ORGANIZATION OF AFRICAN UNITY
SCIENTIFIC, TECHNICAL AND RESEARCH COMMISSION
(O A U / S T R C)

WEST AND CENTRAL AFRICA COWPEA NETWORK
(R E N A C O)

WESTERN AND CENTRAL AFRICA COWPEA NETWORK
RESEAU WIEBE DE L'AFRIQUE OCCIDENTALE ET CENTRALE
OAU-STRC-SAFGRAD
OUA-CSTR-SAFGRAD

1989-90 REGIONAL TRIALS
PRELIMINARY RESULTS

IITA/SAFGRAD
01 B.P. 1495
OUAGADOUGOU 01 — BURKINA FASO

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PREFACE

Regional trials are considered the most appropriate means by which new technologies developed either by RENACO Lead Centers and IITA-GLIP can be transferred to national programs. There are two main objectives of the trials (1) to evaluate the performance of improved technologies over a wide range of environments, and (2) to provide national cowpea programs an opportunity to select new technologies for further testing and use, either directly as new crop varieties or agronomic practices or as a source of breeding materials.

Subsequent to promising technologies identified by the Network Steering Committee in March 1989 at Lome, Togo, a total of 53 regional trials in seven sets as follows, were assembled and dispatched to member countries in May and June, 1989.

- Adaptation to northern Guinea savanna zones	8
- Adaptation to Sudano-Sahelian zones	6
- Adaptation to transition zones	5
- Striga resistance	7
- Aphids resistance	8
- Bruchids resistance	12
- Virus resistance	7
Total	53

Two regional entomology trials, namely minimum insecticide and cowpea insect pest survey were also assembled by entomologists who met at Lome during the March 1989 Workshop. The trials were distributed to member countries from IITA, Ibadan under the supervision of IITA-Outreach Programs' Liaison Scientist, Dr. J.B. Suh. The results were to be collected by Dr. A. Bal, an entomologist from Senegal.

At the time of this write-up, feedback had been received on a total of 44 trials.

National programs conducted the trials because technologies evaluated were of great interest to them.

On our part, we have urged them to repeat the trials in 1990 for a better appraisal of promising technologies identified in 1989 and possibly

to pass on into multilocation testing in 1991 of any of the reconfirmed technologies. We have also advised them to analyse data and report them in their annual progress report and use promising technologies for the benefit of farmers in their respective countries.

This report is intended to give national scientists a good picture of the performance of the new technologies within the sub-region. It is our hope that from this exercise, increased confidence will be instilled as to the importance of the new technologies, thereby accelerating the rapid transfer of technologies to farmers.

This report covers the following regional trials for which we have received good records and reliable results.

- Adaptation for northern Guinea savanna zones;
- Adaptation for Sahelo-Sudanian zones;
- Adaptation for transition zones;
- Striga resistance;
- Aphids resistance;
- Bruchids resistance;

The regional entomology trial will be reported separately.

N. Muleba
Cowpea Network Coordinator

Ouagadougou, June 1990

DECLARATION

Mention of a particular pesticide, any other chemicals or products in this document does not imply endorsement of, or discrimination against any manufactured products by IITA/SAFGRAD.

I. REGIONAL TRIAL FOR NORTHERN GUINEA SAVANNA ZONE

a) Objective

To evaluate improved lines for adaptation to the northern Guinea savanna zone

b) Description

The trial consisted of 8 entries and a local check (Table 1) in four randomized complete block design. It was requested by Benin, Burkina Faso, Cameroon, Côte d'Ivoire, The Gambia, Ghana, Nigeria and Togo.

Table 1. Regional adaptation trial for the northern Guinea savanna zone.

No.	Entry	Pedigree	
1	IT86D-1056	(TVu 3000 x IT82D-789) x(TVu 1509 x IT82D-789)	IITA
2	IT83D-213	-	IITA
3	KVx 396-4-4	(IAR 1696 x KN-1) x SUVITA-2	Burkina
4	KVx 396-18	- do -	Burkina
5	KVx 396-4-2	- do -	Burkina
6	KVx 396-16	- do -	Burkina
7	KN- (VITA-7)	-	IITA
8	KVx 396-4-5	(IAR 1696 x KN-1) x SUvITA-2	Burkina
9	Local check	-	Local

c) Feedback

Feedback was received from all countries reported as follows:

BENIN

Cooperator: Mr. Alphonse Yehouenou

The trial was conducted at the Ndali/INA Station (90°58'N,45'E, 458 m above sea level). It was sown on 3 August, 1989, sprayed with Perfection (Dimethoate) insecticides trice (15 September, 1 October and 17 October) and harvested from 24 October to 3 November, 1989. A total of 870 mm rainfall was received as shown on Fig. 1. The cowpea performance is given on Table 2 below.

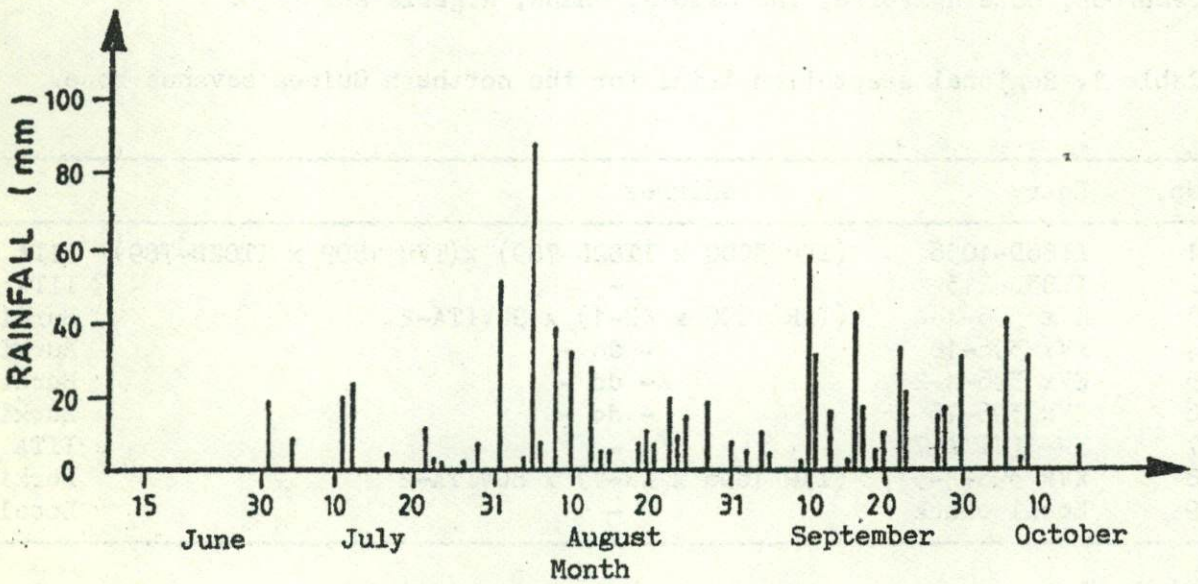

Fig. 1. Rainfall at Ndali/INA, Benin, in 1989.

Table 2. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at INA, Benin, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Yield
		---------DAS----------		--kg/ha--
IT86D-1056	31	44	65	625
IT83D-213	20	47	67	612
KVx 396-4-4	31	46	72	969
KVx 396-18	32	48	70	1271
KVx 396-4-2	33	46	70	1033
KVx 396-16	33	47	71	940
KN-1	34	48	69	871
KVx 396-4-5	33	47	71	1314
TN-61	24	47	68	727
LSD (5%)	7	1	2	289
C.V. (%)	16	2	2	21

BURKINA FASO

Cooperator: Mr. J. Ouedraogo

The trial was conducted at Farako-Bâ (11°04'N,0°21'W, 405 m above sea level). It was sown on 18 July 1989 and sprayed with insecticides (Deltamethrine and Dimethoate) seven times and was harvested in mid to late October, 1989. A total of 926 mm rainfall was received as shown in Fig. 2. The cowpea performance is given on Table 3.

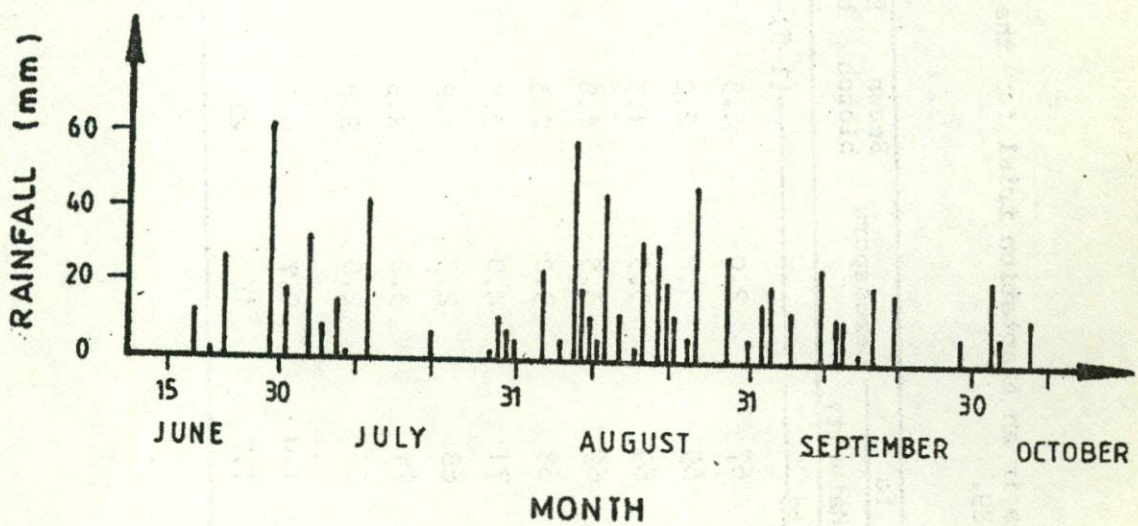

FIGURE 2. RAINFALL AT FARAKO-BA, BURKINA FASO IN 1989.

Table 3. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Farako-Bâ, Burkina Faso, in 1989.

Cultivars	Number of plants	Days to		Cercospora	Brown blotch	Bacterial blight	Web blight	Scab	Virus	Yield
		Flowering	Maturity							
		---DAS---		---(1-5)---				--(1-5)--		-kg/ha-
IT86D-1056	45	47	67	2.0	2.5	1.0	3.0	1.0	2.3	683
IT83D-213	36	48	69	3.8	2.8	3.3	4.0	1.0	2.5	540
KVx 396-4-4	39	46	69	3.5	1.5	1.0	2.5	1.3	1.5	870
KVx 396-18	42	47	69	3.5	1.8	1.0	2.5	1.3	1.3	950
KVx 396-4-2	40	46	68	3.0	2.3	1.0	2.0	1.8	1.0	1193
KVx 396-16	41	48	71	4.0	2.5	1.0	4.0	1.3	1.3	478
KN-1	41	49	68	2.3	1.8	1.0	2.8	1.0	1.5	488
KVx 396-4-5	41	47	71	3.8	2.8	1.0	2.8	3.0	1.5	1031
Lesso Local	43	48	66	2.0	2.8	1.0	2.5	1.3	1.3	492
LSD (5%)	4	0.9	1.0	0.7	0.7	1.2	0.7	1.2	0.8	305
C.V. (%)	7	1.3	1.7	16	22	13	18	59	38	28

CAMEROON

Cooperator: Mr. Georges Ntoukam

The trial was conducted at Sanguere near Garoua (9°18'N,13°25'E). It was sown on 25 July 1989, sprayed with insecticides (Cypermehrine) trice and havested on 16 October 1989. A total of 750 mm rainfall was received as shown on Fig. 3. The cowpea performance is shown on Table 4.

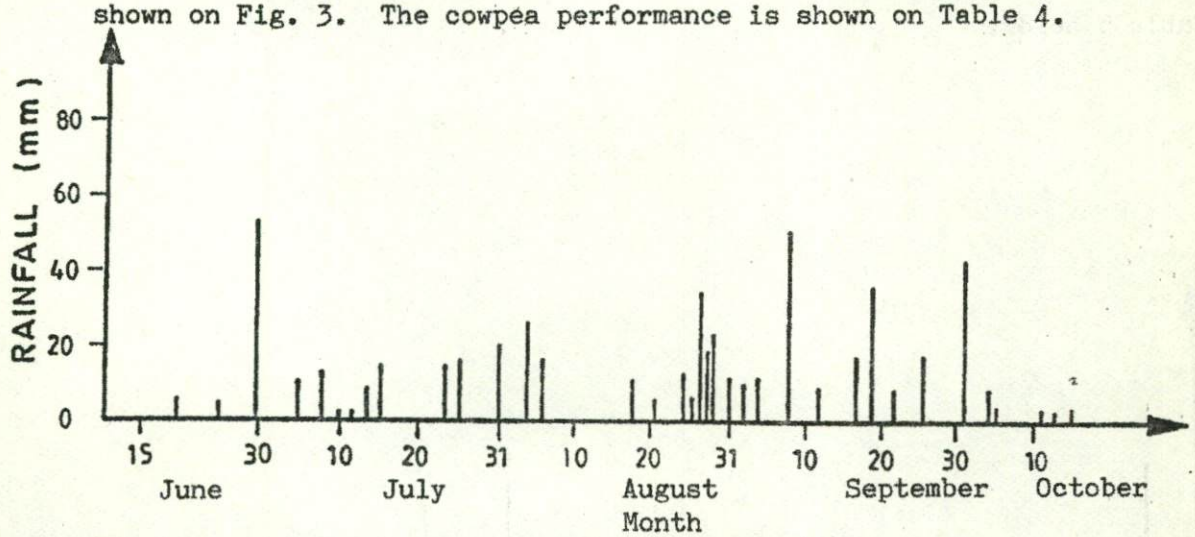

Fig. 3. Rainfall at Sanguere, Cameroon, in 1989.

