized at least two publications which will be prepared on a series of studies done at four elevations comparing tropically adapted, temperately adapted and standard check varieties. The data are impressive.

Monday evening, Dr. A. Plant and I visited the USAID Mission in Guatemala City where we met with Mr. Clem Weber and Mr. Dave Peacock. The discussion was frank and open. The merits of sorghum in Guatemala and Latin America, and what Guatemala can expect to influence by continuing a strong sorghum program. The final judgment was one of - are the dollars available. If they are the program has a high priority for continuation.

The travel was extremely useful and will have a major influence in Texas sorghum as well as sorghum in Guatemala and Latin America.