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ICRISAT
TRAINING OFFICE
FARMING SYSTEME

RAINY SEASON 1985

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EXPERIMENTAL REPORT

1. SORGHUM VARIETAL AND PLANT DENSITY TRIAL
2. VARIETY AND NITROGEN RESPONSE TRIAL IN PEARL MILLET

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I N T R O D U C T I O N

In Senegal, pearl millet and sorghum are the second after groundnut in cultivated area and national production. With the money procured by selling groundnut which is an industrial crop, the farmer buys rice to complete his deficiency in food and to buy other family needs.

This situation, during a long time has favoured the cultivation of groundnut at the loss of pearl millet and sorghum which are the staple food for farmers. Farmers are more than 80 % of the total population,

in the last seventy years, the inflation and the persistent drought have aggravated the food deficiency an over the country.

Also, the price of the groundnut was not indexed to the price of other products of primary necessity. With this hard experience, the farmers begin to increase the cultivation of cereals like pearl millet and sorghum. These two (2) crops occupy 970 000 ha compared to 1 050 000 ha of groundnut.

The rainfall deficiency, low grain yield, poor soils, diseases and insects are the major problems in pearl millet and sorghum production in Senegal.

From 1970, National Center of Agronomic Research at Bambay (Senegal) established the millet improvement office with the objective of developing high yielding varieties with yield stability for intensive agriculture.

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The importance of pearl millet and sorghum in Senegal influenced me to choose ^{these} crops for my two (2) experiments at ICRISAT Center.

- A/ - Sorghum varietal and plant density trial
- B/ - Variety and nitrogen response trial in pearl millet.

A/ - SORGHUM VARIETAL AND PLANT DENSITY TRIAL

1^o) - Objective :

To study response of sorghum varieties to plant density its for high yield in Semi-Arid Tropic Zones,

2^o) - Materials and methods :

This experiment was conducted in the vertisol (BL 2A) of ICRISAT Patancheru in kharif season 1985.

The experiment was laid out in Randomized Block Design (RBD) with two (2) factors and four (4) replications :

- First factor was variety : SPV 351 (V1) and SPH 221 (V2)
- Second factor was plant density : 100 000 plants/ha (D1)
150 000 plants/ha (D2)
200 000 plants/ha (D3).

Each plot consisted of 4 rows of 5 meters length and spaced 0.75 m apart. The gross area was 15 m² and the net area harvested per plot was 4.5 m².

60 kg N/ha and 17 kg P/ha was applied in the following forms :

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- 150 kg/ha of ammonium sulfate (20 % N) at the thinning
- 150 kg/ha of " " " " at the botom
- 243 kg/ha of superphosphate as basal application

At sowing, carbofuran was applied into the furrows
Atrazine was sprayed as pre-emergency application.
The experimenter received a hard weeding (July 10)
and another later.

Rainfall data is provided in table n° 3

3°) - Results and discussion :

Tableau n° 1 Summary of selected means and data

TREATMENTS	Plant Height (cm)	panicle length (cm)	panicles Harvested (000/ha)	Thousand Seed weight (g)	Grain Yield (kg/ha)
Factor A					
SPV 351	145	23	67	21	2 000
SPH 221	149	23	97	21	2 700
F	NS	NS	**	NS	**
SEM ±	2.86 2.86	0.81 081	5.53 553	0.29 0.29	81
CD	8.6 860	2.42 242	16.64 1664	-	1 7 2
Factor B					
100 000 pts/ha	156	26	68	20	2 500
150 000 pts/ha	146	22	86	21	2 400
200 000 pts/ha	130	21	Y1	21	2 100
F	**	**	NS	NS	*
SEM ±	350	0.99 099	677	0.36 0.36	99
CD	1 054	2.97 297	2 038	-	210
Interaction					
F	NS	NS	NS	NS	NS
SEM ±	4.95 495	1.4 14	9.57 957	05 0.57	140
C. V. %					
	7	12	23	5	12

The hybrid SPH 221 has better emergency and seedling vigor than the variety SPV 351. All Resown plants were damaged by the shootfly at the beginning. But SPV 351 That has more gaps was more damaged by the shootfly. The number of panicles harvested shows how the importance of damage for each variety is, particularly the percentage of threshing was not influenced by the population density. It was statistically same for all varieties and densities as shown below :

- SPV 351 : D1 82.5 %, D2 82.4 %, D3 77.8 % and the mean 80.9 %
- SPH 221 : D1 80.4 %, D2 80.7 %, D3 80.5 % and the mean 80.5 %.

