

# Sorghum genetic resources management

2011-12

## *Contents*

<b>EXECUTIVE SUMMARY</b> .....	<b>2</b>
<b>DETAILED REPORT</b> .....	<b>3</b>
1. Sorghum germplasm collection / assembling .....	<b>3</b>
1.1: Sorghum germplasm exploration from Uttarakhand during Kharif 2011 .....	3
1.2: Sorghum germplasm exploration from Kutch region of Gujarat .....	4
2. Sorghum germplasm characterization / evaluation .....	<b>4</b>
2.1: Kharif (2011).....	4
2.2: Genetic resources experiments during rabi (2011-12) .....	8
3. Sorghum germplasm multiplication .....	<b>8</b>
4. Sorghum genetic stocks distribution.....	<b>9</b>
5. Status of sorghum genetic resources at DSR .....	<b>9</b>
6. Sorghum genetic resources evaluated in the AICSIP centres .....	<b>9</b>
6.1: Kharif 2011.....	9
7. Sorghum genetic resources registration .....	<b>31</b>
7.1. Sorghum varietal registration with PVPFRA .....	31
7.2. Genetic stocks registration with NBPGR .....	33
8. Technical programme (2012-13) .....	<b>35</b>
8.1: Sorghum germplasm collection .....	35
8.2: Sorghum germplasm evaluation .....	35
9. Acknowledgement .....	<b>35</b>
<b>Appendix</b> .....	<b>36</b>
1. Germplasm collection.....	36
2. Germplasm assembling .....	36
3. Germplasm characterization & evaluation (Kharif 2011) .....	36
4. Germplasm characterization & evaluation (Rabi 2011-12) .....	36
5. Germplasm multiplication .....	36
6. Germplasm trials .....	36
7. Germplasm distributed to researchers .....	37



## EXECUTIVE SUMMARY

Directorate of Sorghum Research (DSR) is one of the National Active Germplasm Sites (NAGS) with the responsibility to collect, conserve, evaluate, document, and distribute the sorghum germplasm to the bonafied user within the country. The following progress has been made during the reporting period 2011 – 12.

### A: Collection / assembling

- A total of 70 accessions collected from Uttarakhand (30 acc.) and Kutchch regions of Gujarat (40 acc.).
- The local landraces *jonnei*, *jowari* and *bajra* are collected from Uttarakhand.
- The local landraces *Chachadia* (2 acc.), *Danchania* (2 acc.), *Dinelenia* (1 acc.), *Gundri* (4 acc.), *Solapuri* (4 acc.) and *Bajri* (1 acc.) are collected from Gujarat.
- 8091 accessions received from ICRISAT and assembled at DSR.

### B: Characterization / Evaluation

- *Mini-core collections* (242 acc.): Maximum variability was observed in the plant height and days to 50% flowering. The following distinct traits were identified for utilization in the crop improvement programme, very early flowering (66 acc.), early flowering (43), tall plant height (37), very tall plant height (49), long leaf length (15), very broad leaf width (95), long length of panicle branches (17), and very long length of panicle branches (17).
- *Kharif landraces* (103 acc.): Maximum variability was observed in the plant height, days to 50% flowering and leaf length of blade. The following distinct traits were identified for utilization in the crop improvement programme, very early flowering (11 acc.), early flowering (16), tall plant height (19), very tall plant height (74), very long leaf length (18), very broad leaf width (76), and long length of panicle branches (12), Medium length of panicle branches (66).
- *Kharif landraces* (103 acc.): Hyderabad - the traits days to 50% flowering, plant height, leaf width and ear-head length were highly significant and leaf length was significant. Deesa - The traits days to 50% flowering, plant height, ear head length, leaf length and fodder yield were highly significant. Indore - The traits plant height and 1000-seed weight was highly significant.
- *Kharif germplasm* (500 acc.): Udaipur - The traits days to 50% flowering, days to maturity and plant height were highly significant. Rahuri - None of the traits were significant. Coimbatore - None of the traits were significant
- *Rabi germplasm* (500 acc.): Tandur - None of the traits were significant Parbhani - The traits days to 50% flowering, days to maturity and grain yield were significant. Bijapur did not submit the data.
- Location-wise potential germplasm lines identified from these 103 kharif landraces are presented in Table 12. Two accessions (E 158 and ERN 25) were early, one accession (ERN 26) short plant height, four accessions (GGUB 40, E 109, E 246, EA 10) were very tall observed in two loation potential in two locations and one accession is early (EJN 11) in all the three locations.

### D: Conservation

- 31,545 accessions were conserved at medium-term storage. The maximum contribution was from repatriation material (19,199 accessions).
- During the reporting period, 8161 accessions were added to the MTS as new material.

### E: Multiplication

- A total of 1866 acc. of indigenous collections which includes 242 acc. of mini-core collections are being multiplied during rabi (2011 – 12).
- 843 acc. of Maharashtra collections are being multiplied during rabi (2011 – 12).

### F: Distribution

- A total of 10,001 acc. distributed to the bonafied user in the country.
- 500 acc. of kharif germplasm evaluated at Udaipur, Coimbatore and Parbhani during kharif 2011
- 500 acc. of rabi germplasm evaluated at Rahuri, Bijapur and Tandur

### G: Registration

- *PVPFRA*: Two varieties viz., CSV 26 and CSV 27 submitted to the Plant Variety under the New Variety category. All other quarries are being answered
- *NBPGR*: *Sakkari Mukkari Jola* registered by RARS, Dharwad with NBPGR. A total of 46 genetic stocks were registered with NBPGR

## DETAILED REPORT

### 1. Sorghum germplasm collection / assembling

- A total of 70 accessions collected from Uttarakhand (30 acc.) and Kutchch regions of Gujarat (40 acc.).
- The local landraces *jonnel*, *jowari* and *bajra* are collected from Uttarakhand.
- The local landraces *Chachadia* (2 acc.), *Danchania* (2 acc.), *Dinelenia* (1 acc.), *Gundri* (4 acc.), *Solapuri* (4 acc.) and *Bajri* (1 acc.) are collected from Gujarat.
- 8091 accessions received from ICRISAT and assembled at DSR.

#### 1.1: Sorghum germplasm exploration from Uttarakhand during Kharif 2011

A total of 30 accessions collected from central Uttarakhand. Accessions collected from 23 villages, 13 taluks and 5 districts. The maximum of 9 acc. each collected from Almora and Chamoli. The latitude range between 29.1825 and 30.3585 and the longitude range between 79.0078 and 79.4607 were covered for the exploration with the altitude variations between 813 and 1935 m from MSL. A total of 12 acc. collected above the 1500 m MSL. The local landraces *jonnel*, *jowari* and *bajra* are collected. Maximum frequency of guinea bicolor race (18 acc.), very tall (16), very loose (21), grayed orange seed colour (24), and grayed red glume colour. Maximum accessions collected are broom ear head shape and they are used as broom to sweep their home.

Some accessions are used for roti preparations mixed with other millets. The flours of some accessions are used as cattle feed. Farmers of these regions prefer only very tall types for forage purpose. All cultivations are only through organic farming. Sorghum landraces are being grown in these regions for more than 300 years. Sorghum is always grown with the other millets as a mixed-crop or border crop. Sorghum + Wheat flour used to prepare roti and cattle and poultry feed. Sorghum broom is used to avoid breakage in the floor crest.



Fig. 1: Sorghum germplasm used as broom is collected at an altitude of 5500 m MSL



Fig. 2 & 3: The variability in broom sorghum (right) & ear head compactness (left) collected from Uttarakhand

## 1.2: Sorghum germplasm exploration from Kutch region of Gujarat

A total of 40 accessions collected from central Kutch regions. Accessions collected from 25 villages, 13 taluks and 3 districts. The maximum of 5 acc. each collected from Unnava. The latitude range between 22.52324 and 23.58446 and the longitude range between 68.41932 and 72.21628 were covered for the exploration with the altitude variations between 38 and 129 m from MSL. The local landraces *Chachadia* (2 acc.), *Danchania* (2 acc.), *Dinelenia* (1 acc.), *Gundri* (4 acc.), *Solapuri* (4 acc.) and *Bajri* (1 acc.) are collected. Maximum frequency of *Durra* race (21 acc.), tall (23), bold seed (39), and white seed colour (24). All the accessions collected are used as fodder.

Farmers of these regions prefer only tall to very tall types for forage purpose. Sorghum is always grown as sole and also mixed-crop with castor. The landrace *Gundri* seed cost is Rs 50/kg in the market. Due to heavy rain during the year 2011, the seed rate may go up to Rs 100/kg. The fodder rate is Rs 7.50/4kg bundle from the farmer and being sold at Rs 10/2 kg in the market. *Solapuri* and *Gundri* are harvested 90 days after sowing. Most of the landraces are harvested immediately after flowering for forage purpose.



Fig. 4: Farmers selecting the landraces for their seed purpose in Gujarat



Fig. 5 & 6: Variability in the seed colour (left) ear head compactness (right) of sorghum germplasm collected from Kutch region (Gujarat)

## 2. Sorghum germplasm characterization / evaluation

### 2.1: Kharif (2011)

Table 1: The list of kharif 2011 experiments at DSR

Name of the scientist	Exp No	Name of the Project	Name of the experiment	Objectives	Material and methods	Date of sowing	Observations to be made	Anticipated outcome
Elangovan	1	Sorghum Genetic Resources Management	Evaluation of mini-core sorghum collections	To evaluate mini-core sorghum collections for DUS traits	242 acc. + 3 checks in ABD	05-Jun 2011	33 DUS traits	Identification of distinct traits for utilization
Elangovan	2	Sorghum Genetic Resources Management	Evaluation of kharif landraces	To evaluate kharif landraces for DUS traits	103 acc. + 3 checks in ABD	05-Jun 2011	33 DUS traits	Identification of distinct traits for utilization
Elangovan	3	Sorghum Genetic Resources Management	Evaluation of high grain yielding kharif germplasm	To evaluate high grain yielding kharif germplasm for yield attributing traits	50 acc. + 3 checks in ABD	05-Jun 2011	Days to 50% flowering, Plant height, Ear head length, Ear head width, Grain yield, 100-seed weight	Identification of potential germplasm for utilization

#### Title of Experiment 1: Evaluation of mini-core sorghum collections

**Objective:** To evaluate sorghum-mini-core collections for DUS traits

**Materials and methods:** A total of 242 mini-core sorghum collections were evaluated for 24 essential DUS traits along with the CSV 15, SPV 462 and CSV 25 as checks.

**Highlights of results:** The descriptive statistics showed that maximum variability was available in the plant height and days to 50% flowering (Table 2). The following distinct traits were identified for utilization in the crop improvement programme, very early flowering (66 acc.), early flowering (43), tall plant height (37), very tall plant height (49), long leaf length (15), very broad leaf width (95), long length of panicle branches (17), and very long length of panicle branches (17). The frequency of DUS traits and accessions are presented in Table 3.

**Table 2: Descriptive statistics of quantitative characters of mini-core collections**

Characters	Mean	SE	SD	Variance	Range	Min.	Max.
Days to 50% flowering	68.9	1.5	20.4	415.5	81.0	41.0	122.0
Plant natural height (cm)	229.1	7.1	89.7	8045.7	418.5	59.0	477.5
Stigma length (mm)	1.5	0.0	0.6	0.3	2.5	0.5	3.0
Anther length (mm)	2.4	0.0	0.5	0.2	2.0	1.0	3.0
Plant total height (cm)	254.1	6.7	85.0	7221.7	419.4	49.6	469.0
Stem diameter (cm)	2.0	0.0	0.4	0.1	2.0	1.1	3.2
Leaf length of blade (cm)	67.6	0.7	9.0	81.0	60.9	42.3	103.2
Leaf width of blade (cm)	8.6	0.5	5.9	35.0	80.9	2.7	83.6
Panicle length (cm)	26.2	0.6	7.3	53.9	50.2	7.0	57.2
Panicle width (cm)	8.5	0.4	4.7	22.1	41.0	1.8	42.8

**Table 3: Number of accessions identified from mini-core collections in each DUS traits**

S.No	Characteristics	States	Notes	No. of accessions
1 (+)	Seedling: Anthocyanin colouration of coleoptiles	Yellow-green (RHS 144-N144)	1	105
		Greyed-purple (RHS 183-187)	2	139
2 (*)	Leaf sheath: Anthocyanin colouration	Yellow-green (RHS 144-N144)	1	113
		Greyed-purple (RHS 183-187)	2	131
3	Leaf: Mid rib colour (5th fully developed leaf)	White (RHS 155-N155)	1	68
		Yellow-green (RHS 144-N144)	2	170
		Greyed-yellow (RHS 162)	3	4
		Greyed-purple (RHS 183-187)	4	1
4 (*)	Plant: Time of panicle emergence (50% of the plants with 50% anthesis)	Very early (<56 days)	1	66
		Early (56-65 days)	3	43
		Medium (66-75 days)	5	19
		Late (76-85 days)	7	11
		Very late (>85 days)	9	40
5	Plant: Natural height of plant up to base of flag leaf	Very short (<76 cm)	1	2
		Short (76-150 cm)	3	30
		Medium (151-225 cm)	5	58
		Tall (226-300 cm)	7	34
		Very tall (>300 cm)	9	37
6 (*)	Flag leaf: Yellow colouration of midrib	Absent	1	157
		Present	5	23
7 (*)	Lemma: Arista formation	Absent	1	117
		Present	5	63
8 (*)	Stigma: Anthocyanin colouration	Absent	1	8
		Present	5	172
9 (*)	Stigma: Yellow coloration	Absent	1	95
		Present	5	85
10	Stigma: Length	Short (<1mm)	3	79
		Medium (1-2mm)	5	85
		Long (>2mm)	9	13
11 (+)	Flower with pedicel: Length of flower	Very short	1	1
		Short	3	38
		Medium	5	94
		Long	7	43
		Very long	9	4
12	Anther: Length	Short (<3mm)	3	177
		Medium (3-4mm)	5	-
		Long (>4mm)	7	-
13	Anther: Colour of dry anther	Yellow-orange (RHS 14-23)	1	32
		Orange (RHS 24-29)	2	-
		Orange-red (RHS 30-35)	3	-
		Greyed-orange (RHS 163-177)	4	148
		Greyed -Orange	5	-
		Red	6	-
14 (*) (+)	Glume: Colour	Green-white (RHS 157)	1	7
		Yellow-white (RHS 158)	2	14
		Greyed-yellow (RHS 160-162)	3	1
		Greyed-orange (RHS 163-177)	4	1
		Greyed-red (RHS 178-182)	5	33
		Greyed-purple (RHS 183- N187)	6	109
15 (*)	Plant: Total height	Very short (< 76 cm)	1	1
		Short (76-150cm)	3	10
		Medium (151-225 cm)	5	60

S.No	Characteristics	States	Notes	No. of accessions
16	Stem: Diameter (at lower one third height of plant)	Long (226-300 cm)	7	40
		Very long (>300 cm)	9	49
		Small (< 2 cm)	3	112
		Medium (2-4 cm)	5	63
		Large (> 4 cm)	7	-
17	Leaf: Length of blade (the third leaf from top including flag leaf)	Short (< 41 cm)	3	-
		Medium (41-60 cm)	5	32
		Long (61-80 cm)	7	125
		Very long (> 80 cm)	9	15
18	Leaf: Width of blade(the third leaf from top including flag leaf)	Narrow (< 4.1 cm)	3	1
		Medium (4.1-6.0 cm)	5	9
		Broad (6.1-8.0 cm)	7	65
		Very broad (> 8.0 cm)	9	95
19 (*)	Panicle: Length without peduncle	Very short (< 11cm)	1	9
		Short (11-20 cm)	3	18
		Medium (21-30 cm)	5	81
		Long (31-40 cm)	7	37
		Very long (> 40 cm)	9	4
20	Panicle: Length of branches (middle third of panicle)	Short (< 5.1 cm)	3	21
		Medium (5.1-10 cm)	5	110
		Long (10.1-15 cm)	7	17
		Very long (> 15 cm)	9	17
21 (*)	Panicle: Density at maturity (ear head compactness)	Very loose	1	21
		Loose	3	30
		Semi loose	5	50
		Semi compact	7	57
		Compact	9	7
22 (*) (+)	Panicle: Shape	Reversed pyramid	1	-
		Panicle broader in upper part	2	-
		Symmetric	3	124
		Panicle broader in lower part	4	41
		Pyramidal	5	-
23 (*)	Neck of panicle: Visible length above sheath	Absent or very short (<5.1cm)	1	109
		Short (5.1-10cm)	3	13
		Medium (10.1-15 cm)	5	12
		Long (15.1-20cm)	7	8
		Very long (> 20 cm)	9	30
24 (+)	Glume: Length	Very short (25% of grain covered)	1	2
		Short (50% of grain covered)	3	37
		Medium (75% of grain covered)	5	89
		Long (100% of grain covered)	7	32
		Very long (longer than the grain)	9	5
25 (+)	Grain: Threshability	Freely threshable (<11%) unthreshed grain	1	87
		Partly threshable (11 – 50% unthreshed grain)	5	21
		Difficult to thresh (>50% unthreshed grain)	7	32

## Title of Experiment 2: Evaluation of kharif germplasm

*Objective:* To evaluate kharif landraces for DUS traits

*Materials and methods:* A total of 103 +3 essential DUS traits along with the CSV 15, CSV 17 and CSV 22 as checks.

*Highlights of results:* The descriptive statistics showed that maximum variability was available in the plant height, days to 50% flowering and leaf length of blade (Table 4). The following distinct traits were identified for utilization in the crop improvement programme, very early flowering (11 acc.), early flowering (16), tall plant height (19), very tall plant height (74), very long leaf length (18), very broad leaf width (76), and long length of panicle branches (12), Medium length of panicle branches (66). The frequency of DUS traits and accessions are presented in Table 5.

