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Progress Report 29

Kharif Sorghum Germplasm Collection in Karnataka and Adjoining Areas

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C O N T E N T S

	Page No.
SUMMARY	1
INTRODUCTION	7
PLANNING AND ORGANIZATION OF THE MISSION	8
AGRO-CLIMATIC CONDITIONS	9-10
COLLECTION OF SORGHUM GERMPLASM	11
VARIABILITY IN THE SORGHUM COLLECTION	12-17
WILD RELATIVES OF SORGHUMS	17
PESTS AND DISEASES	17
UTILIZATION OF SORGHUM GERMPLASM IN THE SORGHUM IMPROVEMENT PROGRAM	17-18
ACKNOWLEDGEMENTS	19-20
REFERENCES	20
LIST OF SORGHUM SAMPLES COLLECTED	Appendix-I
LIST OF PEARL MILLET AND MINOR MILLETS SAMPLES COLLECTED	Appendix-II
ITINERARY	Appendix-III

KHARIF SORGHUM GERMPLASM COLLECTION IN KARNATAKA AND ADJOINING AREAS

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SUMMARY

1. Present world collection is seriously lacking in photoinsensitive rainy (kharif) season sorghum landraces. There are very few pockets in South India where early kharif sorghums are cultivated among which Northern Karnataka and its adjascent areas are very important. Collection of sorghum landraces in this area became immediate concern in view of the importance of the material and also the serious threat they are facing on account of the spread of hybrids and improved varieties.

2. 'Bhogapura' (durra) is a popular landrace earliest of all with a duration of 90 days. The other early duration landraces are 'Surya haula', 'Ekranal', 'Muraganika jola', 'Kadubuni jola' and 'Jari jola'.

3. Majority of the samples collected in this mission belong to the race 'durra' with a wide range of variability and remarkably early in duration. Interestingly, 50 different local landraces and cultivars belonging to this race could be collected.

4. Limited number of pure guineas and bicolors were collected. Kafirs and caudatums are totally absent. *S. purpureosericeum* is the only wild sorghum noticed.

5. Landraces collected in this mission should be of use in sorghum improvement programs because of their agronomic superiority and earliness in a long day (kharif) season.

6. Samples collected in the severe drought areas of Anantapur, Bellary, Raichur, Gulbarga and Bidar districts may provide source material for drought resistance.

7. Dharwar and Belgaum districts are hot spots for sugary disease. Disease free samples collected from this area may provide useful material for sugary disease resistance.

8. Pop and sweet-stalk sorghums collected in this mission could be of special interest.

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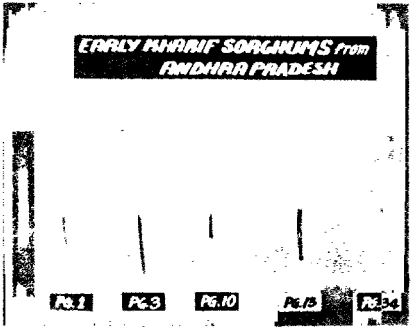


Fig. 1

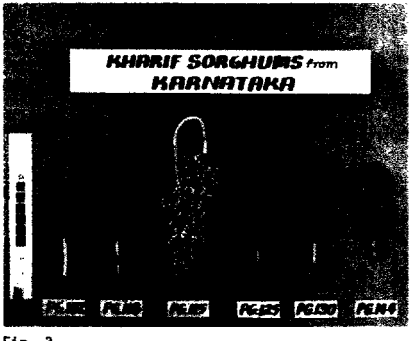


Fig. 3

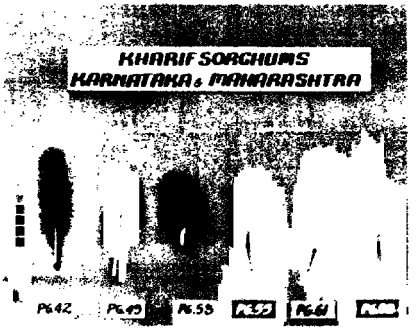


Fig. 2

Fig. 1.	PG.	1	Vanakalam jonna	*Durra*
	PG.	3	Yerra jonna	*Durra*
	PG.	10	Tella jonna	*Durra*
	PG.	13	Patcha jonna	*Durra*
	PG.	34	Neeru jonna	*Durra*
Fig. 2.	PG.	42	Sakkara guleka	*Durra-kafir*
	PG.	49	Kesari jola	*Durra*
	PG.	53	Suryahaula	*Durra*
	PG.	55	Gida dimma jola	*Durra*
	PG.	61	Nadyal jola	*Durra*
	PG.	88	Bhogapura	*Durra*
Fig. 3.	PG.	102	Basavanna pada	*Durra*
	PG.	113	Kanivi jola	*Durra*
	PG.	115	Alluna jola	*Guinea-durra*
	PG.	125	Kharif Maldandi	*Durra*
	PG.	130	Jowari jola	*Durra*
	PG.	144	Muraganiki jola	*Durra*

