

Annual Progress Report: 2016-17

1. Breeding



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1. Breeding

Executive summary

During 2016-17, both basic and applied researches towards improvement of six small millet crops (finger millet, foxtail millet, kodo millet, little millet, barnyard millet and proso millet) were taken up.

- Applied researches dealt with multi-location yield trials. Basic and strategic researches focused on various aspects including development of high yielding varieties of all six millets with tolerance to diseases and insect-pests, etc.
- Zonal concept was adopted for evaluation of entries only in finger millet along with national, zonal check and local checks. Accordingly, North zone and Southern zones were formulated on trial basis for 2016-17.
- Against a total allocation of 108 trials, comprising six millet crops, to various centres all over India, 92 trials were conducted and the overall success was 81.14 %.

I. Multi-location trials

1. **Finger millet Initial varietal Trial- South zone:** Twelve entries along with six checks were evaluated across 12 centres spread over six finger millet growing states.
 - In the early maturity group, the entries BR 14-3 and VL-503 were inferior to grain and fodder yield against check VL-352. But, entry BR 14-3 was superior by 33.70 % over the check VR-708.
 - In medium maturity group, the entry PR 10-35 was significantly superior to GPU-45 and gave 22.92% more grain and 2.48% more fodder yield than the best check GPU-45.
 - In long duration group, the entry KOPN-942 gave 12.62% more grain yield than the check VR-936, but gave less grain and fodder yield over the best check GPU-67.
2. **Finger millet Initial Varietal Trial- North zone:** Twelve entries along with six checks were evaluated across five centres spread over three finger millet growing states.
 - The variety DHFM 78-33 ranked first in the trial and it was on par with the best check VR -708 and was significantly superior to check GPU-67.
 - The entries DHFM 78-33, KOPN-942 and BR-14-3 exhibited more than 20% grain yield over checks VR-936, GPU-67, VL-352, PR-202 and GPU-45.
 - The entry KMR-630 showed more grain yield from 10.65% to 34.30% over checks except VR-708.
3. **Finger millet Advanced Varietal Trial- Early and Medium (AVT I & II) duration: South zone:** In this trial two entries including three checks were evaluated across 13 centres spread over six finger millet growing states.
 - The entries VL-386 and VL-379 gave more than 10% less fodder yield than the best check GPU-45. However, the entry VL-386 gave more than 10% more grain yield than the checks VR-708 and VL-352 and VL-379 over VR-708.
 - The varietal performance of varieties over three years of testing indicated that VL-379 was 10.5% superior in grain yield over the best check, but it was on par with the check in fodder yield.
 - In two years performance of varieties, the variety VL-386 gave 7.0% more grain yield than the best check, but, it was on par with the check for fodder yield
4. **Finger millet Advanced Varietal Trial- Early and Medium (AVT I & II) duration : North zone:** In this trial two entries including three checks were evaluated across eight centres spread over four Finger millet growing states.
 - The varieties VL-379 and VL-386 were significantly superior to the checks GPU-45 and VR-708.

- The entries VL-386 and VL-379 gave less fodder yield (-2.70 to -16.07%) than the best check VL-352. However, the entry VL-379 was superior by 12.61 to 40.63% and entry VL 386 by 6.92 to 33.52% over checks for grain yield.

5. Foxtail millet advanced varietal Trial (FAVT): Twelve entries including two checks were evaluated across 10 centres spread over four foxtail millet growing states.

- None of the entries were significantly superior to the best check SiA 3156. For grain yield, the entries SiA 3164, DHFTMV-2-5, DHFT 5-6, DGHT 77-3 and SiA 3179 were superior from 5.70 to 16.12%.
- The varietal performance of foxtail varieties over 3 years of testing indicated that the variety DHFTMV 2-5 gave 11.39% more fodder yield than the best check SiA 326. Over 2 years performance of varieties, the variety DHFT 5-6 gave 7.23% more fodder yield than the best check SiA 326..

6. Kodo Millet Advanced Varietal Trial (KAVT): In this trial nine entries including three checks were evaluated across eight centers, distributed over seven Kodo millet growing states.

- For grain yield, three Kodo millet varieties namely BK-48, TNPSC-176 and BK -36 gave more than 20% yield and were significantly superior to all the 3 checks (TNAU-86, GPUK-3 and RK- 390- 25).
- Three varieties TNPSC-176, BK-48 and DPS-118 were superior by 8.55 to 17.41% for fodder yield.

7. Little millet Advanced Varietal Trial (LAVT): Eleven entries including three checks were evaluated across 10 centres spread over eight little millet growing states.

- None of the varieties were significantly superior to checks and gave less fodder yield than check OLM-203.
- The entries, DHLT 28-4, TNPSU 171, KOPLM 53, WV 126 and DLM 95 were on par with the check BL-6 for grain yield and were superior by 5.98 to 15.77% over OLM-203 and from 19.27 to 30.28% over JK-8.

8. Barnyard millet Advanced Varietal Trial (BAVT): Eight entries including two checks were evaluated across seven centres spread over four Barnyard millet growing states.

- The entry DHB 23-3 was superior by 13.51% over VL-172 and 14.80% over VL-207 for grain yield and it gave 22.85% more fodder yield than the best check VL-207.
- The varietal performance of barnyard millet varieties over 3 and 2 years of testing indicated that the entry DHB 23-3 was superior to checks for both grain and fodder yields. It was superior by 9.16% for grain yield and 24.67 % for fodder yield.
- In two years performance, the variety VL-249 gave 7.09 % more grain yield than the check VL-172.

9. Proso millet Advanced Varietal Trial (PAVT): In this trial seven entries including three checks were evaluated across five centres spread over three Proso millet growing states.

- The entry TNPM-238 was superior by 4.25 to 14.06% over checks for grain yield and it gave 6.88% more fodder yield than the best check GPU-21, where as the entry DHP 2181 gave 1.81 to 11.39% more grain yield over checks and 13.78% more fodder yield than the best check.
- The varietal performance of Proso millet varieties over three years of testing indicated that the entry DHP 2181 was 9.95% more superior to the check GPUP-21, but none of the entries were superior to checks over three years for fodder yield.
- For fodder yield, the variety TNPM-231 was the top yielder in the trial and it was significantly superior to checks TNAU-151. All other entries were on par with the checks.

II. Sharing of breeding materials: The segregating breeding materials of little millet developed at Project Coordinating Unit, Bengaluru were shared among centres. Thirteen entries along with two checks were evaluated across five centres of little millet growing states.

- For grain yield, the entries namely, 485, 115, 148, 74, 60 and 512 were significantly superior over early check JK 8. The entry 148 was the top yielder with 1690 kg/ha.
- The entries namely, 114, 148, and 512 were significantly superior over early check JK 8 for fodder yield. The entry 114 was the top yielder with 10093 kg/ha.

III. Germplasm Conservation: Project Coordinating Unit, AICRP on Small Millets, Bengaluru is a National Active Germplasm Site. Project Coordinating Unit has maintained 4448, 1410, 965, 1002, 611 and 1747 of finger millet, kodo millet, barnyard millet, little millet, proso millet and foxtail millet accessions respectively. Till now, about 1133 accessions of different millets have been supplied to needy researchers.

IV. Breeder seed production: During the year, the indent of 25.58 quintals of breeder seed was made by DAC, Government of India for all the six crops of small millets. Against the indent, breeder seed allocation of 51.16q was made for production across 12 centres in 9 states. Accordingly, the total production of breeder seed was 105.90q and it is 206.99 % more than the allocation. A surplus breeder seed of 80.32q has been produced.

Detailed report

During 2016-17, both basic and applied researches towards improvement of six small millet crops namely Finger millet, Foxtail millet, Kodo millet, Little millet, Barnyard millet and proso millet were taken up. Applied researches dealt with multi-location yield trials of finished or near finished products (varieties) from the centers of All India Coordinated Research Project on Small Millets (AICRP-SM). Basic and strategic researches focused on various aspects including development of high yielding varieties of six millets with tolerance to diseases and insect-pests, etc.

In line with the recommendations of the previous workshop held at RARS, Tirupati on 17-19, April 2017, the zonal concept was adopted for evaluation of entries during kharif 2016 only in finger millet along with national, zonal check and local checks. Accordingly, two zones i.e. North zone and Southern zones were formulated on trial basis for 2016-17. The trials were spread over 13 locations in finger millet growing area of six states in southern zone and 8 locations in 4 states of Northern zone of India as below.

New Zones for evaluation of Finger millet varieties

South Zone				North Zone			
S. No.	States	No. of centres	Centres	S. No.	States	No. of centres	Centres
1	Andhra Pradesh	3	Vizianagaram, Chintapalle, Perumallapalle	1	Bihar	1	Dholi
2	Chattisgarh	1	Jagdalpur	2	Jharkhand	1	Ranchi
3	Gujarat	2	Dahod, Waghai	3	Madhya Pradesh	2	Dindori, Rewa
4	Karnataka	3	Bangalore, Mandya, Hanumanamatti	4	Uttarakhand	4	Almora, Gaja Majhera, Ranichauri
5	Maharashtra	3	Dapoli, Kolhapur, Berhampur				
6	Tamil nadu	1	Athiyandal				
	Total	13			Total	8	

For other crops (Kodo millet, Barnyard millet, Foxtail millet, Little millet and Proso millet), the existing system of evaluation of entries across locations on All India basis continued this year also.

I. Multi-location trials

During the year 2016-17, a total of nine multi-location yields trials of six millets were conducted across locations. The number of entries and checks, locations and states covered are as below.

Coordinated Breeding trials: Kharif 2016

S. No.	Name of trial	No. of entries	No of Checks	No. of locations	No. of states covered
1	Finger millet Initial Varietal Trial –South Zone (FM-IVT I & II-SZ)	13	6	12	6
2	Finger millet Initial Varietal Trial –North Zone (FM-IVT I & II-NZ)	13	6	5	3
3	Finger millet Advanced Varietal Trial –South Zone, (FM- AVT I & II-NZ)	2	3	13	6
4	Finger millet Advanced Varietal Trial –North Zone , (FM -AVT I & II-NZ)	2	3	8	4
5	Foxtail millet Advanced Varietal Trial (FAVT)	12	2	10	4
6	Kodo millet Advanced Varietal Trial (KAVT)	9	3	8	7
7	Little millet Advanced Varietal Trial (LAVT)	11	3	10	8
8	Barnyard millet Advanced Varietal Trial (BAVT)	8	2	7	4
9	Proso millet Advanced Varietal Trial (PAVT)	7	3	4	2

Against a total allocation of 108 trials, comprising six millet crops, to various centres all over India, 92 trials were conducted and the overall success was 81.14 %. The percent success ranged from 68.75% in foxtail millet to 92.0% in finger millet. Forty six trials were conducted against allocation of 50 trials in finger millet and 5 out of 7 trials in proso millet in kharif 2016.