**Table 4: Descriptive statistics of quantitative characters of kharif landraces**

Characters	Mean	SE	SD	Variance	Range	Min.	Max.
Days to 50% flowering	83	1.6	16.5	273.7	79	47	126
Plant natural height (cm)	319	8.6	85.9	7383.9	379.4	95.6	475
Stigma length (mm)	1.8	0	0.5	0.2	1.9	0.6	2.5
Anther length (mm)	2.7	0	0.4	0.1	1.5	2	3.5

Characters	Mean	SE	SD	Variance	Range	Min.	Max.
Plant total height (cm)	342.9	8.7	87.3	7616.1	398.5	114	512.5
Stem diameter (cm)	2	0	0.2	0.1	1.2	1.4	2.6
Leaf length of blade (cm)	70.3	1	10.2	104.2	51.3	48	99.3
Leaf width of blade (cm)	8.5	0.1	1.1	1.2	5	6	11
Panicle length (cm)	21.4	0.7	6.7	44.3	31.2	9	40.2
Panicle width (cm)	6.7	0.3	2.6	6.8	11.7	2.3	14

**Table 5: Number of accessions identified from kharif germplasm lines in each DUS traits**

S.No	Characteristics	States	Notes	No. of accessions
1 (+)	Seedling: Anthocyanin colouration of coleoptile	Yellow-green (RHS 144-N144)	1	15
		Greyed-purple (RHS 183-187)	2	63
2 (*)	Leaf sheath: Anthocyanin colouration	Yellow-green (RHS 144-N144)	1	42
		Greyed-purple (RHS 183-187)	2	78
3	Leaf: Midrib colour (5th fully developed leaf)	White (RHS 155-N155)	1	18
		Yellow-green (RHS 144-N144)	2	60
		Greyed-yellow (RHS 162)	3	-
		Greyed-purple (RHS 183-187)	4	-
4 (*)	Plant: Time of panicle emergence (50% of the plants with 50% anthesis11)	Very early (<56 days)	1	11
		Early (56-65 days)	3	16
		Medium (66-75 days)	5	25
		Late (76-85 days)	7	16
		Very late (>85 days)	9	52
5	Plant: Natural height of plant up to base of flag leaf	Very short (<76 cm)	1	-
		Short (76-150 cm)	3	11
		Medium (151-225 cm)	5	11
		Tall (226-300 cm)	7	19
		Very tall (>300 cm)	9	74
6 (*)	Flag leaf: Yellow colouration of midrib	Absent	1	95
		Present	5	21
7 (*)	Lemma: Arista formation	Absent	1	43
		Present	5	73
8 (*)	Stigma: Anthocyanin colouration	Absent	1	3
		Present	5	113
9 (*)	Stigma: Yellow coloration	Absent	1	101
		Present	5	15
10	Stigma: Length	Short (<1mm)	3	9
		Medium (1-2mm)	5	97
		Long (>2mm)	9	9
11 (+)	Flower with pedicel: Length of flower	Very short	1	1
		Short	3	19
		Medium	5	69
		Long	7	26
		Very long	9	9
12	Anther: Length	Short (<3mm)	3	59
		Medium (3-4mm)	5	59
		Long (>4mm)	7	-
13	Anther: Colour of dry anther	Yellow-orange (RHS 14-23)	1	6
		Orange (RHS 24-29)	2	-
		Orange-red (RHS 30-35)	3	-
		Greyed-orange (RHS 163-177)	4	110
		Greyed -Orange	5	-
		Red	6	-
14 (*) (+)	Glume: Colour	Green-white (RHS 157)	1	-
		Yellow-white (RHS 158)	2	14
		Greyed-yellow (RHS 160-162)	3	2
		Greyed-orange (RHS 163-177)	4	-
		Greyed-red (RHS 178-182)	5	13
		Greyed-purple (RHS 183- N187)	6	74
15 (*)	Plant: Total height	Very short (< 76 cm)	1	-
		Short (76-150cm)	3	8
		Medium (151-225 cm)	5	9
		Long (226-300 cm)	7	20
		Very long (>300 cm)	9	78
16	Stem: Diameter (at lower one third height of plant)	Small (< 2 cm)	3	75
		Medium (2-4 cm)	5	40
		Large (> 4 cm)	7	-
17	Leaf: Length of blade (the third leaf from top)	Short (< 41 cm)	3	-

S.No	Characteristics	States	Notes	No. of accessions
	including flag leaf)	Medium (41-60 cm)	5	15
		Long (61-80 cm)	7	81
		Very long (> 80 cm)	9	18
18	Leaf: Width of blade(the third leaf from top including flag leaf)	Narrow (< 4.1 cm)	3	-
		Medium (4.1-6.0 cm)	5	-
		Broad (6.1-8.0 cm)	7	39
		Very broad (> 8.0 cm)	9	76
19 (*)	Panicle: Length without peduncle	Very short (< 11cm)	1	2
		Short (11-20 cm)	3	22
		Medium (21-30 cm)	5	8
		Long (31-40 cm)	7	-
		Very long (> 40 cm)	9	-
20	Panicle: Length of branches (middle third of panicle)	Short (< 5.1 cm)	3	31
		Medium (5.1-10 cm)	5	66
		Long (10.1-15 cm)	7	12
		Very long (> 15 cm)	9	-
21 (*)	Panicle: Density at maturity (ear head compactness)	Very loose	1	1
		Loose	3	-
		Semi loose	5	12
		Semi compact	7	12
		Compact	9	11
22 (*) (+)	Panicle: Shape	Reversed pyramid	1	-
		Panicle broader in upper part	2	-
		Symmetric	3	67
		Panicle broader in lower part	4	36
		Pyramidal	5	-
23 (*)	Neck of panicle: Visible length above sheath	Absent or very short (<5.1cm)	1	98
		Short (5.1-10cm)	3	4
		Medium (10.1-15 cm)	5	1
		Long (15.1-20cm)	7	3
		Very long (> 20 cm)	9	1
24 (+)	Glume: Length	Very short (25% of grain covered)	1	-
		Short (50% of grain covered)	3	15
		Medium (75% Of grain covered)	5	63
		Long (100% of grain covered)	7	22
		Very long (longer than the grain)	9	3

A total of two kharif evaluation trials were given to AICSIP centres. The details of the germplasm evaluation trials are presented in Table 6.

**Table 6: The list of kharif 2011 experiments at AICSIP centres**

S. No.	Experiment/materials	Centres	Scientists involved
1	Evaluation of kharif germplasm for essential traits (500 acc.)	Udaipur, Coimbatore, Parbhani	Chowdhary, Sivakumkar, Ambekar and Elangovan
2	Evaluation of mini-core sorghum collections (242 acc.)	Hyderabad	Elangovan
3	Evaluation of kharif landraces for DUS traits (103 acc.)	Hyderabad, Indore and Deesa	Elangovan and Usha Saxena
4	Evaluation of high grain yielding kharif germplasm (50 acc.)	Hyderabad and Indore	Elangovan and Usha Saxena

## 2.2: Genetic resources experiments during rabi (2011-12)

**Table 7: Sorghum genetic resources experiments during rabi (2011-12)**

S.No.	Experiment/materials	Centres	Scientists involved
1	Evaluation of rabi germplasm for essential traits (500 acc.)	Rahuri, Akola, Bijapur	Gadakh, Ghorade, Biradar & Elangovan
2	Evaluation of high grain yielding rabi germplasm (50 acc.)	Solapur	Elangovan and Prabhakar
3	Selection and advancing of rabi genotypes (F5s) (150 acc.)	Solapur	Elangovan and Prabhakar
4	Multiplication of Indian sorghum germplasm (100 acc)	Hyderabad	Elangovan
5	Multiplication of 6795 acc. sent to Svalbard Genebank by CGIAR	Hyderabad	Elangovan

## 3. Sorghum germplasm multiplication

A total of 1866 acc. of indigenous collections which includes 242 acc. of mini-core collections are being multiplied during rabi (2011 – 12). 843 acc. of Maharashtra collections are being multiplied during rabi (2011 – 12).



#### 4. Sorghum genetic stocks distribution

A total of 10,001 acc. distributed to the bonafied user in the country. 500 acc. of kharif germplasm evaluated at Udaipur, Coimbatore and Parbhani during kharif 2011. 500 acc. of rabi germplasm evaluated at Rahuri, Bijapur and Tandur.

#### 5. Status of sorghum genetic resources at DSR

A total of 31,545 accessions were conserved at medium-term storage. The maximum contribution was from repatriation material (19,199 accessions). During the reporting period, 8161 accessions were added to the MTS as new material.

**Table 8: Status of sorghum germplasm in the MTS at DSR (as on 31<sup>st</sup> March 2012)**

S. No.	Genetic Stock	No. of accession			Duplicates / Bulk
		As on 1 <sup>st</sup> March 2011	Additions during 2011-12	Total accessions as on 31 <sup>st</sup> March 2012	
1	A – line	287	0	287	4
2	B – line	317	0	317	7
3	R – line	163	0	163	1
4	Breeders line	2170	0	2170	5
5	National Released Varieties	13	0	13	6
6	State Released Varieties	106	0	106	49
7	Sorghum Project Varieties (SPV)	386	0	386	75
8	Hybrids	33	0	33	17
9	Sorghum Project Hybrids (SPH)	90	0	90	0
10	Exotic collections	466	0	466	264
11	IS lines (germplasm)	3777	203	3980	0
12	Germplasm sent to Svalbard Genebank by ICRISAT	0	7888	7888	0
13	Kharif core collection (IS lines)	498	0	498	0
14	Local germplasm	3804	0	3804	1016
15	Repatriation material (IS lines)	11113	0	11113	0
16	Special types	4	0	4	0
17	Others	424	0	424	0
	<b>Total</b>	<b>23651</b>	<b>8091</b>	<b>31742</b>	<b>1444</b>

#### 6. Sorghum genetic resources evaluated in the AICSIP centres

##### 6.1: Kharif 2011

A total of 103 kharif landraces were evaluated at three locations viz., Hyderabad, Deesa and Indore during Kharif 2011 along with the checks CSV 15, CSV 17 and CSV 22. The data of 103 kharif landraces evaluated at Hyderabad during Kharif 2011 is presented in Table 9. The traits days to 50% flowering, plant height, leaf width and ear-head length were highly significant and leaf length was significant.

**Table 9: Evaluation of kharif landraces at Hyderabad during Kharif 2011**

Acc. No	Days to 50% flowering	Plant height (cm)	Stem diameter (cm)	Leaf length (cm)	Leaf width (cm)	Ear-head length (cm)	Ear-head width (cm)
GGUB 19	99	295	2.3	61.6	9.7	14.0	4.7
GGUB20	64	220	1.8	64.7	7.9	24.0	6.3
GGUB21	58	193	1.5	68.0	8.4	21.8	7.8
GGUB 22	96	346	2.1	69.0	8.8	22.0	5.3
GGUB 23	63	161	2.1	72.2	7.0	24.0	6.4
GGUB 25	61	232	2.0	53.2	7.7	19.4	7.3
GGUB 27	57	114	2.0	61.4	7.8	16.6	5.8
GGUB 29	94	360	2.4	81.0	11.0	21.4	5.8
GGUB 30	95	383	2.0	86.3	9.9	22.0	5.0
GGUB 31	67	323	1.7	65.4	8.8	18.8	3.6
GGUB 32	95	368	2.1	71.3	9.5	14.0	3.3
GGUB 34	92	360	2.4	79.2	8.0	23.0	6.0
GGUB 36	61	249	2.2	59.6	8.1	17.8	4.8
GGUB 37	83	333	2.0	92.6	8.8	22.0	5.8
GGUB 38	59	241	1.6	58.4	7.6	14.8	5.3
GGUB 39	66	188	2.2	69.8	7.8	25.2	5.8
GGUB 40	103	388	2.3	65.8	7.9	20.4	4.4
GGUB 43	96	374	2.0	75.6	8.4	17.2	4.4
GGUB 44	74	322	1.5	69.4	7.6	40.2	14.0
CSV 15	67	253	2.0	81.8	9.6	30.0	5.6
CSV 17	53	131	1.8	73.4	8.1	26.9	6.7

Acc. No	Days to 50% flowering	Plant height (cm)	Stem diameter (cm)	Leaf length (cm)	Leaf width (cm)	Ear-head length (cm)	Ear-head width (cm)
CSV 22	76	375	1.8	72.4	8.1	24.6	10.6
GGUB 47	84	365	2.2	90.0	10.2	21.0	8.0
GGUB 48	84	363	2.1	85.8	9.8	22.0	7.7
GGUB 50	105	349	2.0	53.8	9.1	24.0	9.5
GGUB 51	77	264	2.0	66.4	8.3	28.8	8.6
GGUB 52	84	341	2.3	94.0	10.6	21.8	8.4
GGUB 54	67	265	2.0	63.2	8.7	18.8	5.8
GGUB 55	65	181	2.0	66.6	6.9	20.8	5.2
GGUB 56	95	383	1.9	67.2	8.6	21.2	7.2
GGUB 57	103	364	2.0	60.0	9.2	25.5	7.5
GGUB 58	84	410	2.3	77.4	10.8	21.4	5.4
GGUB 59	97	383	2.3	65.6	10.7	24.0	8.8
GGUB 61	93	398	2.4	78.4	10.1	24.4	7.6
GGUB 62	99	413	2.0	66.2	10.2	26.7	9.0
GGUB 63	95	381	2.1	74.2	9.4	21.3	8.0
GGUB 64	98	390	2.1	60.8	9.2	26.0	9.8
GGUB 65	99	429	2.4	70.4	9.6	29.0	9.0
GGUB 67	109	428	2.2	64.3	9.0	30.0	12.0
CSV 15	68	256	1.9	74.2	8.1	29.2	5.9
CSV 17	56	149	1.9	79.4	7.8	29.2	5.9
CSV 22	76	358	2.0	76.2	9.6	23.5	8.0
GGUB 68	79	300	2.1	70.6	9.8	16.5	5.5
E-1	93	363	2.1	75.2	8.5	17.3	4.7
E-4	86	356	2.1	68.8	9.3	16.0	4.7
E-101	93	412	2.1	74.2	8.3	24.0	7.0
E-106	113	375	2.0	48.0	70.0	29.7	12.3
E-109	126	412	2.1	63.6	8.3	21.0	6.3
E-143	92	405	2.1	72.2	9.5	19.5	6.5
E-153	87	428	2.6	89.5	11.0	35.7	11.7
E-158	53	235	1.4	62.2	6.0	14.0	4.3
E-159	86	390	1.8	86.0	8.5	35.4	12.6
E-161	65	182	1.9	75.8	7.5	30.0	8.5
E-163	69	324	1.9	72.8	8.3	21.6	5.6
E-173	68	340	1.8	66.4	9.0	19.4	6.1
E-178	74	326	1.7	71.8	8.3	16.8	5.9
E-186	94	405	1.8	89.4	8.3	25.5	9.5
E-193	69	250	1.4	63.4	7.2	25.5	9.5
E-195	84	391	2.0	83.6	9.2	20.3	8.5
CSV 15	68	258	1.9	85.8	9.5	30.8	6.2
CSV 17	56	134	1.6	75.0	7.1	28.6	6.6
CSV 22	76	413	2.0	58.6	8.9	24.4	5.0
E-197	81	366	1.6	86.0	9.5	17.0	5.0
E-202	94	433	2.1	79.6	9.1	20.4	6.6
E-203	97	393	2.2	74.2	9.1	23.0	10.0
E-205	84	412	1.8	89.0	8.9	23.0	10.0
E-207	95	398	2.1	59.4	9.3	24.5	11.0
E-210	93	285	1.7	80.8	8.0	24.5	11.0
E-213	95	411	2.1	65.8	8.5	20.8	11.0
E-223	87	376	2.0	99.3	10.2	19.0	7.3
E-225	93	370	2.0	71.6	8.0	12.5	4.0
E-228	93	421	2.0	61.4	7.4	18.0	6.0
E-246	100	431	2.3	66.2	8.0	30.0	11.7
E-249	103	433	2.0	76.2	9.5	15.6	4.0
EA 1	74	382	1.9	62.6	7.1	26.3	8.0
EA 2	105	381	1.9	72.0	7.4	10.2	5.4
EA 4	104	405	1.6	61.8	7.5	26.4	5.0
EA 6	87	177	2.1	64.8	8.0	21.5	4.0
EA 10	103	477	2.3	73.2	8.9	37.0	5.4
CSV 15	68	259	1.8	67.0	7.6	29.8	5.6
CSV 17	54	138	1.9	76.0	7.9	26.2	6.6
CSV 22	76	367	2.0	72.2	8.4	21.8	5.0
EA 11	72	331	2.0	66.2	7.9	10.2	4.8
EG 11	72	402	1.9	65.4	7.5	24.3	5.3
EG 20	105	406	2.2	51.2	8.9	14.0	5.0
EG 24	89	380	1.9	73.8	8.8	23.0	4.0
EG 35	69	324	2.0	66.2	8.5	11.2	5.6
EG 39	94	513	2.0	56.5	7.5	11.2	5.6
EG 40	89	441	2.0	57.6	9.4	11.2	5.6
EG 48	67	329	1.8	59.6	7.3	11.3	4.0
ERS 3	104	452	1.9	57.8	6.6	27.0	8.3

Acc. No	Days to 50% flowering	Plant height (cm)	Stem diameter (cm)	Leaf length (cm)	Leaf width (cm)	Ear-head length (cm)	Ear-head width (cm)
ERS 4	106	401	1.7	57.4	6.2	26.0	10.8
ERS 13	66	271	1.9	61.2	6.5	10.7	2.3
ERS 15	66	219	1.9	62.2	8.5	11.7	2.7
CSV 15	67	251	2.2	82.0	9.8	31.0	5.9
CSV 17	54	134	1.9	74.8	9.3	31.2	7.2
CSV 22	77	413	2.2	75.6	8.4	23.8	5.4
ERS 16	97	426	2.0	76.4	8.4	27.8	9.0
ERS 22	67	315	1.9	62.2	8.6	11.2	2.3
ERS 35	97	476	2.0	70.6	8.7	29.0	11.7
EB 1	74	436	2.0	63.2	7.3	21.0	6.0
EB 2	64	424	2.1	70.8	7.9	18.5	5.0
EJ 42	73	433	1.7	68.8	8.5	18.8	5.8
ER 3	90	368	1.9	91.4	9.2	19.0	5.0
EJN 11	47	184	1.4	59.6	6.5	37.0	14.0
EJN 26	76	408	2.0	70.6	7.9	12.0	4.3
ERN 11	86	400	1.7	67.8	8.6	10.0	4.0
ERN 13	56	231	1.7	69.8	7.6	15.9	4.9
ERN 23	56	237	1.5	63.8	7.1	13.8	3.7
ERN 25	55	243	1.4	64.6	8.1	15.2	5.3
ERN 26	63	115	2.6	87.4	9.2	33.0	11.2
ERN 29	90	362	2.2	77.6	11.0	9.0	3.3
CSV 15	67	261	2.0	71.2	9.1	31.8	7.4
CSV 17	53	119	1.9	78.4	8.8	26.6	6.2
CSV 22	73	379.0	2.4	72.6	9.18	24.8	7.2
<i>F Value</i>	239.04	45.87	2.36	3.23	68.11	26.21	3.83
<i>Pr &gt; F</i>	<.0001***	<.0001***	0.03	0.01**	<.0001****	<.0001****	0.00
<i>R-Square</i>	1.00	1.00	0.94	0.96	1.00	0.99	0.96
<i>Coeff Var</i>	1.43	4.47	8.14	8.15	8.31	6.28	20.04
<i>Mean</i>	81.00	331.97	1.98	70.89	9.10	22.09	6.79
<i>Anova SS</i>	31815.83	998710.06	6.06	10681.29	3858.34	4997.28	701.33
<i>Min</i>	47	114	1.40	48.00	6.00	9.00	2.30
<i>Max</i>	126	513	2.60	99.30	70.00	40.20	14.00

\*\*\* highly significant; \*\* Significant

The data of 103 kharif landraces evaluated at Deesa during Kharif 2011 is presented in Table 10. The traits days to 50% flowering, plant height, ear head length, leaf length and fodder yield were highly significant.