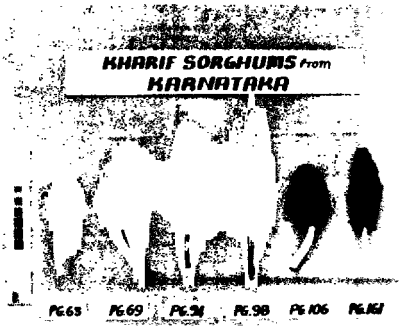


Fig. 4

Fig. 5

Fig. 6

Fig. 4.	PG.	63	Nandibevur jola	*Durra*
	PG.	69	Raichur jola	*Durra*
	PG.	94	Mattur jola	*Durra*
	PG.	98	Sadagar Nandyal	*Durra-bicolor*
	PG.	106	Gidda kempu jola	*Durra*
	PG.	161	Kempu jola	*Durra*
Fig. 5.	PG.	134	Sholapur local	*Durra*
	PG.	160	Jowari jola	*Durra*
	PG.	168	Giddangeri jola	*Durra*
	PG.	181	Tella kidiki	*Durra*
	PG.	184	Peeli jonna	*Durra*
	PG.	186	Jingridukhi	*Durra*
				Durra
Fig. 6.	PG.	152	Ginigeri jola	*Durra*
	PG.	154	Kareguni	*Durra*
	PG.	157	Gangavati	*Durra*
	PG.	166	Mungari jola	*Durra*
	PG.	170	Gundu tenai	*Durra*
	PG.	178	Varadi jola	*Durra*

Fig. 7

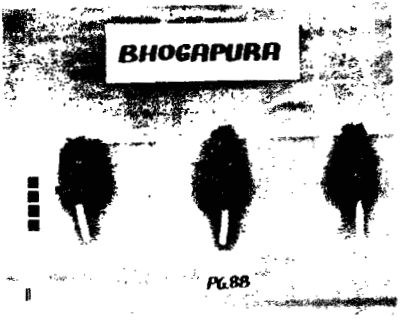


Fig. 8

Fig. 9

Fig. 7. PG. 138 Allina jola *Durra-bicolor*
PG. 176 Dholijaki *Durra-bicolor*
PG. 182 Pelala jonna *Guinea*
PG. 183 Allu jonna *Guinea*

Fig. 8. PG. 88
"Bhogapura" a popular early kharif jowar of Karnataka.

Fig. 9. PG. 185
S. purpureosericeum a para sorghum collected near Janwada village of Bidar district, Karnataka

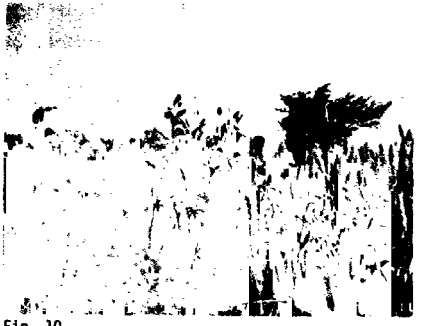


Fig. 10

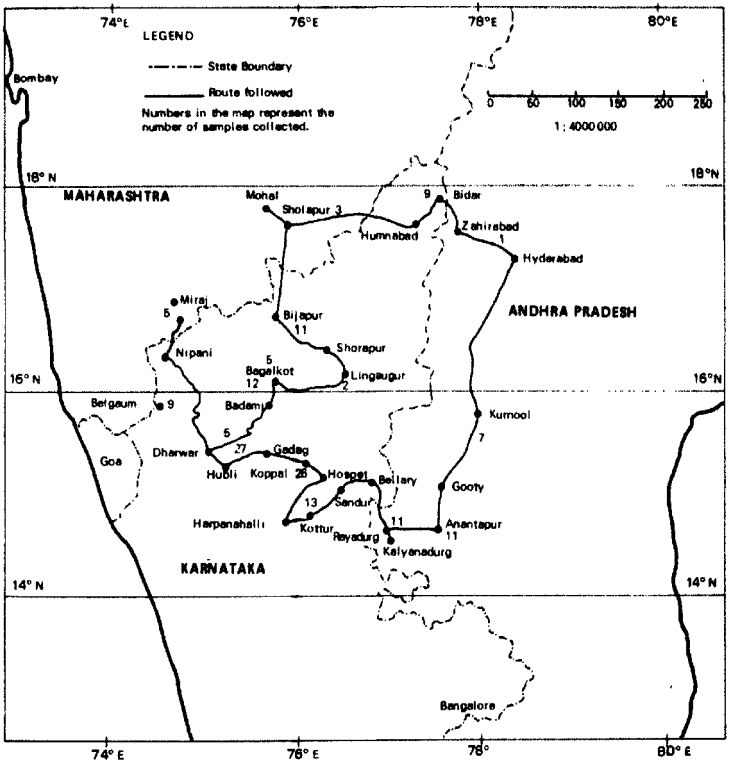
Fig. 11

Fig. 12

Fig. 10. Local landraces being replaced by Hybrids (CSH-5) at a faster rate

Fig. 11. PS. 111 "Kareguni" A sweet stalk sorghum with tan plant colour

Fig. 12. Sorghum grown in the rocky-red soils of Anantapur



Kharif Sorghum Germplasm Collection in Karnataka and Adjoining Areas - November 1980.