Table 4. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Sanguere, Cameroon, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Virus	Yield
		---------DAS----------		--(1-5)--	-kg/ha-
IT86D-1056	32	43	61	2.1	1490
IT83D-213	27	43	61	2.6	902
KVx 396-4-4	31	43	82	1.8	1979
KVx 396-18	32	45	83	1.8	1929
KVx 396-4-2	32	45	79	2.0	1711
KVx 396-16	32	46	83	2.5	1757
KN-1	32	43	65	1.9	1444
KVx 396-4-5	32	46	80	1.6	1908
VYA	31	51	83	2.8	1507
LSD (5%)	1	2	4	0.4	406
C.V. (%)	3	3	3	13	17

COTE D'IVOIRE

Cooperator: Mr. Adou Amalaman

The trial was conducted at Bouake (7°44'N,5°02' W, 375 m above sea level). It was sown on 25 July 1989, sprayed once with insecticide (Deltamethrine) and harvested from 16-26 October, 1989. A total of 1241 mm rainfall was received as shown on Fig. 4. The cowpea performance is given on Table 5 below.

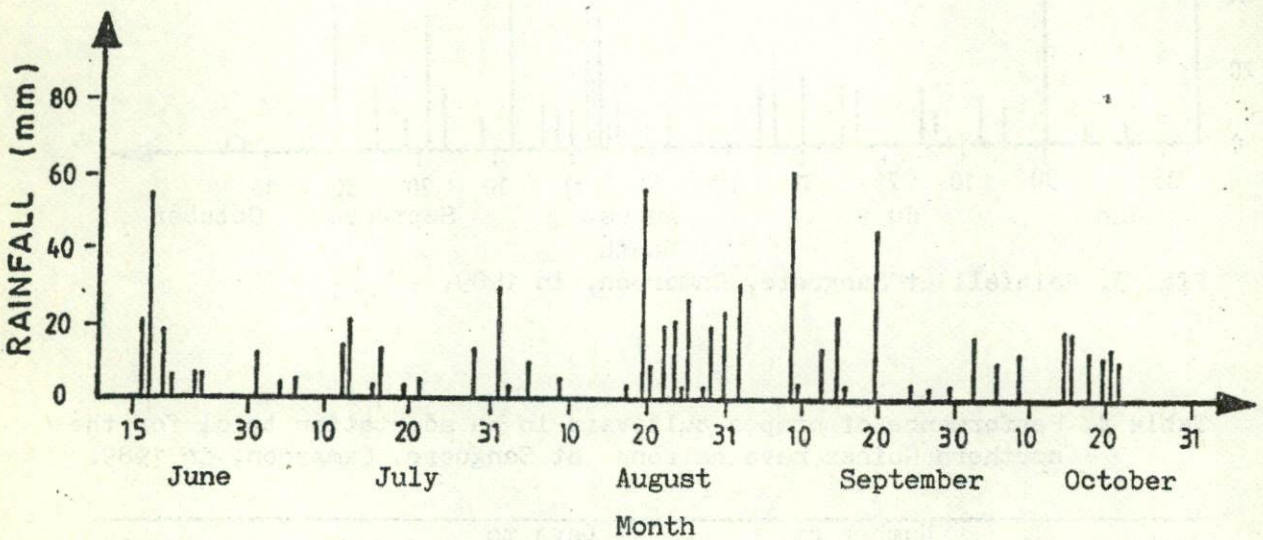

Fig. 4. Rainfall at Bouake, Côte d'Ivoire, in 1989.

Table 5. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Bouake, Côte d'Ivoire in 1989.

Cultivars	Number of plants	Cercos-pora	Web blight	Virus infection	Insect infestation Anoplocnemis	Maruca	Yield
		----(1-5)----			--------(1-5------		-kg/ha-
IT86D-1056	40	1.6	2.0	1.0	1.3	1.7	1012
IT83D-213	25	1.0	2.0	1.0	1.3	1.5	1110
KVx 396-4-4	33	1.0	1.5	1.0	1.4	2.2	1026
KVx 396-18	36	1.0	1.0	1.8	1.0	2.0	1299
KVx 396-4-2	31	1.5	1.0	1.0	1.6	2.6	1279
KVx 396-16	36	1.3	1.7	1.3	1.0	2.0	1354
KN-1	41	1.8	1.7	1.0	1.0	2.4	1640
KVx 396-4-5	33	1.0	1.0	1.0	1.0	2.5	1260
Local	25	1.3	1.0	2.3	1.0	2.0	922
LSD (5%)	6	0.6	0.4	0.4	0.5	0.8	228
C.V.(%)	12	32	20	21	31	27	13

THE GAMBIA

Cooperator: Mr. Musa Bojang

The trial was conducted at Yundum, near Banjul (13°28'N,16°34'W, 10 m above sea level). It was sown on 3 August 1989, sprayed twice with insecticide (Dimethoate) and harvested from 10-18 October, 1989. A total of 781 mm rainfall was received as shown in Fig. 5. The performance of cowpea is given on Table 6.

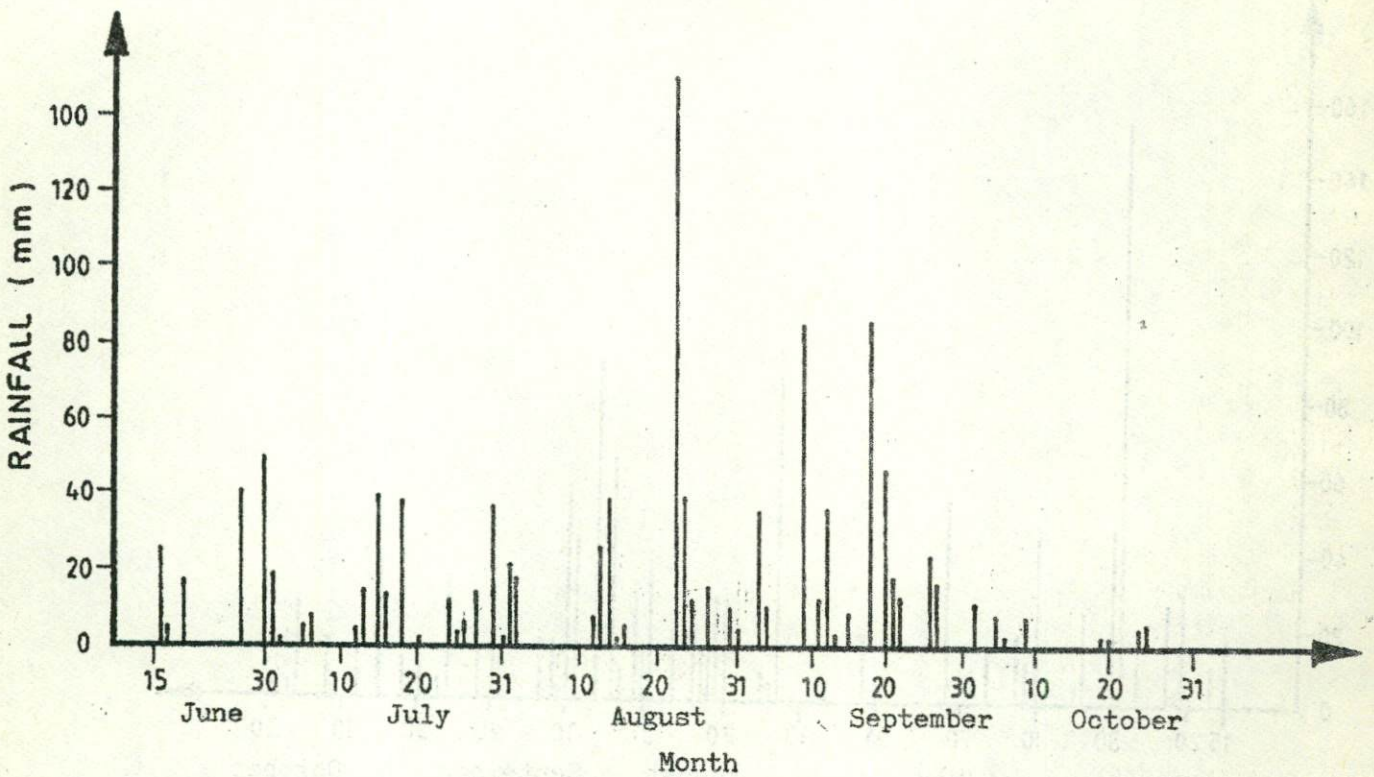

Fig. 5. Rainfall at Yundum, The Gambia, in 1989.

Table 6. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Yundum, The Gambia, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Anoplocnemis curvipes	Cowpea wilt	Anthroc-nose	Yield
		DAS		(1-5)			-kg/ha-
IT86D-1056	36	43	61	2.0	1	1.0	982
IT83D-213	29	43	61	1.8	3	1.0	784
KVx 396-4-4	35	42	63	1.5	1	1.0	1549
KVx 396-18	32	46	65	1.8	1	1.0	1069
KVx 396-4-2	36	46	64	1.3	1	1.0	1588
KVx 396-16	37	47	67	1.5	1	1.0	950
KN-1	34	47	65	3.0	1	1.0	951
KVx 396-4-5	33	45	65	1.5	1	1.0	1370
CB-5	24	39	61	2.0	1	5.0	437
LSD (5%)	4	2	3	NS	1	1	344
C.V. (%)	8	3	3	46	36	0	22

GHANA

Cooperator: Mr. Anthony A. Mahama

The trial was conducted at Nyankpala, near Tamale (9°25'N,0°58'W, 183 m above sea level). It was sown on 23 June 1989, sprayed trice with insecticide (Cypermethrine) and harvested in September. A total of 1601 mm rainfall was received and is given on Fig. 6. The performance of cowpea is shown on Table 7 below.

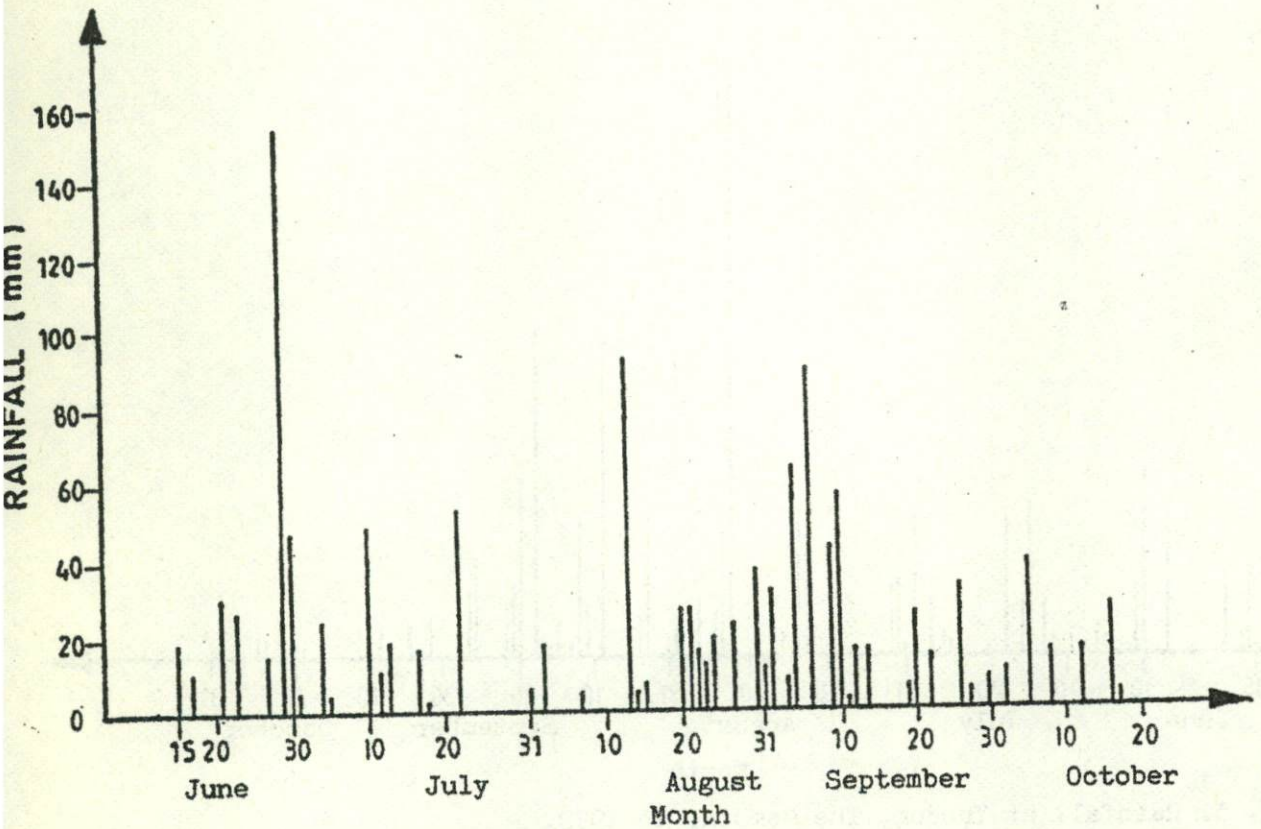

Fig.6. Rainfall at Nyankpala, Ghana, in 1989.

Table 7. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Nyankpala, Ghana, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Cercos-pora	Brown blotch	Bacterial blight	Web blight	Yield
		-DAS-		(1-5)				-kg/ha-
IT86D-1056	35	48	70	3.3	3.0	2.0	1.3	925
IT83D-213	27	48	70	2.5	1.5	1.3	2.0	693
KVx 396-4-4	33	48	75	2.0	1.0	1.0	1.0	626
KVx 396-18	34	48	75	2.5	1.0	1.0	1.0	1096
KVx 396-4-2	36	49	75	2.3	1.0	1.0	1.0	724
KVx 396-16	36	49	75	2.5	1.0	1.0	1.0	802
KN-1	37	48	70	1.3	1.0	1.0	1.3	1411
KVx 396-4-5	33	48	75	1.8	1.0	1.0	1.0	779
Sawla Local	27	48	70	3.8	1.0	1.0	1.0	367
LSD (5%)	4	1	-	0.8	0.1	0.6	0.6	278
C.V. (%)	9	1	0	24	27	35	37	23

NIGERIA

Cooperator: Mr . O.O. Olufajo

The trial was conducted at Samaru/Zaria, (11°11'N,7°38'E, 686 m above sea level). It was sown on 1 August 1989 sprayed five times with insecticides (mixture of Cypermethrine + Dimethoate) and harvested from 11-24 September. The plot received an equivalent of 36 kg P_2O_5/ha as single super phosphate. A total of 1157 mm rainfall was received as given on Fig. 7. The performance of cowpea is given on Table 8 below.