Table 10: Evaluation of kharif landraces at Deesa during Kharif 2011

Entry Name	Days to 50% flowering	Plant height (cm)	Ear head length (cm)	Number of leaves	Leaf length (cm)	Leaf width (cm)	Fodder yield (g/plant)
GGUB-19	91.00	274.00	15.00	15.00	78.00	6.50	0.27
GGUB-20	89.00	234.00	15.00	17.00	92.50	5.25	0.24
GGUB-21	67.00	280.50	14.00	18.00	84.00	8.25	0.22
GGUB-22	94.00	227.00	7.00	19.50	87.00	7.50	0.52
GGUB-23	68.00	162.50	17.00	15.00	55.50	5.75	0.15
GGUB-25	66.00	209.00	14.00	15.50	59.50	4.00	0.23
GGUB-27	71.00	266.50	19.50	13.50	55.50	6.00	0.28
GGUB-29	81.00	240.50	13.00	17.50	76.50	5.50	0.29
GGUB-30	95.00	264.50	15.00	19.50	84.00	6.25	0.42
GGUB-31	72.00	214.00	18.00	17.50	55.50	5.75	0.19
GGUB-32	91.00	182.50	20.00	21.00	71.00	5.50	0.23
GGUB-34	95.00	285.50	12.00	13.50	81.50	4.50	0.19
GGUB-36	78.00	273.50	13.00	17.00	70.50	6.25	0.21
GGUB-37	94.00	238.50	12.00	6.50	62.00	4.50	0.19
GGUB-38	83.00	252.00	15.00	15.00	82.00	4.75	0.18
GGUB-39	70.00	240.00	15.00	16.50	45.50	8.00	0.23
GGUB-40	98.00	180.50	12.00	16.00	74.50	6.75	0.33
GGUB-43	98.00	141.50	17.00	16.00	80.50	5.00	0.21
GGUB-44	75.00	164.50	17.00	16.00	69.50	6.00	0.27
GGUB-46	71.00	160.00	15.00	15.00	65.30	5.20	0.21
CSV-15	73.00	195.00	16.00	6.90	80.20	7.90	0.16
CSV-17	65.00	140.00	10.00	10.00	60.00	8.10	0.11
CSV-22	65.00	210.00	16.00	13.00	60.20	6.90	0.15
GGUB-47	87.00	236.50	34.00	20.00	90.50	10.25	0.28
GGUB-48	81.00	215.00	23.00	16.00	82.00	6.25	0.42
GGUB-50	72.00	303.50	22.00	17.50	67.00	5.00	0.34
GGUB-51	66.00	144.50	15.00	14.00	74.50	7.25	0.24

Entry Name	Days to 50% flowering	Plant height (cm)	Ear head length (cm)	Number of leaves	Leaf length (cm)	Leaf width (cm)	Fodder yield (g/plant)
GGUB-52	89.00	280.50	20.00	19.00	82.00	10.00	0.20
GGUB-54	60.00	234.00	14.00	18.50	63.00	8.25	0.35
GGUB-55	61.00	244.50	15.00	15.00	77.50	6.75	0.27
GGUB-56	93.00	295.50	17.00	17.50	82.00	7.75	0.14
GGUB-57	67.00	266.50	23.00	18.50	100.50	7.50	0.19
GGUB-58	67.00	200.00	13.00	19.00	67.00	7.25	0.42
GGUB-59	92.00	146.50	17.00	16.00	79.50	5.75	0.35
GGUB-61	85.00	178.50	18.00	12.50	39.50	2.75	0.25
GGUB-62	95.00	122.00	19.00	15.00	90.50	4.75	0.15
GGUB-63	90.00	127.50	22.00	16.50	84.50	6.75	0.43
GGUB-64	92.00	139.00	19.00	18.00	81.00	7.50	0.35
GGUB-65	93.00	205.50	24.00	18.50	76.00	6.75	0.27
GGUB-67	93.00	192.50	18.00	15.50	88.50	5.25	0.23
CSV-15	75.00	200.00	22.00	7.00	82.50	14.50	0.16
CSV-17	67.00	135.00	9.00	10.00	62.00	7.90	0.11
CSV-22	62.00	215.00	15.00	14.00	65.20	7.00	0.16
GGUB-68	90.00	239.00	12.00	16.00	63.50	6.00	0.33
E-1	82.00	193.00	9.00	19.50	73.00	7.50	0.25
E-4	70.00	240.00	14.00	11.50	69.50	5.25	0.16
E-101	94.00	232.50	17.00	17.00	94.50	6.25	0.22
E-106	99.00	246.50	20.00	18.00	90.50	6.75	0.41
E-109	98.00	262.00	17.00	12.50	77.00	4.75	0.19
E-143	40.00	224.50	19.00	17.50	92.50	7.50	0.28
E-153	95.00	257.50	32.00	19.00	74.50	8.00	0.45
E-158	47.00	261.00	16.00	19.00	75.50	5.75	0.23
E-159	70.00	228.50	24.00	21.00	89.00	6.00	0.31
E-161	85.00	249.50	18.00	18.00	82.50	6.75	0.16
E-163	89.00	261.50	21.00	17.00	72.00	6.50	0.22
E-173	64.00	272.50	19.00	19.00	75.50	8.75	0.30
E-178	86.00	259.00	11.00	16.00	83.50	5.75	0.26
E-186	44.00	253.50	37.00	15.50	88.00	8.75	0.42
E-193	92.00	232.50	22.00	14.50	92.00	7.25	0.24
E-195	93.00	146.50	20.00	17.00	98.50	10.00	0.32
CSV-15	71.00	205.00	18.00	14.50	81.00	7.00	0.17
CSV-17	69.00	137.00	9.00	9.00	59.00	7.80	0.11
CSV-22	64.00	216.00	18.00	15.00	70.00	7.30	0.16
E-197	94.00	184.50	22.00	16.00	81.50	8.75	0.27
E-202	93.00	135.50	16.00	15.50	91.00	5.75	0.23
E-203	92.00	238.50	18.00	14.50	82.00	5.25	0.22
E-205	96.00	252.50	11.00	10.50	63.00	4.25	0.25
E-207	86.00	275.50	23.00	14.00	72.50	6.25	0.13
E-210	96.00	187.00	16.00	10.00	73.50	6.50	0.20
E-213	92.00	265.50	17.00	14.50	92.00	6.75	0.24
E-223	89.00	260.00	13.00	16.50	79.50	7.00	0.18
E-225	88.00	208.50	18.00	15.50	86.00	7.50	0.42
E-228	90.00	154.50	22.00	13.50	92.00	7.25	0.22
E-246	92.00	259.00	21.00	15.50	95.50	8.50	0.53
E-249	93.00	244.50	16.00	14.50	94.50	8.00	0.42
EA-1	104.00	289.50	16.00	13.00	79.50	3.75	0.16
EA-2	90.00	308.50	16.00	14.50	78.00	6.25	0.19
EA-4	93.00	284.00	13.00	13.50	71.50	5.75	0.14
EA-6	90.00	244.50	13.00	12.50	89.50	6.75	0.13
EA-10	97.00	167.00	18.00	12.00	78.00	3.25	0.18
CSV-15	70.00	210.00	20.00	15.00	80.00	7.50	0.17
CSV-17	68.00	135.00	10.00	11.00	61.00	8.00	0.11
CSV-22	63.00	212.00	16.00	16.00	69.00	7.60	0.16
EA-11	68.00	214.50	15.00	13.50	57.00	4.25	0.15
EG-1	85.00	179.50	14.00	11.50	88.00	5.00	0.33
EG-2	99.00	218.00	16.00	13.50	92.00	6.75	0.23
EG-10	81.00	162.00	21.00	16.00	70.50	5.25	0.24
EG-11	72.00	208.50	16.00	14.50	77.00	6.75	0.31
EG-20	98.00	244.50	16.00	14.00	80.50	7.25	0.16
EG-24	77.00	204.50	16.00	14.50	59.50	6.80	0.18
EG-35	43.00	202.00	17.00	13.50	66.50	7.00	0.27
EG-39	99.00	226.00	12.00	13.50	94.50	7.00	0.21
EG-40	102.00	244.50	18.00	12.50	95.50	5.00	0.39
EG-48	70.00	145.00	10.00	13.00	67.00	5.25	0.19
EG-54	101.00	199.50	12.00	14.50	92.50	5.50	0.18
EG-55	66.00	228.00	7.00	13.50	64.50	4.00	0.17
ERS-3	100.00	227.00	21.00	14.50	80.00	5.50	0.25

Entry Name	Days to 50% flowering	Plant height (cm)	Ear head length (cm)	Number of leaves	Leaf length (cm)	Leaf width (cm)	Fodder yield (g/plant)
ERS-4	98.00	222.50	22.00	12.50	84.50	4.00	0.14
ERS-13	67.00	171.50	6.00	12.50	55.50	3.00	0.15
ERS-15	65.00	153.50	10.00	14.00	68.50	5.00	0.23
CSV-15	69.00	209.00	21.00	16.00	83.50	7.00	0.17
CSV-17	65.00	141.00	8.00	9.00	58.00	7.00	0.10
CSV-22	65.00	215.00	17.00	15.00	70.00	7.30	0.15
ERS-16	97.00	211.50	22.00	15.00	92.50	4.75	0.27
ERS-22	100.00	233.00	21.00	15.50	89.50	5.25	0.23
ERS-35	93.00	157.00	29.00	15.50	85.50	5.00	0.27
EB-1	90.00	184.50	15.00	18.00	83.50	5.75	0.27
EB-2	90.00	195.50	24.00	16.00	104.50	8.50	0.28
EJ-42	75.00	246.50	13.00	15.50	79.50	5.75	0.22
ER-3	94.00	250.50	18.00	15.00	84.50	6.25	0.46
EJN-11	37.00	252.50	12.00	12.50	50.50	4.75	0.14
EJN-26	86.00	299.00	8.00	15.50	76.50	6.25	0.33
ERN-11	91.00	241.00	14.00	21.50	91.50	7.00	0.34
ERN-13	41.00	256.00	15.00	18.50	54.50	7.00	0.20
ERN-23	47.00	229.50	15.00	14.50	50.50	6.25	0.18
ERN-25	55.00	215.00	14.00	13.50	55.20	6.30	0.17
ERN-26	82.00	281.50	13.00	14.50	92.50	8.50	0.24
ERN-29	72.00	299.00	12.00	15.50	79.00	7.00	0.26
CSV-15	71.00	198.00	19.00	16.00	82.00	7.30	0.17
CSV-17	66.00	140.00	9.00	10.00	59.00	7.80	0.10
CSV-22	66.00	210.00	16.00	14.00	68.60	7.20	0.15
<i>F Value</i>	86.94	139.05	14.08	1.19	30.61	0.84	528.03
<i>Pr &gt; F</i>	<.0001***	<.0001***	<.0001***	0.37	<.0001***	0.71	<.0001***
<i>R-Square</i>	1.00	1.00	0.99	0.89	1.00	0.86	1.00
<i>Coeff Var</i>	2.22	1.91	8.73	17.55	3.27	26.46	1.80
<i>Mean</i>	80.15	217.91	16.60	15.05	76.54	6.50	0.24
<i>Anova SS</i>	29007.66	251934.51	3104.31	873.66	20169.29	262.15	1.03
<i>Min</i>	37.00	122.00	6.00	6.50	39.50	2.75	0.10
<i>Max</i>	104.00	308.50	37.00	21.50	104.50	14.50	0.53

\*\*\* highly significant

The data of 103 kharif landraces evaluated at Indore during Kharif 2011 is presented in Table 11. The traits plant height and 1000-seed weight was highly significant.

**Table 11: Evaluation of kharif landraces at Indore during Kharif 2011**

Acc. No	Days to 50% flowering	Plant height (cm)	Grain yield (g/plant)	Seed weight (1000 seed)
GGUB 19	86	296	30	40
GGUB 20	73	294	20	25
GGUB 21	67	274	35	25
GGUB 22	91	373	35	45
GGUB 23	86	276	30	40
GGUB 25	100	332	30	25
GGUB 27	66	327	60	30
GGUB 29	91	328	25	30
GGUB 30	91	327	35	30
GGUB 31	93	272	10	25
GGUB 32	91	303	15	40
GGUB 34	91	364	10	40
GGUB 36	70	289	20	25
GGUB 37	92	328	55	35
GGUB 38	96	280	15	30
GGUB 39	66	172	20	35
GGUB 40	97	382	15	40
GGUB 43	97	323	15	40
GGUB 44	95	289	40	20
GGUB 46	96	220	10	25
CSV 15	78	230	75	30
CSV 17	56	129	20	30
CSV22	86	307	30	35
GGUB 47	88	319	50	30
GGUB 48	91	315	70	25
GGUB 50	90	236	35	35
GGUB 51	87	250	15	30
GGUB 52	93	282	50	35
GGUB 54	76	230	25	35

Acc. No	Days to 50% flowering	Plant height (cm)	Grain yield (g/plant)	Seed weight (1000 seed)
GGUB 55	88	287	40	35
GGUB 56	94	282	20	35
GGUB 57	71	308	25	35
GGUB 58	88	182	35	30
GGUB 59	92	346	50	45
GGUB 61	78	307	30	40
GGUB 62	100	324	20	40
GGUB 63	96	341	15	35
GGUB 64	98	366	15	40
GGUB 65	99	369	0	40
GGUB 67	101	298	10	20
CSV15	77	250	75	30
CSV 17	60	137	0	30
CSV 22		255	35	35
GGUB 68	86	285	20	35
E-1	93	305	25	
E-4	93	276	20	35
E 101	94	370	20	30
E-106	103	347	15	15
E-109	89	377	85	40
E-143	90	351	50	30
E-153	78	351	50	30
E-158	58	266	30	30
E-159	58	315	35	25
E-161	66	120	30	25
E-163	84	268	25	30
E-173	79	252	15	30
E-178	79	275	20	35
E-186	93	361	25	40
E-193	96	220	20	35
E-195	92	291	30	25
CSV 15	77	240	65	30
CSV 17	58	129	0	30
CSV 22	58	305	0	35
E-197	88	293	20	25
E-202	99	289	20	25
E-203	101	327	10	40
E-205	96	305	10	35
E-207	88	304	35	30
E-210	91	260	35	40
E-213	93	330	35	40
E-223	86	338	15	35
E-225	94	305	25	35
E-228	94	322	30	30
E-246	97	376	25	45
E-249	94	352	40	45
EA-1	95	358	20	20
EA-2	95	217	20	25
EA-4	100	356	35	30
EA-6	84	180	35	35
EA-10	101	399	55	25
CSV15	78	232	55	30
CSV17	57	154	25	30
CSV22	85	314	50	35
EA 11	83	142	0	35
EB 1	82	338	35	25
EB 2	96	330	30	35
EJ 42	74	249	35	20
EG 1	96	275	20	25
EG 2	0	0	0	0
ER 3	93	266	35	35
EG 10	94	266	0	35
EG 11	94	332	20	35
EG 20	98	349	25	40
EG 24	73	308	20	25
EG 35	90	251	15	35
EG 39	92	343	20	30
EG 40	79	350	50	30
EG 48	108	258	25	25
EG 54	93	376	0	25
EG 55	94	260	5	20







Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
CJV-38	1387.5	2789	72	130	156	10
CJV-39	7270.5	15632	66	122	178	8
CJV-40	222	597	71	124	124	6
CJV-41	3385.5	6737	67	122	192	7
CJV-42	1776	3605	75	129	194	8
CJV-43	999	1449	78	130	211	10
POP-1	999	1868	63	120	188	8
POP-2	2442	5641	64	124	176	8
POP-3	5494.5	11209	65	126	195	8
POP-8	1276.5	2987	74	126	196	8
POP-11	2386.5	5131	71	122	190	7
POP-12	1942.5	2991	72	128	213	7
POP-13	1110	1876	76	129	186	8
POP-14	1665	2964	77	131	183	8
POP-15	1998	2897	73	125	188	8
POP-17	333	1086	55	106	132	4
POP-18	777	1826	75	131	180	9
POP-29	2830.5	6680	65	118	200	9
POP-31	666	1985	79	129	189	9
POP-32	2497.5	4670	63	118	147	7
POP-35	1942.5	3030	65	117	173	7
POP-37	2886	4877	66	122	167	8
POP-38	4107	8255	68	126	168	7
POP-39	1776	4351	70	124	189	7
POP-40	666	1605	71	122	158	9
POP-42	832.5	1290	70	122	198	8
POP-45	1665	3563	72	123	168	8
POP-46	2886	6811	74	125	183	7
POP-47	3274.5	6582	69	119	189	8
POP-48	2164.5	3853	68	121	192	7
POP-49	777	2510	70	126	175	7
POP-50	3940.5	8433	72	127	176	7
POP-51	666	1345	76	127	178	6
POP-52	3829.5	5974	71	126	205	9
POP-53	555	805	70	123	151	6
POP-54	1221	1795	71	127	181	8
POP-55	1998	3916	70	122	177	7
POP-56	666	1052	69	121	179	8
POP-57	1387.5	3344	68	119	179	7
POP-58	1165.5	2855	74	132	170	6
POP-59	1942.5	5866	75	129	200	7
POP-60	555	1310	76	132	187	7
POP-62	3441	8430	75	133	161	5
POP-64	666	1645	72	126	152	6
POP-84	1054.5	1624	71	123	170	7
POP-121	1332	1359	69	121	189	8
EP-1	999	1209	64	125	160	7
EP-2	388.5	1263	63	123	154	7
EP-3	2608.5	6913	64	124	170	6
EP-5	2442	5226	71	124	169	8
EP-6	1831.5	3260	70	126	153	6
EP-7	2497.5	4945	65	119	151	6
EP-8	777	1228	69	127	138	6
EP-9	1776	2575	67	126	154	6
EP-10	832.5	1790	69	120	139	6
EP-11	666	1765	70	122	124	5
EP-12	1831.5	4487	71	124	158	7
EP-13	1831.5	4542	74	130	142	7
EP-14	832.5	1965	69	123	152	7
EP-15	1665	2081	75	133	153	7
EP-16	2830.5	4416	72	123	172	8
EP-17	1887	2359	64	126	177	7
EP-21	832.5	1965	65	125	163	6
EP-22	1665	3297	63	123	152	8
EP-23	1498.5	2473	59	124	168	6
EP-24	610.5	1984	67	122	173	6
EP-26	1554	2424	65	127	198	7
EP-27	1942.5	3963	66	129	180	8
EP-28	1942.5	4176	69	125	188	8
EP-29	1942.5	3030	70	126	195	9
EP-30	2275.5	4414	64	128	192	9

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
EP-31	1110	2620	64	122	147	6
EP-32	832.5	1965	63	126	185	8
EP-33	1276.5	3076	65	128	170	8
EP-34	3108	6247	64	128	177	8
EP-35	1221	2723	70	124	185	8
EP-37	2775	5661	64	129	192	7
EP-38	666	1572	71	132	189	7
EP-39	1998	4715	72	134	143	7
EP-40	1554	3341	68	130	177	7
EP-41	3607.5	7720	69	130	207	8
EP-42	1110	1709	71	134	179	7
EP-43	166.5	543	76	142	175	8
EP-45	832.5	1573	77	145	162	7
EP-46	2775	4107	75	139	155	7
EP-47	1054.5	1645	74	134	156	6
EP-49	888	1305	69	131	141	7
EP-50	1387.5	2720	64	125	141	7
EP-51	555	1132	63	126	128	8
EP-52	2886	6205	61	125	155	9
SEVS-1	1554	2253	70	136	172	8
SEVS-2	2664	5035	71	139	169	9
SEVS-3	2220	4751	72	134	210	10
SEVS-4	666	1705	69	135	170	7
SEVS-7	610.5	1496	68	132	220	9
SEVS-8	666	966	74	140	178	11
SEVS-9	999	1469	73	135	162	10
SEVS-12	555	1310	72	136	190	10
SEVS-13	943.5	1830	70	138	187	11
SEVS-14	999	1229	69	133	177	7
SEVS-16	1110	1132	65	132	168	9
SEVS-20	999	1149	64	130	183	10
SEVS-21	2775	6882	64	126	175	9
SEVS-23	3163.5	7466	62	123	220	8
SEVS-24	832.5	1757	62	124	163	7
SEVS-27	4218	4809	61	121	190	9
EC -1	1665	1698	66	128	115	7
EC -3	1942.5	3671	64	127	145	7
EC -4	1776	3321	65	131	192	9
EC -5	832.5	1299	66	131	185	9
EC -6	2608.5	5165	66	132	175	9
EC -7	999	1479	66	128	168	8
EC -8	2386.5	3723	67	128	200	9
EC -9	888	1803	64	126	177	10
EC -11	1665	3580	63	123	183	10
EC -12	2053.5	4394	62	122	140	8
EC -13	777	2448	69	133	173	10
EC -15	1498.5	2832	67	133	195	9
EC -16	2553	4315	71	139	191	8
EC -17	2664	3943	65	129	187	10
EC -19	2220	3530	66	128	158	10
EC -20	2553	5055	70	131	180	10
EC -21	2442	4103	75	138	165	10
EC -22	2220	3419	75	137	165	11
EC -23	111	383	73	134	110	9
EC -24	1110	2387	76	136	162	9
EC -25	1276.5	1966	72	138	179	7
EC -26	1554	2937	71	133	188	10
EC -27	277.5	957	67	128	200	8
EC -29	2331	3636	69	131	185	7
EC -31	832.5	1482	70	136	160	9
EC -33	1332	2517	71	131	150	8
EC -34	1221	2063	73	137	153	10
EA -1	888	1385	74	136	153	7
EA -2	3163.5	3923	76	139	165	8
EA -4	2497.5	5370	77	139	203	6
EA -6	2886	5801	79	143	118	7
EA -7	111	350	80	147	149	7
EA -9	3940.5	10442	69	137	237	6
EA -10	1665	4129	71	133	208	7
EA -11	4273.5	9188	72	133	174	8
EP -53	832.5	1299	75	138	154	9

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
EP - 54	610.5	1514	77	143	154	7
EP - 55	333	896	64	125	175	9
EP - 57	3219	5408	67	129	168	7
EP - 58	888	1199	62	128	169	8
EP - 59	2220	2731	71	133	163	9
EP - 60	999	1558	68	129	149	9
EP - 61	832.5	1615	69	131	152	8
EP - 62	610.5	1313	70	136	169	9
EP - 63	1498.5	4166	72	138	174	10
EP - 64	888	1119	79	141	137	8
EP - 65	1554	3326	68	132	186	9
EP - 66	1165.5	3100	65	128	172	9
EP - 67	999	2478	65	128	153	8
EP - 68	999	2478	66	128	154	8
EP - 69	1720.5	3699	65	125	166	8
EP - 70	1054.5	2056	65	126	179	8
EP - 71	1387.5	2733	64	126	156	8
EP - 72	1110	2942	63	123	149	9
EP - 73	1165.5	2494	64	128	172	9
EP - 74	555	1310	64	126	154	9
EP - 75	1443	2251	63	127	172	8
EP - 76	222	420	66	129	169	8
EP - 77	610.5	1001	67	129	144	7
EP - 78	943.5	1783	69	131	121	8
EP - 79	666	1185	66	127	104	9
EP - 80	1387.5	2969	65	125	162	10
EP - 81	2442	6252	70	130	132	8
EP - 82	1221	2723	71	131	147	9
EP - 83	943.5	2123	74	135	157	8
EP - 84	888	2202	69	133	154	7
EP - 85	1110	2620	75	142	124	8
EP - 86	610.5	1905	76	142	142	8
EP - 87	1110	2375	72	140	136	8
EP - 88	4051.5	10736	70	131	169	8
EP - 89	999	2777	71	133	149	9
EP - 90	1942.5	4176	65	126	172	10
EP - 91	1443	3405	68	130	133	8
EP - 92	2331	5967	68	133	154	9
EP - 93	1387.5	3399	67	129	163	9
EP - 94	1165.5	2855	67	129	146	7
EP - 95	832.5	2389	69	131	168	8
EP - 96	1776	4191	66	130	163	8
EP - 97	166.5	430	70	131	171	9
EP - 98	3885	7226	68	131	167	8
EP - 100	1165.5	2308	70	136	181	8
EP - 101	1110	1876	63	131	136	10
EP - 102	777	1150	71	140	194	10
EP - 103	1443	1962	69	129	213	8
EP - 104	1443	2814	72	132	204	7
EP - 105	943.5	1472	66	127	187	8
EP - 106	1276.5	1851	65	127	122	8
EP - 107	1332	1812	66	129	150	9
EP - 108	1609.5	2189	69	133	166	8
EP - 109	2608.5	3261	71	139	176	8
EP - 111	1110	1832	72	140	184	8
EP - 112	888	2291	76	142	154	8
EP - 114	1942.5	3069	64	126	153	8
EP - 115	1387.5	3677	68	132	185	9
EP - 116	1831.5	3938	75	142	163	9
EP - 117	1776	4351	68	130	159	9
EP - 119	943.5	2642	70	136	139	8
EP - 120	1276.5	2106	69	130	152	7
E - 88	2497.5	4945	66	128	187	6
E - 89	1665	3313	66	130	177	7
E - 90	1554	2424	67	133	157	6
E - 91	1887	3566	68	136	147	7
E - 92	1998	3776	69	131	137	5
E - 96	943.5	1472	70	131	160	7
E - 97	1498.5	3207	71	138	173	6
E - 98	1276.5	3013	74	136	170	6
E - 99	166.5	1074	69	135	173	7

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
E - 100	2830.5	5293	72	135	127	7
PEC - 1	777	2681	76	141	166	7
PEC - 2	1165.5	2203	75	137	137	8
PEC - 3	1887	2566	73	133	137	8
PEC - 4	1831.5	3095	63	124	147	8
PEC - 5	2775	4385	64	124	143	7
PEC - 6	1165.5	2308	66	128	180	8
PEC - 7	2109	4745	67	130	210	8
PEC - 8	555	1310	68	129	147	8
PEC - 9	2386.5	3771	69	129	167	9
PEC - 10	2220	3752	70	132	197	9
PEC - 11	1942.5	3283	74	138	183	7
PEC - 12	499.5	919	71	138	163	8
PEC - 13	2775	3413	72	138	130	9
PEC - 14	1776	4103	69	137	193	9
PEC - 15	5494.5	13956	68	132	147	9
PEC - 16	832.5	2040	71	134	173	9
PEC - 18	1831.5	3938	77	141	150	8
PEC - 19	1221	2589	69	132	147	8
PEC - 20	1720.5	3441	64	128	157	8
PEC - 21	1942.5	3671	71	133	160	8
PEC - 22	1720.5	2839	72	138	153	8
PEC - 23	666	1319	73	137	180	9
PEC - 24	666	1252	65	127	143	8
PEC - 25	666	2298	64	130	160	8
PEC - 26	2886	5137	62	124	130	8
PEC - 27	555	877	69	132	140	8
PEC - 28	1165.5	1958	68	130	160	8
PEC - 29	1110	1732	71	132	187	8
PEC - 30	2275.5	2799	69	132	160	7
PEC - 31	388.5	1224	70	136	143	8
PEC - 32	555	1049	64	128	127	8
PEC - 33	444	1434	63	125	150	7
PEC - 34	666	1572	68	129	175	8
PEC - 35	277.5	957	67	127	143	8
PEC - 36	1110	1354	70	134	174	7
NSJB - 6555	1554	3341	71	134	154	8
NSJB - 6557	1110	2253	72	138	120	7
NSJB - 6558	666	1432	75	142	123	7
NSJB - 6559	222	544	69	134	103	7
NSJB - 6560	832.5	2231	68	129	188	6
NSJB - 6561	1165.5	1818	62	122	130	7
NSJB - 6562	1110	1643	60	122	113	6
NSJB - 6565	777	1282	71	134	129	6
NSJB - 6566	666	1052	72	138	143	7
NSJB - 6568	444	1394	64	128	123	5
NSJB - 6571	666	1252	63	125	93	7
NSJB - 6572	555	1104	71	135	169	7
NSJB - 6574	277.5	932	72	134	130	7
NSJB - 6577	2941.5	5942	63	124	140	6
NSJB - 6579	333	1156	63	123	130	6
NSJB - 6580	1720.5	4060	63	129	163	8
NSJB - 6581	1776	4191	65	128	140	6
NSJB - 6583	666	2311	69	131	168	6
NSJB - 6585	2053.5	2793	70	131	157	6
NSJB - 6586	1609.5	2720	74	138	170	7
NSJB - 6587	1998	4715	71	139	167	6
NSJB - 6590	4162.5	6036	62	128	173	8
NSJB - 6591	999	1978	63	125	173	8
NSJB - 6592	2997	6084	65	126	163	7
NSJB - 6593	1110	2253	66	130	160	7
NSJB - 6596	555	1132	67	135	149	9
NSJB - 6597	2053.5	4230	68	134	137	7
NSJB - 6599	1332	2864	66	130	143	8
NSJB - 6603	1665	3363	65	130	167	8
NSJB - 6604	1276.5	2591	63	125	137	7
NSJB - 6605	2109	5399	63	124	150	8
NSJB - 6606	1165.5	2984	64	127	182	6
NSJB - 6608	277.5	988	65	127	160	8
NSJB - 6609	666	2318	66	127	220	9
NSJB - 6610	832.5	1790	69	131	163	7

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
NSJB - 6611	1276.5	2936	70	131	137	7
NSJB - 6614	1776	2220	72	136	157	8
NSJB - 6617	721.5	1190	75	143	130	2
NSJB - 6620	832.5	1648	76	143	150	9
NSJB - 6625	888	1794	71	137	170	10
NSJB - 6626	1332	3104	68	131	170	11
NSJB - 6628	888	2096	64	126	153	9
NSJB - 6629	2997	7942	61	121	180	9
NSJB - 6630	1276.5	2744	64	124	143	7
NSJB - 6647	1387.5	4787	62	123	177	7
NSJB - 6648	666	1259	67	127	167	8
NSJB - 6651	1887	3114	65	128	117	8
NSJB - 6656	832.5	1648	69	131	103	7
NSJB - 6657	1831.5	2857	71	137	133	7
NSJB - 6661	1942.5	3030	75	139	133	7
NSJB - 6662	2220	3286	76	144	120	8
NSJB - 6671	721.5	1429	74	143	130	7
NSJB - 6673	2275.5	3823	70	134	117	7
NSJB - 6675	1332	2744	64	126	137	7
NSJB - 6676	2109	4281	63	125	137	7
NSJB - 6677	55.5	119	63	124	150	9
NSJB - 6678	2220	5239	65	128	163	8
NSJB - 6679	2386.5	4654	66	132	205	7
NSJB - 6680	721.5	1111	67	127	186	7
NSJB - 6683	666	1099	61	125	137	6
NSJB - 6684	999	2358	62	122	150	6
NSJB - 6685	1665	2464	65	131	157	7
NSJB - 6689	55.5	193	66	130	133	6
NSJB - 6690	3996	5435	63	124	160	8
NSJB - 6691	3607.5	7143	61	121	167	8
NSJB - 6692	2275.5	2844	60	123	140	6
NSJB - 6693	2053.5	2587	64	124	167	7
NSJB - 6695	1387.5	1734	60	121	193	7
NSJB - 6696	2331	3450	61	123	153	7
NSJB - 6699	2164.5	4221	65	128	173	7
PU - 5	555	1976	66	132	157	7
PU - 6	499.5	1738	63	127	130	6
PU - 10	610.5	1252	65	127	167	7
PU - 11	555	1127	63	123	163	7
PU - 12	666	1352	64	125	123	6
PU - 13	166.5	614	65	125	127	7
PU - 15	1110	2264	66	127	168	6
PU - 16	832.5	1965	67	127	179	6
EP -121	1054.5	2267	62	123	157	7
EP -122	1665	3563	60	120	163	8
EP -123	610.5	1306	70	131	140	6
EP -124	666	1352	61	123	143	6
EP -125	943.5	2038	71	134	163	8
EP -126	1942.5	4176	75	139	157	7
EP -127	1554	3201	63	125	143	7
EP -128	3663	7875	68	129	153	7
EP -129	943.5	2019	71	137	147	8
EP -130	1498.5	3536	76	138	140	8
EP -131	2830.5	6697	74	135	150	9
EP -132	1443	4257	73	135	163	8
EP -133	1720.5	4060	72	133	147	9
EP -134	277.5	957	75	137	137	6
EP -135	555	2048	71	137	140	7
EP -136	1387.5	2345	65	129	153	8
EP -137	55.5	205	66	134	123	7
EP -138	777	1546	67	131	169	6
EP -139	4051.5	7657	69	135	170	8
EP -140	1998	3117	72	135	177	9
EP -141	2442	3077	74	135	160	8
EG - 1	1498.5	2023	76	138	157	8
EG - 2	1776	3357	70	138	183	8
EG - 3	1443	2251	71	135	230	8
EG - 5	2719.5	4895	69	135	170	6
EG - 6	666	1245	65	132	163	7
EG - 7	1221	1905	72	133	169	6
EG - 8	555	1931	75	137	180	7

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
EG - 9	2331	4406	65	128	190	7
EG - 10	277.5	1049	61	127	157	6
EG - 11	444	1638	62	123	143	5
EG - 13	333	483	61	123	213	8
EG - 14	832.5	1573	68	134	140	6
EG - 15	832.5	1707	69	130	167	7
EG - 16	277.5	957	58	120	163	7
EG - 17	3885	4856	60	126	153	7
EG - 18	666	2458	71	133	201	6
EG - 19	555	1049	72	133	198	7
EG -20	1942.5	3846	69	129	183	8
EG - 21	2497.5	5894	68	131	147	6
EG - 22	3829.5	9612	62	124	157	8
EG - 23	555	1288	61	122	169	6
EG - 24	2719.5	5847	62	124	140	8
EG - 25	444	1385	64	128	187	6
EG - 26	555	1926	65	128	149	7
EG - 27	2220	4418	65	126	163	7
EG - 28	2275.5	6030	63	125	137	7
EG - 29	832.5	2040	66	129	183	7
EG - 30	1942.5	4584	67	129	133	5
EG - 31	2775	5384	68	131	170	9
EG - 32	1110	1399	69	134	193	7
EG - 33	1887	2378	70	132	163	8
EG - 34	1110	2620	71	132	143	9
EG - 35	1332	2997	65	126	160	6
EG - 36	1831.5	4322	66	130	140	8
EG - 37	1887	4623	63	125	173	6
EG - 38	1776	4706	68	131	147	6
EG - 39	388.5	963	70	136	163	6
EG - 40	888	2340	71	132	140	8
EG - 41	610.5	2253	63	127	100	5
EG - 42	943.5	1868	62	130	150	6
EG - 43	2053.5	3265	64	132	190	7
EG - 44	1387.5	2192	63	127	167	6
EG - 46	555	1915	62	128	210	8
EG - 47	1165.5	2308	69	133	150	7
EG - 48	999	1558	64	131	150	7
EG - 49	2497.5	3621	67	135	133	7
EG - 50	832.5	1640	68	134	173	8
EG - 51	388.5	1340	66	127	207	8
EG - 52	3274.5	7040	63	125	160	7
EG - 53	666	1425	62	128	147	7
EG - 54	2830.5	7246	65	125	133	8
EG - 55	1942.5	2817	65	127	153	7
EG - 56	777	1228	63	126	153	5
EG - 57	166.5	704	64	130	140	6
EG - 58	166.5	759	65	127	203	7
EG - 59	1443	3102	61	125	203	7
SEB - 11988	1387.5	2969	60	122	157	6
SEB - 11989	1387.5	3399	55	118	163	6
SEB - 11991	1387.5	3427	57	123	163	7
SEB - 11992	1332	3410	62	124	123	5
SEB - 11995	2386.5	5131	63	124	137	8
SEB - 11996	1054.5	2721	65	128	117	6
SEB - 11998	222	588	68	134	133	6
SEB - 11999	1498.5	3521	71	135	213	9
SEB - 12000	666	966	69	131	160	8
SEB - 12001	1609.5	2656	67	130	153	8
SEB - 12002	388.5	1655	71	137	170	8
SEB - 12003	1110	4473	68	129	163	8
SEB - 12004	0	5263	73	135	123	8
SEB - 12005	1554	2564	76	136	143	7
SEB - 12006	1110	2054	68	128	123	9
SEB - 12008	1720.5	2718	69	132	157	9
SEB - 12009	2053.5	2538	66	126	107	7
SEB - 12010	3441	7329	64	126	157	8
SEB - 12012	666	1352	59	120	140	12
SEB - 12015	721.5	1479	75	141	127	11
SEB - 12016	2275.5	5370	76	138	143	8
SEB - 12017	777	1671	77	141	158	8

