

PROCEEDINGS OF THE 35th CROP SCIENTIST MEET ON MILLETS AND FORAGE CROPS HELD AT TNAU, COIMBATORE

The 35th crop scientists meet on millets and forage crops was held on 8th and 9th May, 2017 at Tamil Nadu Agricultural University, Coimbatore. Review of University Research Sub Projects on Crop improvement, Crop management and Crop protection was taken on 08.05.2017 by the respective Technical Directors.

The Action Plan finalization meeting was held on 09.05.2017 under the Chairmanship of Dr. K. Ramasamy, Vice Chancellor. Dr. M. Maheswaran Director of Research stressed that utmost care should be taken while finalizing the treatments for various trials. During discussion, Vice-chancellor emphasized that only breeder seeds may be produced by plant breeders and breeding efforts may be strengthened to evolve suitable varieties of small millets amenable for mechanical harvest.

The details of cultures identified for release and ART/MLT and action plan to be taken up for the year 2017-18 on Millets and Forage crops in crop improvement was presented by Dr.K.Ganesamurthy, Director i/c, Centre for plant Breeding and Genetics. Similarly, Director i/c, CM and Director i/c, CPPS presented salient findings and action plan for Crop management and Crop protection, respectively.

Crop Improvement

Proceedings of the 35th crop scientist's on millets and forage crops for crop improvement was furnished under following subheads

- 1) General remarks
- 2) Abstracts of the projects reviewed
- 3) Remarks on the individual University Research Projects
- 4) Cultures proposed for Variety Release/ART/MLT
- 5) Action Plan: 2017-18

1) General Remarks

- The local sorghum genotypes and red grain types may be collected and evaluated for special traits (Action: Department of millets and RRS, Paiyur)
- Pollen fertility studies may be carried out in hybrids during summer season at various locations (Action : Department of Millets, Coimbatore; CRS, Veppanthatai; MRS, Vagarai and RRS, Paiyur)
- Research work on varagu may be initiated at DARS, Chettinad (Action : DARS, Chettinad)
- Pasture land grass species may be introduced at AC&RI, Killikulam and a model land for grazing may be established. (Action: Department of Forage Crops and AC & RI, Killikulam)

2) Abstracts of the projects reviewed

A total number of 41 projects comprising 35 projects on millets and six projects on forage crops held by 19 scientists were reviewed by the Director, CPBG. The abstract of the projects reviewed is furnished below:

ABSTRACT

Crops and centres	University Sub-Projects	AICRP Projects	Externally funded projects	Total	No. of Scientists
Sorghum					
Coimbatore	3	1	2	6	3
Kovilpatti	2	1	-	3	1
Arupukottai	1	-	-	1	1
Paiyur	1	-	-	1	1
Sub total	7	2	2	11	6
Pearl millet					
Coimbatore	2	1	1	4	1
Sub total	2	1	1	4	1
Maize					
Coimbatore	3	1	1	5	1
Vagarai	2	1	-	3	1
Veppanthattai	1	-	-	1	1
Sub total	6	2	1	9	3
Small millets					
Athiyandal	3	1	1	5	2
Paiyur	2	-	-	2	2
Madurai	1	-	-	1	2
Chettinad	2	-	-	2	1
Coimbatore	1	-	-	1	1
Sub total	9	1	1	11	8
Total Projects (Millets)	24	6	5	35	18
Forage crops	4	1	1	06	1
Grand total	28	7	6	41	19

Remarks on the individual University Research Projects

CROP IMPROVEMENT

Sorghum

S. No.	URP Details	Remarks
1	CPBG/CBE/PBG/SOR/2016/001 Development of fodder sorghum varieties with improved quality traits April 2016- March 2019 Dr. A. Yuvaraja	In the advanced cultures, important fodder quality parameters viz., crude protein, crude fibre, crude fat, ADF, NDF and HCN content may be assessed.
2	CPBG/CBE/PBG/SOR/2016/002 Maintenance, evaluation and utilization of germplasm in sorghum April 2013 to Mar 2018 Dr. A. Yuvaraja	Characterization based on DUS guidelines may be continued and core and mini core collections may be derived.
3	CPBG/CBE/PBG/SOR/2013/004 Development of dual purpose varieties suitable for rain fed and irrigated ecosystem of Tamil Nadu with improved tolerance to shoot fly and stem borer June 2013 to May 2018 Dr. B.Selvi	In case of cultures tested in the advanced yield trials in addition to the stover yield and quality parameters, the cultures should be screened for shoot fly / stem borer resistance assessed.
4	CPBG/KPT/PBG/SOR/2015/001 Evolution of high yielding, suitable sorghum varieties with resistance to ear head midge for late / normal sowing conditions Mar 2015 to Feb 2020 Dr. N. Malini	All the segregating progenies and seed multiplication of advanced entries and cultures has to be taken up under protected irrigated condition.
5	CPBG/KPT/PBG/SOR/2015/New Nucleus and Breeder seed production of sorghum varieties of Tamil Nadu Mar 2015 to Feb 2020 Dr. N. Malini	URP no. may be obtained. Indented quantity of breeder seed may be produced and supplied. Genetic purity of the released varieties may be ensured.
6	CPBG/APK/PBG/SOR/2015/002 Evaluation of sorghum genotypes for development of varieties suitable for rainfed regions of Tamil Nadu Mar 2015 to Feb 2018 Dr. K. Anandhi	The project leader should visit fields at Coimbatore and Kovilpatti at appropriate cropping season to select segregating material suited for rainfed condition.
7	CPBG/PAI/PAI/SOR/2016/001 Collection, characterization, evaluation and conservation of red sorghum (<i>Sorghum bicolor</i>) germplasm lines Aug 2016 to Dec 2020 Dr. M. Dhandapani	The collected red sorghum genotypes may be purified and evaluated for yield and quality parameters.

Cumbu

S. No.	URP Details	Remarks
1	CPBG/CBE/PBG/PEM/2015/004 Evolution of high yielding single cross pearl millet hybrids with resistance to downy mildew April 2015 - Mar 2020 Dr. P. Sumathi	Required quantity of hybrid seeds may be produced for the hybrid TNBH 08804 identified for release during 2018.
2	CPBG/CBE/PBG/PEM/2015/005 Maintenance of genetic purity and production of nucleus seeds of parental lines of hybrids and composites developed in pearl millet (<i>Pennisetum glaucum</i> L.) July 2015 –June 2020 Dr. P. Sumathi	The recently released cumbu variety CO 10 has to be popularized in Villupuram and Thoothukudi districts. The Indented quantity of breeder seed may be produced and supplied.