ICR 81-0015

INTRODUCTION

An assessment of the present world collection of sorghum maintained at ICRISAT reveals that the majority of the germplasm constitutes either experimental accessions which are generally photo-insensitive or authentic indigenous races from tropical countries which are photosensitive. Most of the landraces assembled from tropical countries including India behave photoperiod sensitive when grown in a long day (rainy) season at Patancheru (17°27'N latitude) indicating the lacking of early insensitive types especially from India. Almost all the landraces collected from India are either late kharif or rabi types.

There are very few pockets in South India where early kharif types are cultivated among which Northern Karnataka and its adjoining areas are very important. These areas were not adequately collected in earlier missions and their valuable germplasm are facing severe threat from hybrids and improved sorghum varieties.

More landraces from this region may provide valuable source material for sorghum improvement programs particularly for earliness, probable resistance to drought (several areas are drought prone). They may also possess weathering resistance because of their maturity during rainy season.

PLANNING AND ORGANIZATION OF THE MISSION

In view of the importance of the material available in this area, a collection mission was organized to collect the traditional kharif landraces which are getting replaced by the new high yielding, uniform varieties and hybrids as research and extension activities are intensified. Planning and organization of the mission was made in consultation with Drs. R. Parameshwarappa, B.T.S. Shankar Gowda, Sorghum Breeders of University of Agricultural Sciences, Dharwar. The collection trip was planned for 14 days (20/11/1980 to 2/12/1980). The areas covered were Anantapur district of Andhra Pradesh; Bellary, Raichur, Dharwar, Belgaum, Bijapur, Gulbarga and Bidar districts of Karnataka and parts of Sholapur district of Maharashtra.

The collection team consisted of the following members of Genetic Resource Unit.

1. Mr. K.E. Prasada Rao, Botanist
2. Mr. V. Gopal Reddy, Technical Assistant
3. Mr. Mahboob Ali, Driver-cum-General Assistant

The route followed, areas collected and number of samples collected are shown on the map. The mission was successful because of timely launching which enabled the gathering of useful information from the standing crop besides the collection of head samples.

AGRO-CLIMATIC CONDITIONS

The areas in this mission lie between 14°N and 18°N latitude. Soils are mainly red-sandy, red-loamy, occassionally medium black in Anantapur, Bellary, Bijapur, Gulbarga, Bidar and Raichur districts, pure black in Dharwar and Belgaum districts. Where soils are black with high moisture retention capacity, farmers take up a late kharif or rabi sorghum crop. In the red-sandy, red-loamy or medium black soils, farmers usually grow an early kharif sorghum crop which matures with the south-west monsoon rain. Average annual rainfall ranges between 518.1 mm (Bellary) to 1549.8 mm (Belgaum). The average monthly rainfall in various regions is shown in table 1.

Table 1: Average monthly rainfall record for the various areas of collection*

Month	Bellary	Anantapur	Bijapur	Gadag	Raichur	Sholapur	Gulbarga	Bidar	Belgaum
Jan	1.5	0.3	3.3	2.4	0.8	3.6	1.3	2.0	0.9
Feb	2.4	2.5	1.2	1.6	6.0	2.0	5.2	7.2	1.6
Mar	4.4	3.9	9.4	6.6	4.1	7.2	11.2	16.7	11.6
Apr	23.5	18.7	25.8	34.7	12.7	15.8	16.8	27.3	57.6
May	61.0	60.3	39.4	82.4	28.4	26.4	39.9	29.2	93.4
June	43.1	55.6	67.7	73.2	102.9	108.7	110.2	146.6	222.5
July	47.7	47.8	78.9	70.3	138.6	127.7	150.8	243.3	519.3
Aug	79.8	93.0	84.8	83.4	135.0	139.9	142.9	186.3	302.8
Sept	110.0	124.1	135.4	133.2	167.5	183.8	178.3	211.5	120.7
Oct	108.5	110.2	97.4	130.1	93.9	92.3	71.0	73.6	175.4
Nov	30.8	38.5	25.9	36.6	24.8	28.0	23.8	29.9	36.9
Dec	5.4	7.2	4.7	9.2	2.6	6.6	1.9	3.4	7.1
	518.1	562.1	573.9	663.7	717.3	742.0	753.3	977.0	1549.8

*Data obtained from climatological table of observatories in India (1931-1960) India Meteorological Department, New Delhi - 1967.

In 1980, the Anantapur district of Andhra Pradesh, Bellary and Bidar districts of Karnataka experienced severe drought. Much of the sorghum area in these districts was not planted and, in areas where it was planted, the crop suffered from severe drought.

Sorghum is planted as a mixed crop in almost all the early kharif areas and the following are the common crop mixtures.

1. sorghum + groundnut + bajra + green gram + gingelly (sesame) + pigeonpea.
2. sorghum + groundnut + bajra + green gram + gingelly
3. sorghum + bajra + pigeonpea + gingelly + green gram + cowpea
4. sorghum + groundnut + pigeonpea
5. sorghum + groundnut + cotton
6. sorghum + bajra + cotton
7. sorghum + pigeonpea + green gram
8. sorghum + groundnut + green gram
9. sorghum + groundnut + horse gram
10. sorghum + gingelly + groundnut + pigeonpea
11. sorghum + cowpea + pigeonpea + gingelly
12. sorghum + pigeonpea
13. sorghum + groundnut
14. sorghum + cotton
15. sorghum + green gram

Sorghum + pigeonpea is the most popular mixed cropping followed.