Trials assigned, conducted and percent success

S. No.	Crop	Trial assigned	Trial conducted	% Success
1	Finger millet	50	46	92.00
2	Foxtail millet	16	11	68.75
3	Kodo millet	10	8	80.00
4	Little millet	14	13	92.86
5	Barnyard millet	11	9	81.82
6	Proso millet	7	5	71.43
	Total	108	92	81.14

1. Finger millet Initial Varietal Trial- South zone

In this trial 12 entries along with six checks (VR-936, GPU-67, VL-352, PR-202, GPU-45 and VR-708) were evaluated across 12 centres spread over six finger millet growing states for grain and fodder yield and other agronomic traits (Table 1, 1a, 1b,1c,1d and Tables from 1.1 to 1.8).

- Days to 50 % flowering and maturity: The entries took 65 to 91 days for days to 50% flowering and 98 to 124 days for days to maturity. The early checks flowered and matured earlier than the new entries.
- Plant height: Plant height ranged from 84 to 112 cm.
- Grain Yield: In the early maturity group, the entries BR 14-3 and VL-503 were inferior to grain and fodder yield against check VL-352. However, the entry BR 14-3 was superior by 33.70 % over the check VR-708. The entry PR 10-35 (3384 kg/ha) was significantly superior to checks GPU-45 in medium maturity group. However, entry KMR-630 (2842 kg/ha) was on par with check GPU-45. In long duration group, KOPN-942 and GPU-94 were on par with checks GPU-67 and VR-936.
- Fodder yield: In the early maturity group, the both the entries BR 14-3 and VL-503 were inferior to fodder yield against the best check VL-352. The entry KMR-630 and VL-387 were inferior to fodder yield over the best check. In long duration group, the entry KOPN-942 gave 12.62% more grain yield than the check VR-936, but gave less grain and fodder yield over the best check GPU-67. Other varieties on par with the checks were KOPM-942, GPU-94, KRI-1009-04 and GPU-93.

Remarks: The entries PR 10-35 and KOPN-942 in long duration performed better for grain and fodder yields.

Table 1: Summary Performance of varieties in Finger millet Initial Varietal Trial in South Zone: Kharif 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers	No. of fingers/ear
		Average	R	Average	R	Average	Average	Average	Average	Average
1	GPU 94	2875	7	8853	6	87	122	105	6	6
2	VL 387	2767	11	6734	18	76	111	88	6	7
4	TNEC-1281	2310	17	7333	14	84	119	107	5	6
6	VR 1094	2615	15	7434	13	81	113	102	6	7
7	BR 14-3	2825	9	7268	15	71	106	94	8	8
9	GPU 93	2664	13	8290	10	89	122	97	6	6
10	DHFM 78-33	2638	14	8032	11	91	124	90	7	6
11	KOPM 942	3123	5	9090	5	87	119	98	7	7
12	KRI-009-04	2534	16	8331	9	86	117	94	7	7
14	VL 503	2137	18	6941	17	71	105	112	6	6
16	PR 10-35	3384	2	9979	1	80	114	109	7	7
17	KMR 630	2842	8	7206	16	83	116	111	7	7
3	VR 936 (Check)	2773	10	9165	4	87	120	104	7	7
5	GPU 67 (Check)	3490	1	9559	3	86	119	98	7	7
8	VL 352 (Check)	2882	6	7597	12	68	104	84	7	7
13	PR 202 (Check)	3349	3	9737	2	84	98	104	7	6
15	VR 708 (Check)	2113	19	5631	19	65	116	103	6	7
18	GPU 45	2753	12	8455	8	80	112	103	6	7

	(Check)									
19	Local check	3227	4	8490	7	84	118	110	8	7
	Zonal Mean	2805		8112		81	115	101	7	7
	C.D. (5%)	392		1380		5	5	6	1	1
	C.D. (1%)	517		1822		6	6	7	1	1
	C.V. (%)	17.36		19.27		7.85	5.16	7.18	8.17	10.78
	P-value		-		-	0	0	0		0

Comparative performance of entries: In the early maturity group, the both the entries were inferior to grain and fodder yield against check VL-352. However, the entry BR 14-3 was superior by 33.70 % over the check VR-708. In medium maturity group, the entry PR 10-35 was significantly superior to GPU-45 and gave 22.92% more grain and 2.48% more fodder yield than the best check GPU-45. The entry KMR-630 and VL-387 were inferior to fodder yield over the best check. In long duration group, the entry KOPN-942 gave 12.62% more grain yield than the check VR-936, but gave less grain and fodder yield over the best check GPU-67 (Tables 1a, 1b, 1c).

Table 1a: Comparative performance of entries over checks in Finger millet Initial Varietal Trial-Early group

S. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield		Fodder yield (kg/ha)	% increase/ decrease over best check VL-352	Neck Blast (%)	Finger Blast (%)
			VL-352	VR-708				
1	BR 14-3	2825	-1.98	33.70	7268	-4.33	9	9
2	VL 503	2137	-26.05	0.85	6941	-8.63	20	26
3	VR 708 (Check)	2113	-26.68	0	5631		27	23
4	VL 352 (Check)	2882	0	36.39	7597		21	20

Table 1b: Comparative performance of entries in Finger millet Initial Varietal Trial-Medium duration

S. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield		Fodder yield (kg/ha)	% increase/ decrease over best check PR-202	Neck Blast (%)	Finger Blast (%)
			PR-202	GPU-45				
1	PR 10-35	3384	1.04	22.92	9979	2.48	12	18
2	KMR 630	2842	-15.13	3.23	7206	-26.0	10	16
3	VL 387	2767	-17.38	0.50	6734	-30.84	14	17
4	VR 1094	2615	-21.91	-5.01	7434	-23.65	15	14
5	PR 202 (Check)	3349	0	21.65	9737	0	17	16
6	GPU 45 (Check)	2753	-17.80	0	8455	-13.16	14	14

Table 1c: Comparative performance of entries in Finger millet Initial Varietal Trial-Long duration

Sl. No.	Entries	Mean grain	% Increase / decrease over	Fodder yield	% increase/de	Neck Blast	Finger Blast
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		yield (kg/ha)	checks for grain yield		(kg/ha)	crease over best check GPU-67	(%)	(%)
			VR-936	GPU-67				
1	KOPN 942	3123	12.62	-10.52	9090	-4.90	12	16
2	GPU 94	2875	3.68	-17.62	8853	-7.38	9	12
3	GPU 93	2664	-3.93	-23.67	8290	-13.27	7	11
4	DHFM 78-33	2638	-4.87	-24.41	8032	-15.97	8	10
5	KRI-009-04	2534	-8.62	-27.39	8331	-12.84	12	18
6	TNEC 1281	2310	-16.70	-33.81	7833	-23.28	18	16
7	GPU 67 (Check)	3490	25.86	0.00	9559		11	11
8	VR 936 (Check)	2773	0.00	-20.54	9165		10	15

Table 1d: Pedigree details of varieties evaluated Finger millet Initial Varietal Trial: Kharif 2016

S. No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	GPU 94	IVT 1	BLR	Bengaluru	1 st year	GPU 67 X GPU 28
2	VL 387	IVT 2	ALM	Almora	1 st year	VL 324 x L540
3	VR 936 (Check)	IVT 3	VIZ	Vizianagaram	Check	IE 2695 x Godavari (PR-202)
4	TNEC-1281	IVT 4	COI	Coimbatore	1 st year	Selection from TNAU 900
5	GPU 67 (Check)	IVT 5	BLR	Bengaluru	Check	Selection from GE 5331
6	VR 1094	IVT 6	VIZ	Vizianagaram	1 st year	GE 3076 x VR 855
7	BR 14-3	IVT 7		Jagdalpur	1 st year	VR 708 x GPU 48
8	VL 352 (Check)	IVT 8	ALM	Almora	Check	VR 708 x VL 149
9	GPU 93	IVT 9	BLR	Bengaluru	1 st year	GPU 67 X GPU 28
10	DHFM 78-33	IVT 10	HAN	Hanumanamatti	1 st year	GE 1130 x GPU 28
11	KOPM 942	IVT 11	KOL	Kolhapur	1 st year	Selection from IEC 190
12	KRI-009-04	IVT 12		Paiyur	1 st year	Co-12 x TNAU 946
13	PR 202 (Check)	IVT 13	PED	Peddapuram	Check	Pure line selection from Mettachodi ragi of Arakku valley
14	VL 503	IVT 14	ALM	Almora	1 st year	WR 2 x VL 201
15	VR 708 (Check)	IVT 15	VIZ	Vizianagaram	Check	Pure line selection from VMEC-36 (Selection from Komatipalli local)
16	PR 10-35	IVT 16		Peddapuram	1 st year	GE 4971 x GPU 26
17	KMR 630	IVT 17	MAN	Mandya	1 st year	PR 202 x GE 1409
18	GPU 45*	IVT 18	BLR	Bengaluru	Check	GPU 26 x L5
19	Local check	Local				

2. Finger millet Initial varietal Trial- North zone

In this trial 12 entries along with six checks (VR-936, GPU-67, VL-352, PR-202, GPU-45 and VR-708) were evaluated across five centres spread over three finger millet growing states for grain and fodder yield and other agronomic traits (Table 2, 2a and Tables from 2.1 to 2.8).

- Days to 50 % flowering and maturity: The entries took 72 to 97 days for days to 50% flowering and 112 to 138 days for days to maturity. As the entries took more days to flower and mature, they were not grouped as early, medium and late groups.
- Plant height: Plant height ranged from 88 to 117 cm.
- Grain Yield: The variety DHFM 78-33 (2561 kg/ha) ranked first in the trial and it was on par with the best check VR -708 and was significantly superior to check GPU-67. The entries KOPN-942, BR-14-3, VL-387, KMR-630 and PR 10-35 were on par with other checks. As the entries took more days to flower and mature, they were not grouped as early, medium and late groups and compared accordingly as one group.
- Fodder yield: The check PR-202 gave the highest yield of 13743 kg/ha in the trial. Among the entries, BR-14-3, VL-387, DHFM 78-33, VL-503, PR 10-35, TNEC-1281, VR-1094, KMR-630 and GPU-93 were on par with checks.