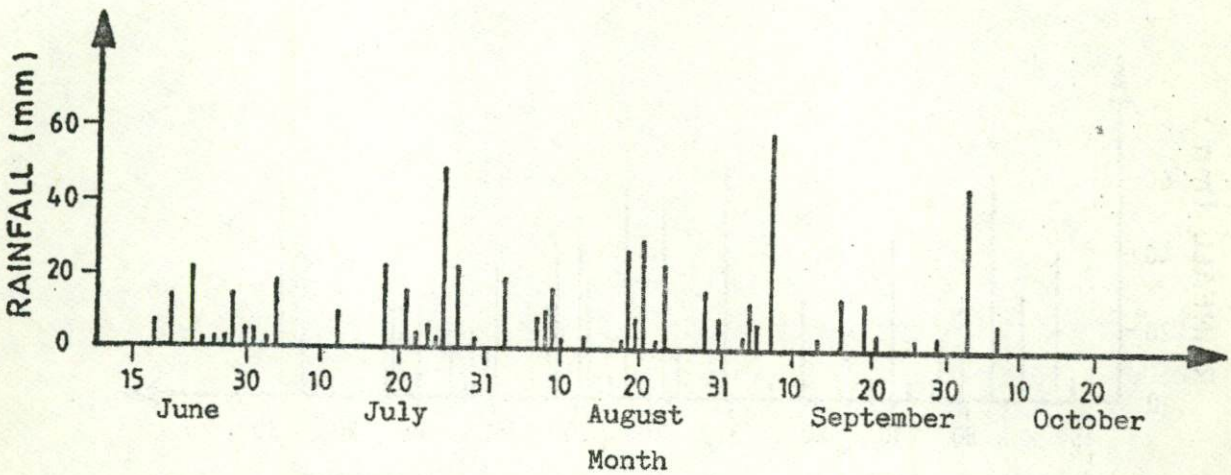

Fig. 7. Rainfall at Zaria, Nigeria in 1989.

Table 8. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Zaria, Nigeria, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Brown blotch	Bacterial blight	Scab	Septoria	Yield
		DAS		(1-5)				kg/ha
IT86D-1056	32	48	71	1.5	3.4	3.0	2.1	1470
IT83D-213	23	48	72	1.3	3.8	2.6	2.0	1391
KVx 396-4-4	31	46	75	1.6	1.9	3.3	3.5	2355
KVx 396-18	31	49	81	2.1	2.5	3.8	2.0	2631
KVx 396-4-2	33	49	76	1.3	2.1	2.8	3.4	2116
KVx 396-16	33	47	74	1.5	1.5	3.5	3.6	2524
KN-1	32	48	73	1.3	2.4	2.8	2.0	3255
KVx 396-4-5	29	49	80	1.6	1.6	3.5	3.3	2411
Sampea 3 (IAR 341)	27	54	82	1.1	1.5	2.8	2.9	2236
LSD (5%)	3	2	3	NS	1.0	0.5	0.3	455
C.V. (%)	8	2	2	32	18	11	8	14

TOGO

Cooperators: Mr. H. Renaud & Mr. Toky Payaro

The trial was conducted at Tantiegou/Dapaon, (10°52'N,0°10'E). It was sown on 23 June 1989, sprayed trice with insecticides (Cypermethrine + Dimethoate) and harvested on 10 September 1989. A total of 1121 mm rainfall was received and is given on Fig.8. The performance of cowpea is given on Table 9 below.

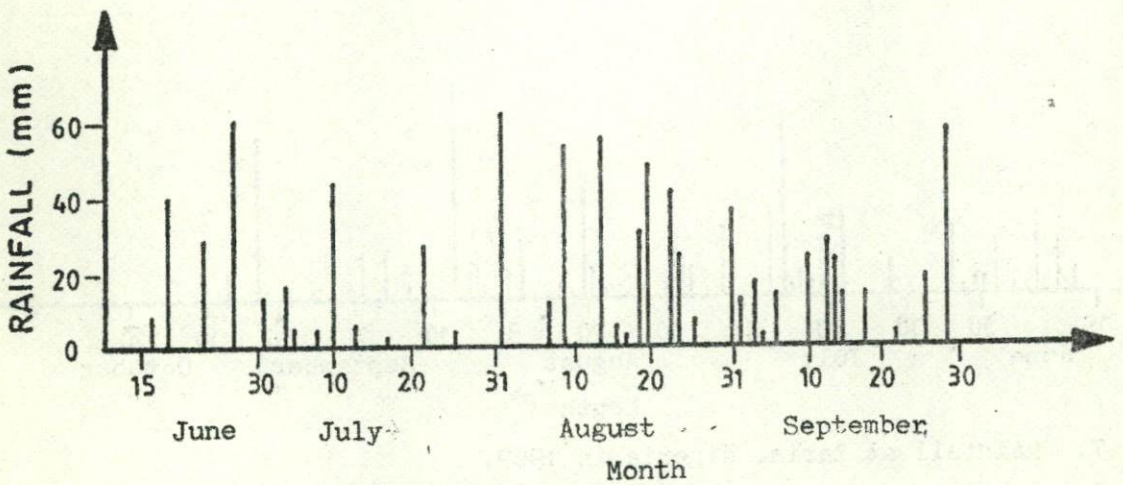

Fig. 8. Rainfall at Tantiegou, Togo, 1989.

Table 9. Performance of cowpea cultivars in an adaptation trial for the northern Guinea savanna zone at Tantiegou, Togo, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Bacterial blight	Web blight	Yield
		--------DAS-------		-----(1-5)------		-kg/ha-
IT86D-1056	82	47	67	2.5	2.5	597
IT83D-213	83	31	61	2.5	1.8	816
KVx 396-4-4	81	26	58	3.0	1.8	676
KVx 396-18	81	37	63	2.5	2.5	595
KVx 396-4-2	82	46	68	3.5	1.0	783
KVx 396-16	82	45	65	3.8	1.0	563
KN-1	82	46	66	3.8	1.0	685
KVx 396-4-5	83	45	64	2.3	3.3	681
58-146	83	45	65	2.8	1.0	780
LSD (5%)	NS	2	2	0.9	0.8	NS
C.V. (%)	1	3	2	21	30	19

COMBINED ANALYSES

A combined analyses of yield across locations showed significant effects due to location, cultivar and their interaction. A yield stability analyses was also conducted. Location and cultivar mean yields, slope (β) and the coefficient of determination (R^2) associated with regression lines of mean yield of cultivars are shown on Table 10 below.

Table 10. Location mean yields; cultivar mean yields across locations; and slope (β) and coefficient of determination (R^2) associated with regression lines of mean yield of cultivars in regional trial for adaptation to northern Guinea savanna zone in 1989.

Location	Yield §	Cultivar	Yield §	β	R^2
	--kg/ha--		--kg/ha--		
Tantiegou (Togo)	686 g	IT86D-1056	973 c	0.59	0.81
Nyankpala (Ghana)	825 f	IT83D-213	856 d	0.44	0.73
Sanguere (Cameroon)	1625 b	KVx 396-4-4	1254 ab	1.09	0.86
Bouake (Côte d'Ivoire)	1212 c	KVx 396-18	1355 a	1.16	0.95
Yundum (The Gambia)	1053 d	KVx 396-4-2	1303 a	0.80	0.80
Ndali/INA (Benin)	929 e	KVx 396-16	1171 b	1.27	0.98
Zaria (Nigeria)	2263 a	KN-1 (VITA-7)	1318 a	1.49	0.81
Farako-Ba (Burkina Faso)	747 fg	KVx 396-4-5	1344 a	1.03	0.92
		Local checks	934 cd	1.12	0.88
LSD (5%)	103				
C.V. (%)	19	LSD (5%)	109	-	-
		C.V. (%)	19	-	-

§ Means followed by the same letters are not statistically different at 5% probability level.

From yield stability analyses, cultivars were classified into five categories as follows:

1) Poorly adapted with above average yield stability; these are cultivars with yield less than 1200 kg/ha and β less than 1.00 (Table 10).

2) Poorly adapted with below average yield stability; these are cultivars with yield less than 1200 kg/ha and β greater than 1.10.

3) Better adapted with above average yield stability; these are cultivars with yield greater than 1200 kg/ha aand β less than 1.00 (Table 10).

4) Adapted with below average yield stability (i.e., responsive to favourable environmental conditions) these are cultivars with yield greater than 1200 kg/ha and β greater than 1.10.

5) Adapted with average yield stability; these are cultivars with yield greater than 1200 kg/ha and β varying between 1.00 and 1.10.

II. REGIONAL TRIAL FOR THE SAHELO-SUDANIAN ZONE

a) Objective:

To assess improved lines for adaptation to the Sahelo-Sudanian zones.

b) Description

The trial consisted of 11 entries and a local check (Table 11 below) in four randomized complete block design. It was requested by Burkina Faso, Cameroon, Guinea Bissau, Niger, Nigeria, Mauritania and Tchad.

Table 11. Regional Adaptation Trial for the Sudano-Sahelian zones.

Entry No.	Entry	Pedigree	Origin
1	KVx 30-309-6G	TVu 2027 x SUVITA-2	Burkina
2	KVx 396-4-4	(IAR 1696 x KN-1) x SUVITA-2	Burkina
3	KVx 396-4-5	- do -	Burkina
4	KVx 396-18-10	- do -	Burkina
5	KVx 396-11-6	- do -	Senegal
6	IT85D-3517-2	- do -	IITA
7	IT85D-3516-2	- do -	IITA
8	IT85D-3577	(IT82E-60 x TVu 801) x TVx 1850-01E	IITA
9	IT83D-219	(TVx 6475 x TVu 4557)	IITA
10	TN88-63	Local selection	Niger
11	TVx 3236	Ife Brown x TVu 1509	IITA
12	Local check	-	-

c) Feedback

At the time of this write-up, feedback had been received from Burkina Faso, Cameroon, Niger and Tchad presented as follows:

BURKINA FASO

Cooperator: Mr. J. Ouedraogo

The trial was conducted at Kamboinse (12°28'N,01°33'W, 300 m above sea level). It was sown on 23 July, sprayed five times with insecticide (Deltamethrine and Dimethoate). A total of 745 mm rainfall was received as shown on Fig. 9. The performance of cowpea is given on Table 12.

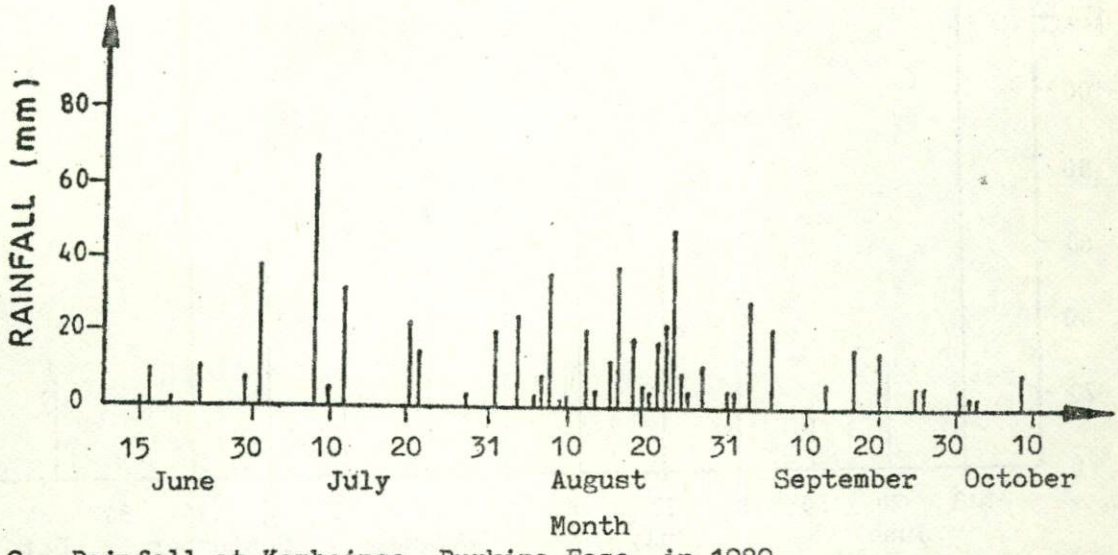

Fig. 9. Rainfall at Kamboinse, Burkina Faso, in 1989.

Table 12. Performance of cowpea cultivars in an adaptation trial for the Sahelo-Sudanian zones at Kamboinse, Burkina Faso in 1989.

Cultivars	Number of plants	Days to			Bacterial blight	CAbMV (virus)	Yield
		Flower bud formation	Flowering	Maturity			
KVx 30-309-6G	32	36	50	65	1.8	2.8	1087
KVx 396-4-4	35	36	44	62	1.5	2.0	1262
KVx 396-4-5	34	37	47	62	1.0	2.0	1232
KVx 396-18-10	37	37	47	63	1.3	2.5	1080
KVx 396-11-6	39	36	45	64	1.0	2.0	1040
IT85D-3517-2	36	36	46	62	1.5	1.3	1102
IT85D-3516-2	34	37	48	61	1.3	1.5	1514
IT85D-3577	31	34	48	65	2.0	2.3	736
IT83D-219	35	38	50	64	4.0	2.8	1100
TN88-63	34	38	44	61	1.0	2.5	1010
TVx 3236	38	37	49	63	1.0	2.0	1298
Kaokin Local	38	41	53	68	1.3	3.3	1239
LSD (5%)	NS	2	5	3	1.8	1.0	N.S.
C.V. (%)	14	5	7	3	37	31	26

CAMEROON

Cooperator: Mr. G. Ntoukam

The trial was conducted at Mouda/Maroua (10°34'N,14°20'E). It was sown on 24 July 1989, sprayed trice with Sherpa-plus insecticide and harvested on 6 October, 1989. About 738 mm rainfall was received. Fig. 10 shows precipitations for 10 days period. The performance of cowpea is given on Table 13 below.