Maize

S. No.	URP Details	Remarks
1	CPBG/CBE/PBG/MAZ/2013/001 Evolution of single cross high yielding maize hybrids resistant to SDM with different maturity groups viz., late (> 95 d), medium (> 85-95 d) and early (>75-85 d) suitable for irrigated ecosystem. June 2013-May 2018 Dr.R.Ravikesavan	As SDM is not occurring and PFSR (Charcoal rot) work has been initiated the hybrids may be evaluated for PFSR.
2	CPBG/CBE/PBG/MAZ/2013/002 Development of high yielding sweet corn hybrids suitable for Tamil Nadu June 2013-May 2018 Dr. R. Ravikesavan	The sugar content of newly obtained lines from IIMR and NBPGR may be estimated and superior lines may be utilized in the synthesis of new hybrids
3	PBG/CBE/PBG/MAZ/2013/003 Collection, maintenance and evaluation of genetic resources in maize gene bank and development of inbred lines June 2013 to May 2018 Dr.A.Yuvaraja	The project is recommended for closure and the materials generated transferred to CPBG/CBE/PBG/MAZ/2013/001
4	DRES/VGI/PBG/2015/New Collection, characterization and maintenance of maize germplasm April 2015 to March 2018 Dr. N. Kumari Vinodhana	The passport data of the available lines may be provided to PGR.
5	DRES/VGI/PBG/2015/New Development of high yielding single cross maize hybrids suitable for irrigated and rainfed ecosystems April 2015 to March 2018 Dr.N. Kumari Vinodhana	The hybrids in advance trials may be screened for TLB
6	CPBG/VPT/PBG/MAZ/2016/001 Development of high yielding single cross maize hybrids suitable for rainfed systems in TN June 2016 to May 2018 Dr.S.Sivakumar	The hybrids received from Coimbatore and Vagarai may be evaluated under rainfed system

Small Millets

S. No.	URP Details	Remarks
1	<p>CPBG/ATL/PBG/SMM/2014/001 Genetic improvement of drought resistance in samai, tenai and panivaragu to evolve high yielding varieties suitable for Tamil Nadu. Aug2014 - July 2019 Dr. A. Nirmalakumari</p>	Drought related parameters may be measured in the advanced lines utilizing the services of the Crop Physiologist in addition to the yield parameters
2	<p>CPBG/ATL/PBG/SMM/2016/002 Genetic improvement of fingermillet, kodomillet and barnyardmillet to evolve high yielding varieties suitable for rainfed conditions of Tamil Nadu Aug 2015 to July 2018 Dr. R. Kanchana Rani</p>	Efforts may be intensified to develop bold seeded dark brown coloured, uniform maturing and high yielding ragi variety better than GPU 28.
3	<p>CPBG/ATL/PBG/BSP/2015/003 Nucleus and breeder seed production in small millets Oct 2015 - Sep 2018 Dr. R. Kanchanarani</p>	Develop adequate field infra structure to produce quality breeder seeds of small millets at Athiyandal and indented quantity of breeder seed may be produced and supplied
4	<p>CPBG/MDU/PBG/SMM/2015/001 Development of short duration, high yielding barnyard millet variety with improved nutritional quality July 2015 to June 2018 Dr. C. Vanniarajan</p>	Popularization of newly released variety MDU 1 in the southern barnyard millet growing districts may be takenup
5	<p>CPBG/PAI/PBG/SMM/2017/001 Development of high yielding long duration ragi varieties suitable for rainfed areas of North Western Zone April 2017 to March 2022 Dr. P. Suthamathi</p>	Crossing programme may be initiated for the development of long duration ragi involving parents having elongated fingers and dark colour grains suited for Dharmapuri and Krishnagiri districts
6	<p>DRES/PAI/PBG/11/002 Maintenance and production of nucleus and breeder seeds of rice and millet varieties released from RRS, Paiyur April 2011 to March 2017 Dr. M. Dhandapani</p>	Indented quantity of breeder seed may be produced and supplied
7	<p>CPBG/CTN/PBG/SMM/2014/001 Development of climate resilient Barnyard millet (<i>Echinochloa frumentaceae</i>) genotypes through Mutation Breeding Nov 2014 to Oct2017 Dr.R.Sasikala</p>	Short duration, sturdy and non-lodging mutants which were identified in M ₂ generation may critically be evaluated
8	<p>CPBG/CTN/PBG/SMM/2010/001 Barnyard millet Advanced varietal trial (BAVT) March 2010 to Till date Dr.R.Sasikala</p>	There is no need for a separate project for the conduct of only one Barnyard millet Advanced varietal trial as it is a voluntary centre

Biotechnology

S. No.	URP Details	Remarks
1	CPMB/CBE/PBT/SMM/2015/001 Characterization and expression profiling of genes involved in Zn and Fe homeostasis in barnyard millet 2016 – 2019 Dr. S. Varanavasiappan	Project may be continued

Forage Crops

S. No.	URP Details	Remarks
1.	CPBG / CBE / PBG / FRG/2014/001 Collection, evaluation, documentation and selection of <i>Cenchrus</i> , <i>Deenanath</i> and <i>Brachiaria</i> species June 2014 to May 2017 Dr. C. Babu	Recommended for closure and the materials generated may be transferred to CPBG/ CBE/ PBG/ FRG/ 2015/ 005
2.	CPBG/ CBE/ PBG/ FRG/2014/002 Evolving high biomass yielding genotypes in <i>Desmanthus</i> and <i>Stylosanthus</i> June 2014 to May 2017 Dr. C. Babu	May be completed and the materials generated may be transferred to CPBG / CBE / PBG / FRG/2015/004
3.	CPBG / CBE / PBG / FRG/2015/004 Evolution of leguminous forage crops (Lucerne and Fodder cowpea) for high yield and protein content April 2015 to March 2020 Dr. C. Babu	The project may be continued; Advanced Lucerne entry TNLC 14 may be screened for pests and diseases
4.	CPBG/CBE/PBG/FRG/2015/005 Evaluation of forage grasses (Cumbu Napier hybrid and Guinea grass) for high biomass and quality April 2015 to March 2020 Dr. C. Babu	The project may be continued. Advanced Cumbu Napier hybrids may be studied for NDF and ADF.