Remarks: The entry DHFM 78-33 performed better both for grain and fodder yield.

Table 2: Summary Performance of varieties in Finger millet Initial Varietal Trial in North Zone: Kharif 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers	No. of fingers/ear
		Average	R	Average	R	Average	Average	Average	Average	Average
1	GPU 94	2088	10	10424	18	93	132	102	4	6
2	VL 387	2440	5	12339	6	80	122	91	3	8
3	TNEC-1281	2087	11	11759	10	92	130	107	4	7
4	VR 1094	1813	18	11637	12	84	125	105	3	7
5	BR 14-3	2450	4	12640	4	91	132	95	3	7
6	GPU 93	2228	9	11219	14	84	123	97	4	7
7	DHFM 78-33	2561	1	11971	8	78	118	94	3	8
8	KOPM 942	2466	3	10770	17	74	115	101	4	7
9	KRI-009-04	1829	17	10943	16	95	134	95	3	7
10	VL 503	2021	15	11863	9	97	138	119	4	7
11	PR 10-35	2248	8	11658	11	85	128	109	3	7
12	KMR 630	2265	7	11629	13	88	129	117	3	7
13	VR 936 (Check)	2047	13	12667	3	91	129	105	3	6
14	GPU 67 (Check)	1659	19	10409	19	66	116	100	3	5
15	VL 352 (Check)	2028	14	11208	15	72	112	88	3	7
16	PR 202 (Check)	1957	16	13743	1	89	129	109	4	7
17	VR 708 (Check)	2550	2	12291	7	87	128	107	3	8
18	GPU 45	2080	12	12387	5	86	129	106	3	7

	(Check)									
19	Local check	2434	6	12792	2	73	113	97	4	7
	Zonal Mean	2171		11808		84	125	102	3	7
	C.D. (5%)	761		2860		10	10	9	1	1
	C.D. (1%)	1010		3788		13	13	12	1	2
	C.V. (%)	27.81		21.11		10.17	6.95	7.51	13	15
	P-value	0.519		0.778		0	0	0	0	0

Comparative performance of entries: As the entries took more days to flower and mature, they were not grouped as early, medium and late groups and compared accordingly as one group. The entries DHFM 78-33, KOPN-942 and BR-14-3 exhibited more than 20% grain yield over checks VR-936, GPU-67, VL-352, PR-202 and GPU-45. The entry KMR-630 showed more grain yield from 8.89 to 34.30% over checks except VR-708. But all the entries exhibited less fodder yield than the best check PR-202 (Table 2a).

Table 2a: Comparative performance of entries in Finger millet Initial Varietal Trial: North zone

Sl. No.	Entries	Grain yield (kg/ha)	% Increase / decrease over checks for grain yield						Neck Blast (%)	Finger Blast (%)
			VR-936	GPU-67	VL-352	PR-202	VR -708	GPU -45		
1	DHFM 78-33	2561	25.11	54.37	26.28	30.86	0.43	23.13	8	10
2	KOPM 942	2466	22.02	47.08	21.60	26.01	-3.29	18.56	12	16
3	BR 14-3	2450	19.69	46.71	20.81	25.19	-3.92	17.79	9	9
4	VL 387	2440	19.20	36.53	20.32	24.68	-4.31	17.31	14	17
5	KMR 630	2265	10.65	34.30	11.69	15.74	-11.18	8.89	10	16
6	PR 10-35	2248	3.54	25.86	10.85	14.87	-11.84	8.08	12	18
7	GPU 93	2228	8.84	25.80	9.86	13.85	-12.63	7.12	7	11
8	GPU 94	2088	2.00	25.38	2.96	6.69	-18.12	0.38	9	12
9	TNEC-1281	2087	1.95	23.39	2.91	6.64	-18.16	0.34	18	16
10	VL 503	2021	-1.27	17.96	-0.35	3.27	-20.75	-2.84	20	26
11	KRI-009-04	1829	-10.65	9.28	-9.81	-6.54	-28.27	-12.07	12	18
12	VR 1094	1813	-11.43	9.28	-10.60	-7.36	-28.90	-12.84	15	14
13	GPU 67 (Check)	1659	-18.95	0.00	-18.20	-15.23	-34.94	-20.24	11	11
14	VR 708(Check)	2550	24.57	53.71	25.74	30.30	0.00	22.60	27	23
15	GPU 45 (Check)	2080	1.61	22.24	2.56	6.29	-18.43	0.00	14	14
16	VR 936 (Check)	2047	0.00	23.39	0.94	4.60	-19.73	-1.59	10	15
17	VL 352 (Check)	2028	-0.93	21.82	0.00	3.63	-20.47	-2.50	21	30
18	PR 202 (Check)	1957	-4.40	10.25	-3.50	0.00	-23.25	-5.91	17	16

3. Finger millet Advanced Varietal Trial- Early & Medium (AVT I & II) duration: South zone

In this trial two entries including three checks VR-708, GPU-45 and VL-352 were evaluated across 13 centres spread over six finger millet growing states for grain and fodder yield and other agronomic traits (Table 3, 3a, 3b, 3d and Tables 3.1 to 3.8).

- Days to 50 % flowering and maturity: The entries took 67 to 81 days for days to 50 % flowering and 98 to 115 days for maturity.
- Plant height: Plant height ranged from 93 to 104 cm.
- Grain Yield: None of the entries were significantly superior to the checks. The two entries VL-386 and VL-379 were on par with checks.
- Fodder yield: The check GPU-45 was the top yielder with 8064 kg/ha. The two varieties VL-386 and VL-379 were on par with check GPU-45.

Remarks: The check GPU-45 stood first rank both for grain and fodder yields. However the new entries VL-386 and VL-379 were on par with the best check GPU-45.

Table 3: Summary Performance of varieties in Finger millet Advanced Varietal Trial in South Zone: 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers	No. of fingers/ear
		Average	R	Average	R	Average	Average	Average	Average	Average
1	VL 386	2983	3	7084	4	72	107	93	3	7
2	VL 379	2940	4	7201	3	71	105	93	3	7
3	VR 708 (Check)	2453	6	6795	5	62	98	86	3	6
4	GPU 45 (Check)	3103	1	8064	1	77	112	99	3	6
5	VL 352 (Check)	2708	5	5170	6	67	101	99	3	7
6	Local check	3091	2	7771	2	81	115	104	3	7
	Zonal Mean	2880		7014		72	106	96	3	7
	C.D. (5%)	380		1682		5	5	5	1	1
	C.D. (1%)	505		2242		6	6	7	1	1
	C.V. (%)	16.11		26.75		8.42	5.41	7.04	19.1	13.7
	P-value	0.007		0.008		0	0	0		0.05

Comparative performance of entries: The entries VL-386 and VL-379 gave 10% less fodder yield than the best check GPU-45. However, the entry VL-386 gave more than 10% more grain yield than the checks VR-708 and VL-352 and VL-379 over VR-708 by 19.85% (Table 3a).

Table 3a: Comparative performance of entries in Finger millet Advanced Varietal Trial (AVT I &II) Early and Medium duration: South zone

Sl. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield			Fodder yield (kg/ha)	% increase/decrease over best check GPU-45	Neck Blast (%)	Finger Blast (%)
			VR-708	GPU-45	VL 352				
1	VL 386	2983	21.60	-3.86	10.15	7084	-12.15	11	10
2	VL-379	2940	19.85	-5.25	8.56	7201	-10.70	8	9
3	GPU-45 (Check)	3103	26.49	0.00	14.58	8064	-	5	6
4	VL-352 (Check)	2708	10.39	-12.72	0.00	5170	-	14	10
5	VR-708 (Check)	2453	0.00	-20.94	-9.41	6795	-	21	22
	Zonal Mean	2837				6862			

Performance of entries over three and two years in Finger millet Advanced Varietal Trial (AVT I & II): The varietal performance of Finger millet varieties over three years of testing indicated that VL-379 was 10.5% superior in grain yield over the best check, but it was on par with the check in fodder yield. In two years performance of varieties, the variety VL-386 gave 7.0% more grain yield than the best check, but, it was on par with the check for fodder yield (Table 3b, 3c). Comparison is made over 3 and 2 years based on the national means as there were no zones earlier.

Table 3b: Performance of entries over three years in Finger millet Advanced Varietal Trial (AVT I & II)

Sl. No.	Name of entry	Grain yield (kg/ha)			India Mean	% over best check	Fodder yield (kg/ha)			India Mean	% over best check
		2014-15	2015-16	2016-17			2014-15	2015-16	2016-17		
1	VL 379	3158	2866	3482	3169	10.5	7600	6300	11678	8526	-8.2
2	VL 352*	2763	2751	3092	2869		6600	6600	12003	8401	
3	GPU 45*	2691	2798	2772	2754		8500	7400	11951	9284	
4	VR 708*	2545	2238	2476	2420		5600	6200	9330	7043	

Table 3c: Performance of entries over two years in Finger millet Advanced Varietal Trial (AVT I & II)

Sl. No.	Name of entry	Grain yield (Kg/ha)		Mean	% over best check	Fodder yield (Kg/ha)		Mean	% over best check
		2015-16	2016-17			2015-16	2016-17		
1	VL 386	2991	3306	3145	7.0	6800	8579	7689	-8.3
2	VL 352 (Check)	2751	3092	2900		6600	10034	8317	
3	GPU	2798	2772	2938		7400	9373	8387	

	45(Check)								
4	VR 708(Check)	2238	2476	2465		6200	7250	6725	

Table 3d: Pedigree details of varieties evaluated Finger millet Advanced Varietal Trial I & II: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	VR 708 (Check)	AVT I & II 1	VIZ	Vizianagaram	Check	Selection from VMEC 36
2	VL 386	AVT I & II 2	ALM	Almora	2 nd year	GEC 440 x VL 149
3	GPU 45(Check)	AVT I & II 3	BLR	Bengaluru	Check	GPU 26 x L5
4	VL 379	AVT I & II 4	ALM	Almora	3 rd year	GECH 440 x VL 149
5	VL 352 (Check)	AVT I & II 5	ALM	Almora	Check	VR 708 x VL 149
6	Local check	Local				

4. Finger millet Advanced varietal Trial- Early & Medium (AVT I & II) duration: North zone

In this trial two entries including three checks VR-708, GPU-45 and VL-352 were evaluated across eight centres spread over four Finger millet growing states for grain and fodder yield and other agronomic traits (Table 4, 4a and Tables from 4.1 to 4.8).