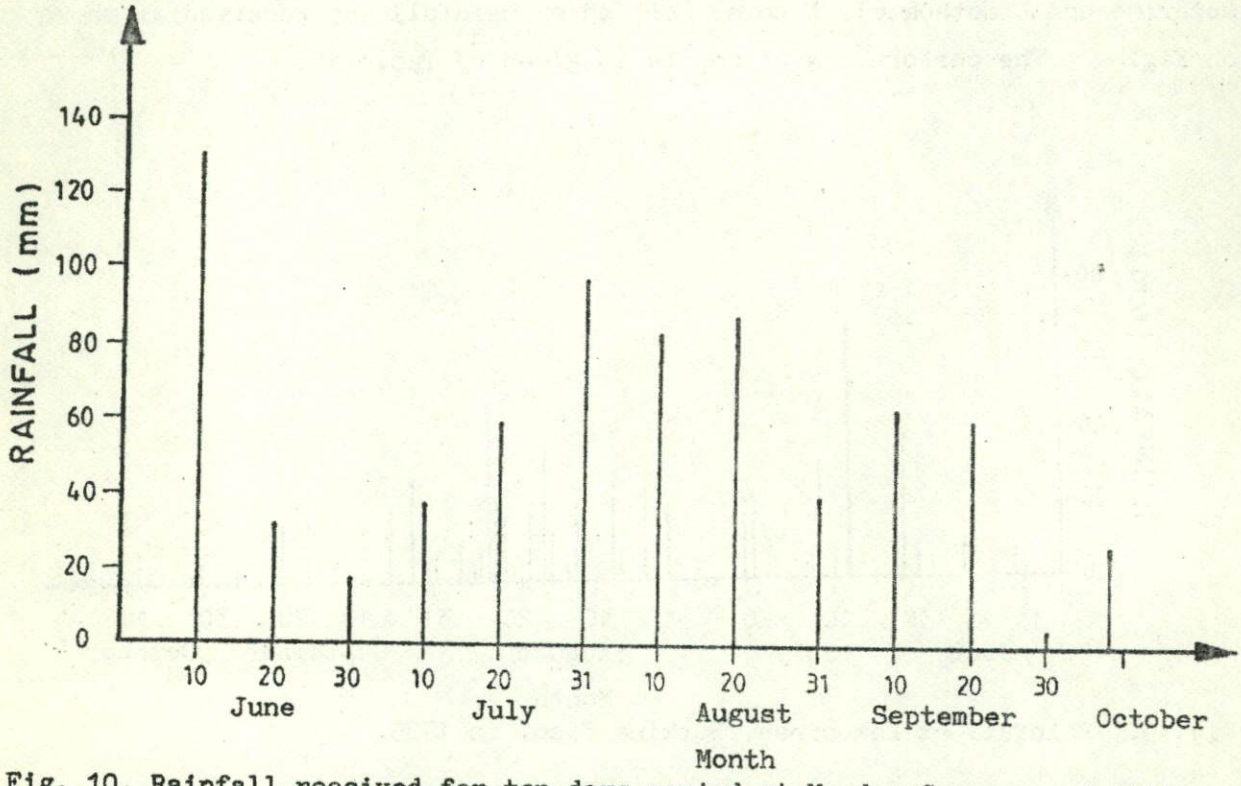

Fig. 10. Rainfall received for ten days period at Mouda, Cameroon, in 1989.

Table 13. Performance of cowpea cultivars in an adaptation trial for the Sudano-Sahelian zones at Maroua, Cameroon, in 1989.

Cultivars	Number of plants	Days to Flowering	CAbMV (virus)	Yield
		----DAS------	-(1-5)-	--kg/ha--
KVx 30-309-6G	28	47	4.3	1037
KVx 396-4-4	29	44	2.9	1250
KVx 396-4-5	31	46	2.6	1399
KVx 396-18-10	31	45	2.5	1733
KVx 396-11-6	30	43	3.1	1141
IT85D-3517-2	31	45	2.6	1622
IT85D-3516-2	29	46	3.0	1519
IT85D-3577	30	46	2.9	1224
IT83D-219	32	46	3.1	1419
TN88-63	30	44	3.8	743
TVx 3236	29	46	2.0	1733
VYA	30	51	2.8	1009
LSD (5%	N.S.	2	0.1	529
C.V. (%)	6	2	12	28

NIGER

Cooperator: Mr. Adamou Moutari

The trial was conducted at Kolo (13°18'N,02°21'E, 210 m above sea level). It was sown on 30 June 1989, sprayed four times with insecticide (Dimethoate + Deltamethrine) and harvested from 26-30 September 1989. The plot was fertilized with 22.5 kg of P_2O_5/ha as triple superphosphate. A total of 556 mm rainfall was received as shown in Fig. 11 below. The performance of cowpea is given on Table 14 below.

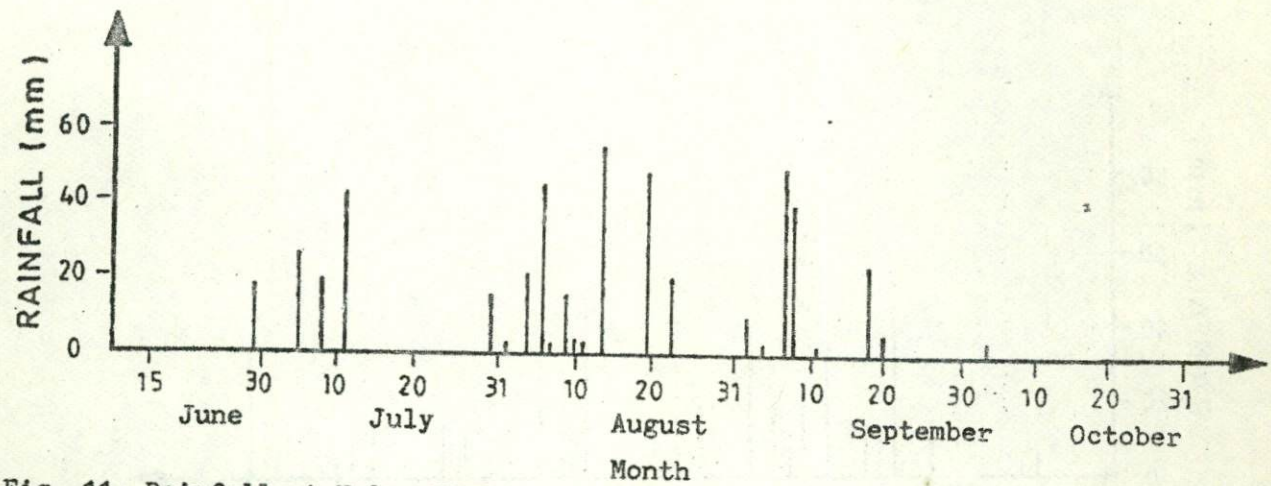

Fig. 11. Rainfall at Kolo, Niger, in 1989.

Table 14. Performance of cowpea cultivars in an adaptation trial for the Sudano-Sahelian zones at Kolo, Niger, in 1989.

Cultivars	Number of plants	Days to			Bacterial blight	Maruca	Yield
		Flower bud formation	Flowering	Maturity			
		DAS			(1-5)		kg/ha
KVx 30-309-6G	42	53	58	83	2.3	2.0	1876
KVx 396-4-4	42	50	57	78	1.5	2.5	1307
KVx 396-4-5	41	50	57	84	1.0	2.5	1711
KVx 396-18-10	42	51	58	82	1.0	2.5	1187
KVx 396-11-6	42	50	57	81	1.0	2.0	1644
IT85D-3517-2	41	54	58	80	1.5	2.3	1746
IT85D-3516-2	41	54	58	80	1.3	2.0	1525
IT85D-3577	42	51	57	81	1.3	2.8	828
IT83D-219	42	50	56	79	2.3	2.3	1219
TN88-63	42	50	57	89	1.0	2.0	2009
TVx 3236	41	51	57	81	1.0	2.0	1193
TN5-78	40	52	57	84	2.0	2.3	2252
LSD (5%)	N.S.	N.S.	N.S.	3	1.0	N.S.	524
C.V. (%)	2	5	2	3	48	21	26

NIGERIA

Cooperator: Mr. O.O. Olufajo

The trial was conducted at Minjibir/Kano (12°10'N, 8°40'E). It was sown on 28 July 1989, sprayed five times with insecticides (Cypermethrine + Dimethoate) and harvested on 18 October 1989. The plot received 36 kg of P_2O_5/ha as a single superphosphate. A total of 602 mm rainfall was received as shown on Fig. 12 below. The performance of cowpea is given on Table 15 below.

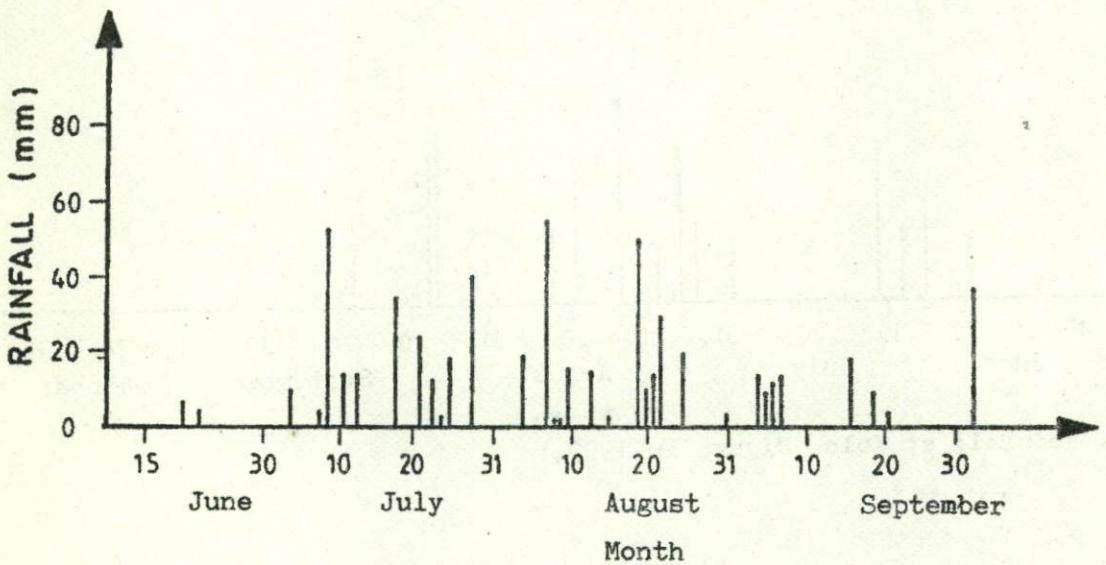

Fig. 12. Rainfall at Minjibir, Nigeria, in 1989.

Table 15. Performance of cowpea cultivars in an adaptation trial for the Sudano-Sahelian zones at Minjibir, Nigeria, in 1989.

Cultivars	Number of plants	Days to Flower bud formation	Days to Flowering	Days to Maturity	Number of Striga plants	CAbMV (virus)	Yield
		----------DAS----------				-(1-5)-	-kg/ha-
KVx 30-309-6G	37	31	44	72	5.0	2.5	761
KVx 396-4-4	39	31	41	66	11.5	1.3	856
KVx 396-4-5	34	30	42	70	12.8	1.0	1193
KVx 396-18-10	37	32	42	67	13.5	2.0	1052
KVx 396-11-6	40	30	39	62	16.5	1.0	720
IT85D-3517-2	33	31	44	71	5.3	1.0	614
IT85D-3516-2	28	30	44	66	14.5	1.0	557
IT85D-3577	34	31	42	65	5.0	1.3	687
IT83D-219	36	30	45	73	3.8	1.0	704
TN88-63	39	31	41	63	9.0	2.0	1114
TVx 3236	36	31	42	63	10.3	1.0	530
SAMPEA 3	36	29	38	65	7.5	2.0	600
LSD (5%)	4	1	2	5	NS	-	383
C.V. (%)	9	3	3	5	76	19	34

TCHAD

Cooperator: Mr. Daniel Valenghi

The trial was conducted at Gassi (12°05'N, 15°02'E, 295 m above sea level). It was sown on 14 July 1989, sprayed ten times with insecticides (Proproxur, Dursban, Decis and Astoate) and harvested from 27 September to 17 October 1989. A total of 515 mm rainfall was received as shown on Fig. 13. The performance of cowpea is given in Table 16 below.

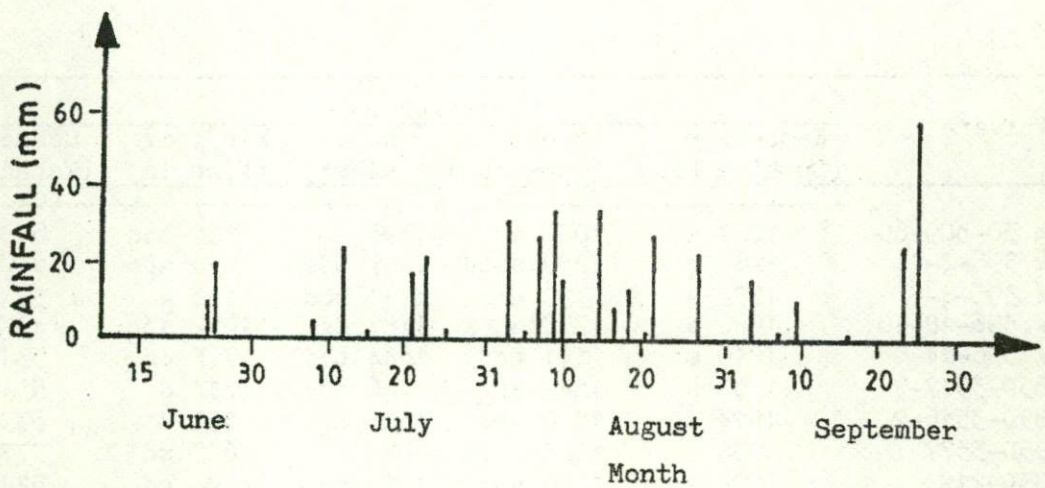

Fig. 13. Rainfall at Gassi, Tchad, in 1989.