Cultures proposed for Variety Release/ART/MLT**Cultures Identified for release****State release**

Crop: Cumbu

Culture name: TNBH 08804

Centre: Dept. of Millets, TNAU, Coimbatore

Parentage: ICMA 99555 x PT 6067

Duration: 85-90 days

Performance of Grain yield (kg/ha)

Sl.No.	Trials	No. of trials	TNBH 08804	CO 9 Hybrid	NBH 1717
1.	Station Trials	03	5495	4677	4478
2.	MLT	20	3729	3400	3423
3.	OFT	30	4147	3538	3353
4.	ART	69	2118	1899	1891
	Total / Mean	122	3872	3379	3286
	% increase over CO 9 hybrid		14.6		
	% increase over NBH 1717		17.8		

Salient Features

- Compact earhead
- Bold and grey colour grain
- Resistant to downy mildew and rust
- Yield advantage (15-20 %) over existing hybrids CO 9 and NBH 1717

Cultures identified for ART 2017-18

Details of the cultures proposed for ART 2017-18

I. Grain Sorghum

S.No.	Crop / Culture	Parentage	Duration (days)	Grain yield (Kg/ha)	Special attributes
1.	TNS 648	APK1 x M35-1	100	2305	Dual purpose, resistant to shoot fly (12.0%)
2.	TKSV 1036	ICSB 518 x SPV 1489	100	2102	Dual purpose, suitable for rainfed condition
	Checks : CO 30, K12, Paiyur 2				

Observations to be recorded: Days to 50 % flowering, plant height, grain yield, straw yield and pests and disease score if any

II. Fodder sorghum

S.No.	Crop / Culture	Parentage	Duration (days)	Grain yield (Kg/ha)	Special attributes
1.	TNFS 213	CO26xM35-1	60	27 t/ha	TSS :7-8% Protein :9.4 % Seed yield : 1800 kg/ha
	Checks; CO 9 hybrid and private hybrid				

Observations to be recorded: Days to 50 % flowering, plant height, green fodder yield at 50 per cent flowering t/ha and pests and disease score if any

III. Pearl millet (Hybrid trial)

S.No.	Crop / Culture	Parentage	Duration (days)	Grain yield (Kg/ha)	Special attributes
1.	TNBH 121235	ICMA 01666x PT6303	90	2676	Compact earhead with bold grains and resistant to downy mildew
Checks; CO 9 hybrid and private hybrid					

Observations to be recorded: Days to 50 % flowering, Days to maturity, seed set per cent, grain yield kg/ha, straw yield kg/ha and pests and disease score if any.

IV. Small millets Ragi

S.No.	Crop / Culture	Parentage	Duration (days)	Grain yield (Kg/ha)	Special attributes
1.	TNEc 1281	Selection from TNAU 900	109	2128	Uniform maturity, non lodging
2.	TNEc 1285	TNAU 900 x CO (Ra) 14	110	2256	High yield, large panicle, bold seeds
Checks : Paiyur 2, CO (Ra)14, CO 15					

Observations to be recorded: Days to 50% flowering, Days to maturity, Plant height (cm), Number of productive tillers/plant, Number of fingers/ear, Finger length (cm), Grain yield (kg/ha), Straw yield (kg/ha) and pests and disease score if any

Samai

S.No.	Crop / Culture	Parentage	Duration (days)	Grain yield (Kg/ha)	Special attributes
1.	TN Psu176	CO (Samai) 4 x IPM 113	88	1205	Drought tolerant, Non shattering and non lodging
2.	TN Psu 177	CO (Samai) 4 x TNAU141	87	1323	High yielding and bold grains
Checks: CO (Samai) 4					

Observations to be recorded: Days to 50% flowering, Days to maturity, Plant height (cm), Number of productive tillers/plant, Number of fingers/ear, Finger length (cm), Grain yield (kg/ha), Straw yield (kg/ha) and pests and disease score if any

Cultures identified for MLT 2017-18

I. Grain Sorghum

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNS 661	TNS 603 x IS 18551	100	3016	Pearly white grain, Moderately resistant to shoot fly
TNS 663	TNS 627 x TNS 640	95-100	2167	Dual purpose and resistant to shoot fly
TNS 667	TNS 630 x TNS 634	102	2105	Dual purpose, moderately resistant to shoot fly and stem borer
TKSV 1308	ICSVB535x K8	100	3270	Bold seed and creamy white colour, suitable for rainfed situation
Checks: CO 30, K12, Paiyur 2, Hybrid CO 5				

Seasons

<i>Kharif</i>	(June – July)	Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Athiyanthal
<i>Rabi</i>	(Sept-Oct)	Kovilpatti, Yethapur, Aruppukkottai, Paiyur
Summer	(Jan – Feb)	Coimbatore, Bhavanisagar and Vaigaidam
Replication: 3	Plot size: 4m x 2.7 m (4 rows)	Spacing: 45 cm x 15 cm
Fertilizer dose	95:45:45 NPK kg/ha	

Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any

II. Pearl Millet

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNBH 1514	ICMA 99222x PT6687	90	3619	Compact, DM resistance
TNBH 1525	ICMA 98222 x PT6680	90	3788	Dark grey seed, compact, DM resistance, Fe 63ppm
TNBH 1526	ICMA 06111xPT6683	88	3868	Bold, compact, DM resistance, Fe– 70ppm
Checks : TNAU Cumbu Hybrid CO 9 , Private hybrid				

Seasons

<i>Kharif</i>	(June – July)	Coimbatore ,Paiyur, Yethapur, Bhavanisagar, Vaigaidam , Vriddhachalam, Tindivanam and Athiyanthal
<i>Rabi</i>	(Sept-Oct)	Kovilpatti, Aruppukkottai, Paiyur and Tindivanam
Summer	(Jan – Feb)	Coimbatore, Pattukkottai, Paiyur, Bhavanisagar, Vriddhachalam and Vaigaidam,
Replication: 3	Plot size: 4m x 2.7 m (6 rows)	Spacing: 45 cm x 15 cm
Fertilizer schedule:	80: 40:40 NPK Kg/ha	