- Days to 50 % flowering and maturity: The entries took 63 to 80 days for days to 50% flowering and 108 to 117 days for maturity.
- Plant height: Plant height ranged from 93 to 104 cm.
- Grain Yield: The varieties VL-379 (3482 kg/ha) and VL-386 (3306 kg/ha) were significantly superior to the checks GPU-45 (2772 kg/ha) and VR-708 (2476 kg/ha), but they were on par with the best check VL-352 (3092 kg/ha).
- Fodder yield: The varieties VL-379 and VL-386 were on par with the checks GPU-45 and VL-352.

Remarks: The varieties VL-379 and VL-386 were significantly superior to the checks GPU-45 and VR-708 for grain yield and they were on par with checks for fodder yield.

Table 4: Summary performance of varieties in Finger millet Advanced Varietal Trial in North Zone: Kharif 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers	No. of fingers/ear
		Average	R	Average	R					
1	VL 386	3306	2	10073	5	73	110	97	3	9
2	VL 379	3482	1	11678	4	72	111	101	3	9
3	VR 708 (Check)	2476	6	9330	6	63	104	93	3	7
4	GPU 45 (Check)	2772	5	11951	3	80	117	102	4	7
5	VL 352	3092	4	12003	2	66	108	104	3	8

	(Check)									
6	Local check	3113	3	12514	1	70	108	102	3	8
	Zonal Mean	3040		11258		71	110	100	3	8
	C.D. (5%)	453		2703		5	5	7	1	1
	C.D. (1%)	608		3640		7	6	9	1	1
	C.V. (%)	14.7		26.23		7.36	4.54	7.29	23.54	12.71
	P-value	0.001		0.845		0	0	0.03	0.268	0.003

Comparative performance of entries: The entries VL-386 and VL-379 gave less fodder yield (-2.70 to -16.07%) than the best check VL-352. However, the entry VL-379 was superior by 12.61 to 40.63% and entry VL 386 by 6.92 to 33.52% over checks for grain yield.(Table 4a).

Table 4a: Comparative performance of entries in Finger millet Advanced Varietal Trial (AVT I &II) Early and Medium duration: North zone

Sl. No	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield			Fodder yield (kg/ha)	% increase/decrease over best check VL-352	Neck Blast (%)	Finger Blast (%)
			VR-708	GPU-45	VL 352				
1	VL-379	3482	40.63	25.61	12.61	11678	-2.70	8	9
2	VL 386	3306	33.52	19.26	6.92	10073	-16.07	1	10
3	VL-352 (Check)	3092	24.87	11.54	0.00	12003		14	10
4	GPU-45 (Check)	2772	11.95	0.00	-10.34	11951		5	6
5	VR-708 (Check)	2476	0.00	-10.67	-19.92	9330		21	22
	Grand mean	3025				11007			

5. Foxtail millet Advanced Varietal Trial (FAVT)

In this trial 12 entries including two checks i.e. SiA-326 and SiA-3156 were evaluated across 10 centres spread over four foxtail millet growing states for grain and fodder yield and other agronomic traits (Table 5, 5a, 5b, 5c, 5d and Tables from 5.1 to 5.6).

- Days to 50 % flowering and maturity: The entries took 43 to 52 days for days to 50% flowering. All the entries matured within 75-85 days. Two entries i.e. RFM 68 and SiA 3159 matured in 75 days and four entries i.e. H-46, SiA 3164, SiA 3179 and SiA 326 matured in 82 days.
- Plant height: Plant height ranged from 79 (SiA 3159) to 119 cm (SiA 3164).
- Grain Yield: None of the entries were significantly superior to the best check SiA 3156. However, the varieties SiA 3164, DHFMV 2-5, DHFT 5-6, DHFT 77-3, SiA 3179 and SiA 3205 were on par with the check SiA 326.
- Fodder yield: None of the varieties were significantly superior to checks. However, the varieties DHFTMV 2-5, DHFT 5-6, DHFT 77-3, SiA 3164, SiA 3205 and SiA 3179 were on par with the best check SiA 326.

Remarks: The varieties namely DHFTMV 2-5, DHFT 5-6, DHFT 77-3, SiA 3164, SiA 3205 and SiA 3179 were on par with the best check SiA 3156 for grain and fodder yield.

Table 5: Summary performance of varieties in Foxtail millet Advanced Varietal Trial: Kharif 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers
		Average	R	Average	R	Average	Average	Average	Average
1	SiA 3205	2091	8	4564	6	49	83	117	3
2	RFM-68	1523	11	2942	12	41	75	84	2
3	DHFTMV 2-5	2254	3	5158	1	52	85	115	4
4	SiA 3163	1432	12	3153	11	44	78	97	2
5	DHFT 5-6	2232	4	5084	3	52	85	117	3
6	H-46	1703	10	3918	10	49	82	110	2
7	SiA 3164	2319	2	4803	5	49	82	119	3
8	SiA 3159	1289	13	2625	13	43	75	79	2
9	SiA 3179	2111	7	4431	8	48	82	114	3
10	DHFT 77-3	2196	5	4921	4	51	84	118	3
11	SiA 326 (Check)	1997	9	5110	2	49	82	118	3
12	SiA 3156 (Check)	2376	1	4389	9	48	81	115	3
13	Local check	2148	6	4529	7	49	80	114	4
	All India Mean	1966		4297		48	81	109	3
	C.D. (5%)	394		1135		3	4	8	1
	C.D. (1%)	522		1507		4	5	11	1
	C.V. (%)	22.7		23.71		7.86	5.23	8.79	19.46
	P-value	0		0		0	0	0	0

Comparative performance of entries: All the entries in the trial were inferior to the best check SiA 326 for fodder yield except DHFTMV 2-5 and inferior to grain yield against check SiA 3156. For grain yield, the entries SiA 3164, DHFTMV-2-5, DHFT 5-6, DHFT 77-3 and SiA 3179 were superior from 5.70 to 16.12% over SiA 326 (Table 5a).

Table 5a: Comparative performance of entries in Foxtail millet Advanced Varietal Trial (FAVT)

Sl. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield		Fodder yield (kg/ha)	% increase/ decrease over best check SiA 326
			SiA 326	SiA 3156		
1	SiA 3164	2319	16.12	-2.39	4803	-6.01
2	DHFTMV 2-5	2254	12.86	-5.13	5158	-0.94
3	DHFT 5-6	2232	11.16	-6.05	5084	-0.51
4	DHFT 77-3	2196	9.96	-7.57	4921	-3.70

5	SiA 3179	2111	5.70	-11.15	4431	-13.29
6	SiA 3205	2091	4.70	-11.99	4564	-10.68
7	H-46	1703	-14.72	-28.32	3918	-23.33
8	RFM 68	1523	-23.73	-35.90	2942	-42.43
9	SiA 3163	1432	-28.29	-39.73	3153	-38.30
10	SiA 3159	1289	-35.43	-45.74	2625	-48.63
11	SiA 3156(Check)	2376	16.97	0.00	4389	
12	SiA 326 (Check)	1997	0.00	-15.95	5110	
	All India Mean	1966			4297	

Performance of entries over three and two years in Foxtail millet Advanced Varietal Trials: The varietal performance of foxtail varieties over 3 and 2 years of testing indicated that none of the varieties were superior to checks over 3 and 2 years for grain yield. But, the variety DHFTMV 2-5 gave 11.39% more fodder yield than the best check SiA 326. Over 2 years performance of varieties, the variety DHFT 5-6 gave 7.23% more fodder yield than the best check SiA 326 (Table 5b, 5c).

Table 5b: Performance of entries over three years in Foxtail millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (kg/ha)				Mean	% over best check	Fodder yield (kg/ha)				Mean	% over best check
		2013-14	2014-15	2015-16	2016-17			2013-14	2014-15	2015-16	2016-17		
1	DHFTMV 2-5		2692	2294	2254	2413	-2.50		7300	6600	5158	6353	11.39
2	SiA 3163		2155	2128	1432	1905	-23.04		4000	580	3153	2578	-54.80
3	SiA 3164	2398	2616		2319	2444	-1.25	5200	570		4803	3524	-38.21
4	SiA 3159		1624	1686	1289	1533	-38.07		4100	4600	2625	3775	-33.81
5	SiA 3156 (Check)		2665	2385	2376	2475			6100	5700	4389	5396	
6	SiA 326 (Check)		2487	2217	1997	2234			6400	5600	5110	5703	

Table 5c: Performance of entries over two years in Foxtail millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (Kg/ha)		Mean	% over best check	Fodder yield (Kg/ha)		Mean	% over best check
		2015-16	2016-17			2015-16	2016-17		
1	SiA 3205	2563	2091	2327	-2.25	6400	4564	5482	2.37
2	DHFT 5-6	2507	2232	2370	-0.46	6400	5084	5742	7.23
3	SiA 3179	2459	2111	2285	-4.01	5500	4431	4966	-7.27
4	SiA 3156 (Check)	2385	2376	2381		5700	4389	5045	
5	SiA 326 (Check)	2217	1997	2107		5600	5110	5355	

Table 5d: Pedigree details of varieties evaluated Foxtail millet Advanced Varietal Trial: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	SiA 3205	FAVT 1	NAN	Nandyal	2 nd year	Selection from IC 308933
2	RFM-68	FAVT 2	REW	Rewa	1 st year	Selection from local

						germplasm no.68 of Dobhi Mandla Dist. Of M.P.
3	DHFTMV 2-5	FAVT 3	HAN	Hanumanamatti	3 rd year	CO 5 x PS 4
4	SiA 3163	FAVT 4	NAN	Nandyal	3 rd year	Srilakshmi x SiA 1482
5	DHFT 5-6	FAVT 5	HAN	Hanumanamatti	2 nd year	GPUS 26 x CO 7
6	SiA 326 (Check)	FAVT 6	NAN	Nandyal	Check	Pureline selection
7	H-46	FAVT 7	HAG	Hagari	1 st year	SiA 2644 x PS 4
8	SiA 3164	FAVT 8	NAN	Nandyal	3 rd year	SiA 2644 x SiA 1435
9	SiA 3159	FAVT 9	NAN	Nandyal	3 rd year	Srilakshmi x SiA 1378
10	SiA 3156 (Check)	FAVT 10	NAN	Nandyal	Check	Selection from SiA 2871
11	SiA 3179	FAVT 11	NAN	Nandyal	2 nd year	Srilakshmi x SiA 1378
12	DHFT 77-3	FAVT 12	HAN	Hanumanamatti	1 st year	GPUS 26 x CO 7
13	Local check	Local				

6. Kodo millet Advanced Varietal Trial (KAVT)

In this trial nine entries including three checks *i.e.* TNAU-86, GPUK-3 and RK- 390- 25 were evaluated across eight centers, distributed over seven Kodo millet growing states for grain and fodder yield and other agronomic traits (Table 6, 6a, 6b and Tables from 6.1 to 6.6).