Entry No.	Grain yield (kg/ha)	Fodder yield (kg/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves
SEB - 12018	3163.5	6422	69	136	147	8
SEB - 12020	444	1789	68	137	143	8
SEB - 12021	499.5	1074	66	129	140	11
SEB - 12023	666	1772	63	125	107	9
SEB - 12024	777	2922	69	130	187	10
SEB - 12025	2331	3683	72	134	133	6
SEB - 12029	3163.5	5346	70	131	127	7
ELG - 1	1221	2418	61	121	140	7
ELG - 2	1221	1905	70	132	160	6
ELG - 3	2830.5	5038	56	122	107	6
ELG - 4	2109	2605	57	122	117	6
ELG - 5	4162.5	9824	68	131	150	7
ELG - 7	499.5	1224	64	125	143	7
ELG - 8	2997	3417	61	123	120	8
ELG - 9	3607.5	5628	65	127	170	8
ELG - 10	1665	4296	63	126	140	7
ELG - 12	1332	3263	63	124	140	5
ELG - 13	1165.5	1457	57	119	140	6
ELG - 14	777	1671	64	124	120	7
ELG - 15	444	1536	66	127	157	6
ELG - 16	499.5	1069	66	128	100	8
ELG - 19	277.5	1113	65	125	113	6
ELG - 20	555	1049	71	134	157	7
ELG - 24	666	1299	69	131	180	7
ELG - 25	777	1538	68	129	133	8
EG - 61	1165.5	2751	62	122	140	7
EG - 65	666	1339	66	126	130	11
EG - 67	832.5	1965	63	125	297	9
EG - 70	222	968	63	124	133	8
EG - 74	832.5	1573	64	124	193	6
EG - 75	1165.5	1818	69	132	100	10
EG - 76	1110	1399	70	136	189	8
EG - 87	610.5	1252	65	129	197	9
EG - 91	1165.5	2960	66	130	180	7
EG - 92	1054.5	2267	69	131	177	7
EG - 93	1054.5	2257	64	124	170	7
EG - 95	832.5	1790	61	123	133	8
EG - 97	1887	5057	71	134	163	7
EG - 99	1443	3824	75	136	147	7
EG - 101	721.5	1696	68	130	127	8
EG - 102	721.5	1681	66	126	177	6
EG - 103	1443	3088	63	123	167	6
ERS - 3	832.5	1049	67	128	173	6
ERS - 5	1831.5	1886	65	127	210	7
ERS - 8	832.5	1407	63	127	197	5
ERS - 12	1221	2430	62	124	177	6
ERS - 19	1276.5	1991	64	127	223	7
ERS - 20	1665	2631	64	126	167	7
ERS - 21	2442	4835	64	127	207	6
ERS - 29	2775	4329	68	128	197	7
ERS - 30	666	1632	66	127	196	8
<i>F Value</i>						
<i>Pr &gt; F</i>						
<i>R-Square</i>	1.00	1.00	1.00	1.00	1.00	1.00
<i>Mean</i>	1480.30	2960.70	68.07	129.57	196.00	7.65
<i>Anova SS</i>	461342004.20	1950607793.00	10957.41	15976.55	706414.70	817.53
<i>Min</i>	55.5	119.00	55.00	106.00	93.33	2.00
<i>Max</i>	7270.5	15632	80.00	147.00	237.00	12.00

The data of 500 rabi germplasm lines evaluated at Parbhani during Rabi 2011-12 is presented in Table 14. The traits days to 50% flowering, days to maturity and grain yield were significant.

**Table 14: Evaluation of rabi germplasm for essential traits at Parbhani during Rabi 2011-12**

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 308600	76	200	121	8	0.120	0.900
IC 308601	69	200	116	9	0.325	1.165
IC 308602	73	165	116	6	0.055	0.866
IC 308603	72	195	118	8	0.220	0.714
IC 308606	72	190	120	8	0.085	0.850

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 308607	73	220	119	10	0.380	1.540
IC 308608	72	223	116	8	0.515	1.500
IC 308611	75	200	117	8	0.065	0.860
IC 308612	68	190	115	8	0.195	0.734
IC 308614	74	160	120	5	0.065	0.552
IC 308615	70	215	113	7	0.045	1.310
IC 308617	73	175	116	8	0.225	0.778
IC 308618	74	183	117	7	0.085	1.000
IC 308619	72	120	118	9	0.275	1.690
IC 308620	74	180	120	10	0.045	0.798
IC 308622	74	173	120	7	0.145	0.412
IC 308623	73	190	119	7	0.035	0.430
IC 308624	71	240	117	9	0.260	1.100
IC 308625	69	250	113	8	0.210	0.480
IC 308629	71	257	115	7	0.085	0.540
IC 308631	72	200	119	9	0.095	0.730
IC 308632	74	197	121	10	0.120	0.960
IC 308633	69	207	116	10	0.085	0.930
IC 308634	69	193	115	7	0.175	0.640
IC 308635	69	197	113	10	0.335	1.490
IC 308636	70	217	114	9	0.095	1.100
IC 308637	69	207	114	10	0.335	1.000
IC 308638	68	240	115	8	0.088	0.470
IC 308639	69	230	116	9	0.075	1.190
IC 308640	68	180	113	9	0.215	0.560
IC 308643	68	210	112	8	0.078	0.910
IC 308646	69	217	114	9	0.245	0.750
IC 308647	70	235	117	10	0.285	1.210
IC 308648	68	227	114	8	0.205	0.890
IC 308649	66	245	113	8	0.230	0.880
IC 308650	67	220	114	7	0.115	0.470
IC 308652	68	220	113	9	0.200	0.520
IC 308653	66	140	113	6	0.065	0.550
IC 308658	69	227	112	8	0.360	0.902
IC 308660	67	250	114	8	0.250	0.790
IC 308661	66	205	115	8	0.175	0.340
IC 308663	67	217	113	8	0.240	0.750
IC 308664	69	193	115	9	0.270	0.680
IC 308665	78	202	123	9	0.350	0.700
CSV 216 (c)	71	233	117	8	0.400	1.140
CSV 22 ©	70	230	116	8	0.380	1.080
M 35-1 ©	68	180	113	9	0.220	0.980
IC 308670	69	207	114	7	0.225	0.680
IC 308671	70	213	115	8	0.320	0.890
IC 308672	68	220	113	8	0.145	0.440
IC 308673	68	210	116	7	0.155	0.700
IC 308674	67	217	112	8	0.240	0.550
IC 308675	70	202	114	7	0.250	0.740
IC 308676	67	217	112	9	0.230	0.914
IC 308677	77	197	122	8	0.290	1.220
IC 308678	69	202	115	7	0.165	1.061
IC 308679	66	200	113	7	0.330	0.930
IC 308681	71	200	116	9	0.195	0.580
IC 308682	68	220	114	6	0.250	0.752
IC 308683	69	215	114	8	0.210	0.804
IC 308684	66	220	113	6	0.185	0.714
IC 308685	65	205	110	5	0.200	0.650
IC 308687	68	225	113	7	0.140	0.470
IC 308688	68	220	115	7	0.180	0.480
IC 308689	67	223	112	8	0.190	0.720
IC 305882	66	173	114	6	0.265	0.820
IC 305883	66	205	111	7	0.310	0.850
IC 305884	66	202	115	8	0.295	1.096
IC 305886	67	218	112	9	0.345	0.740
IC 305887	66	190	115	7	0.225	0.800
IC 305888	67	198	112	8	0.290	1.060
IC 305889	67	220	112	8	0.360	0.850
IC 305890	65	215	113	8	0.245	0.880
IC 305891	66	220	111	8	0.315	1.330
IC 305892	71	220	115	8	0.395	0.886
IC 305893	70	217	115	8	0.380	0.660



IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 305894	71	210	118	8	0.370	1.140
IC 305895	73	232	119	10	0.295	1.074
IC 305896	72	225	117	9	0.245	0.960
IC 305897	72	222	117	9	0.315	0.930
IC 305898	70	215	115	8	0.275	0.860
IC 305902	74	230	119	10	0.355	0.802
IC 305903	73	217	118	8	0.340	0.830
IC 305904	74	207	116	8	0.315	0.804
IC 305905	71	222	116	7	0.110	0.876
IC 305907	72	242	117	9	0.245	1.070
IC 305908	73	188	119	7	0.255	1.003
IC 305909	74	227	119	10	0.155	0.620
IC 305910	75	243	122	9	0.375	1.020
IC 305911	70	240	119	9	0.205	1.030
IC 305912	71	220	116	8	0.340	0.863
IC 305913	67	215	113	8	0.180	0.680
IC 305914	69	217	114	7	0.155	0.580
IC 305915	70	183	115	10	0.285	0.780
IC 305916	71	220	116	8	0.180	0.920
IC 305918	68	220	115	8	0.320	0.980
CSV 216 (c)	69	228	114	7	0.380	0.860
CSV 22 ©	70	243	114	9	0.340	0.360
M 35-1 ©	68	177	113	8	0.250	0.306
IC 305919	74	177	121	7	0.305	0.554
IC 305920	68	210	113	11	0.320	1.680
IC 305921	67	215	115	8	0.350	1.600
IC 305922	73	220	118	7	0.090	0.580
IC 305923	75	180	120	9	0.440	1.720
IC 305924	86	210	131	11	0.200	0.830
IC 305926	73	190	119	9	0.140	1.400
IC 305927	72	258	117	10	0.380	1.560
IC 305928	74	240	121	9	0.195	0.980
IC 305930	72	213	118	8	0.250	0.990
IC 305931	75	180	120	9	0.270	1.140
IC 305932	71	165	116	7	0.305	0.854
IC 305933	83	187	129	8	0.365	1.060
IC 347567	74	203	119	8	0.150	0.540
IC 347568	76	222	122	10	0.390	1.600
IC 347569	77	178	124	10	0.265	1.100
IC 347570	73	220	118	8	0.045	0.160
IC 347573	79	210	125	9	0.090	0.500
IC 347575	71	175	117	11	0.100	0.410
IC 347578	72	180	117	9	0.250	0.630
IC 347579	72	193	118	10	0.070	0.350
IC 347580	78	180	123	8	0.140	0.780
IC 347586	73	173	118	9	0.110	0.410
IC 347587	81	158	125	7	0.150	0.806
IC 347589	73	185	118	7	0.075	0.310
IC 347590	73	207	118	8	0.240	0.560
IC 347593	70	190	116	8	0.095	0.580
IC 347595	72	180	117	9	0.315	1.150
IC 345703	79	130	124	6	0.035	0.360
IC 345705	78	210	125	9	0.085	1.100
IC 345706	74	218	119	9	0.340	0.880
IC 345707	71	218	116	8	0.270	0.620
IC 345708	67	200	113	8	0.315	1.350
IC 345709	75	227	120	8	0.150	0.710
IC 345710	74	237	119	9	0.305	1.100
IC 345711	74	180	121	7	0.240	1.098
IC 345713	76	195	121	9	0.310	0.790
IC 345714	74	195	119	9	0.130	0.778
IC 345715	71	203	118	9	0.290	1.196
IC 345717	77	215	122	9	0.215	0.960
IC 345718	73	203	119	9	0.135	0.330
IC 345719	72	230	117	8	0.220	1.070
IC 345721	66	205	114	7	0.300	1.030
IC 345722	86	170	131	10	0.130	0.740
IC 345723	80	180	126	10	0.060	0.690
IC 345724	76	173	121	7	0.295	0.860
IC 345725	78	190	125	8	0.395	0.810
IC 345726	79	192	124	7	0.135	0.316

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
CSV 216 (c)	71	240	119	11	0.380	1.650
CSV 22 ©	72	225	117	10	0.320	1.350
M 35-1 ©	68	180	113	8	0.280	0.740
IC 345727	73	145	118	7	0.095	1.060
IC 345728	71	223	116	9	0.245	1.080
IC 345729	74	280	119	10	0.290	1.530
IC 345731	71	215	118	9	0.265	1.030
IC 345733	73	175	118	7	0.115	0.340
IC 345735	70	213	118	7	0.035	0.302
IC 345736	73	180	118	8	0.245	1.030
IC 345243	96	190	140	7	0.045	0.280
IC 345244	98	180	141	7	0.105	0.650
IC 345246	96	210	142	7	0.045	0.480
IC 345248	96	180	141	8	0.205	0.540
IC 345249	83	165	131	8	0.055	0.222
IC 345251	96	180	141	8	0.105	0.450
IC 345252	96	220	141	7	0.055	0.530
IC 345253	84	137	129	7	0.070	0.280
IC 343552	74	190	131	7	0.160	0.640
IC 343553	71	162	116	8	0.310	0.960
IC 343554	72	165	117	6	0.270	1.100
IC 343556	73	192	118	7	0.280	1.000
IC 343557	73	172	119	8	0.205	0.980
IC 343558	73	185	118	7	0.470	1.440
IC 343559	75	185	122	8	0.290	1.080
IC 343560	75	202	120	9	0.280	1.180
IC 343561	76	215	121	8	0.275	1.160
IC 343562	72	200	117	9	0.215	0.590
IC 343563	73	188	119	7	0.205	0.840
IC 343564	73	207	118	8	0.320	1.090
IC 343565	71	210	116	10	0.270	0.660
IC 343566	72	193	118	8	0.230	1.060
IC 343567	69	208	114	7	0.240	1.090
IC 343568	70	207	115	8	0.345	1.210
IC 343569	69	207	115	6	0.255	0.820
IC 343570	71	230	116	10	0.315	0.920
IC 343571	69	195	114	8	0.300	0.740
IC 343572	70	190	116	7	0.100	0.340
IC 343573	68	203	113	10	0.300	0.620
IC 343574	77	193	122	8	0.300	1.110
IC 343575	71	232	116	9	0.290	1.090
IC 343576	70	218	115	9	0.270	0.710
IC 343577	73	185	119	9	0.270	0.774
IC 343578	69	202	114	9	0.325	0.830
IC 343579	73	210	119	10	0.230	0.678
IC 343580	73	208	118	8	0.280	0.810
IC 343581	73	212	118	8	0.250	1.160
IC 343582	74	228	120	11	0.340	0.920
IC 343583	71	195	116	9	0.195	0.820
IC 343584	72	165	119	8	0.370	1.060
IC 343585	74	207	119	9	0.360	1.012
IC 343586	73	213	120	10	0.320	1.190
IC 343587	72	188	117	10	0.055	0.640
CSV 216 (c)	73	240	118	11	0.375	1.120
CSV 22 ©	74	215	120	9	0.340	1.010
M 35-1 ©	69	178	115	11	0.245	0.880
IC 343588	74	185	119	7	0.240	0.914
IC 343589	74	200	121	9	0.250	1.148
IC 343590	75	158	121	8	0.265	1.160
IC 343591	99	220	131	8	0.030	0.600
IC 343592	73	215	118	9	0.290	0.850
IC 343593	72	210	119	10	0.230	0.656
IC 343594	72	185	117	9	0.200	0.830
IC 343595	80	208	125	8	0.210	0.886
IC 345186	72	187	119	9	0.200	0.660
IC 345187	72	198	117	10	0.305	0.902
IC 345189	73	210	120	8	0.320	0.820
IC 345190	71	213	116	8	0.250	0.900
IC 345191	69	198	116	9	0.195	0.856
IC 345192	73	220	118	10	0.280	0.930
IC 345193	74	205	121	8	0.245	0.950