Observations to be recorded: Days to 50 % flowering, Days to maturity, seed set per cent, grain yield kg/ha, straw yield kg/ha and Pests and disease score if any

**IV. Maize
MLT I**

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
VaMH 12014	UMI 1200 x VIM 357	110	9907	<ul style="list-style-type: none"> • Grain type: yellow semi-dent • High shelling percentage (79%) and test weight (39g/100 grains) • Moderately resistant to TLB and stem borer
VaMH 14020	UMI 1230 x VIM 153	110	9823	<ul style="list-style-type: none"> • Grain type: orange semi-flint • High shelling percentage (79%) and test weight (39g/100 grains) • Moderately resistant to TLB and stem borer
ACM-M13-007	UMI285 lpa x UMI1200-1	110	11840	<ul style="list-style-type: none"> • Orange yellow color grain • Flint type kernel • Low phytate content.
ACM-M-13-02	UMI1200 β^+ x UMI1230 β^+	110	8450	<ul style="list-style-type: none"> • Orange yellow grain • Flint type kernel • High β-carotene content
CMH 11-583	N09-153-2 x N10-65-3	105	12904	<ul style="list-style-type: none"> • High yielding • Deep orange kernels
CMH 11-586	N09-164-2 x N148	110	12500	<ul style="list-style-type: none"> • High yielding • Deep orange kernels
Checks : TNAU Maize Hybrid CO 6, 900 M (G), NK 6240				

Seasons

Maize MLT I *Kharif* (Irrigated) (June – July) : Coimbatore, Vagarai, Bhavanisagar, Paiyur, Athiyanthal, Vaigaidam, Virinjipuram, Madurai

Maize MLT III *Rabi* - irrigated (Dec – Jan) : Coimbatore, Vagarai, Bhavanisagar, Paiyur, Vaigaidam, Madurai

Replication: 3 Plot size: 5m x 3.6 m (6 rows each) Spacing: 60 cm x 25 cm.
Fertilizer schedule: 250: 75:75 NPK Kg/ha

MLT II

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
VaMH 12013	UMI 1200 x VIM 319	110	6865	<ul style="list-style-type: none"> • Grain type: yellow dent • High shelling percentage (79%) and test weight (37.0g/100) grains. • Moderately resistant to

				TLB and stem borer
VaMH 13023	UMI 1200 x VIM 153	105	7385	<ul style="list-style-type: none"> • Grain type: yellow semi-dent • High shelling percentage (78%) and test weight (37.5g/100) grains. • Moderately resistant to TLB and stem borer
Checks : TNAU maize Hybrid CO 6, 900 M (G), NK 6240				

Maize MLT II *Kharif* (Rainfed) (Sept-Oct) : Aruppukkottai, Kovilpatti, Yethapur, Veppanthattai, Vagarai
 Replication: 4 Plot size: 5m x 3.6 m (6 rows each) Spacing: 60 cm x 25 cm.
 Fertilizer schedule: 250: 75:75 NPK Kg/ha

Observations to be recorded: Days to 50 % tasselling, Days to 50 % silking, yield, pests and disease score if any

V. Sweet corn hybrids

Entry	Parentage	Duration (Days)	Green cob yield (Kg/ha)	Special features
CSCH 13002*	WNC 12069 x SC 11-2	73-75 days	13129	High sugar content (16.9)
CSCH 14003*	WNC 12039-1 x SC 1421-5-2-1	72-75 days	13864	Plumby kernels and high sugar content (17.3)
Checks : Sugar 75				

*Early duration hybrids and hence should be harvested 4 to 5 days earlier to Sugar 75
 Sweet corn MLT *Kharif* (Jul-Aug) : Irrigated Coimbatore, Vagarai, Bhavanisagar, Paiyur, Athiyanthal, Vaigaidam, Virinjipuram, Madurai
 Replication: 5 Plot size: 5m x 3.6 m (6 rows each) Spacing: 60 cm x 20 cm.
 Fertilizer schedule: 150: 50:50 NPK Kg/ha

Observations to be recorded: Days to 50 % tasselling, Days to 50 % silking, green cob yield, pests and disease score if any

V. Small millets

Ragi

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNEc1292	CO (Ra) 14 x TNAU 900	115	1967	High yield, large panicle, bold seeds
TNEc 1294	CO (Ra) 14 x TNAU 950	110	1748	Long panicle, uniform maturity, non lodging
PYR 009-04	CO 12 x TNAU 946	105	3660	Short duration, drought resistant
Checks : Paiyur 2, CO (Ra)14, CO 15				
Seasons : <i>Kharif</i>				

Replication : 3

Plot size: 3 m x 2.5 m
(10 rows per plot)

Spacing: 22.5 cm x 10 cm.

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers :Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal

Kudiraivali

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNEf 197	CO(Kv) 2x TNAU153	87	1800	Large ear head, Bold seeds
ACM 15-343	ACM10-161x ACM10-012	85	1875	Short duration (85-90 days); Fe - 18mg/100g
ACM 15-353	ACM12-110x ACM10-011	86	1900	Lengthy compact panicle (29.5 cm)
Checks : CO (Kv) 2				

Seasons : *Kharif*

Replication : 3

Plot size: 3 m x 2.5 m
(10 rows per plot)

Spacing: 22.5 cm x 10 cm

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers :Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal

Samai

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNPsu183	CO2 x MS4729	82	2156	Tall plant stature, good fodder yield, large panicle
TNPsu184	CO3 x PM29	80	2043	Drought tolerant, non lodging, uniform maturity
TNPsu186	MS507 x MS1211	86	2340	More productive tillers, high fodder and grain yield
Check : CO (Samai) 4				

Seasons : *Kharif*

Replication : 3

Plot size: 3 m x 2.5 m
(10 rows per plot)

Spacing: 22.5 cm x 10 cm.

