USAID/SAFGRAD/OAU-STRC/ICRISAT

WEST AND CENTRAL AFRICA SORGHUM RESEARCH NETWORK
(WCASRN)

RESEARCH COLLABORATION ON SORGHUM ANTHRACNOSE DISEASE

BURKINA FASO, MALI, AND ICRISAT/WASIP-MALI

Report on Meetings held at WASIP-Mali, Bamako
3 and 4 June, 1991

(A SUMMARY)

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INTRODUCTION

Anthracnose disease of sorghum caused by the fungus Colletotrichum graminicola is perhaps the most important disease of sorghum on both local and introduced varieties in the Sudanian (500-1000 mm of annual rainfall) and Northern Guinean (1000-1200 mm annual rainfall) zones of West Africa. The fungus attacks the leaves, stems, and grains. Work done by the national program of Burkina Faso indicated upto 34 % loss in grain yield due to leaf infection by C. graminicola. ICRISAT's program in Mali (WASIP-M) found that losses in grain can reach 67 % in varieties in which infection results in grain abortion. Both the national program of Burkina Faso and WASIP-Mali independantly observed that at least two isolates (pathotypes ?) of C. graminicola exist in West Africa. Preliminary laboratory results from WASIP-Mali indicate that the two isolates of C. graminicola correspond to those obtained from local varieties, (acervuli rarely formed in vivo), and improved varieties (abundant acervuli in vivo).

The SAFGRAD/ICRISAT West and Central Africa Sorghum Research Network (WCASRN) has been funding a research project on sorghum anthracnose in Burkina Faso since 1989. During the past couple of years the national program of Mali has shown interest in this disease and is one of the National Agricultural Research Systems (NARS) in West Africa that conducts the International Sorghum Anthracnose Virulence Nursery (ISAVN) from Texas A&M University in the United States. Burkina Faso also participates in ISAVN . The pathology sub-program of WASIP-Mali has a research project on various aspects of the foliar stage of the disease.

This report summarizes discussions and other activities of a meeting between the national programs of Burkina Faso, Mali, and WASIP-Mali on areas of research collaboration on sorghum anthracnose disease.

OBJECTIVES OF THE MEETING

1. To inform the National Programs of Burkina Faso and Mali, recent progress made by WASIP-Mali on laboratory studies on the variability of the anthracnose fungus C. graminicola.

2. To decide on areas of research in which the two national programs and WASIP-Mali can collaborate.

3. To decide on some common approach with respect to the identification of pathotypes of C. graminicola in West Africa.

GENERAL

Mr. Adama Neya, sorghum Pathologist in the national program of Burkina Faso is the principal investigator of WCASRN's anthracnose project at the Farako-Bâ Station in Burkina Faso. He had also done

some work on sorghum stalk infection by C. graminicola before embarking on the present project. He was invited to participate in the meeting. His travel expenses were met by the Network. A copy of the program for his visit is at the end of this report. Mr. M. Diourté, the sorghum pathologist in the national program of Mali was invited to participate in the discussions. Provision was made for Mr. Neya to visit the program of Mr. Diourté.

Discussions were held at WASIP-Mali facilities at Samanko, 16 Km from Bamako. Present at the discussions on 3 June, 1991 were :

M. Diourté	-	Pathologist, Mali National Program
A. Neya	-	Pathologist, Burkina Faso National Program
I. Sissoko	-	Senior Research Assistant, Pathology, Wasip-Mali
O. Djiré	-	Technician, pathology, WASIP-Mali
B. Diallo	-	Technician, Pathology WASIP-Mali
M.D. Thomas	-	Principal Sorghum Pathologist, WASIP-Mali, and Coordinator, West and Central Africa Sorghum Research Network.

HIGHLIGHTS OF THE MEETINGS

Discussions on 3 June

1. **Regional Sorghum Leaf Anthracnose Resistance Trial (RSLART).**

Adama Neya and M.D. Thomas finalized the protocol for this trial which was being conducted for the first time this year in Mali, Burkina Faso, Nigeria and Niger. The trial has 19 test entries and one susceptible control. The 19 test entries were selected as being resistant by Mr. Neya in 1989 and 1990 as part of the WCASRN's project on anthracnose.

2. **Identification of races of C. graminicola**

Preliminary results from WASIP-Mali

Following a brief introduction by M.D. Thomas, I. Sissoko presented a 45 - minute slide show on preliminary work carried out by WASIP-Mali on the identification of two isolates of C. graminicola. Isolations were made from the four genotypes given in the table below. They were selected from an anthracnose variability trial of 11 entries. The combination of 11 entries was put together by Neya Adama and the trial was grown for the first time in Mali and Burkina Faso in 1990 as a preliminary step for pathotype identification of C. graminicola.

Genotype	Origin	Type	Foliar Symptoms
S 29	Cameroon	Guinea	Hypersensitive-like
CSV 424	Burkina Faso	Guinea	Hypersensitive-like
IRAT 204	Burkina Faso (IRAT)	Caudatum	Typical with acervuli
IS 6928	ICRISAT Center germplasm	Caudatum	Typical with acervuli

Isolations were carried out on potato dextrose agar (PDA) and oatmeal agar (OA). The PDA was prepared by using 200 g fresh potato and 20 g dextrose per liter; and for OA, 30 g oats (Commercial Quaker oats) per litre. Both media contained 20 g agar and 0.05 g ampicillin per litre. The slides presented included these showing two types of C. graminicola from the four genotypes on both PDA and OA. The culture characteristics of those two isolates are given below.