Table 16. Performance of cowpea cultivars in an adaptation trial for the Sudano-Sahelian zones at Gassi, Tchad, in 1989.

Cultivars	Number of plants	Days to			Locust infestation		Yield
		Flower bud formation	Flowering	Maturity	1	2	
		DAS			(1-9)		kg/ha
KVx 30-309-6G	31	41	48	70	4.5	3.5	619
KVx 396-4-4	43	41	47	69	5.0	5.0	640
KVx 396-4-5	39	42	48	71	4.5	4.5	587
KVx 396-18-10	32	41	48	71	4.0	5.0	437
KVx 396-11-6	41	41	47	70	4.5	4.5	534
IT85D-3517-2	38	40	50	66	4.0	4.0	534
IT85D-3516-2	39	40	47	68	4.0	4.5	673
IT85D-3577	33	37	45	61	4.0	4.5	577
IT83D-219	38	43	49	71	4.5	5.0	524
TN88-63	37	41	46	71	5.0	4.0	761
TVx 3236	43	41	46	67	3.0	3.5	777
KN-1 (Niger)	40	43	51	73	5.0	6.5	357
LSD (5%)	6	2	NS	5	NS	NS	412
C.V. (%)	10	4	7	5	24	96	48

SUMMARY

Table 17 gives the yield of cowpea at each test location. It should be noted that the field plot at Minjibir, Nigeria, was heavily infested with Striga gesnerioides, therefore, the performance of cultivars at that location also reflects their sensivity to Striga infestation.

Table 17. Yield of cowpea as affected by location and cultivar in Sudano-Sahelian zones in 1989.

Cultivars	Location §									
	Kamboinse (Burkina Faso)		Mouda (Cameroon)		Kolo (Niger)		Minjibir (Nigeria)		Gassi (Tchad)	
	kg/ha									
KVx 30-309-6G	1087	a	1037	cd	1876	ab	761	bcd	619	ab
KVx 396-4-4	1262	a	1250	abcd	1307	cde	856	abcd	640	ab
KVx 396-4-5	1232	a	1399	abc	1711	bcd	1193	a	587	ab
KVx 396-18-10	1080	a	1733	a	1187	de	1052	abc	437	ab
KVx 396-11-6	1040	a	1141	bcd	1644	bcd	720	cd	534	ab
IT85D-3517-2	1102	a	1622	ab	1746	abc	614	d	534	ab
IT85D-3516-2	1514	a	1519	abc	1525	bcd	557	d	673	ab
IT85D-3577	736	a	1224	abcd	828	e	687	cd	577	ab
IT83D-219	1100	a	1419	abc	1219	de	704	cd	524	ab
TN88-63	1010	a	743	d	2009	ab	1114	ab	761	ab
TVx 3236	1298	a	1733	a	1193	de	530	d	777	a
Local Check	1239	a	1009	cd	2252	al	600	d	557	b
LSD (%)	NS		529		525		383		412	
C.V. (%)	26		28		26		34		48	

§ Means followed by the same letter are not statistically different at 5% probability level.

III. REGIONAL TRIAL FOR TRANSITION ZONES

a) Objective

To assess improved lines for adaptation to transition zones.

b) Description

The trial consisted of 8 cultivars and a local check (Table 18) in four randomized complete block design. It was requested by Guinea Conakry and Togo.

Table 18. Regional trial for adaptation to transition zones.

No	Entry	Pedigree	Origin
1	IT82E-32	[P33-K x (TVu 410 x SVS-32)] x(TVu 1190 x TVu 2616)	IITA
2	IT82E-16	TVu 201-1D x(TVu 37 x TVu 530)	IITA
3	IT81D-1137	TVx 1193-7D x TVu 2027	IITA
4	IT82D-885	TVx 133-16D-2 x (TVu 1190 x IT84E-124) x TVu 2616	IITA
5	KVx 396-16	(IAR 1696 + KN-1) x SUVITA-2	Burkina
6	KVx 396-4-4	- do -	Burkina
7	TVx 1999-01F	-	IITA
8	IT84S-2246-4	IT82D-716 x IT81D-1020	IITA
9	Local check	-	Local

c) Feedback

At the time of this write-up, feedback had been received and is presented as follows:

GUINEA CONAKRY

Cooperators: Soumah Morlaye, M. Kaba & Souleymane Keita

The trial was conducted at two locations, Bordo/Kankan (10°23'N,9°15'W, 376 m above sea level) and Kilissi/Kindia (10°5'N,12°50'W, 95 m above sea level). At Kankan, the trial was sown on 8 July 1989, sprayed three times with insecticide (Parathion) and harvested from 1-9 September; the plot was fertilized with 69 kg of P_2O_5/ha as super triple phosphate. A total of 1195 mm rainfall was received and is given on Fig. 14. At Kilissi, the trial was sown on 7 July 1989; it was not sprayed and was harvested on 7 November 1989; the plot received 23 kg of P_2O_5/ha as single super phosphate. A total of 1344 mm rainfall was received from June to November 1989.

The performance of cowpea at Kankan and Kilissi is given on Tables 19 and 20 respectively.

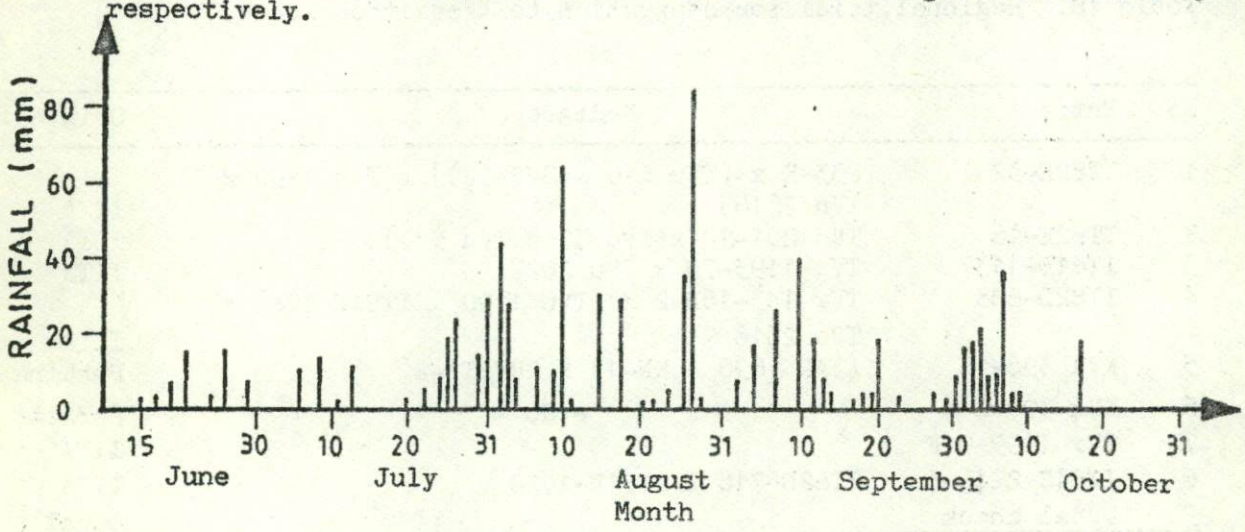

Fig. 14. Rainfall at Kankan, Guinea Conakry, in 1989.

Table 19. Performance of cowpea cultivars in an adaptation trial for transition zones at Kankan, Guinea Conakry, in 1989.

Cultivars	Number of plants	Days to			Seed yield
		Flower bud formation	Flowering	Maturity	
		DAS			-kg/ha-
IT82E-32	39	30	44	62	806
IT82E-16	37	30	43	61	878
IT81D-1137	38	30	42	67	948
IT82D-885	12	28	41	60	818
KVx 396-16	36	32	46	67	738
KVx 396-4-4	37	30	44	65	873
TVx 1999-01F	31	33	47	68	865
IT84S-2246-4	38	31	44	65	729
Dembo Local (Burkina)	37	29	44	62	900
LSD (5%)	4	1	1	2	397
C.V. (%)	7	3	1	2	32

Table 20. Performance of cowpea cultivars in an adaptation trial for transition zones at Kilissi, Guinea, in 1989.

Cultivars	Number of plants	Days to		Seed yield
		Flower bud formation	Flowering	
		----------DAS-------		-kg/ha-
IT82E-32	42	30	34	408
IT82E-16	42	30	34	182
IT81D-1137	42	30	34	151
IT82D-885	23	29	35	105
KVx 396-16	42	29	35	119
KVx 396-4-4	42	30	34	197
TVx 1999-01F	40	30	34	151
IT84S-2246-4	42	30	34	166
Pkaku-Toghoï	42	30	34	346
LSD (5%)	3	0.4	0.4	145
C.V. (%)	5	1	1	48

TOGO

Cooperator: Mrs. Akossiwa Duyiboe

The experiment was conducted at Ativeme in southern Togo. It was sown on 14 June 1989, sprayed twice with insecticide (Deltamethrine) and harvested from 31 August to 14 September 1989. A total rainfall of 1058 mm was received as given on Fig. 15. The performance of cowpea is given in Table 21 below.

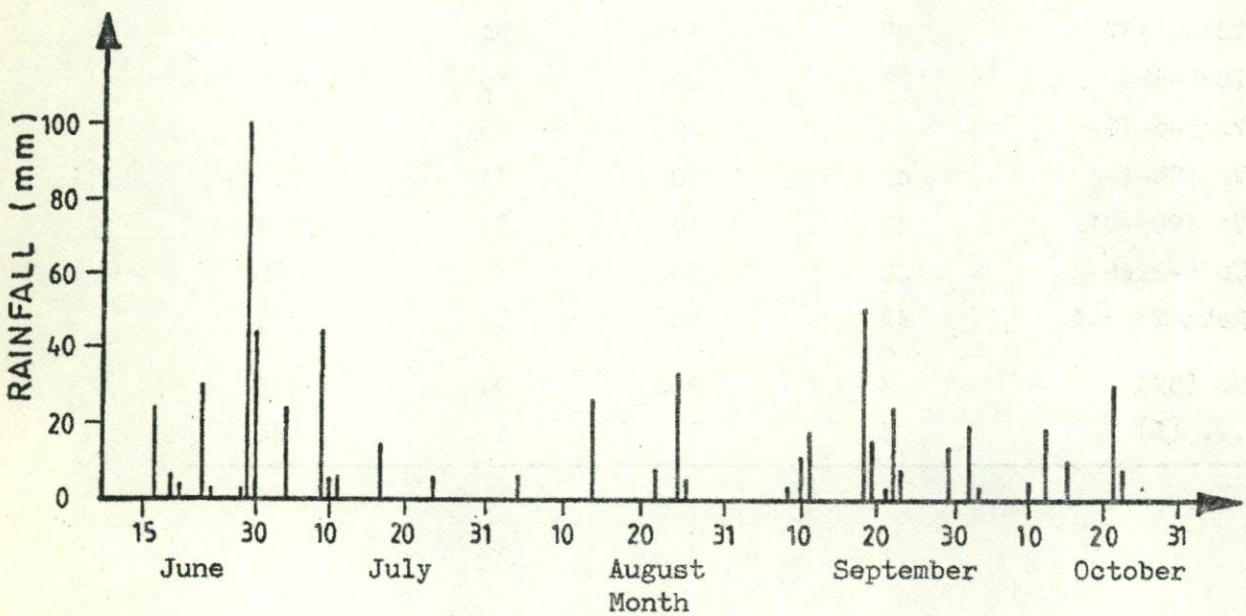

Fig. 15. Rainfall at Ativeme, Togo, in 1989.

Table 21. Performance of cowpea cultivars in an adaptation trial for transition zone at Ativeme, Togo, in 1989.

Cultivars	Number of plants	Days to			Insect infestation		Seed yield
		Flower bud formation	Flowering	Maturity	Ootheca	Aphids	
		----------DAS----------			-----(1-5)-----		-kg/ha-
IT82E-32	35	44	46	70	2.5	1.0	875
IT82E-16	26	43	46	69	2.5	1.0	1060
IT81D-1137	33	42	47	74	3.0	1.0	1071
IT82D-885	19	42	44	71	2.0	1.0	651
KVx 396-16	20	45	47	76	3.0	2.3	620
KVx 396-4-4	33	43	46	71	3.0	1.0	769
TVx 1999-01F	22	45	49	72	3.0	1.0	1126
IT84S-2246-4	36	44	47	76	2.5	1.0	977
VITA-5	33	45	50	73	4.0	1.0	490
LSD (5%)	13	3	4	4	1.4	1.4	NS
C.V. (%)	20	3	4	3	22	51	36

IV. REGIONAL COWPEA *STRIGA* RESISTANCE TRIAL

a) Objective

To evaluate *Striga* resistance of improved lines at different locations in Sahelo-Sudanian zones of semi-arid West Africa.

b) Description

The trial consisted of 7 lines compared with *Striga* resistant checks: B 301, IT82D-849 and SUVITA-2 and 1 *Striga* susceptible check, IT82E-32 repeated twice (Table 22).

Table 22. Regional *Striga* resistance trial in 1989-90.