SPV 351 and SPH 221 have certain common characters. In effect, any significant difference was not observed for plant height, panicle length and thousand seed weight between these varieties.

Nevertheless, for the panicles harvested and grain yield, the difference was highly significant and the SPH 221 was superior to SPV 351.

The difference was respectively 30,000 panicles/ha and 700 kg grains/ha.

The lower density (100,000 plants/ha) had highest plant and longest panicle ; followed by the medium density (150,000 plants/ha).

The grain yield also was superior in the lower density followed again by the medium density. That means, the plant height and panicle length determined by the plant density, influence the grain yield.

Any difference significant was not observed between these three (3) densities for the panicles harvested and thousand seed weight.

For grain yield in SPV 351, the lower plant density was superior to the others. And for SPH 221, the medium density was dominant in grain yield, but slightly superior to medium density.

Any difference statistically significant was not observed for the interaction.

4^o) - Conclusion :

In this year, the crops was greatly affected by the drought at the time of flowering and the shoot fly.

In this experiment, SPH 221 was superior in grain yield than SPV 351. SPH 223. had also the better emergency and seedling vigor.

For SPV 351 the best density was 100,000 plants/ha
The plant density (150,000 pts/ha) was recommended for SPH 221.

For getting more knowledge of the cause of superiority of SPH 221 to SPV 351, it will be interesting to conduct again this experiment in including two (2) characters in the observations (number of plants at the emergency and number tillers).

5^o) - Literature review :

a) - Los BARRROS, University of Philippines 1981
XVIII, 133 P TANSIE 54 689

Effects of tillage, stand establishment and residue management on performance of sorghum: grown under upland and rainfed lowland conditions.

b) - Preager HERMAN A., Jr ; Thesis-Kansas State University 1977 MF 5799

Field environmental conditions related to tillering and its contribution to yield of grain sorghum.

c) - Siddig MUHAMED ; Thesis (M.Sc) - American University of Beirut.

Effect of row-width and strain on yield and other characteristics of grain sorghum.

B/ - VARIETY AND NITROGEN RESPONSE TRIAL IN PEARL MILLET

1^o) - Objective :

To study response of pearl millet varieties to nitrogen level for high yield in Semi-Arid Tropic Zones.

2^o) - Materials and Methods :

This experiment was conducted in alfisol (RCW 13A) of ICRISAT Center Patancheru in rainy season 1985.

its experiment design was Randomized Block Design (RBD) with two (2) factors and four (4) replication :

- Factor A = Variety : BK560 (V1) and IVS 5454 (V2)
- Factor B = Nitrogen Level : 20 kg N/ha (F1) , 40 kg N/ha (F2) and 60 kg N/ha (F3).

Number rows per plot : 4

Length of row : 5 meters

Row spacing : 0.75 meter

Gross area per plot : 15 m²

Net area of plot harvested : 4.5 m².

- All fertilizer was applied as basal application ;
- Diammonium phosphate (18 % N and 20 % P) : 85 kg/ha for each treatment
- Ammonium Sulphate (20 %N) : 23 kg/ha for F1, 123.5 kg/ha for F2 and 223.5 for F3.
- Date of sowing 25.6.85
- Atrazine was sprayed as pre-emergency application
- One (1) weeding with tractor and one (1) hand weeding were done in this experiment
- Rainfall data is provided in table n^o 3.

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3^o) - Results and discussion :Table n^o 2 : Summary of Selected means and data

TREATMENTS	Flowering 50 % (days)	Plant Height (Cm)	panicle length (Cm)	panicles harvested (000/ha)	Thousand Seed weight (g)	Grain Yield kg/ha
Factor A : Variety						
BK 560	51	176	20	275	6.24	2 620
IVS 5454	51	206	24	205	6.56	2 290
F	NS	**	**	**	NS	**
SEM ±	0.29	2.26	0.31	6.36	0.17	62
CD	1.05	8.35	1.14	23.47		235
Factor B : Nitrogen						
20 kg N	51	191	23	233	6.61	2 290
40kgN	50	187	22	246	6.03	2 580
60 kg N	51	191	22	241	6.57	2 500
F	NS	NS	NS	NS	NS	*
SEM ±	0.35	2.77	0.38	7.79	0.21	75
CD	0.86	6.82	0.93	19.16		192
Interaction						
F	NS	NS	NS	NS	*	NS
SEM ±	0.5	3.92	0.54	11.02	0.29	107
CD					0.97	
cv (%)	2	4	5	Y	Y	9

These two (2) varieties tested at three different levels of nitrogen were not shown any difference at the emergency and seedling vigor.