- Days to 50 % flowering and maturity: The entries ranged for days to 50% flowering from 70 to 75 days and 99 to 112 days for maturity. The check variety RK 390-25 matures early by recording 99 days where as the entry TNPSC-176 found late maturing.
- Plant height and number of productive tillers: The range of plant height was from 63 to 75 cm and number of productive tillers ranged from 5 to 6 per plant.
- Grain Yield: Three Kodo millet entries namely BK-48 (3048 kg/ha), TNPSC-176 (2902 kg/ha) and BK -36 were significantly superior to all the 3 checks (TNAU-86, GPUK-3 and RK- 390- 25).
- Fodder yield: Four entries TNPSC-176 (8287 kg/ha), BK-48 (7942 kg/ha), DPS-118 (7662 kg/ha) and BK-36 (7339 kg/ha) were significantly superior to checks GPUK-3 and RK- 390- 25, but they were on par with the best check TNAU-86. .

Remarks: Three Kodo millet entries namely BK-48, TNPSC-176 and BK -36 were significantly superior to two checks (GPUK-3 and RK- 390- 25) for both grain and fodder yields, but all three entries were significantly superior for all the checks for grain yield.

Table 6: Summary performance of varieties in Kodo millet Advanced Varietal Trial: Kharif 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers
		Average	R	Average	R	Average	Average	Average	Average
1	BK-48	3048	1	7942	2	74	107	66	6.35
2	DPS-118	2287	8	7662	3	72	111	75	5.7
3	BK-36	2900	3	7339	4	74	110	63	5.99
4	RK-156	2328	7	5380	9	68	103	64	5.28

5	RK-64	2445	5	5709	7	66	103	66	5.56
6	TNPSC 176	2902	2	8287	1	75	112	66	6.05
7	RK 390-25 (Check)	2191	9	4952	10	63	99	63	5.26
8	GPUK-3 (Check)	2189	10	5436	8	68	105	66	5.85
9	TNAU 86 (Check)	2366	6	7058	5	70	104	65	5.81
10	Local check	2786	4	6451	6	68	102	67	6.15
	All India Mean	2537		6661		70	106	66	5.76
	C.D. (5%)	461		1485		4	5	4	0.64
	C.D. (1%)	613		1987		6	7	5	0.85
	C.V. (%)	18.3		17.9		5.9	5.1	6.2	11.09
	P-value	0		0		0	0	0	0.021

Comparative performance of entries: For grain yield, three Kodo millet varieties namely BK-48, TNPSC-176 and BK -36 gave more than 20% yield and were significantly superior to all the 3 checks (TNAU-86, GPUK-3 and RK-390- 25). Three varieties TNPSC-176, BK-48 and DPS-118 were superior by 17.41%, 12.94% and 8.55% for fodder yield, respectively (Table 6a).

Table 6a: Comparative performance of entries in Kodo millet Advanced Varietal Trial (KAVT)

Sl. No.	Entries	Grain yield (kg/ha)	% Increase / decrease over checks for grain yield			Fodder yield (kg/ha)	% increase /decrease over best check TNAU-86
			TNAU-86	GPUK-3	RK-390-25		
1	BK- 48	3048	28.49	39.24	39.11	7942	12.94
2	TNPSC-176	2902	22.65	32.57	32.17	8287	17.41
3	BK - 36	2900	22.56	32.48	32.35	7339	3.98
4	RK - 64	2445	3.33	11.69	11.59	5709	-19.11
5	RK- 156	2328	-1.60	6.34	6.25	5380	-23.77
6	DPS-118	2287	-3.33	4.47	4.38	7662	8.55
7	TNAU – 86 (Check)	2366	0.00	8.08	7.98	7058	
8	RK 390 -25 (Check)	2191	-7.39	0.09	0.00	4952	
9	GPUK-3 (Check)	2189	-7.48	0.00	-0.04	5436	
	All India Mean	2537				6661	

Table 6b: Pedigree details of varieties evaluated Kodo millet Advanced Varietal Trial: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	BK-48	KAVT 1	JAG	Jagdapur	1 st year	Mutant of TNAU 51

2	DPS-118	KAVT 2	DIN	Dindori	2 nd year	Local selection from Dhua Kheda, Snehapur block, Dindori
3	GPUK-3 (Check)	KAVT 3	BLR	Bengaluru	Check	Selection from germplasm GPLM 826
4	BK-36	KAVT 4	JAG	Jagdapur	1 st year	Mutant of CO-3
5	RK-156	KAVT 5	REW	Rewa	2 nd year	Selection from local germplasm number RPS 156 of Tihai Satna Dist, MP
6	RK 390-25 (Check)	KAVT 6	REW	Rewa	Check	Mutant of RK 390
7	RK-64	KAVT 7	REW	Rewa	1 st year	Selection from local germplasm number RPS 64 of Sindhi Dist, MP
8	TNAU 86 (Check)	KAVT 8	COI	Athiyandal	Check	Selection from Individual plant selection 85
9	TNPSC 176	KAVT 9	COI	Athiyandal	1 st year	Selection from DPS 63
10	Local check	Local				

7. Little millet Advanced Varietal Trial (LAVT)

In this trial 11 entries including three checks i.e BL 6, OLM 203 and JK-8 were evaluated across 10 centres spread over eight foxtail millet growing states for grain and fodder yield and other agronomic traits (Table 7, 7a, 7b, 7c, 7d and Tables from 7.1 to 7.6).

- Days to 50 % flowering and maturity: The entries took 40 to 81 days for days to 50% flowering. All the entries matured within 74 to 115 days.
- Plant height and number of productive tillers: Plant height ranged from 91 to 135 cm. Productive tillers per plant number ranged from 4 to 6.
- Grain Yield: None of the entries were significantly superior to the best check BL-6 (1694 kg/ha). However, the entries, DHLT 28-4, TNPSU 171, KOPLM 53, WV 126, DLM 95 and GPUL 2 were on par with the check BL-6.
- Fodder yield: None of the varieties were significantly superior to checks. The check variety OLM 203 (8193 kg/ha) was the top yielder. However, the varieties DHLT 28-4, TNPSU 171, KOPLM 53, WV 126, DLM 95 and GPUL 2 were on par with the best check OLM 203.

Remarks: The varieties namely DHLT 28-4, TNPSU 171, KOPLM 53, WV 126, DLM 95 and GPUL 2 were on par with the best check BL-6 for grain yield and OLM 203 for fodder yield.

Table 7: Summary performance of varieties in Little millet Advanced Varietal Trial: *Kharif* 2016

Sl. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers
		Average	R	Average	R	Average	Average	Average	Average
1	BL 150	1574	9	7840	3	60	93	121	5
2	TNPSU 174	1533	11	7360	5	57	89	120	5
3	RLM 238	1473	13	5919	13	41	77	88	6
4	KOPLM 53	1680	4	6750	12	73	106	123	4
5	GPUL 2	1603	7	7621	4	81	115	133	4

6	DHLtMV 14-1	1596	8	6970	10	63	94	130	5
7	TNPSU 171	1704	2	6839	11	55	90	126	5
8	WV 126	1661	5	7334	7	76	111	117	4
9	DLM 95	1646	6	8017	2	80	114	131	4
10	DHLT 28-4	1798	1	7345	6	60	93	123	5
11	GPUL 3	1511	12	6976	9	52	84	120	4
12	OLM 203 (Check)	1553	10	8193	1	73	106	135	4
13	BL 6 (Check)	1694	3	7259	8	59	94	128	5
14	JK 8 (Check)	1380	14	5639	14	40	74	91	6
	All India Mean	1600		7147		62	96	120	5
	C.D. (5%)	447		1677		7	8	14	1
	C.D. (1%)	591		2222		10	11	18	2
	C.V. (%)	31.52		22.75		13.21	8.55	12.75	31.65
	P-value	0.945		0.037		0		0	0.018

Comparative performance of entries: None of the varieties were significantly superior to checks and gave less fodder yield than the check OLM-203. However, the entries, DHLT 28-4, TNPSU 171, KOPLM 53, WV 126 and DLM 95 were on par with the check BL-6 for grain yield and were superior by 5.98 to 15.77% over OLM-203 and from 19.27 to 30.28% over JK-8 for grain yield (Table 7a).

Table 7a: Comparative performance of entries little millet Advanced Varietal Trial (LAVT)

Sl. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield			Fodder yield (kg/ha)	% increase/decrease over best check OLM 203
			OLM 203	BL 6	JK 8		
1	DHLT 28-4	1798	15.77	6.13	30.28	7345	-10.35
2	TNPSU 171	1704	9.72	0.59	23.47	6839	-16.52
3	KOPLM 53	1680	8.17	-0.82	21.73	6750	-17.61
4	WV 126	1661	6.95	-1.94	20.36	7334	-10.48
5	DLM 95	1646	5.98	-2.83	19.27	8017	-2.14
6	GPUL 2	1603	3.21	-5.37	16.15	7621	-6.98
7	DHLtMV 14-1	1596	2.76	-5.78	15.65	6970	-14.92
8	BL 150	1574	1.35	-7.08	14.05	7840	-4.30
9	TNPSU 174	1533	-1.28	-9.50	11.08	7360	-10.16
10	GPUL 3	1511	-2.70	-10.80	9.49	6976	-14.85
11	RLM 238	1473	-5.15	-13.04	6.73	5919	-27.75
12	BL 6 (check)	1694	9.07	0.00	22.75	7259	
13	OLM-203 (Check)	1553	0.00	-8.32	12.53	8193	
14	JK 8 (Check)	1380	-11.13	-18.53	0.00	5639	
	All India Mean	1600				7147	

Performance of entries over three and two years in Little millet Advanced Varietal Trials: The varietal performance of foxtail varieties over three and two years of testing indicated that none of the entries were superior to checks over 3 and 2 years for grain and fodder yield.