No	Entry	Pedigree	Origin
1	KVx 396-11-6	(IAR 1696 x KN-1) x SUVITA-2	Burkina
2	KVx 396-8-5	- do -	Burkina
3	KVx 396-6-1	- do -	Burkina
4	KVx 396-4-4-2	- do -	Burkina
5	KVx 396-4-4-4	- do -	Burkina
6	B 301	Local selection	Botswana
7	IT82D-849	-	IITA
8	TN93-80	Local selection	Niger
9	IT82E-32	[P33-1C x (TVu 410 x SVS-32)] x (TVu 1190 x TVu 2616)	IITA
10	TN121-80	Local selection	Niger
11	IT82E-32	[P33-1C x (TVu 410 x SVS-32] x TVu 1190 x TVu 2616)	IITA
12 A	SUVITA-2	Local selection (Gorom Local)	Burkina

Striga gesnerioides causes severe damage to cowpea production in some parts of the Sahelo-Sudanian zones of West Africa. It is, therefore, imperative to find stable sources of *Striga* resistant cultivars to control *Striga* damage. In the absence of such cultivars, it would be necessary to find sources of *Striga* tolerant cultivars that can reduce damage in cowpea production.

The *Striga* resistance trial was requested by Benin, Niger, Nigeria, Senegal and Tchad. However, data received from Tchad does not appear to be reliable and will not be reported.

BENIN

Cooperator: Mr . Jean Detongnon

The trial was conducted at two locations: Agbangnizou and Zakpata, near Bohicon (7°11'N, 2°03'E) in southern Benin. Zakpata was less infested with Striga as compared to Agbangnizou. Following cultivars were free of Striga infestation, KVx 396-6-1, B301 and TN121-80 as given on Table 23. It should be noted that at both locations Striga shoots emerged late in the season when cowpea pods were ready for harvest.

Table 23. Performance of cowpea cultivars under natural Striga infestation at Abangnizou and Zakpata, Benin, 1989.

Cultivars	Number of Striga shoots per m² §		Average grain yield
	Agbangnizou	Zakpata	
	---------shoot/m²----------		--kg/ha--
KVx 396-11-6	0.3	0.0	250
KVx 396-8-5	0.8	0.3	279
KVx 396-6-1	0.0	0.0	179
KVx 396-4-4-2	0.0	0.3	177
KVx 396-4-4-4	2.7	1.7	270
B 301	0.0	0.0	375
IT82D-849	4.5	0.0	250
TN93-80	3.7	0.0	198
IT82E-32	8.5	0.2	260
TN121-80	0.0	0.0	312
IT82E-32	0.0	1.3	167
SUVITA-2	11.2	0.0	231

§ At both locations, Striga emerged very late; Striga plants were very young when cowpea plants were due for harvest.

MALI

Cooperator: Mr. Ondie Kodio

The trial was conducted at Kaporo in the Seno province. The performance of cowpea is given on Table 24.

Table 24. Performance of cowpea cultivars under natural Striga infestation at Kaporo, Mali, 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Number of Striga shoots per m^2	Yield
		------DAS---------			-kg/ha-
KVx 396-11-G	41	45	70	3.0	785
KVx 396-8-5	38	50	73	7.0	863
KVx 396-6-1	40	50	68	2.3	1040
KVx 396-4-4-2	41	48	73	2.5	645
KVx 396-4-4-4	39	48	73	4.2	647
B 301	40	51	70	0.3	549
IT82D-849	40	50	68	0.0	510
TN93-80	41	55	75	0.0	1138
IT82E-32	39	45	68	3.0	412
TN121-80	41	55	73	0.0	1040
IT82E-32	37	45	68	5.2	255
SUVITA-2	38	49	72	0.0	1020
LSD (5%)	4	NS	1	2.3	313
C.V (%)	6	0	1	70.0	29

NIGERIA

Cooperator: Mr. O.O. Olufajo

The trial was conducted at Minjibir, described earlier in the regional adaptation trial for the Sudano-Sahelian zones. It was sown on 22 July, sprayed five times with insecticides (mixture of Cypermethrine + Rogor) and harvested on 17 October. The plot received 36 kg of P_2O_5/ha as single super phosphate. Rainfall received during the crop season is given on Fig. 12. The performance of cowpea is given on Table 25. It should be noted that KVx 396-8-5 and KVx 396-6-1 had as many Striga shoots as the susceptible check, IT82E-32, yet yielded significantly higher than the latter. This suggests some possible Striga tolerance.

Table 25. Performance of cowpea cultivars under natural Striga infestation at Minjibir, Nigeria, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Number of Striga shoots/m²	Virus infection	Yield
		-------DAS--------			--(1-5)--	-kg/ha-
KVx 396-11-6	40	38	64	1.2	1.8	1729
KVx 396-8-5	37	42	70	1.7	1.3	2159
KVx 396-6-1	41	39	69	1.7	2.5	1853
KVx 396-4-4-2	38	39	69	1.3	1.5	1711
KVx 396-4-4-4	39	39	69	0.7	1.8	1939
B 301	40	42	66	0.1	1.0	1603
IT82D-849	40	41	61	0.0	1.5	1240
TN93-60	39	45	72	0.1	3.3	1674
IT82E-32	39	38	64	1.8	1.8	1354
TN121-80	40	44	69	0.0	3.5	2080
IT82E-32	38	38	61	1.1	1.5	1275
SUVITA-2	40	43	71	0.7	4.3	987
LSD (5%)	3	2	4	NS	0.7	417
C.V. (%)	5	3	4	106	22	18

SENEGAL

Coperator: Mr. Ndiaga Cisse

The trial was conducted at Ndatt-Fall. No data was received other than information on Striga shoots per plot (Table 26).

SUMMARY

Table 26 shows Striga shoots emergence in cowpea plots at Abangnizou and Zakpota, (Benin), Koporo (Mali), Minjibir (Nigeria) and Ndatt-Fall (Senegal). It appears that only TN121-80 was free from Striga infestation at the five locations. B 301 was least infested in all the five locations. It should be noted that the Striga resistance of TN121-80 was confirmed in Burkina Faso (INERA 1989 Annual Report). This cultivar also combines high yield and good seed quality preferred in Sahelian zones.

Table 26. Striga shoots per plot in regional Striga resistance trial in Sahelo-Sudanian zone in 1989.

Cultivars	LOCATIONS				
	Koporo (Mali)	Minjibir (Nigeria)	Ndatt-Fall (Senegal)	Abangnizou (Benin)	Zakpota (Benin)
	shoot/m²				
KVx 396-11-G	3.0	1.2	0.0	0.3	0.0
KVx 396-8-5	7.0	1.7	0.4	0.8	0.3
KVx 396-6-1	2.3	1.7	0.0	0.0	0.0
KVx 396-4-4-2	2.5	1.3	0.1	0.0	0.3
KVx 396-4-4-4	4.2	0.7	0.1	2.7	1.7
B 301	0.3	0.1	0.1	0.0	0.0
IT82D-849	0.0	0.0	0.0	4.5	0.0
TN93-80	0.0	0.1	0.0	3.7	0.0
IT82E-32	3.0	1.8	4.0	8.5	0.2
TN121-80	0.0	0.0	0.0	0.0	0.0
IT82E-32§	5.2	1.1	10.8	0.0	1.3
SUVITA-2	0.0	0.7	0.0	11.2	0.0
LSD (5%)	2.3	N.A.	N.A.	-	-
C.V. (%)	70	106	222	-	-

§ In this treatment, variety IT82E-32 was repeated in the trial, but was inadvertently labelled in the second treatment as TN5-78.

V. REGIONAL APHIDS RESISTANCE TRIAL

a) Objective

To assess in the field, agronomic performance of improved lines and bio-test in the laboratory for their resistance to Aphis craccivora, a field insect pest.

b) Description

The trial comprised of nine lines compared with a local check (Table 27). It was requested by Burkina Faso, Guinea Bissau, Guinea Conakry, Niger, Nigeria, Tchad and Togo.

Table 27. Aphids resistance trial

No.	Entry	Pedigree	Origin
1	IT82E-25	(TVu 3629 x TVu 6203) x TVu 2616 x TVu 662)	IITA
2	IT86D-373	[IT83D-442 x (TKx 133-16-D2 x IT81D-988)]	IITA
3	IT86D-888	(IT82E-60 x TVu 3000) x IT82D-716	IITA
4	IT86D-444	(IT82D-789 x IT82D-716) x IT84E-1-108	IITA
5	IT87S-1390	(IT82D-789 x IT82D-716) x IT84E-1-108	IITA
6	IT87S-1394	(IT82D-789 x IT82D-716) x IT84E-1-108	IITA
7	IT87S-1459	(IT82D-789 x IT82D-716) x IT84E-1-108	IITA
8	IT84S-2246	(IT82D-716 x IT81D-1020)	IITA
9	IT85D-3577	(IT82E-60 x TVu 801) x TVx 1850-01E	IITA
10	Local check	-	Local

c) Feedback

Feedback had been received from Burkina Faso, Guinea Conakry, Nigeria, Tchad and Togo presented as follows:

BURKINA FASO

Cooperators: Mrs. C. Dabire and Mr. J. Ouedraogo

The trial was conducted in the field at Kamboinse, Sudan savanna zone described earlier. It was sown on 15 July, sprayed six times with insecticides (Deltamethrine + Dimethoate) and harvested on 2 October, 1989. A laboratory evaluation with artificial aphids infestation was also conducted. The performance of the lines is given on Table 28.

Table 28. Performance of cowpea cultivars in a regional Aphids resistance trial at Kamboinse, Burkina Faso in 1989.

Cultivars	Number of plants	Days to		Bacterial blight	Brown blotch	Yield	Aphids Biotest (60 DAS)	
		Flowering	Maturity				Dead plants	Infestation score
		---DAS---		---(1-5)---		--kg/ha--	---(1-5)---	
IT82E-25	40	49	65	1.5	1.0	943	2.5	4.7
IT86D-373	38	51	71	3.3	1.0	523	100.0	1.0
IT86D-888	38	48	73	1.0	1.3	831	7.5	2.7
IT86D-444	36	48	72	2.5	1.0	851	100.0	1.0
IT87S-1390	40	49	74	1.0	1.5	1131	0.0	4.0
IT87S-1394	39	51	71	3.3	1.0	526	0.0	4.0
IT87S-1459	39	50	70	1.0	1.0	825	0.0	2.0
IT84S-2246	40	50	72	1.5	1.0	1167	25.0	1.5
IT85D-3577	33	51	72	1.3	1.3	1099	15.0	5.0
KN-1	37	49	69	1.0	1.0	1196	100.0	1.0
LSD (5%)	4	1	1	0.7	0.4	302	-	-
C.V. (%)	8	2	1	28	25	23	-	-

GUINEA CONAKRY

Cooperators: Mr. M. Kaba and Mr. S. Keita

The trial was conducted at two locations, Bareng (Lat. 10°11'N, Alt. 970 m) and Kankan (10°23'N, 9°13'W, 376 m above sea level). At Bareng the trial was sown on 23 June, sprayed once with insecticide (Folidol) and harvested from 13 September to 13 October 1989. The field plot at this location received N and P fertilizers. At Kankan, the trial was sown on 10 July, sprayed trice with insecticide (Parathion) and harvested from 1-9 September 1989. The field plot received 69 kg of P_2O_5/ha as triple superphosphate. Rainfall and the performance of cowpea at Bareng are given on Fig. 16 and Table 29, respectively. Rainfall and cowpea performance at Kankan are given on Fig. 14 and Table 30 respectively.

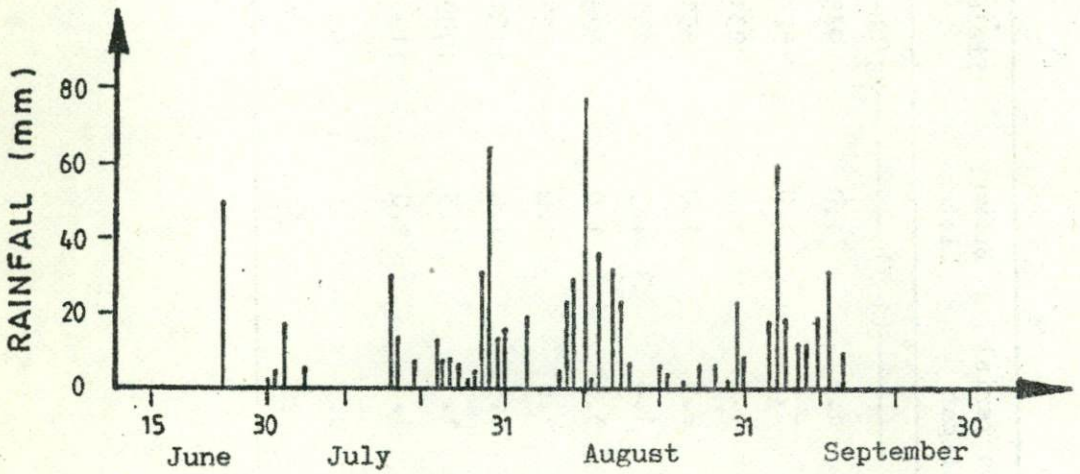

Fig. 16. Rainfall at Bareng-Pita, Guinea Conakry in 1989.

Table 29. Performance of cowpea cultivars in a regional aphids resistance trial at Bareng-Pita, Guinea Conakry, in 1989

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Yield
		--------DAS----------		--kg/ha--
IT82E-25	41	59	85	623
IT86D-373	40	56	86	161
IT86D-888	41	57	84	772
IT86D-444	33	62	83	502
IT87S-1390	40	56	86	755
IT87S-1394	41	54	85	716
IT87S-1459	41	67	82	558
IT84S-2246	41	56	86	834
IT85D-3377	32	57	85	840
58-146	42	54	81	516
LSD (5%)	8	2	3	393
C.V. (%)	14	3	2	43

Table 30. Performance of cowpea cultivars in a regional Aphids resistance trial at Kankan, Guinea, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Yield
		--------DAS----------		--kg/ha--
IT82E-25	39	43	63	1049
IT86D-373	38	44	61	720
IT86D-888	38	43	64	951
IT86D-444	22	45	66	715
IT87S-1390	36	43	66	621
IT87S-1394	39	42	59	1003
IT87S-1459	38	47	67	1073
IT84S-2246	32	43	63	811
IT85D-3577	32	44	64	951
Lososso Kankan	24	48	61	544
LSD (5%)	10	7	5	456
C.V. (%)	21	12	5	37

NIGERIA

Cooperator: Mr. C.I. Amatobi

The trial was conducted at Kadawa/Kano (12°10'N,8°34'E, 486 m above sea level). It was sown on 1 August, sprayed trice with insecticides (Cypermethrin + Dimethoate) and harvested on 25 October 1989. The plot was fertilized with 60 kg of P_2O_5/ha as single super phosphate. A total rainfall of 598 mm was received and is given on Fig. 17. The performance of cowpea is given on Table 31.