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 345194	78	220	123	8	0.220	0.602
IC 345195	80	147	122	8	0.330	1.180
IC 345196	74	170	119	7	0.310	0.802
IC 345197	72	210	120	9	0.290	0.632
IC 345198	72	188	118	10	0.245	0.536
IC 345200	71	220	116	8	0.190	0.640
IC 345201	71	232	118	9	0.385	1.400
IC 345203	73	215	118	9	0.170	0.690
IC 345204	72	212	119	8	0.260	1.040
IC 345205	69	220	114	9	0.290	0.780
IC 345206	71	222	118	10	0.260	0.940
IC 345208	73	225	118	9	0.190	0.630
IC 345209	74	232	120	8	0.270	0.870
IC 369119	74	208	119	7	0.105	0.260
IC 369120	74	192	120	8	0.045	0.650
IC 369121	76	195	121	9	0.110	0.310
IC 369122	73	202	120	8	0.085	0.416
IC 369123	72	165	117	6	0.105	0.502
IC 369127	73	200	119	6	0.130	0.542
IC 369128	70	200	115	6	0.225	0.602
IC 369129	74	185	120	7	0.036	0.310
IC 369130	71	203	116	8	0.200	0.470
IC 369131	71	207	118	6	0.070	0.306
IC 392124	75	190	121	7	0.040	0.280
IC 392125	74	202	119	10	0.275	1.250
IC 392126	74	205	121	10	0.345	0.740
IC 392127	76	188	121	9	0.215	0.760
IC 392128	77	205	123	10	0.385	1.550
IC 392129	73	193	118	9	0.262	0.754
IC 392130	72	210	119	8	0.255	1.200
IC 392131	74	220	119	9	0.215	0.860
IC 392132	75	202	121	9	0.265	0.980
IC 392133	78	205	123	7	0.275	0.920
IC 392134	78	227	123	9	0.175	0.840
IC 392135	80	200	126	8	0.095	0.640
CSV 216 (c)	74	245	119	9	0.390	0.950
CSV 22 ©	73	210	118	9	0.355	0.740
M 35-1 ©	72	137	119	7	0.241	0.940
IC 392136	77	198	122	9	0.180	1.115
IC 392137	77	228	123	10	0.215	1.081
IC 392138	76	235	121	11	0.055	0.668
IC 392139	78	232	124	10	0.160	0.860
IC 392141	77	228	122	11	0.145	0.540
IC 392142	80	212	126	10	0.035	0.390
IC 392143	78	223	123	9	0.225	0.840
IC 392144	77	232	125	9	0.225	0.960
IC 392145	77	238	122	8	0.285	1.151
IC 392146	73	250	119	10	0.425	1.196
IC 392149	78	213	119	9	0.070	0.586
IC 392150	72	240	114	8	0.380	0.970
IC 392151	71	197	118	7	0.250	0.546
IC 392152	69	225	118	9	0.190	0.760
IC 392153	73	238	117	9	0.435	1.400
IC 392154	73	206	120	8	0.290	1.120
IC 392155	72	220	123	9	0.305	0.890
IC 392156	74	202	123	7	0.140	0.942
IC 392157	78	215	121	9	0.135	0.620
IC 392158	78	215	120	10	0.045	0.340
IC 392159	76	232	117	9	0.055	0.470
IC 249027	74	180	118	6	0.295	0.860
IC 249029	72	185	114	6	0.150	0.380
IC 249030	73	210	116	8	0.170	0.830
IC 249031	69	195	117	6	0.170	0.390
IC 249032	70	220	115	7	0.120	0.636
IC 249033	72	202	117	8	0.215	0.650
IC 249034	68	160	119	7	0.080	0.390
IC 249036	72	187	118	7	0.160	0.520
IC 249037	74	177	119	7	0.170	0.250
IC 249038	73	177	117	8	0.130	0.658
IC 249039	73	160	119	8	0.125	0.590
IC 249040	72	213	120	9	0.200	1.080

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 249041	74	128	117	7	0.360	0.825
IC 249042	73	150	116	9	0.140	0.895
IC 249043	72	177	114	7	0.230	0.625
IC 249044	71	177	131	8	0.145	0.308
IC 249045	69	215	115	7	0.185	0.936
IC 249046	85	138	116	10	0.160	0.360
IC 249047	70	193	117	8	0.320	0.840
IC 249048	69	255	117	8	0.265	0.704
IC 249049	72	272	131	8	0.175	0.448
IC 249050	72	223	122	7	0.105	0.621
IC 249051	85	200	131	11	0.030	0.256
IC 249052	77	250	125	8	0.170	0.928
IC 249053	78	208	117	10	0.145	0.548
IC 249055	76	160	118	9	0.130	0.598
IC 249056	72	172	115	7	0.095	0.340
CSV 216 (c)	71	230	119	10	0.362	1.115
CSV 22 ©	70	230	119	9	0.342	1.050
M 35-1 ©	73	172	115	7	0.246	0.858
IC 249057	70	222	121	9	0.205	0.612
IC 249060	86	240	131	11	0.075	0.540
IC 249061	85	175	130	13	0.045	0.198
IC 249062	74	202	118	8	0.120	0.488
IC 249063	72	185	119	10	0.132	0.570
IC 249065	106	230	146	9	0.090	0.363
IC 249066	106	190	146	8	0.110	0.540
IC 249067	76	173	119	8	0.155	0.240
IC 249068	75	165	128	7	0.060	0.810
IC 249071	74	150	125	8	0.140	0.560
IC 249077	99	180	143	9	0.040	0.120
IC 249078	94	200	141	9	0.055	0.136
IC 249079	94	180	142	9	0.020	0.100
IC 249080	86	178	131	11	0.075	0.400
IC 249081	73	185	121	8	0.070	0.526
IC 249082	72	212	117	9	0.045	0.345
IC 249087	76	208	120	7	0.030	0.314
IC 249088	72	230	119	7	0.035	0.120
IC 249089	75	228	118	8	0.090	0.320
IC 249090	74	212	116	8	0.090	0.376
IC 249091	73	167	115	5	0.065	0.180
IC 249092	71	228	115	8	0.145	0.420
IC 249093	69	165	130	8	0.180	0.540
IC 249094	70	235	115	8	0.170	0.630
IC 249098	70	200	118	8	0.145	0.490
IC 249099	71	230	125	7	0.165	0.630
IC 249100	73	188	115	8	0.240	0.890
IC 249101	79	163	118	9	0.055	0.210
IC 249102	70	193	118	8	0.125	0.670
IC 249103	73	187	115	7	0.105	0.610
IC 249106	72	195	119	9	0.100	0.402
IC 249107	70	210	121	8	0.170	0.452
IC 249108	74	162	119	7	0.055	0.428
IC 249110	75	197	118	8	0.040	0.120
IC 249111	74	193	117	8	0.175	0.640
IC 249112	72	213	116	8	0.210	0.640
IC 249113	72	170	116	9	0.065	0.340
IC 249114	71	178	116	8	0.240	0.460
IC 249115	70	182	121	9	0.075	0.420
IC 249116	71	193	123	9	0.350	1.360
IC 249117	75	200	125	9	0.230	0.650
PU-5	78	250	117	11	0.035	0.090
PU-6	79	237	122	11	0.255	0.950
PU-10	72	213	119	11	0.100	0.390
PU-11	77	210	121	9	0.035	0.095
PU-12	73	240	125	10	0.115	0.331
PU-13	76	218	118	9	0.095	0.370
PU-15	78	232	118	10	0.030	0.980
CSV 216 (c)	73	253	115	9	0.390	1.360
CSV 22 ©	72	250	118	10	0.370	1.425
M 35-1 ©	70	183	116	7	0.230	1.190
IC 420936	71	213	119	8	0.115	0.652
IC 420937	72	200	118	9	0.100	0.470

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 420938	72	220	119	10	0.105	0.670
IC 420939	73	193	117	6	0.240	0.942
IC 420940	74	242	118	10	0.155	0.990
IC 420941	72	230	115	8	0.310	1.320
IC 420942	72	210	119	8	0.180	0.842
IC 420943	70	225	122	9	0.070	0.225
IC 420944	74	213	119	10	0.145	0.580
IC 420945	76	255	123	9	0.120	0.367
IC 420946	74	240	120	10	0.060	0.336
IC 420947	78	232	119	10	0.075	0.210
IC 420948	74	212	118	7	0.080	0.240
IC 420949	74	263	118	10	0.050	0.150
IC 420950	72	220	119	9	0.105	0.370
IC 420951	73	250	121	8	0.180	1.230
IC 420952	72	240	119	10	0.065	0.910
IC 420953	76	235	124	9	0.215	1.640
IC 420954	73	250	123	8	0.075	0.521
IC 420955	79	227	130	9	0.205	0.674
IC 420956	77	235	126	9	0.030	0.352
IC 541308	83	253	120	8	0.160	0.502
IC 541309	81	233	130	9	0.085	0.408
IC 541310	74	245	122	7	0.085	0.612
IC 541313	72	227	121	7	0.065	0.144
IC 541314	77	220	115	12	0.050	0.406
IC 541316	76	192	117	9	0.075	0.590
IC 541317	70	177	119	7	0.035	0.436
IC 541318	71	170	115	7	0.105	0.260
IC 541320	72	257	116	8	0.125	0.144
IC 541321	73	267	121	10	0.080	0.292
IC 541322	70	140	119	6	0.070	0.316
IC 541323	71	177	120	7	0.125	0.620
IC 541324	75	168	118	7	0.030	0.324
IC 541325	86	180	130	8	0.180	0.540
IC 541327	76	193	121	8	0.110	0.586
IC 541328	73	170	119	7	0.195	0.450
IC 541331	74	156	118	8	0.065	0.182
IC 541334	71	213	121	9	0.095	0.370
IC 541335	72	180	130	7	0.205	0.940
IC 541336	74	165	119	6	0.145	0.448
IC 541337	76	173	120	8	0.100	0.680
IC 541338	85	160	113	8	0.070	0.380
CSV 216 (c)	74	220	118	8	0.395	0.920
CSV 22 ©	75	240	119	9	0.375	0.940
M 35-1 ©	68	183	115	6	0.230	0.662
IC 541339	99	240	139	9	0.040	0.236
IC 541340	86	150	126	8	0.050	0.270
IC 541341	83	157	129	8	0.040	0.506
IC 541342	72	180	119	6	0.055	0.580
IC 541343	71	260	119	7	0.085	0.300
IC 541344	72	220	118	6	0.055	0.520
IC 541345	73	240	117	7	0.125	0.350
IC 541347	78	250	121	9	0.035	0.520
IC 541348	72	230	118	6	0.140	0.650
IC 541349	73	163	120	6	0.030	0.506
IC 541350	76	160	122	7	0.035	0.340
IC 541351	73	187	119	7	0.080	0.210
IC 541353	75	227	120	3	0.115	0.334
IC 541354	77	140	121	7	0.035	0.536
IC 541355	74	175	119	7	0.100	0.340
IC 541356	75	185	118	8	0.180	0.560
IC 541357	86	200	116	9	0.045	0.120
IC 541358	74	207	118	9	0.055	0.230
IC 541359	73	217	119	3	0.080	0.252
IC 541360	71	183	120	7	0.105	0.510
IC 541362	74	150	118	8	0.110	0.360
IC 541363	75	222	120	7	0.105	0.626
IC 541364	86	190	122	7	0.045	0.536
IC 541365	94	250	141	7	0.050	0.332
IC 541366	75	230	117	3	0.055	0.658
IC 541847	77	157	121	5	0.095	0.372
IC 541848	72	200	120	6	0.100	0.382

IC No	Days to 50% flowering	Plant height (cm)	Days to maturity	No. of leaves	Grain yield (kg/plot)	Fodder yield (kg/plot)
IC 541849	72	210	121	6	0.040	0.172
IC 541850	76	180	120	6	0.090	0.304
IC 541853	75	182	119	8	0.160	0.480
IC 541856	74	227	122	7	0.050	0.280
IC 541857	85	190	119	10	0.050	0.210
IC 541858	75	198	117	7	0.030	0.140
IC 541859	77	212	115	8	0.060	0.100
IC 541860	74	197	122	8	0.205	0.790
IC 541861	72	167	118	7	0.125	0.460
IC 541862	70	170	118	7	0.170	0.560
IC 541866	73	160	118	7	0.140	0.420
IC 541867	75	168	121	6	0.120	0.720
IC 541871	76	155	118	8	0.035	0.340
IC 541873	73	170	118	7	0.120	0.360
IC 541874	73	145	116	9	0.165	0.402
CSV 216 (c)	74	247	118	10	0.360	0.920
CSV 22 ©	73	215	119	8	0.355	0.823
M 35-1 ©	71	150	118	7	0.260	0.752
IC 541876	85	227	131	13	0.095	0.458
IC 541878	72	170	119	8	0.195	0.520
IC 541880	72	207	116	7	0.125	0.302
IC 541881	74	220	118	8	0.135	0.414
IC 568337	72	203	119	7	0.030	0.090
IC 568338	71	193	117	7	0.180	0.540
IC 568339	73	210	119	8	0.245	0.610
IC 568340	74	160	119	6	0.275	0.928
IC 568341	72	193	118	8	0.075	0.140
IC 568343	74	210	119	7	0.040	0.120
IC 568344	85	190	132	9	0.045	0.130
IC 568345	73	180	115	6	0.040	0.140
IC 568348	70	160	117	6	0.105	0.300
IC 568350	71	125	119	6	0.030	0.240
IC 568351	72	135	117	7	0.090	0.530
IC 568352	71	182	115	7	0.090	0.416
IC 568355	74	168	117	8	0.160	0.906
IC 568356	72	158	118	7	0.180	0.810
IC 568360	70	140	120	7	0.130	0.486
IC 568361	72	250	118	9	0.095	0.726
IC 568403	73	135	121	8	0.095	0.350
IC 568407	74	153	116	8	0.110	0.315
IC 568412	76	168	117	7	0.080	0.240
IC 568429	85	182	135	10	0.030	0.090
IC 568433	72	188	118	6	0.075	0.230
IC 568434	73	208	121	9	0.060	0.180
IC 568435	72	150	121	7	0.100	0.310
IC 568437	73	130	123	8	0.060	0.180
IC 568439	75	120	118	6	0.850	0.220
IC 568441	76	108	117	9	0.075	0.224
IC 568443	78	108	121	7	0.055	0.160
IC 568444	72	260	123	6	0.055	0.180
IC 0585208	76	190	116	6	0.075	0.206
IC 0585210	77	140	118	7	0.105	0.258
IC 0585213	70	220	114	6	0.145	0.650
IC 0585217	70	215	115	7	0.070	0.314
IC 0585224	72	160	119	4	0.090	0.390
IC 0585225	69	240	114	5	0.130	0.254
IC 0585226	69	230	112	4	0.105	0.446
IC 0585234	74	170	118	6	0.025	0.182
ERS 30	73	230	110	8	0.270	0.570
CSV 216 (c)	76	230	118	9	0.380	1.150
CSV 22 ©	75	230	117	6	0.345	1.210
M 35-1 ©	74	220	115	9	0.245	0.850
<i>F Value</i>	7.62	3.49	9.16	1.12	48.93	1.75
<i>Pr &gt; F</i>	<.0001***	0.00	<.0001***	0.38	<.0001***	0.04
<i>R-Square</i>	0.99	0.98	0.99	0.95	0.998815	0.97
<i>Coeff Var</i>	2.85	7.83	1.55	16.16	8.854018	37.95
<i>Mean</i>	73.80	201.67	119.23	8.13	0.184963	0.69
<i>Anova SS</i>	15710.61	404591.78	14545.97	897.83	6.10	56.43
<i>Min</i>	36.00	108.00	110.00	3.00	0.02	0.09
<i>Max</i>	106.00	280.00	146.00	13.00	0.85	1.72

## 7. Sorghum genetic resources registration

### 7.1. Sorghum varietal registration with PVPFRA

Two varieties viz., CSV 26 and CSV 27 submitted to the Plant Variety under the New Variety category. All other queries are being answered.

The status of national extent and new varieties registration with PPV&FRA is presented in Table 15. The status of state extent and new varieties registration with PPV&FRA is presented in Table 16. Sorghum varieties applied for registration as variety under common knowledge is presented in Table 17. The status of sorghum varieties registered with the PPV&FRA is presented in Table 18.

**Table 15: Status of National extant and new varieties registration with PPV&FRA (As on 31st March 2012)**

S. No.	Denomination	Type of variety	Classification	SPV / SPH Nos.	Status	Notification
<b>Variety: National (extant) (submitted)</b>						
1	CSV 14R	Extant variety	Variety	SPV 839	Submitted	814(E) 04/11/1992
2	CSV 15	Extant variety	Variety	SPV 946	Submitted	349(E) 20/05/1996
3	CSV 216R	Extant variety	Variety	SPV 1359	Submitted	821(E) 13/09/2000
4	CSV 19SS	Extant variety	Variety	RSSV 9	Submitted	1172(E) 28/08/2005
<b>Hybrid: National (extant) (submitted)</b>						
1	CSH 13	Extant variety	Hybrid	SPH 504	Submitted	647(E) 09/09/1997
2	CSH 14	Extant variety	Hybrid	SPH 468	Submitted	814(E) 04/11/1992
3	CSH 15R	Extant variety	Hybrid	SPH 677	Submitted	1(E) 01/01/1996
4	CSH 16	Extant variety	Hybrid	SPH 723	Submitted	647(E) 09/09/1997
5	CSH 17	Extant variety	Hybrid	SPH 660	Submitted	425(E) 08/06/1999
6	CSH 18	Extant variety	Hybrid	SPH 960	Submitted	1050(E) 26/10/1999
7	CSH 19R	Extant variety	Hybrid	SPH 1010	Submitted	821(E) 13/09/2000
8	CSH 20MF	Extant variety	Hybrid	UPMCH 1101	Submitted	1172(E) 25/08/2005
9	CSH 22SS	Extant variety	Hybrid	NSSH 104	Submitted	1566(E) 05/11/2005
<b>A lines: National (extant) (submitted)</b>						
1	296A	Extant variety	A - line	296A	Submitted	647(E) 09/09/1997
2	2219A	Extant variety	A - line	2219A	Submitted	1172(E) 25/08/2005
3	AKMS 14A	Extant variety	A - line	AKMS 14A	Submitted	425(E) 08/06/1999
4	27A	Extant variety	A - line	27A	Submitted	647(E) 09/09/1997
5	IMS 7A	Extant variety	A - line	IMS 7A	Submitted	1566(E), 05/11/2005
6	IMS 9A	Extant variety	A - line	IMS 9A	Submitted	1050(E) 26/10/1999
7	104A	Extant variety	A - line	104A	Submitted	821(E) 13/09/2000
<b>B lines: National(extant) (submitted)</b>						
1	296B	Extant variety	B - line	296B	Submitted	647(E) 09/09/1997
2	2219B	Extant variety	B - line	2219B	Submitted	1172(E) 25/08/2006
3	AKMS 14B	Extant variety	B - line	AKMS 14B	Submitted	425(E) 08/06/1999
4	27B	Extant variety	B - line	27B	Submitted	647(E) 09/09/1997
5	IMS 7B	Extant variety	B - line	IMS 7B	Submitted	1566(E), 05/11/2005
6	IMS 9B	Extant variety	B - line	IMS 9B	Submitted	1050(E) 26/10/1999
7	104B	Extant variety	B - line	104B	Submitted	821(E) 13/09/2000
<b>R lines: National (extant) (submitted)</b>						
1	RS 29	Extant variety	R - line	RS 29	Submitted	647(E) 09/09/1997
2	RS 585	Extant variety	R - line	RS 585	Submitted	1(E) 01/01/1996
3	RS 627	Extant variety	R - line	RS 627	Submitted	1566(E), 05/11/2005
4	RS 673	Extant variety	R - line	RS 673	Submitted	425(E) 08/06/1999
5	AKR 150	Extant variety	R - line	AKR 150	Submitted	814(E), 04/11/1992
6	AKR 354	Extant variety	R - line	AKR 354	Submitted	821(E) 13/09/2000
7	C 43	Extant variety	R - line	C 43	Submitted	647(E) 09/09/1997
8	Indore 12	Extant variety	R - line	Indore 12	Submitted	1050(E) 26/10/1999
9	UPMC 503	Extant variety	R - line	Pant Chari 6	Submitted	1172(E) 25/08/2005
<b>Varieties: National (new) (submitted)</b>						
1	CSV 17	New variety	Variety	SPV 1489	Submitted	449 (E) 11/02/2009
2	CSV 18	New variety	Variety	SPV 1595	Submitted	449 (E) 11/02/2009
3	CSV 20	New variety	Variety	SPV 1616	Submitted	449 (E) 11/02/2009
4	CSV 21F	New variety	Variety	SRF 286	Submitted	Awaited
5	CSV 22	New variety	Variety	SPV 1626	Submitted	1703 (E) 05/10/2007
6	CSV 23	New variety	Variety	SPV 1714	Submitted	72 (E) 10/01/2008
7	CSV 24SS	New variety	Variety	SPSSV 6	Submitted	Awaited
8	CSV 25	New variety	Variety	SPV 1746	Submitted	2187(E) 27/08/2010
9	CSV 26	New variety	Variety	SPV 1829	Submitted	29/03/2012