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers :Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu

Tenai

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNAU 331	PS 4 x ISe 198	86	2889	High yielding, Drought tolerant and large panicle
TNAU 330	SiA 326 x ISe 186	84	2779	Drought tolerant and high tillering

TNSi337	CO6 x ISe198	82	2428	High tillering, blast tolerant, tip sterility absent
TNSi342	PS4 x TNAU46	86	2270	High grain and straw yield, short duration, drought tolerant

Checks : CO (Te) 7

Seasons : *Kharif*

Replication : 3 Plot size: 3 m x 2.5 m Spacing: 22.5 cm x 10 cm.
(10 rows per plot)

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers : Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu

Varagu

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TNPSc 176	Selection from DPS 19	107	1351	High yielding, Suitable for rainfed conditions
TNPSc 262	Selection from DPS 63	107	1267	Tall plant stature, more fodder yield, Long panicle

Checks : CO 3

Seasons : *Kharif*

Replication : 5 Plot size: 3 m x 2.5 m Spacing: 22.5 cm x 10 cm.
(10 rows per plot)

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers : Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal

Panivaragu

Entry	Parentage	Duration (Days)	Grain yield (Kg/ha)	Special features
TN Pm 231	K1 x TNAU 137	69	2729	High yielding, bold grains and input responsive
TN Pm 238	Selection from IPM19	63	2405	Stable in yield potential, drought tolerant and non lodging
TNPm244	TNAU143 x PV4824	72	2031	Open panicle, bold seeds, high grain yield, drought tolerant
TNPm247	PV1403 x PV1673	75	2082	High yield, large panicle, bold seeds

Checks : CO (Pv) 5

Seasons : *Kharif*

Replication : 3 Plot size: 3 m x 2.5 m Spacing: 22.5 cm x 10 cm.
(10 rows per plot)

Fertilizer schedule: 40: 20:00 Kg of NPK /ha

Centers : Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu

Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any

Forage Crops

1. Fodder maize

Entry	Parentage	Duration (Days)	Green fodder yield (t/ha)	Special features
TNFM 132-4	(BC 8221 x African tall) x (SC 3322, African tall and CB7 derived progenies)	65	45.5	<ul style="list-style-type: none"> • Shorter in duration; White coloured grain; More palatability
TNFM 131-9	(CBC1 x Madurai local) x African tall x (SC 3322, African tall and CB7 derived progenies)	65	45.1	
Check: African Tall				

Season

Rabi-Irrigated Coimbatore, Vagarai, Bhavanisagar, Vriddhachalam, Paiyur, Vaigaidam, Yethapur, (Dec-Jan) Pattukottai, Killikulam, Virinjipuram

Replication: 2 Plot size/Spacing: 4 m x 1.8 m accommodating 4 m long 6 rows at 30 cm

Fertilizer dose 30: 40:20 NPK Kg/ha

Observations to be recorded: Days to 50 % tasselling, Days to 50 % silking, green fodder yield at milky stage, pests and disease score if any

ANNEXURE – I

ADAPTIVE RESEARCH TRIALS ON MILLET CROPS (Dept. of Agriculture) 2017 – 2018

ART No.	Entry	Check																									
			Thiruvallur	Vilupuram	Vellore	Tiruvannamalai	Cuddalore	Dharmapuri	Salem	Krishnagiri	Namakkal	Erode	Coimbatore	Tiruppur	Tiruchirapalli	Perambalur	Karur	Pudukkottai	Madurai	Theni	Dindigul	Virudhunagar	Ramanad	Sivagangai	Thoothukudi	Tirunelveli	Total
I. Sorghum																											
1/2017-18 (June-July)	TNS648 TKSV 1036	CO 30, K 12	2	2	4	4	2	2	2	2	2	2	4	4	2	2	4	2	2	2	2	4	-	-	-	-	52
2/2017-18 (Sept-Oct.)	TNS648 TKSV 1036	CO 30, K 12	2	2	4	4	2	4	4	2	2	2	4	4	2	2	4	2	2	2	2	4	2	4	2	2	62
3/2018-19 (Mar. April.)	TNS648 TKSV 1036	CO 30, K 12	2	2	4	4	2	2	2	2	2	2	2	4	4	2	4	2	2	2	2	2	-	-	-	-	50
II. Pearl millet (Hybrid)																											
1/2017-18 (June-July)	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	2	2	-	2	2	2	2		2	4	4	-	2	4	4	-	-	2	4	-	-	-	-	-	38
2/2017-18 (Sept-Oct.)	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	-	2	-	-	2	-	-		2	2	2	-	-	-	-	2	2	2	2	2	-	2	2	2	26
3/2018-19 (Jan- Feb.)	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	2	2	2	2	2	2	2		2	2	2	-	2	2	2	2	2	2	2	2	-	-	2	-	38
III. Ragi																											
ART 1 / 2017- 18 (June-July)	TNEc1281, TNEc1285	CO (Ra) 14, CO 15	-	4	4	4	-	4	4	4	4	4	4	-	-	-	-	-	-	-	-	4	-	-	-	-	40
ART 2 / 2017- 18 (Sept-Oct)	TNEc1281, TNEc1285	CO (Ra) 14, CO 15	-	4	4	4	-	4	4	4	4	4	4	-	-	-	-	-	-	-	-	4	-	-	-	-	40
IV. Samai																											
ART 1 / 2017- 18 (June-July)	TNPsu 176, TNPsu 177	CO (Samai) 4	-	4	4	4	-	4	4	4	4	4	4	-	-	-	-	-	-	-	-	4	-	-	-	-	40
ART 2 / 2017- 18 (Sept-Oct)	TNPsu 176, TNPsu 177	CO (Samai) 4	-	4	4	4	-	4	4	4	4	4	4	-	-	-	-	-	-	-	-	4	-	-	-	-	40