Table 7b: Performance of entries over three years in Little millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (kg/ha)				Mean	% over best check	Fodder yield (kg/ha)				Mean	% over best check
		2013-14	2014-15	2015-16	2016-17			2013-14	2014-15	2015-16	2016-17		
1	BL 150		1767	1598	1574	1646	2.03		6700	6100	7840	6880	-2.13
2	TNPSU 174		1563	1519	1533	1538	-4.66		6200	6200	7360	6587	-6.30
3	KOPLM 53		1726	1561	1680	1656	2.61		6200	4900	6750	5950	-15.36
4	GPUL 2		1623	1609	1603	1612	-0.11		6400	5900	7621	6640	-5.54
5	DHLTMV 14-1	1452		1721	1596	1659	2.79	5400		6100	6970	6157	-12.42
6	TNPSU 171		1562	1472	1704	1579	-2.12		6700	6300	6839	6613	-5.93
7	BL 6 (Check)		1533		1694	1614			6800		7259	7030	
8	OLM 203 (Check)		1516	1385	1553	1485			6000	6700	8193	6964	
9	JK 8 (Check)		1590	1170	1380	1380			5200	4700	5639	5180	

Table 7c: Performance of entries over two years in Little millet Advanced Varietal Trial

Sl. No.	Name of entry	Centre	Grain yield (Kg/ha)			Mean	% over best check	Fodder yield (Kg/ha)			Mean	% over best check
			2014-15	2015-16	2016-17			2014-15	2015-16	2016-17		
1	DLM 95	Dindori		1596	1646	1621	0.46		6200	8017	7109	0.17
2	BL 6 (Check)	Jagdapur	1533		1694	1614		6800		7259	7030	
3	OLM 203 (Check)	Berhampur		1385	1553	1469			6000	8193	7097	
4	JK 8 (Check)	Rewa		1170	1380	1275			5200	5639	5420	

Table 7d: Pedigree details of varieties evaluated Little millet Advanced Varietal Trial: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	BL 150	LAVT 1	JAG	Jagdapur	3 rd year	Paiyur 1 x DLM 369
2	TNPSU 174	LAVT 2	COI	Athiyandal	3 rd year	CO 4 x IPM 113
3	RLM 238	LAVT 3	REW	Rewa	1 st year	Selection from local germplasm number 238 of Rewa dist MP
4	OLM 203 (Check)	LAVT 4	BER	Berhampur	Check	Pure line selection from Lakshampur local
5	KOPLM 53	LAVT 5	KOL	Kolhapur	3 rd year	Individual plant selection from local germplasm
6	GPUL 2	LAVT 6	BLR	Bengaluru	3 rd year	Pureline selection from Peddasame

7	DHLtMV 14-1	LAVT 7	HAN	Hanumanamatti	3 rd year	Co 2 x TNAU 110
8	BL 6 (Check)	LAVT 8	JAG	Jagdalpur	Check	Paiyur 1 x OLM 29
9	TNPSU 171	LAVT 9	COI	Athiyandal	3 rd year	CO 2 x TNAU 28
10	WV 126	LAVT 10		Waghai	1 st year	
11	JK 8 (Check)	LAVT 11	REW	Rewa	Check	Selection from local germplasm
12	DLM 95	LAVT 12	DIN	Dindori	2 nd year	Selection from local of Sherajhar
13	DHLT 28-4 (DHLM 28-4)	LAVT 13	HAN	Hanumanamatti	1 st year	CO 2 x TNAU 26
14	GPUL 3	LAVT 14	BLR	Bengaluru	1 st year	JK 8 x Peddasame (Purple early)

8. Barnyard millet Advanced Varietal Trial (BAVT)

In this trial eight entries including two checks i.e VL-172 and VL-207 were evaluated across seven centres spread over five Barnyard millet growing states for grain and fodder yield and other agronomic traits (Table 8, 8a, 8b, 8c, 8d and Tables from 8.1 to 8.6).

- Days to 50 % flowering and maturity: The entries took 45 to 58 days for days to 50 % flowering. RBM-44 was the earliest with 45 days. The range for days to maturity was from 80 to 91 days.
- Plant height: Plant height ranged from 116 to 133 cm.
- Grain Yield: None of the entries were significantly superior to the best checks. The entry DHB 23-3 was the top yielder with 2318 kg/ha. Other entries namely, VL-249, TNEF-197, DHBMV 93-2 and DHBM 99-6 were on par with the checks VL-172 and VL-207.
- Fodder yield: None of the entries were significantly superior to checks. The entry DHB 23-3 was the top yielder with 7402 kg/ha. All other entries were on par with the check VL-207 and VL172.

Remarks: The entry DHB 23-3 was top yielder for both grain and fodder yields in the trial, though it was not significantly superior to checks.

Table 8: Summary performance of varieties in Barnyard millet Advanced Varietal Trial: Kharif 2016

SL. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers
		Average	R	Average	R	Average	Average	Average	Average
1	DHB 23-3	2318	1	7402	1	55	88	131	4
2	RBM -44	1735	10	5212	8	45	80	108	4
3	DHBM 18-6	1846	9	6324	4	58	89	131	4
4	VL 249	2147	2	5222	7	49	82	118	4
5	TNEF 197	1950	8	6717	3	58	91	133	4
6	DHBMV 93-2	2029	6	5181	9	48	82	117	4
7	DHBM 99-6	2121	3	7397	2	58	90	131	4
8	VL 172 (Check)	2042	5	4998	10	47	81	116	4
9	VL 207 (Check)	2019	7	6025	5	52	83	120	4
10	Local check	2049	4	5415	6	54	87	125	4

	All India Mean	2026		5989		52	85	123	4
	C.D. (5%)	504		1911		5	4	14	1
	C.D. (1%)	672		2545		6	5	18	1
	C.V. (%)	23.2		29.8		8.4	4.5	10.4	10.7
	P-value	0.604		0.071		0	0	0.004	0.557

Comparative performance of entries: The entry DHB 23-3 was superior by 13.51% over VL-172 and 14.80% over VL-207 for grain yield and it gave 22.85% more fodder yield than the best check VL-207 (Table 8a).

Table 8a: Comparative performance of varieties in Barnyard millet Advanced Varietal Trial (BAVT)

Sl. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield		Fodder yield (kg/ha)	% increase/decrease over best check VL-207
			VL 172	VL 207		
1	DHB 23-3	2318	13.51	14.80	7402	22.85
2	VL 249	2147	5.14	6.33	5222	-13.32
3	DHBM 99-6	2121	3.88	5.05	7397	22.77
4	DHBMV 93-2	2029	-0.63	0.49	5181	-14.00
5	TNEF 197	1950	-4.50	-3.41	6717	11.48
6	DHBM 18-6	1846	-9.59	-8.56	6324	4.96
7	RBM 44	1735	-15.03	-14.06	5212	-13.49
8	VL 172 (Check)	2042	0.00	1.13	4992	
9	VL 207 (Check)	2019	-1.12	0.00	6025	
	Grand mean	2023			6052	

Performance of entries over three and two years in Barnyard millet Advanced Varietal Trials: The varietal performance of barnyard millet varieties over 3 and 2 years of testing indicated that the entry DHB 23-3 was superior to checks for both grain and fodder yields. It was superior by 9.16% for grain yield and 24.67 % for fodder yield. In two years performance, the variety VL-249 gave 7.09 % more grain yield than the check VL-172.

Table 8b: Performance of entries over three years in Barnyard millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (kg/ha)			India Mean	% over best check	Fodder yield (kg/ha)			India Mean	% over best check
		2014-15	2015-16	2016-17			2014-15	2015-16	2016-17		
1	DHB 23-3	2686	2233	2318	2412	9.16	7200	6000	7402	6867	24.67
2	VL 172*	1935	2220	2042	2066		4700	5500	4998	5066	
3	VL 207*	2411	2200	2019	2210		4900	5600	6025	5508	

Table 8c: Performance of entries over two years in Barnyard millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (Kg/ha)		Mean	% over best check	Fodder yield (Kg/ha)		Mean	% over best check
		2015-16	2016-17			2015-16	2016-17		
1	VL 249	2417	2147	2282	7.09	5000	5222	5111	-12.07

2	VL 172*	2220	2042	2131		5500	4998	5249	
3	VL 207*	2200	2019	2110		5600	6025	5813	

Table 8d: Pedigree details of varieties evaluated Barnyard millet Advanced Varietal Trial: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	DHB 23-3	BAVT 1	HAN	Hanumanamatti	3 rd year	VI 13 x IEC 566 (59-2)
2	RBM -44	BAVT 2	REW	Rewa	1 st year	Selection from local germplasm of sidhi district MP
3	DHBM 18-6	BAVT 3	HAN	Hanumanamatti	1 st year	VL 13 x IEC-566
4	VL 249	BAVT 4	ALM	Almora	2 nd year	VL 200 x VB 409
5	VL 172*	BAVT 5	ALM	Almora	-	VL 177 x GECH 506
6	TNEF 197	BAVT 6	COI	Coimbatore	1 st year	CO1 x VL 208
7	DHBMV 93-2	BAVT 7	HAN	Hanumanamatti	1 st year	EF-8 X IEC-566
8	VL 207*	BAVT 8	ALM	Almora	Check	VL 172 x GECH 504
9	DHBM 99-6	BAVT 9	HAN	Hanumanamatti	1 st year	VL 14 x IEC -566
10	Local check	Local				

9. Proso millet Advanced Varietal Trial (PAVT)

In this trial seven entries including three checks *i.e.* GPUP-21, TNAU-151 and TNAU-145 were evaluated across five centres spread over three Proso millet growing states for grain and fodder yield and other agronomic traits (Table 9, 9a, 9b, 9c and Tables from 9.1 to 9.6).