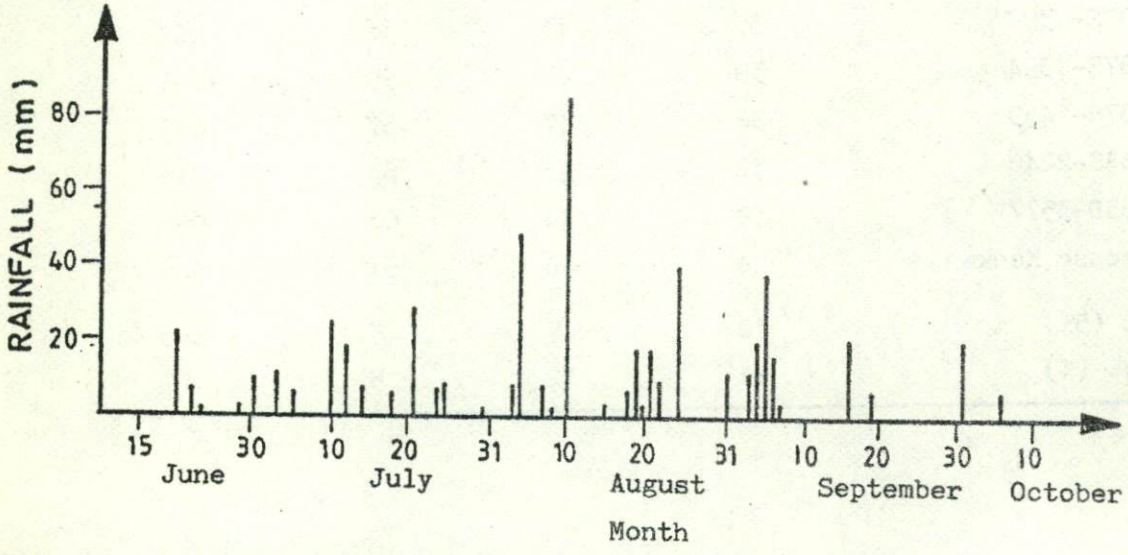

Fig. 17. Rainfall at Kadawa, Nigeria, in 1989.

Table 31. Performance of cowpea cultivars in a regional Aphids resistance trial at Kadawa/Kano, Nigeria in 1989.

Cultivars	Number of plants	Insect infestation		Yield
		Thrips	Maruca	
			-(1-5)-	--kg/ha--
IT82E-25	76	53	1.0	1497
IT86D-373	57	12	1.0	347
IT86D-888	71	15	0.8	1060
IT86D-444	62	12	1.8	908
IT87S-1390	57	32	2.3	923
IT87S-1394	73	16	0.8	643
IT87S-1459	70	11	1.0	458
IT84S-2246	70	19	1.5	980
IT85D-3577	62	49	1.0	1629
Sampea 7	76	26	1.5	1519
LSD (5%)	12	14	1.4	524
C.V. (%)	12	41	76	37

TCHAD

Cooperator: Mr. Daniel Valenghi

The trial was conducted at Gassi in Sahelo-Sudanian zone described earlier. It was sown on 14 July, sprayed ten times wih insecticides (Propoxur, Dursban, Decis, Astoate) and harvested from 27 September to 17 October 1989. Rainfall received is given on Fig. 13 and cowpea performance is given on Table 32 below.

Table 32. Performance of cowpea cultivars in a regional Aphids resistance trial at Gassi, Tchad, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Yield
		---DAS---		-kg/ha-
IT82E-25	34	46	65	302
IT86D-373	21	58	75	45
IT86D-888	32	48	68	431
IT86D-444	10	48	66	97
IT87S-1390	1	82	87	22
IT87S-1394	34	46	67	219
IT87S-1459	34	50	68	235
IT84S-2246	35	44	63	518
IT85D-3577	13	61	75	244
TVx 3236	28	48	68	327
LSD (5%)	15	18	11	256
C.V. (%)	44	23	11	72

Cooperators: Mr. H. Reneaud and Mr. T. Payaro

The trial was conducted at two locations, namely Tantiegou and Broukou (9°45'N,0°55'E). Tantiegou has been described in the northern Guinea adaptation trial. At Broukou, the trial was sown on 5 July sprayed four times with insecticides (Cypermethrin + Dimethoate) and harvested on 19 September 1989. The plot was fertilized with NPK (15:15:15 kg/ha). The cowpea performance at Tantiegou is given on Table 33. A total rainfall of 1172 mm was received at Broukou as given on Fig. 18 and cowpea performance at this location is given on Table 34.

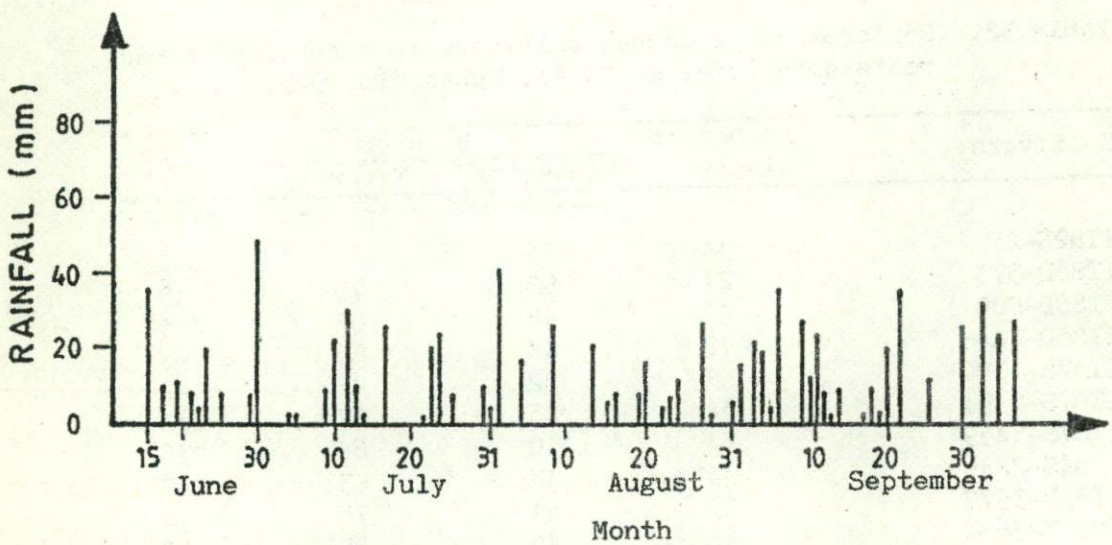

Fig. 18 Rainfall at Broukou, Togo, in 1989.

Table 33. Performance of cowpea cultivars in a regional Aphids resistance trial at Tantiegou, Togo, in 1989.

Cultivars	Number of plants	Days to		Disease infection		Yield
		Flowering	Maturity	Bacterial blight	Brown blotch	
		------DAS---------		-------(1-5)-----		-kg/ha-
IT82E-25	67	43	76	2.8	2.3	819
IT86D-373	76	43	78	2.8	2.8	869
IT86D-888	67	43	76	2.5	2.3	649
IT86D-444	66	43	78	2.0	2.3	696
IT87S-1390	57	51	78	2.3	2.0	555
IT87S-1394	75	42	77	2.3	2.8	775
I87S-1459	74	45	80	2.8	1.0	808
IT85D-2246	74	43	78	2.8	1.0	810
IT85D-3577	37	64	79	1.5	1.5	302
58-146	80	45	79	2.5	1.0	1160
LSD (5%)	30	15	4	0.5	0.7	328
C.V. (%)	31	22	3	25.0	26.0	30

Table 34. Performance of cowpea cultivars in a regional Aphids resistance trial at Broukou, Togo, in 1989.

Cultivars	Number of plants	Days to		Disease infection		Yield
		Flowering	Maturity	Web blight	Virus	
		--------DAS--------		-------(1-5)-----		-kg/ha-
IT82E-25	42	44	67	3.9	2.0	1348
IT86D-373	38	44	67	2.5	2.1	875
IT86D-888	35	43	66	3.1	2.1	854
IT86D-444	38	45	68	3.1	1.8	984
IT87S-1390	38	43	66	3.0	2.0	1204
IT87S-1394	41	42	63	3.9	2.0	869
IT87S-1459	40	48	69	4.0	3.8	549
IT84S-2246	39	46	68	2.6	2.5	1471
IT85D-3577	29	45	68	3.6	2.5	925
58-146	42	44	67	3.4	2.4	1392
LSD (5%)	8	2	1	0.9	0.6	396
C.V. (%)	14	3	1	18.0	18.0	26

SUMMARY

The yield performance of lines across locations is given on Table 35.

Table 35. Seed yield of cowpea cultivars in a regional trial for Aphids resistance in semi-arid West Africa in 1989.

Cultivars	LOCATIONS						
	Kamboinse (Burkina Faso)	Bareng-Pita (Guinea Conakry)	Kankan (Guinea Conakry)	Kano (Nigeria)	Gassi (Tchad)	Broukou (Togo)	Tantiegou (Togo)
	kg/ha						
IT82E-25	943 abc	623 a	1049 a	1497 ab	302 abc	1348 ab	819 b
IT86D-373	523 e	161 b	720 ab	347 e	45 d	875 cd	869 ab
IT86D-888	831 bc	772 a	951 ab	1060 bc	431 ab	854 cd	649 b
IT86D-444	851 bc	502 ab	715 ab	908 cd	97 cd	984 bc	696 b
IT87S-1390	1131 ab	755 a	621 ab	923 cd	22 d	1204 abc	555 bc
IT87S-1394	526 de	716 a	1003 a	643 cde	219 bcd	869 cd	775 b
IT87S-1495	825 cd	558 a	1073 a	458 de	235 bcd	549 d	808 b
IT84S-2246	1167 a	834 a	811 ab	980 cd	518 a	1471 a	810 b
IT85D-3677	1099 abc	840 a	951 ab	1629 a	244 bcd	925 cd	302 c
Local Check	1196 a	516 ab	544 b	1519 ab	327 abc	1392 a	1160 a
LSD (5%)	302	393	456	524	256	396	328
C.V. (%)	23	43	37	37	72	26	30

VI. REGIONAL BRUCHIDS RESISTANCE TRIAL

a) Objective

To assess in the field the agronomic performance of improved lines and bio-test in the laboratory of their resistance to Callosobruchus maculatus, a storage insect pest.

b) Description

The trial comprised nine lines compared with a Local Check (Table 36). It was requested by Burkina Faso, Cameroon, Cape Verde, Guinea Bissau, Guinea Conakry, Nigeria, Mali Mauritania, Tchad and Togo.

Table 36. Regional bruchids resistance trial.

Entry	Pedigree	Origin
IT86D-364	(IT82D-889 x IT83D-442) x IT82D-716	IITA
IT86D-498	IT84E-124 x (TKx 133-16D-2 x IT81D-988)	IITA
IT86D-560	(IT81D-1137 x Ife Brown) x (IT81D-1020 x IT82D-716)	IITA
IT86D-713	(IT81D-1137 x Ife Brown)	IITA
IT85D-1038	(IT82D-789 x TVu 3000) x IT82D-789	IITA
IT87S-1393	(IT82D-789 x TVu 3000) x IT82D-789	IITA
IT87S-1463	(IT82D-789 x TVu 3000) x IT82D-789	IITA
IT84S-2246	(IT82D-716 x IT81D-1020)	IITA
IT87D-1827	(IT82D-716 x IT81D-1020)	IITA
Local Check	-	Local

c) Feedback

Feedback had been received from Burkina Faso, Cape Verde, Guinea Conakry, Mali, Nigeria, Tchad and Togo as follows:

BURKINA FASO

Cooperators: Mrs. C. Dabire & Mr. J. Ouedraogo

The trial was conducted both in the field and in the laboratory at Kamboinse in the Sudan savanna zone described earlier. It was sown on 15 July, sprayed seven times with insecticides (Deltamethrine and mixture of Deltamethrine + Dimethoate) and harvested on 11 October, 1989. Rainfall received at Kamboinse is given on Fig. 9. The performance of cowpea is given on Table 37. Lines IT86D-498 and IT84S-2246 were highly resistant to bruchids.

Table 37. Performance of cowpea cultivars in a regional bruchids resistance trial at Kamboinse, Burkina Faso, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Yield	Bruchid-Biotest (60 DAS) Grain damage	Number of adult insects	Percent emerged adults
		-------DAS-------		-kg/ha-	--%--		--%--
IT86D-364	20	44	69	570	55	11.6	17.4
*IT86D-498	39	45	68	657	14	3.4	4.8*
IT86D-560	34	46	66	999	56	19.4	26.0
IT86D-713	33	51	74	1361	40	11.8	16.1
IT86D-1038	36	50	70	1256	53	14.6	20.2
IT87S-1393	30	51	71	1026	62	15.2	21.1
IT87S-1463	31	45	71	569	48	17.4	22.1
*IT84S-2246	35	43	66	907	18	4.6	5.8*
IT87D-1827	22	46	70	946	38	11.4	15.7
KN-1	31	46	65	1358	69	34.8	46.3
LSD (5%)	8	3	2	336	-	-	-
C.V. (%)	18	5	2	24	-	-	-

CAPE VERDE

Cooperator: Mr. C. Silva

The trial was conducted at Sao Jorge (15°26'N,23°35'W, 170 m above sea level). It was sown on 19 August and harvested on 24 November 1989. No insecticide nor fertilizer treatments were applied. A total precipitation of 312 mm was received and is given on Fig. 19. The performance of cowpea is given on Table 38 below.