ADAPTIVE RESEARCH TRIALS ON MILLET CROPS (KVK's) 2017 – 2018

ART No.	Entry	Check																					
			Pudukkottai	Karur	Perambalure	Cuddalore	Virudhunagar	Trichy	Vellore	Thiuvallur	Krishnagiri	Arupukottai	Villupuram	Salem	Madurai	Dharmapuri	Namakkal	Kovilpatti	Theni	Coimbatore	Erode	Tiruvannamalai	Total
I. Sorghum																							
1/2017-18 (June-July)	TNS648 TKSV 1036	CO 30, K 12	2	-		2	2	2	2	2	-	-	2	2	2	2	-	-	-	-	-	20	
2/2017-18 (Sept-Oct.)	TNS648 TKSV 1036	CO 30, K 12	2	-	-	2	-	2	2	-	-	2	2	-	2	-	-	-	-	-	-	14	
3/2018-19 (Mar. April.)	TNS648 TKSV 1036	CO 30, K 12	2	-	-	2	-	2	2	2	-	-	2	2	2	2	-	-	-	-	-	18	
II. Pearl millet (Hybrid)																							
1/2017-18 (June-July)	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	2	-		2	2	2	2	2	-	-	2	2	2	2	-	-	-	-	-	20	
ART-2 Sep-Oct	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	2	-	-	2	-	2	2	-	-	2	2	-	2	-	-	-	-	-	-	14	
ART-3 Jan-Feb	TNBH121235	TNAU Cumbu hybrid CO 9, Private hybrid	2	-	-	2	-	2	2	2	-	-	2	2	2	2	-	-	-	-	-	18	
III. Ragi																							
ART 1 / 2017-18 (June-July)	TNEc1281, TNEc1285	CO (Ra) 14, CO 15	-	-	-	-	4	-	4	-	4	-	4	4	-	4	4	-	-	4	4	4	40
ART 2 / 2017-18 (Sept-Oct)	TNEc1281, TNEc1285	CO (Ra) 14, CO 15	-	-	-	-	4	-	4	-	4	-	4	4	-	4	4	-	-	4	4	4	40
IV. Samai																							
ART 1 / 2017-18 (June-July)	TNPsu 176, TNPsu 177	CO (Samai) 4	-	-	-	-	4	-	4	-	4	-	4	4	-	4	4	-	-	4	4	4	40
ART 2 / 2017-18 (Sept-Oct)	TNPsu 176, TNPsu 177	CO (Samai) 4	-	-	-	-	4	-	4	-	4	-	4	4	-	4	4	-	-	4	4	4	40

CROP MANAGEMENT

Department of Agronomy, TNAU, Coimbatore

University Research Projects

1	AECRI/FMC/CBE/2015/001 Mechanization in irrigated maize (Dec,2015 to May,2017) Dr.A.Surendrakumar, Professor (FMP) Dr.A.P.Sivamurugan, AP (Agronomy) Dr.R.Karthikeyan, AP (Agronomy) Dr.K.Sathiyabama, AP(SS&AC) Dr.C.Menaka, AP (SST)	<ul style="list-style-type: none"> • May be continued for one more season by maintaining intra row spacing uniformly
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Department of Soil Science & Agrl. Chemistry, TNAU, Coimbatore

University Research Projects

1	NRM - CBE - SAC - 14 – 001 Phosphorus acquisition and phosphorus use efficiency as influenced by various P sources in maize – groundnut sequence - An investigation using ³² P (June, 2014 to May, 2016) Dr.S.Meena, Professor (SS&AC)	<ul style="list-style-type: none"> • The project may be closed and completion report may be submitted
2	NRM/CBE/SAC/13/004 Permanent Manurial Experiment of Coimbatore Under irrigated Tropical Agro Ecosystem (November 2013 to October 2018) Dr. M. Malarkodi, Assistant Professor (SS & AC)	<ul style="list-style-type: none"> • To be continued
3	NRM/CBE/SAC/MAZ/2016/001 Screening and evaluating maize hybrids for lime induced Fe chlorosis in calcareous soils (July, 2016 to June, 2019) Dr.T.Chitdeshwari, Professor (SS&AC) Dr. R.Ravikesavan, Professor (PB&G), Dr. A. Senthil, Asst. Professor (CRP) Dr. A.P.Sivamurugan, Asst. Prof. (Agronomy)	<ul style="list-style-type: none"> • To be continued
4	NRM/CBE/SAC/MAZ/2016/002 Development, characterization and evaluation of new chelated zinc and iron formulations for Maize crop (July 2016 to June 2019) Dr.P.Malathi, Assistant Professor (SS&AC)	<ul style="list-style-type: none"> • To be continued

Externally Funded Projects

S.No.	Title of the Projects	Remarks
1	DBT/NRM/CBE/SAC/2014/R004 Bio-remediation of degraded calcareous sodic and saline-sodic soils (June, 2014 to May, 2017) Dr.T.Chitdeshwari, Professor (SS&AC) Co-Principal Investigators Dr.U.Sivakumar, Professor (Agrl. Microbiology) Dr.P.Malarvizhi, Professor (SS&AC)	<ul style="list-style-type: none"> • The project may be closed and completion report may be submitted

Seed centre, TNAU, Coimbatore

University Research Projects

1	SC / CBE / SST / 2013 / 008 Influence of seed moisture content and containers under controlled and modified atmospheric conditions on storability of maize seeds (December 2013 to November 2016) Dr. K. Nelson Navamaniraj, Asst. Prof. (SST)	<ul style="list-style-type: none">• The project may be closed and completion report may be submitted
2	SEED/ CBE/ SST/ LUC/ 2016/ 001 Studies on maximisation of seed yield and standardisation of seed germination testing procedure in Hedge Lucerne (<i>Desmanthusvirgatus</i>). (September, 2016 to August, 2018) Dr.S. Sundareswaran, Professor (SST)	<ul style="list-style-type: none">• To be continued

MRS, Vagarai

University Research Projects

1	NRM/VGI/SAC/ MAZ/2014/001 Permanent Manurial Experiment on maize-green gram cropping system in red sandy loam soil of Vagarai under irrigated condition (Oct 2014 to Sep 2019) Dr. M.Elayarajan*, Asst. Professor, (SS & AC)	<ul style="list-style-type: none">• * <i>In-lieu of</i> the scientist transferred, a crop management scientist may be identified and necessary approval may be obtained from the Director of Research, TNAU, Coimbatore. (Action: Professor and Head, MRS, Vagarai)• Equivalent yield of the cropping system may be worked out.• Micronutrient analysis and assessing the functional groups may be done
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DARS, Chettinad