- Days to 50 % flowering and maturity: The entries took 37 to 44 days for days to 50 % flowering and 71 to 81 days for maturity. The variety GPUP-25 took only 37 days for flowering and 71 days for maturity.
- Plant height: Plant height ranged from 86 to 109 cm.
- Grain Yield: None of the entries were significantly superior to the checks. All the entries were on par with the three checks. The entry TNPM-238 (1962 kg/ha) was the top yielder among new entries. .
- Fodder yield: The variety TNPM-231 was the top yielder in the trial with 4718 kg/ha and it was significantly superior to check GPUP-21. All other entries were on par with the checks.

Remarks: The entry TNPM-238 was better yielder for both grain and fodder yields and it was on par with the checks.

Table 9: Summary performance of varieties in Proso millet Advanced Varietal Trial: Kharif 2016

SL. No.	Entries	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % Flowering	Days to Maturity	Plant height (cm)	No. of productive tillers
		Average	R	Average	R	Average	Average	Average	Average
1	TNPM 234	1728	9	4076	3	44	81	109	5
2	TNPM 238	1962	2	3992	4	39	74	102	7
3	TNPM 231	1770	8	4718	1	43	79	105	5
4	GPUP 26	1779	7	3569	9	42	78	96	6

5	GPUP 24	1711	11	3788	6	41	79	95	7
6	DHP 2181	1916	3	4250	2	40	76	99	7
7	GPUP 25	1825	5	3898	5	37	71	86	8
8	GPUP 21 (Check)	1822	6	3735	7	41	78	99	7
9	TNAU 151 (Check)	1720	10	3409	10	44	81	107	5
10	TNAU 145 (Check)	1882	4	3662	8	44	80	106	5
11	Local Check	1976	1	3258	11	43	74	96	7
	All India Mean	1816		3882		41	78	100	6
	C.D. (5%)	338		1178		4	5	12	2
	C.D. (1%)	453		1615		5	7	16	3
	C.V. (%)	14.54		18.67		7.05	4.95	9.09	26.2
	P-value	0.837		0.81		0.002	0.002	0.01	0.05

Comparative performance of entries: The entry TNPM-238 was superior by 4.25 to 14.06% over checks for grain yield and it gave 6.88% more fodder yield than the best check GPU-21, whereas the entry DHP 2181 gave 1.81 to 11.39% more grain yield over checks and 13.78% more fodder yield than the best check (Table 9a).

Table 9a: Comparative performance of entries in Proso millet Advanced Varietal Trial (PAVT)

Sl. No.	Entries	Mean grain yield (kg/ha)	% Increase / decrease over checks for grain yield			Fodder yield (kg/ha)	% increase/decrease over best check GPU-21
			GPUP 21	TNAU 151	TNAU 145		
1	TNPM 238	1962	7.68	14.06	4.25	3992	6.88
2	DHP 2181	1916	5.16	11.39	1.81	4250	13.78
3	GPUP 25	1825	0.16	6.10	-3.03	3898	4.36
4	GPUP 26	1779	-2.36	3.43	-5.47	3569	-4.44
5	GPUP 24	1711	-6.09	-0.52	-9.09	3788	1.41
6	TNPM 231	1770	-2.85	2.90	-5.95	4718	26.31
7	TNPM 234	1728	-5.61	0.46	-8.18	4076	9.12
8	GPUP 21 (Check)	1822				3735	
9	TNAU 145 (Check)	1882				3662	
10	TNAU 151 (Check)	1720				3409	
	All India Mean	1811				3882	

Performance of entries over three years in Proso millet Advanced Varietal Trial: The varietal performance of Proso millet varieties over three years of testing indicated that the entry DHP 2181 was 9.95% more superior than the check GPUP-21, but none of the entries were superior to checks over three years for fodder yield (Tables 9b).

Table 9b: Performance of entries over three years in Proso millet Advanced Varietal Trial

Sl. No.	Name of entry	Grain yield (kg/ha)			Mean	% over best check	Fodder yield (kg/ha)			Mean	% over best check
		2014-15	2015-16	2016-17			2014-15	2015-16	2016-17		
1	TNPM 234	2534	1913	1728	2058	0.93	6200	7400	4076	5892	-0.42
2	GPUP 24	2343	1885	1711	1980	-2.8	5000	7500	3898	5466	-7.62
3	DHP 2181	2748	2061	1916	2242	9.95	5500	7400	3735	5545	-6.28
4	TNAU 151 (Check)	2290	1830	1720	1947		5700	7800	4250	5917	
5	GPUP 21 (Check)	2331	1963	1822	2039		6400	7200	3569	5723	
6	TNAU 145 (Check)	2317	1863	1882	2021		5800	7500	3662	5654	

Table 9c: Pedigree details of varieties evaluated Proso millet Advanced Varietal Trial: Kharif 2016

S.No.	Entries	Code	Center code	Center	Level of testing	Pedigree
1	TNPM 234	PAVT 1	COI	Athiyandal	3 rd year	Selection from TNAU 196
2	TNPM 238	PAVT 2	COI	Athiyandal	1 st year	Selection from IPM 19
3	TNPM 231	PAVT 3	COI	Athiyandal	1 st year	K1 x TNAU 137
4	GPUP 21 (Check)	PAVT 4	BLR	Bengaluru	Check	GPUP 14 x K1
5	GPUP 26	PAVT 5	BLR	Bengaluru	1 st year	GPMS 109 X GPUP 21
6	TNAU 151 (Check)	PAVT 6	COI	Athiyandal	Check	TNAU 96 x PV 1673
7	GPUP 24	PAVT 7	BLR	Bengaluru	3 rd year	GPMS 109 x GPUP 21
8	DHP 2181	PAVT 8	HAN	Hanumanamatti	3 rd year	Selection from IPM 2181
9	GPUP 25	PAVT 9	BLR	Bengaluru	1 st year	GPMS 109 X GPMS 908
10	TNAU 145 (Check)	PAVT 10	COI	Athiyandal	Check	PV 1454 x TNAU 96
11	Local Check	Local				

II. Sharing of breeding materials

Breeding materials are being shared among centres in all the crops and during this year, the segregating materials of little millet developed at Project Coordinating Unit, Bengaluru was shared among 5 centres. In this trial, 13 entries along with two checks i.e. JK 8 and OLM 203 were evaluated across five centres (Bengaluru, Athiyandal, Jagdalpur,

Rewa and Vizianagaram) of 5 little millet growing states for grain and fodder yield and other agronomic traits (Table 10, 10a).

- Days to 50 % flowering and maturity: The entries took 45 to 51 days for days to 50 % flowering. All the entries matured within 76 to 89 days. The entry no. 74 was the earliest with 76 days compared to early check JK 8 (83 days).
- Plant height: Plant height ranged from 112 to 138 cm.
- Grain yield: The entries namely, 485, 115, 148, 74, 60 and 512 were significantly superior over early check JK 8 (1098 kg/ha). The entry 148 was the top yielder with 1690 kg/ha.
- Fodder yield: The entries namely, 114, 148, and 512 were significantly superior over early check JK 8 (7027 kg/ha). The entry 114 was the top yielder with 10093 kg/ha.

Remarks: Overall, the entries 512, 148 and 485 performed better for grain and fodder yields and they can be tested across locations in National programme.

Table 10: Summary performance of entries in Little millet Multi-location Trial

S. No.	Entries	Pedigree	Grain yield (kg/ha)		Fodder yield (kg/ha)		Days to 50 % flowering		Days to maturity	Plant height (cm)	No. of productive tillers
			Average	R	Average	R	Average	R	Average	Average	Average
1	485	JK8X Peddasame purple early	1555	6	8774	5	50	13	79	124	6
2	206	JK8X Peddasame purple early	1249	14	7350	10	51	11	82	130	6
3	115	JK8X Peddasame purple early	1578	5	6951	14	55	4	85	120	6
4	114	JK8X Peddasame purple early	1442	8	10093	1	54	5	85	133	6
5	101	JK8X Peddasame purple late	1438	9	8745	6	59	1	89	133	6
6	148	JK8X Peddasame purple late	1690	1	9515	3	56	3	86	126	7
7	95	JK8X Peddasame purple late	1394	11	7995	9	52	7	81	112	6
8	289	JK8X Peddasame purple late	1257	13	7294	11	51	10	82	124	6
9	74	JK8X Peddasame purple late	1579	4	6901	15	45	15	76	120	6
10	419	JK8X Peddasame purple late	1331	12	9302	4	57	2	89	138	6
11	60	JK8X Peddasame purple late	1591	3	7003	13	50	14	79	120	6
12	512	JK8X Peddasame purple late	1676	2	9965	2	50	12	81	125	6
13	73	JK8X Peddasame purple late	1403	10	8101	8	51	9	82	117	6
14	JK 8 (Check)	Selection from local germplasm	1098	15	7027	12	52	8	83	120	6
15	OLM 203 (Check)	Pureline selection from Lakshampur local	1458	7	8705	7	53	6	82	124	7
	Grand mean		1460		8197		53		83	124	6

	C.D. (5%)		399		2329		9		10	14	2
	C.D. (1%)		532		3104		11		13	19	3
	C.V. (%)		21.35		22.02		12.8		9.45	9.06	21.64
	F (Probability)		0.451		0.053		0.227		0.352	0.056	0.985

Comparative performance of entries: All the new entries gave more grain yield from 14.48 to 53.92% over the early check JK-8. The entries 512, 114, 148 and 419 were superior in fodder yield over early check from 6.86 to 15.94%. However, the entries 512, 148 and 485 performed better for grain and fodder yields and they can be tested across locations in National programme (Table 10a).

Table 10a: Comparative performance of entries over checks in little millet Multi location Trial

S. No.	Entries	Mean Grain yield (kg/ha)	% increase / decrease over early check	Mean fodder yield (kg/ha)		% increase / decrease over early check
		Average	JK 8	Average	R	JK 8
1	148	1690	53.92	9515	3	9.30
2	512	1676	52.64	9965	2	14.47
3	60	1591	44.90	7003	13	-19.55
4	74	1579	43.81	6901	15	-20.72
5	115	1578	43.72	6951	14	-20.15
6	485	1555	41.62	8774	5	0.79
7	114	1442	31.33	10093	1	15.94
8	101	1438	30.97	8745	6	0.46
9	73	1403	27.78	8101	8	-6.94
10	206	1249	13.75	7350	10	-15.57
11	95	1394	26.96	7995	9	-8.16
12	289	1257	14.48	7294	11	-16.21
13	419	1331	21.22	9302	4	6.86
14	JK 8 (Check)	1098		7027	12	
15	OLM 203 (Check)	1458		8705	7	
	Grand mean	1449		8197		

III. Genetic resources

Germplasm Conservation: Project Coordinating Unit of All India Coordinated Project on Small Millets, Bengaluru is also National Active Germplasm Site (NAGS). Its main function is to collect, evaluate, conserve and supply germplasm accessions to needy scientists from different centres. The project Coordinating Unit has maintained 4448, 1410, 965, 1002, 611 and 1747 of finger millet, kodo millet, barnyard millet, little millet, proso millet and foxtail millet accessions respectively. Till now, about 1133 accessions of different millets have been supplied to needy researchers (Table 11).

