

A Current Status Report on the Yemen Arab Republic
Sorghum Collection Relative to its Grow Out, Field
Classification, Seed Increase and Future Plans.

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A collection of the locally grown sorghum genotypes was made in the Yemen Arab Republic in the 1975, 1977 and 1978 growing seasons. Seed of this Yemen Arab Republic Sorghum Collection was shipped from the Yemen Arab Republic in early 1979 in two separate lots. These seed shipments were transmitted via the Germplasm Resources Laboratory in Washington, D.C. and received at the University of Arizona in the early summer of 1979. Seed of like entries from the two shipments were combined into one packet of seed. These were carefully checked against a master seed list of this collection that had been made out in Sana'a, Yemen Arab Republic in 1978 prior to and in anticipation of shipping this collection to the U. S.

Twenty five metal seed boxes were made to hold this collection. Space was temporarily made available in the University of Arizona, Department of Plant Sciences, germplasm storage area for this original collection seed.

Data obtained during the actual collection of the approximately 4,500 entries and their threshing was assembled into a preliminary report. This report was started in Yemen in 1978 but had to be completed in the U. S. where adequate facilities are available to physically publish such a report. This report was completed in late 1979. It is titled "A Preliminary Description of the Germplasm Collection of Sorghum Varieties From the Yemen Arab Republic by Robert L. Voigt and Mohamed A. El-Lakany and published as Communication Number 1, Plant Sciences Department, January 1, 1979. This report is the only published data on this collection at this time.

During the summer of 1979 plans were made to grow-out, classify and increase a portion of this collection at the Mayaguez Institute of Tropical Agriculture in Puerto Rico under the management of Dr. Antonio Sotomayor-Rios, Director of the Institute. Seed was put up and sent to Puerto Rico in September 1979. Approximately 50 seed per entry were counted or measured out from the original supply of seed of each collection entry for a single 10 foot plot row. Every 100th plot row was a check variety, Combine Kafir 60, to assist in verifying the rows in the field. An attached supplementary report by Dr. O. J. Webster fully describes the grow-out and increase activities and situation as of this date. Dr. Webster was asked to go to Puerto Rico to collect field classification data, harvest, thresh and ship to the U. S. a majority of the grow-out that was ready during the month of January 1980.

The resources to make this 1979-1980 portion of the grow-out possible came from the Puerto Rico station and the USAID Yemen Sorghum/Millet project contract from the University of Arizona. The Puerto Rico station furnished the land, planted and cared for the crop, furnished labor to bag the heads and assisted with the harvest and threshing. The USAID-University of Arizona contract, supplied the professional resources (Dr. Webster) to collect the data, and supervise harvesting and threshing of the grow-out items. Selfing bags, envelopes and other supplies were furnished from this contract.

As of the date of this report there are still some late-blooming entries in the process of being bagged, harvested, or threshed. New seed of the increased lines is being cleaned here at the University of Arizona. Unthreshed branches from heads have been left in each packet of seed for future assistance in any classification problems.

Entries in the collection with only a small amount of seed of 30 or 40 seed or less are being increased in the University of Arizona sorghum project Green House. The risk of losing these entries in a field planting was too great. Seventy entries were planted for increase in the greenhouse in 1979-80.

Only about one-third of the collection has been grown out at Puerto Rico in 1979-80. The remaining two-thirds still needs to be grown out, field data collected and seed increased.

Additional descriptive data needs to be taken on the seed of the increased entries.

A very important step that needs to be taken as soon as possible is assigning Plant Introduction (P.I.) numbers to this collection so that it may be worked into the "world collection system". Dr. George White of the Germplasm Resources Laboratory in Washington, D. C. is understandably anxious to immediately move ahead with this action. Dr. White has been very helpful and patient with our efforts to date. This collection would not be in the U. S. without the assistance of Dr. White.