COLLECTION OF SORGHUM GERMPLASM

The mission was just in time for collection of sorghum in several areas except it was bit late for the collection of early kharif types such as 'Bhogapura'. In areas where the crop was harvested, head samples were collected from farmer's field where the crop is staked after harvesting.

Crops and number of samples collected is listed below:

Crop	Wild types	Head Samples	Farmers seed samples	Market samples	Total
Sorghum	2	148	3	4	157
Pearl millet	-	17	4	-	21
Setaria	-	3	6	-	9
Eleusine	-	2	-	-	2
					189

No wild sorghums were noticed in the area of collection except two accessions of *S. purpureosericeum* (para sorghum). The list and details of the collection are presented in appendix I and II.

All the accessions collected are authentic indigenous landraces except D-340 (PG-137) which is an improved variety locally called 'Gangavati' and one 'Anthur-Benthur' a rabi variety (PG-120) developed by a progressive farmer. CSH-5 and CSH-1 are the most popular hybrids in this area which are spreading fast (Fig. 10).

Sorghum grain is generally used for the preparation of roti (unleavened bread) in this area. Most of the kharif sorghum landraces were planted in June and harvested in October. In some patches of Bellary district, the crops were planted in May and harvested in September. In Belgaum district, sorghum is grown as a late kharif crop where it is planted in July and harvested in December. In the present mission, special emphasis was given to the collection of early kharif types. The duration of these landraces ranged from 90 to 110 days.

VARIABILITY IN THE SORGHUM COLLECTION

The panicle shape and spikelet morphology of the samples were observed and recorded at the time of collection. The collected samples were classified into basic and intermediate races.

The collected samples belong to the following taxonomic races.

Species /race	No. of samples collected
Para Sorghums (*S. purpureosericeum*)	2
Eu-Sorghums	
Sorghum bicolor (L.) Moench	
ssp. *bicolor*	
Race Durra	135
Durra-bicolor	6
Durra-kafir	2
Bicolor	2
Guinea	2
Guinea-durra	1
Not classified	7
	157

Most of the landraces collected in the present mission belong to the basic race durra. Pure races of bicolor and guinea were also present to a vary limited extent. Pure races of kafir and caudatum are totally absent.

The variability in each race, the agronomic importance and other special features are discussed hereunder.

Durra

The durras collected in this mission showed a wide range of variability. Each landrace is easily distinguishable and carries a local name mostly based on its morphological characters and utilization. The 50 durra landraces were collected in this mission and their respective local names is listed below:

S.No.	Local Name	No. of samples collected
1.	Kempu jola (Red sorghum)	13
2.	Bhogapura	8
3.	Talla jonna (white sorghum)	5
4.	Punasa jonna (kharif sorghum)	5
5.	Mungari jonna (kharif sorghum)	5
6.	Surya haula	5
7.	Raichur jola	5
8.	Ekranal	5
9.	Bili jola (white sorghum)	5
10.	Nandyal jola	4
11.	Yerra jonna (Red jowar)	4
12.	Mattur	4
13.	Jowari jola	4
14.	Gidda kempu	4
15.	Patcha jonna (yellow sorghum)	3
16.	Irala jonna	3
17.	Gida dimma jola	3
18.	Gangavati	3
19.	Sholapur local	3
20.	G[illegible]ri	3

S.No.	Local Name	No. of samples collected
21.	Pasara jonna (yellow sorghum)	2
22.	Kesari jola	2
23.	Allu jola	2
24.	Sadagar Nandyal	2
25.	Kanivi	2
26.	Kharif	2
27.	Chalo jola	2
28.	Kar jola	2
29.	Peeli jonna (yellow sorghum)	2
30.	Vanakalam jonna (rainy season sorghum)	1
31.	Neeru jonna	1
32.	Lathvavani jonna	1
33.	Kunti jonna	1
34.	Kempu kesari	1
35.	Nandibevur jola	1
36.	Ayidukalasa	1
37.	Kodimuruka	1
38.	Mulagond	1
39.	Bailhongal local	1
40.	Shadbol	1
41.	Gadda jola	1
42.	Mura ganika	1
43.	Kadabuni jola	1
44.	Ginigeri	1
45.	Karegunl	1
46.	Gundu Tenai	1
47.	Kamakala jola	1
48.	Varadi jola	1
49.	Tella kidiki	1
50.	Jingridukhi	1
	Local names could not be traced	2
		135

'Kempu jola' (Fig. 4, PG-161) have dark red pericarp and are without subocat. These are widely distributed throughout the tract and some of them are used in the preparation of a special kind of sweet. 'Bhogapura' (Fig. 8, PG-88) is a popular landrace earliest of all with a duration of 90 days from seed to seed. The other early duration landraces are 'Surya haula' (Fig. 2, PG-53), 'Ekranal', 'Muraganika jola' (Fig. 3, PG-144), 'Kadabuni jola' and 'Jari jola'.