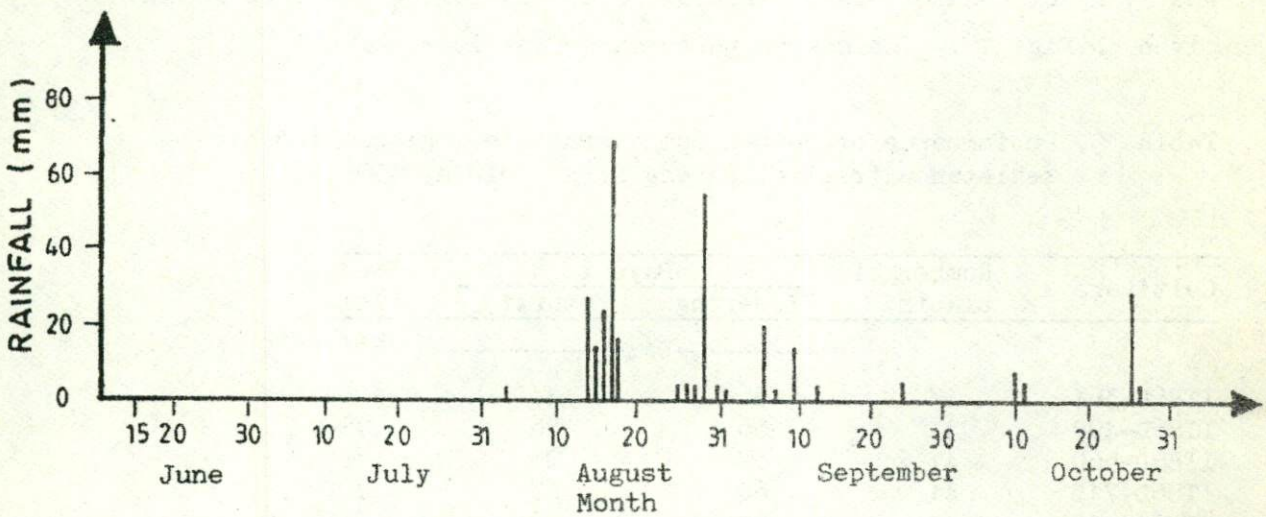

Fig. 19. Rainfall at Sao Jorge, Cape Verde in 1989.

Table 38. Performance of cowpea cultivars in a regional bruchids resistance trial at Sao Jorge, Cape Verde, 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Seed yield
		---DAS---		-kg/ha-
IT86D-364	19	70	78	675
IT86D-498	45	41	58	1527
IT86D-560	34	41	64	352
IT86D-713	37	41	69	793
IT86D-1038	32	56	69	910
IT87S-1393	30	54	78	382
IT87S-1463	46	39	58	999
IT84S-2246	48	43	60	1263
IT87D-1827	45	40	58	1057
Santiago Local	41	41	59	998
LSD (5%)	23	24	26	732
C.V. (%)	38	35	28	56

GUINEA CONAKRY

Cooperators: Mesrs. M. Kaba, S. Keita & Beavogui J. Togba.

The trial was conducted at Bareng-Pita and Kankan described earlier. At Bareng-Pita, the trial was sown on 23 June, sprayed once with insecticide (Folidol) and harvested from 13 September to 10 October 1989. The field plot was fertilized with 45 kg of P_2O_5/ha as triple super phosphate and 21 kg of N/ha of urea. Rainfall received during the crop season is given on Fig. 16. The cowpea performance is given on Table 39 below.

Table 39. Performance of cowpea cultivars in a regional bruchids resistance trial at Bareng-Pita, Guinea, 1989.

Cultivars	Number of plants	Days to		Seed yield
		Flowering	Maturity	
		----------DAS----------		-kg/ha-
IT86D-364	27	56	87	1007
IT86D-498	41	56	86	790
IT86D-560	41	57	90	796
IT86D-713	41	60	87	790
IT86D-1038	40	59	88	549
IT87S-1393	40	57	87	684
IT87S-1463	41	63	89	311
IT84S-2246	40	56	86	998
IT87D-1827	26	59	89	1084
KN-1	40	55	82	569
LSD (5%)	3	2	4	284
C.V. (%)	5	2	3	26

At Kankan, the trial was sown on 7 July, sprayed trice with insecticide (Parathion) and harvested early in September, 1989. The field plot was fertilized with NPK (25.5:25.5:25.5 kg/ha). Rainfall received at Kankan is shown on Fig. 14 and the performance of cowpea is given on Table 40 below:

Table 40. Performance of cowpea cultivars in a regional bruchids resistance trial at Kankan, Guinea Conakry in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Seed yield
		---DAS---		--kg/ha--
IT86D-364	16	45	66	704
IT86D-498	37	43	64	769
IT86D-560	39	46	62	1039
IT86D-713	38	46	65	848
IT86D-1038	38	47	68	1346
IT87S-1393	35	47	68	1181
IT87S-1463	34	45	68	868
IT84S-2246	39	45	65	1037
IT87D-1827	21	45	65	946
Lososso Kankan	32	39	58	713
LSD (5%)	6	1	1	359
C.V. (%)	13	2	1	26

MALI

Cooperator: Mr. O. Kodio

The trial was conducted at Cinzana and cowpea yield is given on Table 41 below.

Table 41. Performance of cowpea cultivars in a regional bruchids resistance trial at Cinzana, Mali, in 1989.

Cultivars	Seed yield
	---kg/ha--
IT86D-364	596
IT86D-498	581
IT86D-560	1909
IT86D-713	1730
IT86D-1038	1565
IT87S-1393	1395
IT87S-1463	528
IT84S-2246	1004
IT87D-1827	1503
KN-1	2387
LSD (5%)	804
C.V (%)	42

NIGERIA

Cooperator: Mr. C. Amatobi

The trial was conducted at Kadawa / Kano, described earlier. It was sown on 1 August, sprayed trice with insecticides (Cypermethrine + Dimethoate) and harvested on 25 October, 1989. The field plot was fertilized with 60 kg of P_2O_5/ha as single super phosphate. Rainfall received during the crop season is given on Fig. 17 and cowpea performance is given on Table 42 below.

Table 42. Performance of cowpea cultivars in a regional bruchids resistance trial at Kadawa/ Kano, Nigeria in 1989.

Cultivars	Number of plants	Insect infestation		Yield
		Maruca	Thrips	
		--(1-5)--		--kg/ha--
IT86D-364	56	1.0	18	683
IT86D-498	74	2.3	21	698
IT86D-560	66	2.3	28	802
IT86D-713	73	3.0	14	445
IT86D-1038	74	1.5	52	892
IT87S-1393	65	2.3	34	947
IT87S-1463	59	2.0	24	510
IT84S-2246	67	2.0	25	889
IT87D-1827	39	3.3	16	530
SAMPEA-7	74	2.0	27	1352
LSD (5%)	18	1.7	16	293
C.V. (%)	20	55.0	43	26

TCHAD

Cooperator: Mr. D. Valenghi

The trial was conducted at Gassi, described earlier. It was sown on 14 July, sprayed ten times with insecticides (Propoxur, Dursban, Decis and Astoate) and harvested from 27 September to 17 October, 1989. Rainfall received during the crop season is given on Fig. 13 and the cowpea performance is given on Table 43.

Table 43. Performance of cowpea culativars in a regional bruchids resistance trial at Gassi, Tchad, in 1989.

Cultivars	Number of plants	Days to Flowering	Days to Maturity	Insect infestation Locust(1)	Insect infestation Locust(2)	Seed yield
		-----DAS-----		-----(1-9)-----		-kg/ha-
IT86D-364	20	47	66	4.5	3.5	353
IT86D-498	43	45	67	4.0	5.0	346
IT86D-560	44	49	70	3.5	3.0	450
IT86D-713	38	48	69	4.0	3.5	422
IT96D-1038	40	49	68	4.5	6.0	153
IT87S-1393	31	50	69	5.5	6.0	263
IT87S-1463	11	47	68	4.0	5.5	105
IT84S-2246	39	44	63	4.0	3.5	482
IT87D-1827	24	48	67	4.5	2.5	565
TVx 3236	28	48	68	5.5	4.5	598
LSD (5%)	11	2	3	2.2	2.5	324
C.V. (%)	25	3	3	34	40	60

TOGO

Cooperator: Mrs. A. Duyiboe

The trial was conducted both in the field and in the laboratory at Ativeme in southern Togo. It was sown on 2 June, sprayed twice with insecticides (Deltamethrine) and harvested from 17 August to 6 September. A total precipitation of 1058 mm was received and is given on Fig. 15. The cowpea performance is given on Table 44. It should be noted that in contrast to the Kamboinse results of Burkina Faso, line IT86D-1038 and IT86D-1393 were highly resistant to bruchids infestation.

SUMMARY

The yield performance of lines across locations is shown on Table 45.

Table 44. Performance of cowpea cultivars in a regional bruchids resistance trial at Ativeme, Togo, in 1989.

Cultivars	Days to		Diseases		Insect pests		Bruchid-Biotest (45 DAS)			Yield
	Flowering	Maturity	Virus	Stem rot	Maruca	Ootheca	Number of eggs	Number of adult insects	Percent emerged adults	
	--------DAS--------		----(1-5)-----		--(1-5)--				---%---	--kg/ha--
IT86D-364	45	76	1.0	1.1	1.6	3.8	42	15	36	1060
IT86D-498	43	70	1.3	1.1	2.3	3.5	71	38	54	1266
IT86D-560	51	79	1.0	1.1	1.0	3.5	71	71	93	937
IT86D-713	47	78	1.0	1.0	1.1	3.8	59	27	46	1342
✗IT86D-1038	51	78	1.0	1.1	1.0	4.3	22	0	0 ✗	1871
✗IT87S-1393	52	77	1.3	1.0	1.0	3.8	16	0	0 ✗	1836
IT87S-1463	45	75	1.0	1.1	2.4	4.0	80	155*	100*	913
IT84S-2246	46	70	1.4	1.9	1.9	3.8	65	50	77	1483
IT87D-1827	46	75	1.1	1.0	1.6	3.8	50	20	40	1063
VITA-5	47	73	1.0	1.0	1.0	3.3	52	29	56	1057
LSD (5%)	3	4	0.5	0.9	0.8	-	-	-	-	416
C.V. (%)	5	4	31.0	22.0	41.0	15.0	-	-	-	22

*Second generation bruchids emerged.

Table 45. Seed yield of cowpea cultivars in a bruchids resistance trial in semi-arid West Africa in 1989

Cultivars	LOCATIONS §							
	Kamboinse (Burkina Faso)	Sao Jorge (Cape Verde)	Bareng-Pita (Guinea Conakry)	Kankan (Guinea C.)	Cinzana (Mali)	Kadawa (Nigeria)	Gassi (Tchad)	Ativeme (Togo)
IT86D-364	570 ef	675 b	1007 ab	704 c	596 de	683 bcd	353 abcd	1060 cd
IT86D-498	657 def	1527 a	790 bc	769 c	581 e	698 bcd	346 abcd	1261 bcd
IT86D-560	999 bc	352 c	796 bc	1039 abc	1909 ab	802 bc	450 abc	937 cd
IT86D-713	1361 a	793 bc	790 bc	848 bc	1730 abc	445 d	422 abcd	1342 bc
IT86D-1038	1256 abc	910 abc	543 cd	1346 a	1565 bc	892 b	153 cd	1871 a
IT87S-1393	1026 abc	382 c	684 c	1181 ab	1395 bcd	947 b	263 bcd	1836 a
IT87S-1463	569 f	999 abc	311 d	868 bc	528 e	510 cd	105 d	913 d
*IT84S-2246	907 cde	1262 ab	998 ab	1037 abc	1004 cde	889 b	482 ab	1483 ab
IT87D-1827	946 bcd	1057 abc	1084 a	946 bc	1503 bc	530 cd	565 ab	1063 cd
Local check	1358 a	998 abc	569 cd	713 c	2388 a	1352 a	598 a	1057 cd
LSD (%)	336	731	283	359	804	293	324	416
C.V. (%)	24	56	26	26	42	26	60	22

§ Means followed by the same letters are not statistically different at 5% probability level.

VII. COMMENTS

High coefficients of variations (C.V.'s) 30% have been observed in many locations. These may be attributed either to great variations of which blocking of experimental units (replications) did not control properly or poor rain distribution during the crop season or poor management of the trials, such as poor drainage, untimely weeding of experimental plots, untimely insecticide application or poor handling of harvested products, etc.

Scientists involved in regional trial testing should pay particular attention to high C.V's and should take the necessary steps when experimenting a trial to keep C.V's as low as 20%, except that they were caused by weather hazards. It is well known that C.V's of 30% occur in semi-arid zones if dry spells lasted for a period of 8 days or more.

In order to improve on the quality of regional trials and to maximize their importance, scientists involved in regional testing in their respective countries should endeavour to take as many observations as possible, especially on physiological traits (plant population density, date of flower bud formation, date of flowering, date of maturity), disease reactions, insect pest damage (including bruchids and aphids bio-tests which appear in the accompanying trial protocols) as well as yield data. It is equally important to indicate the geographical situation (latitudes, longitudes, altitudes) of the location where the trial was conducted. The variables mentioned above are necessary in order to permit scientists to properly appraise the strengths and weaknesses of any technology that they are testing. They could also help national programs rapidly move high performing technologies to on-farm testing or using them as source of breeding material in the case of variety trials which will certainly save them time and money.

The idea of reporting the performance of regional trials is to permit national scientists apprehend the performance of new technologies across locations in the sub-region. The most appropriate time to bring out this information should be between the months of April and May. In other words, before the next season starts, so that scientists can prepare themselves

from the performance observed and the remarks made and make the necessary adjustments for the new season. However, given that national programs have not always respected the date limit (15 December) after harvest for returning their data sheets to the Network Coordinator, this report could not have been out earlier than now.

We are once more reminding national scientists to keep to the date line for returning data to the Coordinator if we are to achieve our purpose of regional trials.

Some national programs have not as yet returned data of their trials and we are urging them to send them so that we can establish a complete picture of the performance of new technologies within the framework of the network.

1990-06

1989-90 REGIONAL TRIALS PRELIMINARY RESULTS

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