	Mycelium[1]			Conidia[2]		Acervuli[2]	
Genotype	Color	Growth	Density	Formation	Length	Presence	Satae
S 29 (Guinea)	White	Fast	Dense	Average	Short	Yes	Yes
CSV 424 (Guinea)	Grayish white	Fast	Dense	Average	Short	Yes	Yes
IRAT 204 (Caudatum)	Pink	Slow	Loose	Abundant	Long	Yes	Yes
IS 6928 (Caudatum)	Pink	Slow	Loose	Abundant	Long	No	-

1. After Seven days
2. After three weeks

The culture characteristics mentioned in the table above were more evident on OA than on PDA, and suggest two types of isolates. It is stressed that these observations are very preliminary, based on visual assessment.

Preliminary Results from Burkina Faso

Adama Neya commented briefly on preliminary results on race identification from the project on anthracnose in Burkina Faso. He clearly identified two groups based on color of C. graminicola on PDA after 10 days incubation. One group had "dirty" white mycelium and the second group had pale pink mycelium. All pale pink cultures were isolated from improved or introduced genotypes, and had on the average longer conidia (24.7µ). In contrast, the "dirty" white cultures were isolated mainly from local genotypes and had on the average shorter conidia (24.4µ). Conidial width was constant in both groups (4.4µ). These observations compliment those of WASIP-Mali. However, in Burkina Faso, growth was faster for the pink isolates compared to the white isolates.

3. Variability Trial

As mentioned above, a variability trial consisting of 11 entries selected by Adama Neya was conducted by Burkina Faso and WASIP-Mali in 1990 as an initial step to the identification of races of C. graminicola in West

Africa. During the discussions on this trial for 1991, the following were agreed upon :

- 19 resistant lines sent to WASIP-Mali from IC in India would be included in the trial, bringing the total number of entries to 30.

- the trial will be conducted at Farako-Bâ in Burkina Faso at Sotuba, Samanko and Longorola in Mali. In Mali, the national program will be responsible for the trial at Sotuba and Longorola.

- for isolation, Burkina Faso will concentrate on the grain, Mali on the stalk, and WASIP-Mali on foliar infection. Both PDA and OA media will be used as described above, and each laboratory will note conditions under which plates were incubated. Isolations will be made from all 30 entries in the trial.

- the following culture characteristics will be assessed, mycelial growth, color and density; conidial production, length and shape; presence or absence of acervuli, presence or absence of setae.

  code for isolates should start with Cg for C. graminicola, followed by either F, G or T for foliar, grain or stem, an hyphen and then location-SKO for Samako, SB for Sotuba, FA for Farako-Bâ and LG gor Longorola. An example of an isolate from the leaf at Samanko will be written CgF-SKO. It was suggested that the varieties from which the isolations will be made should be noted separately.

- WASIP-Mali will undertake cross-inoculation experiments in pots. For this purpose, the following varieties were selected; IS 6928, IS 18442 (HS 112), IRAT 204, CSV 424, and S29.

A short discussion followed on the importance of seed transmission of C. graminicola. The national program of Burkina Faso will concentrate on this aspect. Some details on the protocol for the variability trial and cross-inoculation experiments were further discussed.

There was also a general discussion on the 1991 anthracnose trials and how the three programs will collaborate.

June 4

Since the time allocated for the visit of WASIP-Mali pathology laboratory was taken up the previous day, the visit was re-scheduled for part of the morning of June 4.

I. Sissoko explained all steps that were taken to isolate C. graminicola. Cultures of C. graminicola were observed and temporary slides made of conidia of the two isolates.

VISIT OF ADAMA NEYA

1-5 JUNE 1991

Tentative Program

Saturday 1/6/91 : 17h.40 - arrival Ethiopian Airlines from Ouagadougou, ET 963.
Airport an hotel formalities (Hotel Tennessee)

Sunday 2/6/91 : 17h.00 - Preliminary discussions - M.D. Thomas (Hotel Tennessee).

Monday 3/6/91 : 07h.15-08h - travel to Samanko
08h.00-09h - discussion on the protocol for the new regional anthracnose trial - M.D. Thomas.

09h.00-10h.00 - discussion on the variability of anthracnose - M.D. Thomas, M. Diourté and I. Sissoko.

10h.00-11h.30 - visit WASIP-Mali Pathology Laboratory to observe work on C. graminicola isolates - M.D. Thomas, M. Diourté, I. Sissoko.

LUNCH IN TOWN

15H.00-18H.00 - Free.

Tuesday 4/6/91 : 07h.00-07h.15 - travel to Sotuba
07h.30-11h.00 - visit of M. Diourté's program.

LUNCH

12h.20-15h.00 - general discussions on collaboration for 1991 trials - M.D. Thomas, M. Diourté and I. Sissoko.

Wednesday 5/6/91: Departure - Air Burkina UBW 301/302 at 10h.00 (leave hotel at 07h.00)

1991-06

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