PROGRESS REPORT ON INCREASE OF YEMEN SORGHUM COLLECTION

By O. J. Webster

One thousand items of the collection were sent to the Mayaguez Institute of Tropical Agriculture, Mayaguez, Puerto Rico in September of 1979. The seed of each item was planted in a 10 foot row late in October in Field 4 A of the Isabela station. Early in November Dr. Antonio Sotomayor-Rios called and reported that there was a poor stand on part of the field and asked for a second set of seed. Seed was prepared and mailed in three boxes of 400 items each. The box with items 800-1200 arrived first and Dr. Sotomayor began planting in Field 6A and continued a day later with the beginning of the group, entry 1. He was able to plant items 1-250 before a rain delayed planting. The numbers 250 to 500 filled out the field 6A and the rest, 501-799 were planted in field 6B.

A fourth box of 1201-1600 was sent to Mayaguez with the instructions to hold and plant when convenient. Dr. Sotomayor planted this part of the collection in field 6B. Stands for this group were very poor, most plots had no plants and so this part of the field was abandoned in anticipation that the next planting would include a preliminary germination test and extra seed packaged when required.

When I arrived on January 7 the most of the plants in Field 4A had been covered with paper bags and most of the material in rows 1-500 was ready for harvest. We harvested all ripe heads in these rows on January 7 and 8 and placed the heads on the greenhouse bench to dry. The immature heads were ready for harvest by the end of the month.

There were three rather distinct types in rows 1-500 and I classified them as A, B, and D.

Type A was predominant and was described as a grain grass type; tillering (more than 5 stems per plant); fine stems, narrow leaves; white midvein; 2E* head type, very loose erect primary branches, head pyramidal in shape, short awns; spikelet type generally Caudatum; seed color generally reddish, some white; race Guinea - Caudatum; single seeded florets; plant height 5 to 6 feet; purple plant color.

Type B. About 5 feet in height; recurved peduncle; A7* ear compactness and shape, panicles not solid but about 2 inches in diameter; very long awns, small reddish-brown seed which threshes freely from the glumes; white midveins; non tillering; a Durra - Kafir; single seeded florets; reddish purple plant color.

The stems of items of this type were mostly bloomless (lacking a waxy cuticle, like corn). I have never seen this character in any other collection I have looked at. Recently in the US the character has been found to be associated with improved feed value as a forage. Bloomless plants, however are not as drought tolerant as are normal.

Type D. This is another unusual type since most plants have a kafir type seed with yellow endosperm similar to the Kauras found in northern Nigeria. The plant and head types however are different. Plant height, 6-8 feet; short recurved peduncle; poor head exertion; #5* semi-compact heads ranging from a kafir to a durra type; very pubescent glumes; white midvein, purple plant color; generally awned.

*A simplified classification of cultivated sorghum. J.R. Harlan and J.M. de Wet, Crop Science 1972:171-176.

Stands in rows 1-500, field 4A were good but stands in the northeast quarter of this field were poor, no plants in many rows. The failure to get a stand may be due to poor germination or to the condition of the soil. Based on previous experience with growing sorghum on this farm some fields or parts of fields give poor stands which is thought to be due to nematodes.

Most plants in lines 501-1000 were either short, relatively early durras or very tall late durras. These tall plants root lodge and are difficult to self.

Stands in rows 800-1000 second planting Field 6A were somewhat better than in field 4A, but still there were a number of plots with no plants. Stands in rows 1001-1200 were good and many lines had plants 10 to 12 feet in height and were heading when I left on February 5. I would guess that these will be classified as guinea race. Mixed among these tall late lines were a number of A types.

We were able to bag a number of heads in rows 1-500 of the second planting and between the two fields should have several grams of seed. It is always a problem to bag the A type plants. The panicles are small and the fine stems are vulnerable to breaking by the wind which prevails at Isabela.

Stands in the middle portion of field 6B were poor or zero. This part of the field is low and water may collect from frequent rains.