'Patcha jonna' (Fig. 1, PG-13), 'Pasara jonna', 'Peali jonna' (Fig. 5, PG-184) are those with yellow pericarp. Geda dimma jola (Fig. 2, PG-55) and Raichur jola (Fig. 4, PG-69) are highly priced for their grain quality. 'Allu jola' is a popping type. 'Nandyal' (Fig. 2, PG-61) are agronomically superior with good head size and maximum grain number per panicle. 'D-340', a named cultivar locally called as 'Gangavati' (Fig. 6, PG-157), is very popular in Bijapur and Dharwar districts.

'Kharif Maldandi' (Fig. 3, PG-125) is a photoperiodinsensitive, medium tall, converted version of rabi Maldandi which is photoperiodsensitive and tall. This could have come by chance selection of a photoperiodinsensitive segregate from the Maldandi variety when grown in kharif (long day) season. However, this cultivar is similar to Maldandi in all other respects.

Durra-bicolor

One of the collections of 'Raichur jonna' and 'Sedagar Nandyal' (Fig. 4, PG-98) belong to this intermediate race with more prominent long glumes enclosing the elongated grain. 'Kanumuchuga', 'Muskin jola', 'Allina jola' (Fig. 7, PG-138) and 'Dholijaki' (Fig. 7, PG-176) are large glume types that belong to this intermediate race. These could be classified as subrace membranaceum. These are supposed to be bird resistant. Some of them are good pop types.

Durra-kafir

'Sakkara guleka' (Fig. 2, PG-42) and 'Karaguni' (PG-111) belong to this intermediate race. Although kafir landraces are not reported to have been distributed in India, these two cultivars could have developed as a result of natural introgression of kafir germplasm from the kafir-milo hybrids into the local durra races. 'Karaguni' has sweet-stalk as well as agronomic desirability.

Bicolor

There are only two samples of pure bicolors which do not have any local names. These are mainly fodder types with poor grain quality.

Guinea

Two pure guineas were collected with the local names 'Pelala jonna' (Fig. 7, PG-182) and 'Allu jonna' (Fig. 7, PG-183). Both local names mean 'Popping sorghums'. These types have long, loose panicles with characteristic twisted grain in between gaping involute glumes.

Guinea-durra

'Alluna jola' (Fig. 3, PC-115) collected in the Gadag area belong to this intermediate race. Its panicle is semi-loose on a recurved peduncle with open glumes and transverse crease.

WILD RELATIVES OF SORGHUMS

Two accessions of para sorghums (*S. purpureosericeum*) are the only wild types collected in this trip. These are very sparsely distributed (Fig. 9) and quickly disappearing on account of over grazing.

PESTS AND DISEASES

Stem borer, *Heliothis* caterpillar, and ear head bugs are the important sorghum pests observed. Covered grain smut and sugary disease are present. Sugary disease is very severe in Dharwar and Belgaum districts especially on late maturing varieties.

UTILIZATION OF SORGHUM GERMPLASM IN THE SORGHUM IMPROVEMENT PROGRAM

Sorghum germplasm collected in this mission include a wide range of early maturing kharif landraces which are lacking in the present collection.

Landraces belonging to the basic race durra are usually photoperiodsensitive and tall when grown in India in the long day (kharif) season. Consequently much of the local germplasm could not be

readily utilized in the on-going breeding programs. The present collection include several early maturing durras on reasonably good agronomic background which could be well utilized in breeding programs.

Accessions collected in the severe drought affected areas of Anantapur, Bellary, Raichur, Gulbarga and Bidar districts are worth testing for drought tolerance.

Many of the landraces collected mature during the rainy season. Consequently they might have acquired some weathering resistance which need to be tested. Belgaum and Dharwar districts are real hot spots for sugary disease. Improved varieties planted on the experimental station were severly affected with sugary disease. Disease free samples collected from this area may provide useful material for sugary disease resistance.

Stem borer and ear-head bug are the common insect pests present almost throughout the tract. As a result of long standing co-existance, at least some of the landraces might have picked inherent resistance against these pests. It would be interesting and may prove worthwhile to subject the collection to controlled screening for the two prevalent pests.

Pop sorghums collected in this mission may prove useful. Sweet-stalk sorghums on good agronomic base could be used as dual purpose sorghums and they may provide source material for the production of alcohol.

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REFERENCES

Randhawa, M.S. *et al.* Farmers of India Vol II, Indian Council of Agricultural Research, New Delhi, 1961.

_____ Climatological table of observatories in India (1931-1960). India Meteorological Department, New Delhi-1967.

Harlan, J.R., and J.M.J. de Wet. A simplified classification of cultivated sorghum. Crop Science 12: 172-176. 1972.

Bor, N.L. The grasses of Burma, Ceylon, India and Pakistan. Pergamon press. Oxford 1960.

Prasada Rao, K.E. Sorghum collection from hilly areas in Eastern Ghats of India. Mimeographed ICRISAT 1978.

Prasada Rao, K.E. Sorghum and Millets Germplasm collection in Madhya Pradesh. GRU Progress Report-8, ICRISAT 1979.