Table 10: Germplasm maintained, collected, supplied and used in breeding programme

S. No.	Millets	Total No. of germplasm maintained	Exotic collections	No. of germplasm supplied
1	Finger Millet	4448	175	629
2	Kodo Millet	1410	10	76
3	Barnyard Millet	965	14	67
4	Little millet	1002	-	78
5	Proso Millet	611	106	58
6	Foxtail Millet	1747	339	225
	Total	10,183	644	1133

IV. Breeder seed production

During the year, the indent of 25.58 quintals of breeder seed was made by DAC, Government of India for all the six crops of small millets. Against the indent, breeder seed allocation of 51.16 q was made for production across 12 centres in 9 states. Accordingly, the total production of breeder seed was 105.90q and it is 206.99 % more than the allocation. A surplus breeder seed of 80.32 q has been produced. Many centres produced not only the targeted quantity of breeder seed, but also produced breeder seeds of non-allotted varieties in addition (Tables from 12 to 14). The crop-wise breeder seed produced is as below.

Table 12: Breeder seed production: Crop-wise

S. No.	Crop	DAC Indent	Production	Surplus/Deficit over DAC Indent
1	Finger millet	17.32	86.78	69.46
2	Kodo millet	4.15	6.26	2.11
3	Foxtail millet	2.55	5.10	2.55
4	Proso millet	0.50	1.00	0.50
5	Barnyard millet	1.06	0.86	-0.20
6	Little millet	-	5.90	5.90
	Total	25.58	105.90	80.32

Table 13: Details of Breeder seed produced during 2016-17: State-wise

Sl. No.	Name of the Producing Centre	Name of Variety	Year of notification	DAC Indent	Allotment BSP-I	Production	Surplus/ Deficit over DAC indent
1. Uttarakhand							
	Almora						
	Finger millet	VL 352	2013	0.30	0.60	2.00	1.70
		VL 315	2006	0.25	0.50	1.00	0.75

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		VL 347	2012	0.75	1.50	1.10	0.35
		VL 324	2006	0.30	0.60	1.10	0.80
				1.60	3.20	5.20	3.60
	Barnyard millet	VL Madira 207	2008	0.88	1.76	0.50	-0.38
				0.88	1.76	0.50	-0.38
	Ranichauri						
	Finger millet	PRM 2	2011	0.10	0.20	0.20	0.10
	Barnyard millet	PRJ 1	2009	0.18	0.36	0.36	0.18
				0.28	0.56	0.56	0.28
		State Total		2.76	5.52	6.26	3.50
2. Karnataka							
	Bengaluru						
	Finger millet	GPU 28	1998	0.55	1.10	4.00	3.45
		GPU 48	2009	0.65	1.30	7.00	6.35
		GPU 45	2001	0.20	0.40	0.50	0.30
		GPU 67	2010	4.80	9.60	15.00	10.20
		ML 365	2009	3.25	6.50	10.00	6.75
		L 5		-	-	0.50	0.50
		Indaf 5		-	-	0.50	0.50
		Indaf 8		-	-	0.50	0.50
				9.45	18.90	38.00	28.55
	Mandya						
	Finger millet	MR 6	2008	0.40	0.80	8.00	7.60
		KMR 301	2012	0.10	0.20	8.00	7.90
		MR 1	1998	0.10	0.20	7.00	6.90
		Indaf 7	1984	0.02	0.04	0.04	0.02
		KMR 204		-	-	8.00	8.00
				0.62	1.24	31.04	30.42
	Hanumanamatti						
	Foxtail millet	HMT 100-1	2009	0.05	0.10	0.10	0.05
				0.05	0.10	0.10	0.05
		State Total		10.12	20.24	69.14	59.02
3. Maharashtra							
	Kolhapur						
	Finger millet	Phule nachini	2013	0.03	0.06	1.20	1.17
		Dapoli-1	1994	0.02	0.04	0.04	0.02
				0.05	0.10	1.24	1.19
	Little millet	Phule ekadashi				0.20	0.20
						0.20	0.20
		State total		0.05	0.10	1.44	1.39
4. Jharkhand							
	Ranchi						
	Finger millet	A 404	1993	0.10	0.20	0.20	0.10
		BM 2	1996	0.10	0.20	0.20	0.10
		State Total		0.20	0.40	0.40	0.20

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5. Bihar							
	Dholi						
	Finger millet	RAU 8	1989	0.35	0.70	0.70	0.35
	Proso millet	BR 7	1984	0.50	1.00	1.00	0.50
		State Total		0.85	1.70	1.70	0.85
6. Odisha							
	Berhampur						
	Finger millet	Chilika (OEB10)	2001	1.00	2.00	2.00	1.00
		Bhairabi (BM-9-1)	1999	1.00	2.00	2.00	1.00
		Suvra (OUAT-2)	1999	1.00	2.00	2.00	1.00
		State Total		3.00	6.00	6.00	3.00
7. Andhra Pradesh							
	Nandyal						
	Foxtail millet	SiA 3085	2013	2.50	5.00	5.00	2.50
		State Total		2.50	5.00	5.00	2.50
8. Chhattisgarh							
	Jagdalpur						
	Finger millet	Chattisgarh -2	2015	0.80	1.60	1.50	0.70
		Indira Ragi -1 (BR 7)	2012	1.15	2.30	2.50	1.35
	Kodo millet	Indira Kodo 1 (BK 1)	2012	1.25	2.50	2.30	1.05
		State Total		3.20	6.40	6.30	3.10
9. Madhya Pradesh							
	Rewa						
	Kodo millet	Jawahar					
		Kodo 65 (RK 65-18)	2009	0.20	0.40	0.33	0.13
		JK 155	2000	0.75	1.50	1.26	0.51
		Jawahar Kodo 13 (JK 13)	2007	0.70	1.40	0.09	-0.61
		JK 106	2009	0.50	1.00	1.00	0.50
		Jawahar Kodo 439	2005	0.75	1.50	1.28	0.53
				2.90	5.80	3.96	1.06
	Little millet	JK 137		-	-	2.47	2.47
		JK 8		-	-	0.98	0.98
		JK 36		-	-	1.73	1.73
		JK 4		-	-	0.52	0.52
				-	-	5.70	5.70
		State total		2.90	5.80	9.66	6.76
		Grand total		25.58	51.16	105.90	80.32

Table 14: Details of Breeder seed produced during 2016-17: Crop-wise and Variety-wise

Sl. No.	Name of Variety	Year of Notification	DAC Indent	Production	Surplus/Deficit over DAC Indent
Finger Millet					
1.	Chhattisgarh – 2	2015	0.80	1.50	0.70
2.	Phule Nachani	2013	0.03	1.20	1.17
3.	VL Mandua 352	2013	0.30	2.00	1.70
4.	Indira Ragi-1 (BR-7)	2012	1.15	2.50	1.35
5.	KMR-301	2012	0.10	8.00	7.90
6.	VL Mandua 347 (VL 347)	2012	0.75	1.10	0.35
7.	PRM-2	2011	0.10	0.20	0.10
8.	GPU 67	2010	4.80	15.00	10.20
9.	ML-365	2009	3.25	10.00	6.75
10.	RATHNA (GPU-48)	2009	0.65	7.00	6.35
11.	Divya (MR-6)	2008	0.40	8.00	7.60
12.	VL Mandua 324	2006	0.30	1.10	0.80
13.	VL Mandua-315	2006	0.25	1.00	0.75
14.	Chilika (OEB-10)	2001	1.00	2.00	1.00
15.	GPU-45	2001	0.20	0.50	0.30
16.	BAHIRABI (BM-9-1)	1999	1.00	2.00	1.00
17.	SUVRA (OUAT-2)	1999	1.00	2.00	1.00
18.	GPU-28	1998	0.55	4.00	3.45
19.	MR-1	1998	0.10	7.00	6.90
20.	BM 2	1996	0.10	0.20	0.10
21.	DAPOLI-1	1994	0.02	0.04	0.02
22.	A-404	1993	0.10	0.20	0.10
23.	RAU-8	1989	0.35	0.70	0.35
24.	HASTA (INDAF-7)	1984	0.02	0.04	0.02
25.	L 5		-	0.50	0.50
26.	INDAF-5		-	0.50	0.50
27.	INDAF-8		-	0.50	0.50
28.	KMR 204		-	8.00	8.00
	Total		17.32	86.78	69.46
Kodo Millet					
1.	Jawahar Kodo-155 (RBK-155)	2000	0.75	1.26	0.51
2.	Jawahar Kodo 13 (JK-13)	2007	0.70	0.09	-0.61
3.	Jawahar Kodo - 439	2005	0.75	1.28	0.53
4.	Jawahar Kodo-65 (RK 65-18)	2009	0.20	0.33	0.13
5.	Jawahar Kodo -106	2009	0.50	1.00	0.50
6.	Indira Kodo -1 (BK-1)	2012	1.25	2.30	1.05
	Total		4.15	6.26	2.11
Foxtail Millet					
1.	HMT-100-1	2009	0.05	0.10	0.05
2.	SiA 3085	2013	2.50	5.00	2.50

	Total		2.55	5.10	2.55
Proso Millet					
1.	BR-7	1984	0.50	1.00	0.50
	Total		0.50	1.00	0.50
Barnyard Millet					
1.	VL Madira 207	2008	0.88	0.50	-0.38
2.	PRJ-1	2009	0.18	0.36	0.18
	Total		1.06	0.86	-0.20
Little millet					
1	JK 137		-	2.47	2.47
2	JK 8		-	0.98	0.98
3	JK 36		-	1.73	1.73
4	JK 4		-	0.52	0.52
5	Phule Ekadashi		-	0.20	0.20
	Total		-	5.90	5.90
	Grand Total		25.58	105.90	80.32

Plant Breeding tables (from 1.1 to 9.6)

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