University Research Projects

1	DCM/ATL/AGR/SMM/2016/002 Samai based cropping system for rainfed agro ecosystem (June 2016 to May 2019) Dr. P. Kannan, Assistant Professor (SS&AC) Dr. T.Myrtle Grace, Professor and Head	<ul style="list-style-type: none">• To be continued
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RRS, Aruppukkotai

University Research Projects

1	DCM/APK/AGR/FSO/2016/001 Performance of multicut fodder cholam types under different land treatments and nutrient management in rainfed vertisol condition (September, 2016 to August, 2019) Dr. S.Senthivel, Professor (Agronomy)	<ul style="list-style-type: none">• To be continued
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2	NRM/APK/SAC/SMM/2016/001 Effect of integrated nutrient management practices on growth and yield of red gram (APK I) and barnyard millet Co(Kv) 2 in rainfed black soils of Virudhunagar district (October, 2016 to March, 2018) Dr.B.Bhakiyathusaliha, Asst. Professor (SS&AC)	<ul style="list-style-type: none"> To be continued
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ARS, Vaigai dam

University Research Projects

1	DCM/VGD/AGR/MAZ/2016/001 Studies on pre and post herbicidal weed management in maize hybrid CO (MH)6 (January 2016 – December 2017) Dr. R. Jeyasrinivas, Assistant Professor (Agronomy)	<ul style="list-style-type: none"> Discussion may be made with the AICRP-Weed control unit of Dept. of Agronomy, TNAU, Coimbatore for observations to be included on weed management
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ARS, Kovilpatti

University Research Projects

1	DCM/KPT/AGR/SMM/2016/001 Minor millet based contingency intercropping system for late monsoon sowing for southern district of Tamil Nadu (October 2016 - March 2018) Dr. M. Joseph, Assistant Professor (Agronomy)	<ul style="list-style-type: none"> To be continued
2	Nutrient Management for hybrid maize in rainfed vertisol (2014-16) Dr. A.Solaimalai, Assistant Professor (Agronomy)	<ul style="list-style-type: none"> The project No. may be obtained May be continued for one more year by including STCR approach in the treatments for comparison * <i>In-lieu of</i> the scientist transferred, a crop management scientist may be identified and necessary approval may be obtained from the Director of Research, TNAU, Coimbatore. (Action: Professor and Head, ARS, Kovilpatti)

CEM, Athiyandal

University Research Projects

S. No.	Title of the Projects	Remarks
1	DCM/ATL/AGR/SMM/2016/001 Agronomic management to suit mechanization in small millet (<i>Tenai</i>) (June 2016 to May 2019) Dr. K.Sivagamy, Assistant Professor (Agronomy) Dr.K.Ananthi, Assistant Professor (Crop Physiology) Dr. R. Mythili, Assistant Professor (Agrl. Engg)	To be continued

	AC&RI,Vazhavachanur	
2	DCM/ATL/AGR/SMM/2016/002 Samai based cropping system for rainfed agro-ecosystem (June 2016- May 2019) Dr. K.Sivagamy, Assistant Professor (Agronomy) Dr. S. Krishna Kumar, Assistant Professor (SS&AC) AC & RI,Vazhavachanur	• To be continued
3	DCM/ATL/AGR/SMM/2015/001 Evaluation of System of Finger millet Intensification in Tamil Nadu (October 2015 to May 2018) Dr.P.Parasuraman, Professor and Head	• To be continued
4	DCM/ATL/AGR/SMM/2015/002 Effect of organic foliar spray on growth and yield of ragi (<i>Eleusine coracana</i>) in Thiruvannamalai District (February 2015 to March 2017) Dr.P.Parasuraman, Professor and Head	• To be continued
6	DCM/ATL/CRP/SMM/2015/001 Impact of foliar application of nutrients and plant growth regulators on growth and yield of Kodo Millet (<i>Paspalum scorbiculatum</i>) under rainfed condition (June, 2015 to July, 2017) Dr. K.Ananthi, Assistant Professor (Crop Physiology)	• To be continued

RRS, Paiyur

University Research Projects

1	DCM/ATL/AGR/SMM/2016/002 Samai based cropping system for rainfed agroecosystem (June 2016 to May 2019) Dr. P. Ayyadurai, Asst.Professor (Agronomy) Dr. M. Vijayakumar, Asst.Professor (SS&AC)	• To be continued
2	DCM/PAI/CRP/RAG/2015/001 Physiological approaches to increase the productivity of finger millet under rainfed conditions (July 2015 to March 2018) Dr. K. Krishna Surendar,*Asst.Professor (CRP)	• To be continued • * <i>In-lieu of</i> the scientist transferred, a crop management scientist may be identified and necessary approval may be obtained from the Director of Research, TNAU, Coimbatore. (Action: Professor and Head, RRS, Paiyur)
3	NRM/PAI/SAC/SMM/2015/001 Effect of zinc and iron application on yield and nutrient uptake of finger millet under rainfed condition (July 2015 - June 2017) Dr.M.Vijayakumar, Asst. Professor (SS&AC)	• The project may be closed and completion report may be sent
4	NRM/PAI/SAC/SMM/2015/001	• The project may be closed

	<p>Permanent Manurial Experiment on samai-horsegram cropping sequence in red sandy loam soil of Krishnagiri under rainfed condition (July 2015 - June 2017) Dr.M.Vijayakumar, Asst. Professor (SS&AC)</p>	<p>and completion report may be sent</p> <ul style="list-style-type: none"> • Equivalent yield of the cropping system may be worked out
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CRS, Veppanthattai University Research Projects

1	<p>DCM/VPT/AGR/MAZ/2015/001 Nutrient management for hybrid maize in rained vertisol (August 2015 – July 2017) Dr. N.Meyyazhagan, Professor and Head</p>	<ul style="list-style-type: none"> • May be continued for one more year by including STCR approach in the treatments for comparison.
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Action Plan Trials Proposed:

1. Enhancing the productivity of nutri -cereals through supplemental irrigation and moisture conservation

Objective:

- ✓ To study the effect of supplemental irrigation from farm pond and crop residue mulch on Samai and Kuthiraivali productivity

Work Plan

Activity

- ✓ Rainwater harvesting
- ✓ Recycling of harvested rainwater at the time of moisture stress through mobile sprinkler
- ✓ Recording biometric attributes at 30 days interval
- ✓ Soil moisture at weekly interval
- ✓ Recording yield attributes and yield of Samai and Kuthiraivali
- ✓ Water Use Efficiency and Water productivity

Crops: Kuthiraivali and Samai

Experimental details

- T₁** - Farmers practice (rainfed cultivation without supplemental irrigation)
T₂ - Supplemental irrigation twice through **mini portable sprinkler**
T₃ Supplemental irrigation twice through **mini portable sprinkler** & crop residue mulch 2.5 t/ha

- ❖ Recommended crop and soil management practices are uniform for all the treatments
- ❖ Supplemental irrigation during moisture stress period (tillering and flowering stage) of crop growth.