Mengesha, M.H., K.E. Prasada Rao., and S. Appa Rao. The Status of Cereals Germplasm at ICRISAT, GRU ICRISAT Publication 1979.

Appendix I

Sorghum samples collected in Karnataka and adjoining areas - November 1980

Coll. No.	State	District	Nearest town	Village/Precise Locality	Altitude Meters	Local Name	Classification
PG-1	Andhra Pradesh	Kurnool	Kurnool	32 N Kurnool	315	Vanakalam jonna	D
PG-2	"	"	"	Narlavagu	"	Tella jonna	D
PG-3	"	"	"	"	"	Yerra jonna	D
PG-5	"	"	"	China Takuru	330	-	B
PG-6	"	"	"	"	"	Patcha jonna	D
PG-7	"	"	"	"	"	Punasa jonna	D
PG-8	"	"	"	"	"	"	D
PG-9	"	Anantapur	Anantapur	Vadiampeta	290	Mungari jonna	D
PG-10	"	"	"	"	"	Tella jonna	D
PG-11	"	"	"	"	"	Yerra jonna	D
PG-13	"	"	Atmakur	Padamata Kothapalli	440	Patcha jonna	D
PG-14	"	"	"	"	"	Punasa jonna	D
PG-15	"	"	"	"	"	"	D
PG-16	"	"	"	"	"	Yerra jonna	D
PG-17	"	"	"	"	"	Punasa jonna	D
PG-18	"	"	"	"	"	Tella jonna	D
PG-21	"	"	"	Kalavapalli	450	Pasara jonna	D
PG-22	"	"	"	"	"	Lathvaram jonna	D
PG-23	"	"	Kalyanadurg	Kalyanadurg	550	Patcha jonna	-
PG-24	"	"	"	"	"	Hoali jonna	-
PG-25	"	"	"	"	"	"	-
PG-26	"	"	"	"	"	Thota jonna	-
PG-28	"	"	"	Papampalli	"	Irala jonna	B
PG-29	"	"	"	"	"	"	D
PG-30	"	"	"	"	"	"	D

Contd..

Coll. No.	State	District	Nearest town	Village/Precise locality	Altitude Meters	Local Name	Classification
PG-32	Andhra Pradesh	Anantapur	Kalyanadurg	Chapari	550	Tella jonna	D
PG-34	"	"	"	T. Veerapuram	500	Neeru jonna	D
PG-35	"	"	"	"	"	Kunti jonna	D
PG-36	"	"	"	"	"	Pasaru jonna	D
PG-40	Karnataka	Bellary	Sandur	Taranagar	500	Bhogapura	D
PG-41	"	"	"	"	"	"	D
PG-42	"	"	"	Sandur	"	Sakkara guleka	DK
PG-43	"	"	"	"	"	Bhogapura	D
PG-45	"	"	"	Yeswantnagar	580	"	D
PG-48	"	"	Kudligi	Kalingeri	650	Surya haula	D
PG-49	"	"	"	"	"	Kesari jola	D
PG-50	"	"	"	"	"	"	D
PG-51	"	"	"	"	"	Kempu kesari	D
PG-52	"	"	"	Kudligi	550	Surya haula	D
PG-53	"	"	"	"	"	"	D
PG-55	"	"	Harpanahalli	K. Ayyana halli	"	Gida dinna jola	D
PG-56	"	"	"	"	"	"	D
PG-61	"	"	Hospet	Kadimi halli	570	Mandyal jola	D
PG-62	"	"	"	"	"	Kempu jola	D
PG-63	"	"	"	"	"	Mandibevur jola	D
PG-64	"	"	"	"	"	Kempu jola	D
PG-65	"	"	"	Mandibevur	"	Raichur jonna	DB
PG-66	"	"	"	"	"	Geda dinna jonna	D
PG-67	"	"	"	"	"	Mandyal	D
PG-68	"	"	"	"	"	Raichur jola	D
PG-69	"	"	"	"	"	"	D
PG-70	"	"	"	"	"	"	D

Contd...

Coll. No.	State	District	Nearest town	Village/Precise locality	Altitude Meters	Local Name	Classification
PG-71	Karnataka	Bellary	Hospet	Mandibevur	570	Surya haula	D
PG-72	"	"	-	Mahajana halli	540	Kempu jola	D
PG-73	"	"	-	"	"	Surya haula	D
PG-74	"	Raichur	Koppal	Koppal	500	Bhogapura	D
PG-76	"	"	"	Kinnal	470	"	D
PG-77	"	"	"	"	"	"	D
PG-78	"	"	Kinhal	Malinur	480	Mattur	-
PG-83	"	"	Koppal	Kalikeri	"	Kempu jola	D
PG-84	"	"	Kinhal	Hatti	500	"	D
PG-85	"	"	Koppal	Chilaka mukki	"	Ayidukalasa	-
PG-86	"	"	"	Hosur	580	Allu jola	D
PG-87	"	"	"	"	"	"	D
PG-88	"	"	"	"	"	Bhogapura	D
PG-89	"	"	"	Chidagara halli	550	Nandyal	D
PG-90	"	"	"	"	"	Ekranal	D
PG-91	"	"	"	Halligudi	560	Raichur jowar	D
PG-92	"	Dharwar	Gadag	Harlapur	"	Mattur	D
PG-93	"	"	"	"	"	"	D
PG-94	"	"	"	"	"	"	D
PG-95	"	"	"	Gadag	650	"	D
PG-96	"	"	"	"	"	Kempu jola	D
PG-97	"	"	"	"	"	"	D
PG-98	"	"	"	"	590	Sadagar Nandyal	DB
PG-99	"	"	"	"	"	"	D
PG-100	"	"	"	"	"	Mangari Bilijola	D

Contd...