They were also flowery and matured at the same times.

For the plant height, IVS 5454 was largely superior to BK 560 (203 cm against 176 cm). Any difference statistically significant was not observed in the levels of nitrogen and in the interaction.

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The same observations for plant height is true also for panicle length (24 cm for IVS 5454 and 20 cm for BK 560).

The number of **panicles** harvested was largely superior for BK 560. The nitrogen level and the interaction had not any effect on the number of panicles harvested.

For the weight of thousand seeds, only the interaction in F 3 (60 kg/ha) was shown significant : IVS 5454 was more heavy than BK 560 (7.22 g against 5.92 g).

For the grain yield, some statistic difference were observed in each factor and not in the interaction. in effect, BK 560 had the better grain production than IVS 5454 (2620 against 2300 kg/ha) which was influenced by the number of panicles harvested.

For Factor B, F2 (40 kg N) and F3 (60 kg N) were statistically equal and superior to F1 (20 kg N).

When we compare the percentage of threshing, IVS 5454 was superior. And BK 560 was superior in panicles harvested and grain yield. It resulting that BK 560 had more tiller than IVS 5454.

4^o) - Conclusion :

I'm affred that the nitrogen applied as basal application had reducing its effects of the differente rates on the varieties tested.

Never theless, the variety BK 560 was better than ~VS-5454 in grain yield for each rate of nitrogen in this case. This superiority is due to number of tillers more important for BK 560.

Also, the maximum yield was obtained with 40 kg N and 60 kg N/ha. But in including the economic effect, 40 kg N/ha is recommended.

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5^o) - Literature review :

- a) - Kasana, N.A., and Chaudhary, R.R. 1981 Pakistan Journal of Agriculture Research 2 (4) : 222-224. 4 ref.
+ Fertilizer (Nitrogen and phosphate) requirement of pearl millet variety "BY-18" in Pakistan.
- b) - Gautam, R.C., and Kanshik, S.K. 1981. Fertilizer News 26 (8) ; 20-22,25.
+ Responses of pearl millet to Fertilizer application.
- c) Ramakrishna, Y .S., Sastri, A. S. R. A. S. and Rao, B. V. R. 1981
India; Journal of Agronomy 26 (2) : 110-113. 5 Ref.
+ Drought vulnerability of pearl millet under Jodhpur conditions.
- d) - Beaty, E.P., Engel, J.L., and Powell, J.D. 1977
Agronomy Journal 69 (2) : 308-311 - 14 Ref .
+ Yield, leaf growth, and tillering in bahiagrass by N rate an season.

Table nº 3

Rainfall Data

Total (484.2 mm
(59 days

Months	June	July	August	September	October
1	0.6 m/m				
2	12.8 "	0.6 mm	4.8 mm		43.4 mm
3		21.6 "			8.0 II
4	0.4 "	3.2 "		22 mm	0.4 mm
5	3.3 "	1.6 "		1.6 "	16 "
6					
7	18.2 "			1.6 "	12.6 mm
8		0.3 "		8.0 II	
9		0.4 "			
10			1.8 "		
11			3.2 "		
12			4.2 "	23.2 "	
13			5.3 "		
14		2.2 "	3.7 "	3.4 "	
15	1.8 II	3.0 "			
16		1.6 "	0.4 "		
17		2.1 "			
18	1.2 "	2.2 "			
19	21.6 "	4.0 "			
20		15.8 "			
21	2.6 II	10.4 "		30.2 "	
22					
23	-	26.6			
24		1.6 II	2.0 "		
25	11.8 "	4.4 "	5.8 "	5.6 II	
26	1.2 "		8.0 "	0	
27		8.2 II	-		
28		22.2 "	-		
29	3.3 "	5.2 "	-		
30	9.8 "	9.2 "	-		Totals
31		27.0 II	7.0 "		484.2 months 59 days
Total days	12 days	22 days	11 days	8 days	
Total m/m	88.6 mm	173.4 mm	46.2 mm	95.6 mm	80.4 mm