S. No.	Denomination	Type of variety	Classification	SPV / SPH Nos.	Status	Notification
10	CSV 27	New variety	Variety	SPV 1870	Submitted	29/03/2012
<b>Hybrids: National (new) (submitted)</b>						
1	CSH 23	New variety	Hybrid	SPH 1290	Submitted	1566(E) 05/11/2005
2	CSH 24MF	New variety	Hybrid	UTMCH 1302	Submitted	Awaited
3	CSH 25	New variety	Hybrid	SPH 1567	Submitted	1108(E) 8/5/2008
<b>Parental lines: National (new)</b>						
1	PMS 28 A	Parental line	New variety	--	Submitted	1108(E) 8/5/2008
2	PMS 28B	Parental line	New variety	--	Submitted	1108(E) 8/5/2008
3	463A	Parental line	New variety	--	Submitted	--
4	463 B	Parental line	New variety	--	Submitted	--
5	NR 486	Parental line	New variety	--	Submitted	--

**Table 16: Status of State extant and new varieties registration with PPV&FRA (As on 31st March 2012)**

S. No.	Denomination	Type of variety	University	State	Status
<b>State varieties - Extant (submitted)</b>					
1	PSV-1	Extant variety	ANGRAU - Hyderabad	Andhra Pradesh	Submitted, but not accepted as its original version SPV 462 has crossed 15 years period by the time of verification of application by PPV&FRA
2	Selection 3	Extant variety	MAU - Rahuri	Maharashtra	Submitted
3	Phule Maulee	Extant variety	MAU - Rahuri	Maharashtra	Submitted
4	Uttara	Extant variety	MAU - Rahuri	Maharashtra	Submitted
5	SSV 84	Extant variety	MAU - Rahuri	Maharashtra	Submitted
6	Pant Chari 5	Extant variety	Pantnagar	Uttarakhand	Submitted
7	Pant Chari 6	Extant variety	Pantnagar	Uttarakhand	Submitted
8	Pant Chari 4	Extant variety	GBPUA&T - Pantnagar	Uttarakhand	Submitted
9	Parbhani Moti	Extant variety	MPKV - Parbhani	Parbhani	Submitted
10	Parbhani Swetha	Extant variety	MPKV - Parbhani	Parbhani	Submitted
11	PVK 809	Extant variety	MPKV - Parbhani	Parbhani	Submitted
12	Paiyur-2	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
13	APK-1	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
14	BSR-1	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
15	CO (FS) 29	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
16	CO (S)-28	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
17	K-11	Extant variety	TNAU - Coimbatore	Tamil Nadu	Submitted
18	Jawahar Jowar- 938	Extant variety	RVSKVV - Indore	Madhya Pradesh	Submitted
19	Jawahar Jowar- 1022	Extant variety	RVSKVV - Indore	Madhya Pradesh	Submitted
20	Jawahar Jowar- 1041	Extant variety	RVSKVV - Indore	Madhya Pradesh	Submitted
21	Pratap Jowar-1430	Extant variety	MPUAT - Udaipur	Rajasthan	Submitted
22	SPH-837	Extant variety	MPUAT - Udaipur	Rajasthan	Submitted
23	HC 308	Extant variety	Hissar	Haryana	Submitted
24	HJ 513 *	Extant variety	Hissar	Haryana	Submitted
25	PCH 106	Extant variety	IARI	New Delhi	Submitted
26	PSH 1	Extant variety	ANGRAU - Hyd.	Andhra Pradesh	Submitted
27	NTJ 4	Extant variety	ANGRAU - Hyd.	Andhra Pradesh	Submitted
28	NTJ 3	Extant variety	ANGRAU - Hyd.	Andhra Pradesh	Submitted
29	PSV 2	Extant variety	ANGRAU - Hyd.	Andhra Pradesh	Submitted
30	SSV 74	Extant variety	Dharwad	Karnataka	Submitted
31	DSH 4	Extant variety	Dharwad	Karnataka	Submitted
32	DSV 4	Extant variety	Dharwad	Karnataka	Submitted
<b>State varieties- New (submitted)</b>					
1	AKSV 22*	New variety	Akola	Maharashtra	Submitted
2	PKV Ashwini*	New variety	Akola	Maharashtra	Submitted
3	AKSV 13R (PKV Kranti)*	New variety	Akola	Maharashtra	Submitted
4	Vasudha	New variety	Rahuri	Maharashtra	Submitted
5	Phule Chitra	New variety	Rahuri	Maharashtra	Submitted
<b>State varieties applications which will not be submitted as no information received in spite of repeated reminders</b>					
1	GJ 38	Extant variety	Surat	Gujarat	No Information received from NAU, Surat, Hence, application not processed
2	GJ 40	Extant variety	Surat	Gujarat	
3	GJ 41	Extant variety	Surat	Gujarat	
4	GFS 5	Extant variety	Surat	Gujarat	
5	Surat 1	Extant variety	Surat	Gujarat	
6	Bundela	Extant variety	Mauranipur	Uttar Pradesh	No Information received from CSAUA&T, Kanpur (Mauranipur), Hence, application not processed



**Table 17: Status of varieties of common knowledge including farmers varieties registration with PPV&FRA (As on 31st March 2012)**

S. No.	Denomination	Type of variety	Classification	State	Status
1	IS 84	R line	Parental line	National	Rejected as it has completed 15 years
2	2077A	A line	Parental line	National	Rejected as it has completed 15 years
3	2077B	B line	Parental line	National	Rejected as it has completed 15 years
4	CS3541	R line	Parental line	National	Rejected as it has completed 15 years
5	M 35-1	Farmers variety	Variety	National (Karnataka, Maharashtra and Andhra Pradesh)	Rejected as it has completed 15 years
6	Scented sorghum	Farmers variety	Variety	MP and UP	Rejected as it has completed 15 years
7	Malwan	Farmers variety	Variety	Gujarat	Rejected as it has completed 15 years

**Table 18: Sorghum varieties registered with PPV&FRA**

S.No.	Registration No	Crop	Denomination	Date of grant	Period of registration
1	102 of 2009	Sorghum	CSH-15R (SPH 677)	July 20, 2010	December 31, 2010
2	109 of 2009	Sorghum	CSV-15	July 20, 2010	May 19, 2011
3	103 of 2009	Sorghum	CSH-17 (SPH-660)	July 20, 2010	June 7, 2014
4	163 of 2009	Sorghum	Pant Chari - 5 (UPFS-32)	December 21, 2009	October 25, 2014
5	144 of 2009	Sorghum	RSSV 9 (CSV-19SS)	December 21, 2009	August 24, 2020
6	133 of 2009	Sorghum	CSH-20MF (UPMCH-1101)	December 21, 2009	August 24, 2020
7	132 of 2009	Sorghum	CSH-22SS	December 21, 2009	November 4, 2020
8	55 of 2009	Sorghum	CSV 216 (Phule Yashoda (SPV-1359)	April 16, 2009	April 15, 2015
9	33 of 2009	Sorghum	CSH-16 (SPH 723)	February 12, 2009	September 8, 2012
10	32 of 2009	Sorghum	CSH-13	February 12, 2009	September 9, 2012
11	34 of 2009	Sorghum	CSH-18 (SPH-960)	February 12, 2009	October 25, 2014
12	38 of 2010	Sorghum	Haryana Chari 308	October 20, 2010	December 31, 2010

## 7.2. Genetic stocks registration with NBPGR

Sakkari Mukkari Jola registered under Institute name (RARS, Dharwad). So far 53 sorghum genetic stocks registered with NBPGR since 2005 (Table 19).

**Table 19: List of sorghum genetic resources registered with NBPGR, New Delhi**

S. No	Crop Name	Botanical Name	National Identity	Donar Identity	Ingrno	Year	Pedigree	Developer	Developing Institute	Novel Unique features
1	Sorghum	<i>Sorghum bicolor</i>	IC471842	S 437-1	05016	2005	Sel from S 153/IV 60-1 x Sorghum roxburghii P-1-3-7-1-1	SK Pahuja, RPS Grewal, Rajesh Yadav, Yogesh Jindal, SR Pundir, YP Luthra, AS Rath and SP Singh	Forage section, CCS HAU Hisar	Low HCN (Hydrocyanic acid), IVDMD) & multiple resistance
2	Sorghum	<i>Sorghum bicolor</i>	IC549901	CRS-1	07026	2007	Selection from Hegari landrace from Hegari village Hegari village, Bijapur	Prabhaker, SS Rao, IK Das, MS Raut	National Research Centre on Sorghum, Sholapur	Better drought tolerant mechanism
3	Sorghum	<i>Sorghum bicolor</i>	IC560414	MS463B	08080	2008	463B-SPV463 x 2219B	S Audilakshmi, C Aruna, RV Vidya Bhushanam and N Seetharama	NRC on Sorghum, Hyderabad	Converted male & female parents of dual purpose sorghum hybrid, SPH 1148 with high yield
4	Sorghum	<i>Sorghum bicolor</i>	IC561243	NR 486R	08081	2008	NR486-IS23521 x SPV475	S Audilakshmi, C Aruna, RV Vidya Bhushanam and N Seetharama	-do-	Converted male & female parents of dual purpose sorghum hybrid, SPH 1148 with high yield
5	Sorghum	<i>Sorghum bicolor</i>	IC345715	EC-13	08082	2008	EC-13	M Elangovan, PG Padmaja and Prabhakar	-do-	Shoot fly resistance and high grain yield
6	Sugarcane	<i>Saccharum x Sorghum hybrid</i>	IC522943	SSH-1	05021	2005	ICSA56 (Sorghum) x IJ76316 (Saccharum officinarum)	N Vijayan Nair	Sugarcane Breeding Institute (SBI), Coimbatore	Hybrid between Saccharum x Sorghum
7	Sorghum	<i>Sorghum bicolor</i>	IC565017	SPV 1742	09017	2009	Selection from EC515837	M Elangovan, UD Chavan, VR Bhagwat, TG Nageswararao, B Venkatesh Bhatt, CV Ratnavathi	DSR, Rajendranagar, Hyderabad, Andhra Pradesh	Good roti and dough making qualities
8	Sorghum	<i>Sorghum bicolor</i>	IC567687 & IC567688	MS line 126 A & B	09018	2009	2219B x SPV 126	S Audilakshmi, C Aruna, N Seetharama	-do-	Male sterility, with sweet stalk and greyed yellow grain colour
9	Sorghum	<i>Sorghum bicolor</i>	IC567689 & IC567690	MS line 91 A & B	09019	2009	2219B x SPV 221	S Audilakshmi, C Aruna, N Seetharama	-do-	Male sterility, with yellow grain colour
10	Sorghum	<i>Sorghum bicolor</i>	IC567691 & IC567692	MS line 356A & B	09020	2009	2219B x IS3691 x M 35-1	S Audilakshmi, C Aruna, N Seetharama	-do-	Male sterility, with high cane yield
11	Sorghum	<i>Sorghum bicolor</i>	IC567693 & IC567694	MS line 288A & B	09021	2009	422B x 310B	S Audilakshmi, C Aruna, N Seetharama	-do-	Male sterility, with sweet bold grain
12	Sorghum	<i>Sorghum bicolor</i>	IC567695 & IC567696	MS line 45A & B	09022	2009	296B x M 35-1	S Audilakshmi, C Aruna, N Seetharama	-do-	Male sterility, with sweet bold grain
13	Sorghum	<i>Sorghum bicolor</i>	IC569675	NRCDFR-06-1	09088	2009	NRCFSR 06-1-SPV-15-18 x IS 2122	C Aruna, PG Padmaja, Vittal Sharma, T Hussain, VR Bhagwat, S Audilakshmi, N	-do-	Shoot fly tolerance with multiple resistance to leaf diseases and also agronomic

S. No	Crop Name	Botanical Name	National Identity	Donar Identity	Ingrno	Year	Pedigree	Developer	Developing Institute	Novel Unique features
								Seetharama		superiority and yield
14	Sorghum	<i>Sorghum bicolor</i>	IC392140	PEC 17	09089	2009	PEC 17	M Elangovan, SS Rao, Prabhakar, Vilas A Tonapi, D Chandra , Sekara Reddy	-do-	High grain yield and high biomass under rabi conditions and shallow soil
15	Sorghum	<i>Sorghum bicolor</i>	IC570245	PDSR-GM-25	09090	2009	Recombinant inbred line from cross 296 B x B 58586	S Audilakshmi, IK Das, N Seetharama, RB Ghorade, PN Mane, MY Kamtar, YD Narayana	-do-	Grain mould resistance and round grain
16	Sorghum	<i>Sorghum bicolor</i>	IC570246	PDSR-GM-83	09091	2009	RIL from cross 296 B x B 58586	-do-	-do-	Grain mould resistance with greyed yellow grain
17	Sorghum	<i>Sorghum bicolor</i>	IC570247	PDSR-GM-92	09092	2009	RIL from cross 296 B x B 58586	-do-	-do-	Grain mould resistance with tall plant type
18	Sorghum	<i>Sorghum bicolor</i>	IC570248	PDSR-GM-98	09093	2009	RIL from cross 296 B x B 58586	-do-	-do-	Grain mould resistance with yellow white grain
19	Sorghum	<i>Sorghum bicolor</i>	IC570249	PDSR-GM-124	09094	2009	RIL from cross 296 B x B 58586	-do-	-do-	Grain mould resistance with tall plant type and long panicles
20	Sorghum	<i>Sorghum bicolor</i>	IC570250	09037; IC570250	09095	2009	RIL from cross 296 B x B 58586	-do-	-do-	Late duration grain mould resistance
21	Sorghum	<i>Sorghum bicolor</i>	IC570251	PDSR-GM-170	09096	2009	RIL from cross 296 B x B 58586	-do-	-do-	Grain mould resistance with long primary branches
22	Sorghum	<i>Sorghum bicolor</i>	IC570252	PDSR-GM-203	09097	2009	RIL from cross 296 B x B 58586	-do-	-do-	Early duration grain mould resistance
23	Sorghum	<i>Sorghum bicolor</i>	IC572930	MS 3042 A & B	09098	2009	AKMS 14B x CSV 8R	S Audilakshmi, C Aruna, N Seetharama	-do-	Dwarf MS line with high crude protein
24	Sorghum	<i>Sorghum bicolor</i>	IC572931	MS 3151 A & B	09099	2009	227 B x 45 B	-do-	-do-	Medium early duration male sterile line with high stalk protein
25	Sorghum	<i>Sorghum bicolor</i>	IC572932	MS 3062 A & B	09100	2009	27 B x IS 19305	-do-	-do-	Medium tall male sterile line with good quality of stalk
26	Sorghum	<i>Sorghum bicolor</i>	IC572933	MS 3009 A & B	09101	2009	(IS 3677 x IS 1054) x SPV 775	-do-	-do-	Medium duration MS line with superior stover quality
27	Sorghum	<i>Sorghum bicolor</i>	IC572934	MS 3182A & B	09102	2009	191 B x IS 3922 x karad local	-do-	-do-	Medium dwarf MS line with high ash (9.6%) in stalk
28	Sorghum	<i>Sorghum bicolor</i>	IC345703	EC-1	09103	2009	EC-1	M Elangovan, TG Nageshwara Rao, N Sivaraj	-do-	Resistance to multiple foliar diseases-rust, anthracnose, zonate leaf spot, sooty stripe and downy mildew
29	Sorghum	<i>Sorghum bicolor</i>	IC345733	EC-31	09104	2009	EC-31	-do-	-do-	Resistance to multiple foliar diseases - rust, zonate leaf spot, sooty stripe and ergot
30	Sorghum	<i>Sorghum bicolor</i>	IC345734	EC-32	09105	2009	EC-32	-do-	-do-	Resistance to multiple foliar diseases - rust, zonate leaf spot, sooty stripe,downy mildew and ergot
31	Sorghum	<i>Sorghum bicolor</i>	IC345772	SEVS-6	09106	2009	SEVS-6	-do-	-do-	Resistance to multiple foliar diseases - rust, zonate leaf spot, sooty stripe,downy mildew and ergot
32	Sorghum	<i>Sorghum bicolor</i>	IC0584056	Atharga Kempu Jola	10003	2010	Selection from farmer's field in Atharga village	BD Biradar, Gowri M Sajjanar, Hemalatha S, Prema B Patil, SB Devarnavadagi	UAS, Dharwad, RARS, Bijapur, Kamalaka	Good flaking quality
33	Sorghum	<i>Sorghum bicolor</i>	IC0584513	DSR-GMN-41	10004	2010	I 12 x IS 25017-43	SS Ambekar, MY Kamtar, K Ganesamurthy, RB Ghorade, Usha Saxena, Pooranchand, JD Jadav, S Audilakshmi, IK Das, TG Nageshwar Rao, N Seetharama	DSR, Rajendranagar, Hyderabad, Andhra Pradesh	Early duration grain mould resistance
34	Sorghum	<i>Sorghum bicolor</i>	IC0584514	DSR-GMN-42	10005	2010	I 12 x IS 25017-44	-do-	-do-	Grain mould resistance with greyed yellow grain
35	Sorghum	<i>Sorghum bicolor</i>	IC0584515	DSR-GMN-46	10006	2010	I 12 IS 25017-58	-do-	-do-	-do-
36	Sorghum	<i>Sorghum bicolor</i>	IC0584516	DSR-GMN-52	10007	2010	I 12IS 25017-70	-do-	-do-	-do-
37	Sorghum	<i>Sorghum bicolor</i>	IC0584517	DSR-GMN-58	10008	2010	SRT 26B x IS 25017-280	-do-	-do-	Tall grain mould resistant line with long panicle
38	Sorghum	<i>Sorghum bicolor</i>	IC0584518	DSR-GMN-59	10009	2010	GMRP 9 x IS 25017-282	-do-	-do-	Grain mould resistance with circular grain
39	Sorghum	<i>Sorghum bicolor</i>	IC0584519 & IC0584520	MS3054 A & B	10010	2010	27B x GM 97433	S Audilakshmi, C Aruna, N Seetharama	-do-	Tall MS line with high grain yield
40	Sorghum	<i>Sorghum bicolor</i>	IC0584521 & IC0584522	MS3060 A & B	10011	2010	27B x N 99	-do-	-do-	High grain yielding MS line with long panicle and medium dwarf plant height
41	Sorghum	<i>Sorghum bicolor</i>	IC0584523 & IC0584524	MS3061 A & B	10012	2010	27B x IS 19305	-do-	-do-	MS line of early duration and with high grain yield
42	Sorghum	<i>Sorghum bicolor</i>	IC0584525 & 0584526	MS3095 A & B	10013	2010	422B x IS 25017	-do-	-do-	Very tall MS line with high grain yield, long panicle and grey yellow grain
43	Sorghum	<i>Sorghum bicolor</i>	IC0584527 & 0584528	MS3143 A & B	10014	2010	463B x SPV 475	-do-	-do-	MS line with high grain yield and medium plant height
44	Sorghum	<i>Sorghum bicolor</i>	IC0584529 & IC0584530	MS3146 A & B	10015	2010	463B x SPV 475	-do-	-do-	Late duration MS line with high grain yield
45	Sorghum	<i>Sorghum</i>	IC0584531 &	MSS3183	10016	2010	AKMS 14B x IS	-do-	-do-	MS line with medium height,