Coll. No.	State	District	Nearest town	Village/Precise Locality	Altitude Metera	Local Name	Classification
PG-101	Karnataka	Dharwar	Gadag	Gadag	590	Muskin jola	DB
PG-102	"	"	"	"	"	Basavanna pada or Ayida kalasa	D
PG-103	"	"	"	Kadampur	600	Kaichur jowar	D
PG-104	"	"	"	"	"	Kodimuruku	D
PG-105	"	"	"	"	"	Kempu jola	D
PG-106	"	"	"	"	"	Gidda kempu jola	D
PG-109	"	"	"	"	"	Kanu machaga	DB
PG-111	"	"	"	"	"	Kare guni	DK
PG-112	"	"	Gadag	Gadag	610	Gangavati	D
PG-113	"	"	"	"	"	Kanivi	D
PG-114	"	"	"	"	"	Malagund	D
PG-115	"	"	"	Benkadukathi	"	Alluna jola	GD
PG-116	"	"	Annegiri	Annegiri	580	Sadagar Mandyal	D
PG-117	"	"	"	"	580	Gidda kempu	D
PG-118	"	"	"	"	"	"	D
PG-119	"	"	"	"	"	"	D
PG-120	"	"	"	Anthur-Benthur	600	Anthur-Benthur local	-
PG-122	"	"	"	Malavadi	550	-	DB
PG-123	"	Belgaum	Bailhongal	Bailongal	620	Bailhongal local	D
PG-124	"	"	Hosargi	Hodalahevi	670	Shadbol	D
PG-125	"	"	"	Hosargi	680	Kharif Maldandi	D
PG-126	"	"	"	"	"	"	D
PG-127	"	"	"	Annaharothi	700	Chalo jola	D
PG-128	"	"	"	"	"	"	D
PG-129	"	"	Panchapur	Hankalagi	680	Gadda jola	D
PG-130	"	"	"	Aktangi hobla	"	Jowari jola	D
PG-131	"	"	"	"	"	Kempu jola	D

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Coll. No.	State	District	Nearest town	Village/Precise Locality	Altitude Meters	Local Name	Classification
PG-132	Maharashtra	Kolhapur	Ichalakaranji	Sharadwad	560	Kar jola	D
PG-133	"	"	"	"	"	"	D
PG-134	"	"	"	"	540	Sholapur local	D
PG-135	"	"	"	"	"	"	D
PG-136	"	"	"	"	"	"	D
PG-137	Karnataka	Dharwar	Navalgund	Habsur	"	Nandyal	D
PG-138	"	"	"	"	530	Allina jola	DB
PG-139	"	"	"	Yemanur	520	-	L
PG-140	"	"	"	"	"	Allina jola	D
PG-141	"	"	Kulageri	Konnur	"	Bili jola	D
PG-142	"	Bijapur	Badami	Thimmapur	"	Ekranal	D
PG-143	"	"	"	"	"	Mungari jola	D
PG-144	"	"	"	Hiremutchaloud	"	Hooraganiki jola	D
PG-145	"	"	"	"	"	Mungari jola	D
PG-146	"	"	"	"	"	Kadabuni jola	D
PG-147	"	"	"	"	"	Ekranal	D
PG-150	"	"	"	Badami	500	Akranol	D
PG-151	"	"	"	Mandikeswara	"	Akranol	D
PG-152	"	"	"	Halkurki	540	Ginigari jola	D
PG-153	"	"	"	"	"	Gangavati	D
PG-154	"	"	"	"	"	Kareguni	D
PG-155	"	"	"	"	"	Kempu jola	D
PG-156	"	"	Bagalkot	Murnal	520	Kempu jola	D
PG-157	"	"	"	"	"	Gangavati	D
PG-158	"	"	"	Amadinne	480	Jowari jola	D
PG-159	"	"	"	"	480	Kempu jola	D
PG-160	"	"	"	Sirur	"	Jowari jola	D

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Coll. No.	State	District	Nearest town	Village/Precise Locality	Altitude Meters	Local Name	Classification
PG-161	Karnataka	Bijapur	Raichur	Lingsugur	450	Kempu jola	D
PG-163	"	"	"	Guragunti	420	Jowari jola	D
PG-164	"	"	Gulbarga	Gudugutta	395	Kanumi jola	D
PG-165	"	"	"	"	395	Mungari jola	D
PG-166	"	"	"	Bondoda	310	"	D
PG-167	"	"	"	Hebbal. B	320	Giddangeri jola	D
PG-168	"	"	"	"	"	"	D
PG-169	"	Gulbarga	Gulbarga	"	"	"	D
PG-170	"	"	"	"	"	Gundu Tenai	D
PG-171	"	"	"	Sanhapur	"	Kanakada jola	D
PG-172	"	"	"	"	"	Bili mungari	D
PG-173	"	"	"	"	"	"	D
PG-175	"	"	"	Devapur	350	Local kharif jowar	D
PG-176	Maharashtra	Sholapur	Sholapur	Naldurg	500	Dholijaki	D
PG-177	"	"	"	"	"	Peali jowar	D
PG-178	"	Osmanabad	Umarga	Turori	"	Varadi jola	D
PG-179	Karnataka	Bidar	Humnabad	Kandaram	610	Patcha jonna	D
PG-180	"	"	"	"	"	Yerra jonna	D
PG-181	"	"	"	"	"	Talla kidiki	D
PG-182	"	"	"	"	"	Pelala jonna	G
PG-183	"	"	"	Elsingi	580	Allu jonna. (Pelala jonna)	G
PG-184	"	"	Bidar	Majjinodi	550	Peali jonna	D
PG-185	"	"	"	Janwada	470	S. purpureosericeum	-
PG-186	"	"	"	"	"	Jingridukhi	D
PG-187	"	"	"	Markal	480	Safed jowar	D
PG-189	Andhra Pradesh	Medak	Medak	Sadasivpet	550	S. purpureosericeum	-

P = Prasada Rao
G = Gopal Reddy
PG

D = Durra
DB = Durra-bicolor
DK = Durra-kafir

B = Bicolor
G = Guinea
GD = Guinea-durra

Appendix II

Pearl millet and Minor millets samples collected in Karnataka and adjoining areas - November 1980

Coll. No.	State	District	Nearest Town	Village/Precise locality	Altitude Meters	Crop Species	Local Name
PC-4	Andhra Pradesh	Kurnool	Kurnool	China Tekuru	315	Setaria italica	Nasa Korrala
PC-12	"	Anantapur	Anantapur	Vadiampeta	290	P. americanum	Sajja
PC-19	"	"	"	Padamata Kothapalli	"	"	"
PC-20	"	"	"	"	"	"	"
PC-27	"	"	Kalyanadurg	Papampalli	550	"	Soodaru Sajja
PC-31	"	"	"	"	"	"	Sajja
PC-33	"	"	"	Chapari	"	"	"
PC-37	Karnataka	Bellary	Sandur	Vaddu	500	Setaria italica	Navani
PC-38	"	"	"	"	"	"	"
PC-39	"	"	"	"	"	"	"
PC-44	"	"	"	Sandur	"	P. americanum	Bajra
PC-46	"	"	"	Yeswant Nagar	"	"	"
PC-47	"	"	"	"	"	"	"
PC-54	"	"	Kudligi	Kudligi	650	"	"
PC-57	"	"	Harpana halli	K. Ayyana halli	550	Setaria italica	Navani
PC-58	"	"	"	"	"	"	"
PC-59	"	"	"	"	"	"	"
PC-60	"	"	"	"	"	Eleusine coracana	Ragi
PC-75	"	Raichur	Koppal	Chivavadagi	500	P. americanum	Sajja
PC-79	"	"	Kinhal	Halinur	480	"	"
PC-80	"	"	"	"	"	Setaria italica	Navani
PC-81	"	"	"	"	"	"	K. 2221

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Coll. No.	State	District	Nearest Town	Village/Precise locality	Altitude Meters	Crop Species	Local Name
PG-82	Karnataka	Raichur	Kinhal	Malimur	480	P. americanum	Sajja
PG-107	"	Dharwar	Gadag	Kadampur.	650	"	Jowari Sajja
PG-108	"	"	"	"	"	"	"
PG-110	"	"	"	"	"	"	Hunsi Bajra
PG-121	"	"	Annegiri	Malavadi	580	Setaria italica	Navani
PG-148	"	Bijapur	Badami	Hiremuchalgud	500	P. americanum	Bajra
PG-149	"	"	"	Badami	"	"	"
PG-162	"	"	Bagalkot	Lingsugur	450	"	Jowari Bajra
PG-174	"	Gulbarga	Shorapur	Devapur	350	"	-
PG-188	"	Bidar	Bidar	Bidar	550	"	-

Appendix III

ITINERARY

20-10-1980	-	Hyderabad - Kurnool - Gooty
21-10-1980	-	Atmakur - Kalyanadurg - Rayadurg - Ballary
22-10-1980	-	Sandur - Kudligi - Harpana halli
23-10-1980	-	Hospet - Kadimi halli - Nandibevur - Koppal
24-10-1980	-	Kinhal - Gadag
25-10-1980	-	Annegeri - Dharwar
26-10-1980	-	Dharwar
27-10-1980	-	Bailhongal - Nasargi - Ichalakaranji - Dharwar
28-10-1980	-	Navalgund - Kulageri - Badami
29-10-1980	-	Timmapur - Nandikeswara - Bagalkot
30-10-1980	-	Murnal - Lingsugur - Gulbarga
31-10-1980	-	Hebbal-B - Sanhapur - Devapur - Sholapur
1-11-1980	-	Naldurg - Turori - Janwada - Markal - Bidar
2-11-1980	-	Sadasivpet - Hyderabad