S. No	Crop Name	Botanical Name	National Identity	Donar Identity	Ingrno	Year	Pedigree	Developer	Developing Institute	Novel Unique features
		<i>bicolor</i>	0584532	A & B			25017			short pedicel and high grain yield
46	Sorghum	<i>Sorghum bicolor</i>	IC0584533 & IC0584534	NS3216 A & B	10017	2010	SPGM 94009 x SPV 1231	-do-	-do-	Medium duration, tall MS line with high grain yield
47	Sorghum	<i>Sorghum bicolor</i>	IC0584535 & IC0584536	NS3228 A & B	10018	2010	2219B x (SPV 462 x IS 18475)	-do-	-do-	High yielding MS line in with grain
48	Maize	<i>Zea mays</i>	IC411279	BML-2	04024	2004	BML-2 (X1 Y 110-SN -b96 K -1-1-1-1-2-1-2-xb -xb-xb-1-xb	Sai Kumar Ramnujam, E Satyanaryana, P Mary Rekha, S Ravindra Babu, P Shanthi and D Rajesham	ARS, ANGRAU, Amberpet, Hyderabad	Profilie rabbit ears tolerant to banded leaf sheath blight ( BLSB), Sorghum downy mildew (SDM), PFSR, and water logging and General Combining Ability (GCA)
49	Maize	<i>Zea mays</i>	IC411285	BML-11	04029	2004	BML-11 (SUVAN 3-B 96-1-3-#x3-2-x-1-2-1-1-3-xb-xb-xb-xb	Sai Kumar Ramnujam, E Satyanaryana, P Mary Rekha, S Ravindra Babu, P Shanthi and D Rajesham	ARS, ANGRAU, Amberpet, Hyderabad	Tassel resembling sorghum panicle
50	Sorghum	<i>Sorghum bicolor</i>	EC434430	IS 41762	02022	2002	U- Thong - (EC434430) sel	B Sarath Babu, HC Sharma, RDVJ Prasada Rao and KS Varaprasad	BNBPGR, RS, Hyderabad	Immune to yellow sugarcane aphid <i>Melanapsis sacchari</i>
51	Sorghum	<i>Sorghum bicolor</i>	IC432861 432862)	140 A & B	04094	2004	104B x ICSB36209	BN Narkhede, JV Patil, SB Chaudhary, BK Katule, SB Wandthekar, VM Kulkarni and BB Thombare	MPKV, Rahuri	CMS, thermoinsensitive with high yield and long panicle ( 28cm)
52	Sorghum	<i>Sorghum bicolor</i>	IC0585920	SbABM	10131	2010	Somaclonal Mutant of A1 variety.	MS Maralappanavar, GM Sajjanar, VV Kulkarni, SS Patil and MS Kuruvinashetti.	Agricultural Research Station, UAS, Dharwad, Karnataka	An axillary branched somaclonal mutant derived from A1 variety of rabi sorghum, productive ear heads are branched with grain size on par with main ear head.
53	Sorghum	<i>Sorghum bicolor</i>	IC0585921	Sakkari Mukkari Jola	10132	2010	Collection from farmers fields of North Karnataka.	BD Biradar, GM Sajjanar, PB Patil and SB Devarnavadagi.	Regional Agricultural Research Station (RARS), Bijapur, Karnataka	Source of very sweet and soft hurda grains.

## 8. Technical programme (2012–13)

### 8.1: Sorghum germplasm collection

SN	Regions/State	Collaborator	Season/Year
1	South Madhya Pradesh	AICSIP – Indore	Kharif – 2012
2	Northern Uttarakhand	AICSIP – Pantnagar	Kharif – 2012

### 8.2: Sorghum germplasm evaluation

#### 8.2.1: Kharif 2012

SN	Experiment/materials	Centres	Scientists involved
1	Evaluation of Kharif indigenous collections (500)	Hyderabad, Indore, Deesa	Elangovan, Usha Saxena and SK Jain

#### 8.2.2: Rabi 2012–13

SN	Experiment/materials	Centres	Scientists involved
1	Evaluation of Maharashtra sorghum germplasm collections	Hyderabad, Bijapur and Rahuri	Sunil, Biradar, Gadag and Elangovan
2	Multiplication of 6795 acc sent to Svalbard Genebank by CGIAR	Hyderabad	Elangovan

## 9. Acknowledgement

We acknowledge the all the AICSIP centres, DSR – G Vincent Reddy, M Jhansi Rani, V Ravi Kumar, Kiran Babu and N Laxamma for their joint efforts in evaluation / characterization of genetic resources.

## Appendix

### 1. Germplasm collection

S.No	Mission Number	Season	State	Region	Collaboration	IC Numbers	No. of Acc.
1	27/2011/01	Kharif	Uttaranchal	Kumaon & Garhwal	AICSIP - Pantnagar	To be received	30
2	28/2011/02	Kharif	Gujarat	Kutch	AICSIP - Deesa	To be received	40
						<b>Total</b>	<b>70</b>

### 2. Germplasm assembling

S. No	No. of accession	Institute/ Division	Date	Passport data	Remarks	Season/ remarks	Status
1	7888	NBPGR (RS) Hyderabad	21-Apr-11	No	Germplasm sent to Svalbard Genebank by ICRISAT	Kharif 2011	MTS
2	5	Biochemistry - DSR	22-Jun-11	No	BMR germplasm		
3	163	ICRISAT	15-Jul-11	Yes	Accessions from China and others		MTS & Umakanth & Sanjana
4	35	ICRISAT	2-Dec-11	Yes	Wild sorghum (8 acc.) and other races		MTS & Padmaja
	<b>8091</b>	<b>Total</b>					

### 3. Germplasm characterization & evaluation (Kharif 2011)

Name of scientist	Exp No	Name of the Project	Name of the experiment	Objectives	Material & methods	Date of sowing	Observations to be made	Anticipated outcome
Elangovan	1	Sorghum Genetic Resources Management	Evaluation of mini-core sorghum collections	To evaluate mini-core sorghum collections for DUS traits	242 acc. + 3 checks in ABD	05-Jun 2011	33 DUS traits	Identification of distinct traits for utilization
Elangovan	2	Sorghum Genetic Resources Management	Evaluation of kharif landraces	To evaluate kharif landraces for DUS traits	103 acc. + 3 checks in ABD	05-Jun 2011	33 DUS traits	Identification of distinct traits for utilization
Elangovan	3	Sorghum Genetic Resources Management	Evaluation of high grain yielding kharif germplasm	To evaluate high grain yielding kharif germplasm for yield attributing traits	50 acc. + 3 checks in ABD	05-Jun 2011	Days to 50% flowering, Plant height, Ear head length, Ear head width, Grain yield, 100-seed weight	Identification of potential germplasm for utilization

### 4. Germplasm characterization & evaluation (Rabi 2011-12)

Name of the scientist	Exp No	Name of the Project	Name of the experiment	Objectives	Material and methods	Date of sowing	Observations to be made	Anticipated outcome
<i>M Elangovan</i>	1	Sorghum Genetic Resources management	Multiplication of 2500 Indigenous sorghum germplasm	To multiply 2 kg of seeds	2500 acc. of indigenous collections of DSR and mini-core collection	26th Oct 2012	Rouging, Selfing,	Quality seed produced

### 5. Germplasm multiplication

S.No	Material	Source	Season	Location	No. of acc.	Remarks
1	Indegenous collections	DSR	Rabi	Hyderabad	1866	Being packed
2	Maharashtra collections	DSR	Rabi	Hyderabad	843	Being packed
				<b>Total</b>	<b>2709</b>	

### 6. Germplasm trials

S. No.	Material	Source	Season	Location	No. of acc.	Germplasm	Purpose	Scientist/status
1	Evaluation of germplasm for essential traits	DSR	Kharif	Udaipur	500	500	Identification of potential germplasm	Dr Chowdhary & Dr M Elangovan
2	Evaluation of germplasm for essential traits	DSR	Kharif	Coimbatore	500	0	Identification of potential germplasm	Dr Sivakumar & Dr M Elangovan
3	Evaluation of germplasm for essential traits	DSR	Kharif	Parbhani	500	0	Identification of potential germplasm	Dr Ambekar & Dr M Elangovan
4	Evaluation of kharif landraces	DSR	Kharif	Indore	103	103	Identification of potential germplasm	Dr Usha Saxena & Dr M Elangovan
5	Evaluation of high grain yielding kharif germplasm	DSR	Kharif	Indore	50	20	Identification of potential germplasm	Dr Usha Saxena & Dr M Elangovan
6	Evaluation of germplasm for essential traits	DSR	Rabi	Rahuri	500	500	Identification of potential germplasm	Dr Gadag & Dr M Elangovan
7	Evaluation of germplasm for essential traits	DSR	Rabi	Bijapur	500	0	Identification of potential germplasm	Dr Biradar & Dr M Elangovan
8	Evaluation of germplasm for essential traits	DSR	Rabi	Tandur	500	0	Identification of potential germplasm	Dr Sudhakar & Dr M Elangovan

## 7. Germplasm distributed to researchers

S. No	No. of accession	Division/Institute	Date	Purpose	Received by
1	85	AICRP - Forage, Rahuri	1-Apr-11	Sudan grass for varietal improvement	Dr AH Sonone
2	3	Banasthali Uni. - Rajasthan	2-May-11	Resistant & Susceptible Charcoal rot material	Dr Nilima Kumari
3	16	AICSIP - Akola	13-May-11	Utilize in the breeding programme	Ghorade
4	500	AICSIP - Udaipur	30-May-11	Evaluate for essential traits	Chowdhary
5	500	AICSIP - Coimbatore	30-May-11	Evaluate for essential traits	Sivakumar
6	500	AICSIP - Parbhani	30-May-11	Evaluate for essential traits	Ambekar
7	1	Plant Breeding - DSR	1-Jun-11	For molecular studies	Madhusudhana
8	103	AICSIP - Indore	1-Jun-11	Evaluation of kharif landraces	Usha Saxena
9	50	AICSIP - Indore	1-Jun-11	Evaluation of high grain yielding kharif germplasm	Usha Saxena
10	103	AICSIP - Deesa	3-Jun-11	Kharif landraces for dual-purpose improvement	Patil PR
11	58	AICSIP - Deesa	3-Jun-11	Sudan grass IS lines for dual-purpose improvement	Patil PR
12	88	AICSIP - Deesa	3-Jun-11	FM lines of IGFRI for dual-purpose improvement	Patil PR
13	236	AICSIP - Hisar	3-Jun-11	Evaluation of mini-core collections for forage traits	Pahuja
14	5	AICSIP - Hisar	3-Jun-11	Evaluation of scented sorghum	Pahuja
15	1	Alternate uses - DSR	7-Jun-11	E 228 for food quality analysis	Vishala
16	500	Agril. Entomology, DSR	8-Jun-11	Evaluation of kharif germplasm for Stem borer resistance	Shyam Prasad
17	500	Agril. Entomology, DSR	8-Jun-11	Evaluation of kharif germplasm for Shoot fly resistance	Bhagwat
18	14	Agril. Entomology, DSR	8-Jun-11	Shoot fly resistance germplasm	Bhagwat
19	82	Plant Physiology - DSR	9-Jun-11	To evaluate for drought tolerance	SS Rao
20	53	Biochemistry - DSR	9-Jun-11	To study the sugar accumulation	Ratnavathi
21	78	Plant Breeding - DSR	14-Jun-11	Red grained mini-core collections for forage varietal development	Aruna
22	84	Plant Breeding - DSR	14-Jun-11	Sudan grass IS lines for forage varietal development	Aruna
23	116	Plant Breeding - DSR	14-Jun-11	FM lines from IGFRI for forage varietal development	Aruna
24	10	Plant Breeding - DSR	14-Jun-11	Pachcha jonna for forage improvement	Aruna
25	29	Plant Breeding - DSR	14-Jun-11	SPV lines fo forage improvement	Aruna
26	13	Plant Breeding - DSR	14-Jun-11	IS lines fo forage improvement	Aruna
27	10	Plant Breeding - DSR	14-Jun-11	Indegenous collections for forage improvement	Aruna
28	16	AICSIP - Akola	14-Jun-11	Pop sorghum	Desmukh
29	93	Agril. Entomology, DSR	21-Jun-11	Screening for grainmold tolerance	TGN Rao
30	100	AICSIP - Akola	24-Jun-11	Kharif landraces for evaluation of yield parameters	Ghorade
31	236	AICSIP - Akola	24-Jun-11	Mini-core collecions for evaluation of yield parameters	Ghorade
32	14	AICSIP - Akola	24-Jun-11	IS lines for evaluation of yield parameters	Ghorade
33	98	AICSIP - Pantnagar	8-Jul-11	Germplasm and genetic stocks	Shotria
34	100	AICSIP - Dharwad	8-Jul-11	Kharif landraces for evaluation of yield parameters	YD Narayana
35	236	AICSIP - Dharwad	8-Jul-11	Mini-core collecions for evaluation of yield parameters	YD Narayana
36	3	Agril. Entomology, DSR	8-Jul-11	IS lines	Subbarayudu
37	25	Agril. Entomology, DSR	18-Jul-11	Diverse races for screening for shoot fly	Padmaja
38	113	NRCDFP - NBPGR - New Delhi	25-Jul-11	Sorghum genetic stocks for DNA Finger Printing	OIC, NRCDFP
39	302	AICSIP - Dharwad	29-Jul-11	Screening for ergot tolerance	YD Narayana
40	137	Plant Breeding - DSR	16-Aug-11	Evaluation for Nutritional quality	Hariprasanna
41	2	Agril. Entomology, DSR	5-Sep-11	Screening for shoot fly resistance	Bhagwat
42	500	AICSIP - Tandur	3-Oct-11	Evaluate for essential traits	Sudhakar
43	500	AICSIP - Bijapur	5-Oct-11	Evaluate for essential traits	Biradar
44	500	AICSIP - Rahuri	9-Oct-11	Evaluate for essential traits	Gadakh
45	500	Agril. Entomology, DSR	11-Oct-11	Screening for shoot fly resistance	Bhagwat
46	53	Biochemistry - DSR	20-Oct-11	Screening for food quality	Ratnavathi
47	500	AICSIP - Tandur	22-Oct-11	Evaluate for essential traits	Sudhakar
48	117	Plant Breeding - DSR	24-Oct-11	IS lines and other rabi landraces	Sanjana
49	105	Plant Breeding - DSR	24-Oct-11	IS lines from ICRISAT for Sweet sorghum improvement	Umakanth
50	306	Plant Breeding - DSR	24-Oct-11	Selection and advancement of rabi F6s	Sanjana
51	306	AICSIP - Akola	28-Oct-11	Selection and advancement of rabi F6s	Ghorade
52	306	CRS - Solapur	28-Oct-11	Selection and advancement of rabi F6s	Prabhakar
53	10	Plant Breeding - DSR	27-Oct-11	Diverse races for screening for nutritional quality	Hariprasanna
54	843	Plant Breeding - DSR	3-Nov-11	Multiplication and evaluation	Sunil
55	142	AICSIP - Bijapur	3-Nov-11	Evaluation of Karnataka germplasm at Bijapur	Biradar
56	15	Plant Breeding - DSR	23-Nov-11	IS lnes for forage improvement	Aruna
57	24	Agril. Entomology, DSR	5-Dec-11	Screening for shoot pests	Shyam Prasad
58	35	Agril. Entomology, DSR	2-Dec-11	Screening for shoot pests	Padmaja
59	6	IIT - Chennai	22-Mar-12	Evaluation for Nutritional quality	Chandra
60	20	Agril. Entomology, DSR	26-Mar-12	Screening for shoot pests	Padmaja
	10001	TOTAL			