Duration: Two years (2017 – 19)

Requirement

- ✓ Farm pond size- 3 cents area with 2 m depth with polythene lining
- ✓ Mini portable sprinkler unit for recycling of harvested water

Observations to be recorded:

- ✓ Runoff and water harvesting potential

Biometric attributes:

- ✓ Crop establishment/ population ha⁻¹ at 15 DAS and at harvest
- ✓ Plant height (cm) at 45 DAS & at harvest
- ✓ Dry matter production (kg/ ha) at 45 DAS & at harvest

Yield attributes

- ✓ No. of panicles/ plant
- ✓ Panicle weight (g)
- ✓ Test weight (g)

- ✓ Grain and straw yield (kg/ha)

Physiological studies - At the time of moisture stress and after supplemental irrigation

- ✓ Relative water content (RWC)
- ✓ Proline content
- ✓ Chlorophyll stability index

Soil properties

- ✓ Soil moisture content at 15 days interval
- ✓ Organic carbon, N, P, K – Initial and Post harvest

Co-ordinating Centre

WTC, TNAU, Coimbatore

Scientists In-charge

Dr. S.P. Ramanathan, Professor (Agronomy)
Dr. K. Nagarajan, Professor (SWC)

Collaborating Centres

RRS, Aruppukottai

Scientists In-charge

Dr. P. Duraisingh, Professor (Agronomy)
Dr. Salika, Assistant Professor (SS&AC)
Dr. S. Selvakumar, Assistant Professor (SWC)

ARS, Kovilpatti

Dr. M. Joseph, Assistant Professor (Agronomy)
Dr. Sanjeev Kumar, Assistant Professor (SS&AC)
Dr. Anandaraj, Assistant Professor (SWC)

CEM, Athiyendal

Dr. P. Parasuraman, Professor (Agronomy) & Head
Dr. S. Krishnakumar, Assistant Professor (SS&AC),
Vazhavachanur

2. Enhancing water use efficiency and water productivity of maize - vegetable cropping system

Objective:

- To improve the water use efficiency and water productivity of maize - vegetable cropping system

Treatment details:

- T₁** Drip fertigation @ 100% PE in Maize fb Onion / prevailing vegetable
T₂ Drip fertigation @ 125% PE in Maize fb Onion / prevailing vegetable
T₃ Conventional irrigation in Maize fb Onion/ prevailing vegetable

Duration: Two years (2017-19)

Season:

- Kharif* season - Maize
Rabi season - Onion / prevailing vegetable

Variety:

- Maize – TNAU Maize hybrid CO 6
Onion - CO (On) 5 (seedlings)

Plot Size: 10 cents for each treatment

Drip Irrigation Layout:

Two rows of Maize in bed width of 90 cm
 Distance between two laterals - 120 cm and emitters discharge – 4 lph
 Fertigation schedule: RDF of respective crops
 Maize: 250:75:75 kg N, P, K/ ha
 P applied as SSP basally. N & K as conventional fertilizers (urea and white potash)
 Fertigation schedule: once in 3 days

Stage	Percentage of RDF	
	N	K
Vegetative stage	25%	10%
Crop development stage	50%	50%
Maturity stage	25%	40%

Observations to be recorded:

Maize

- Growth parameters – Plant height, DMP at 30, 60 DAS and at harvest
- Physiological attributes – Leaf area index at 30, 60 DAS and at harvest
 Relative water content, Proline content and Chlorophyll stability index at vegetative and grain filling stage.
- Yield parameters – Cob length, Cob girth, Grain yield and Stover yield

Onion / Prevaling vegetable - Growth and yield parameters

Water usage - Quantity of water used, Water use efficiency, water productivity

Economic analysis – System basis (Maize equivalent) - Gross return, Net return and B: C ratio

Co-ordinating Centre

WTC, TNAU, Coimbatore.

Scientists In-charge

Dr. S.P. Ramanathan, Professor (Agronomy)
 Dr. G. Senthil Kumar, Assistant Professor (Agronomy)
 Dr. K. Nagarajan, Professor (SWC)

Collaborating Centres

AEC & RI, Kumulur

Scientists In-charge

Dr. S. Vallalkannan, Assistant Professor (Agronomy)
 Dr. K. Arunadevi, Assistant Professor (SWC)

AC & RI, Madurai

Dr. N.K. Sathiyamoorthi, Assistant Professor (Agronomy)
 Dr. M. Rajeshwari, Professor (SWC)

On Farm Trial (OFT)

Altering crop geometry to suit mechanical weeding in maize

Objective:

To evaluate the mechanical weeder by altering crop geometry for enhancing productivity of maize.

Treatment details:

T₁ – PE Atrazine 0.25 kg/ha + power weeder operation at 45 DAS with 75 x 20 cm spacing

T₂ - Two power weeder operation at 20 and 45 DAS with 75 x 20 cm spacing

T₃ - PE Atrazine 0.25 kg/ha + Hand weeding at 45 DAS with 60 x 25 cm spacing

Project duration : *Kharif* – 2017
Variety : TNAU Maize hybrid Co 6
Plot size : 60 m²

Observations to be recorded

Growth parameters

- Plant population at 30, 60 DAS and at harvest
- Plant height at 30, 60 DAS and at harvest
- DMP at 30, 60 DAS and at harvest

Yield parameters

- Cob length in cm
- Cob girth in cm
- No of grains per row
- No of rows per cob
- Test weight (100 seed weight) in g

Grain yield (kg/ha)

Stover yield (kg/ha)

Economics

- Gross return (Rs./ha)
- Net return (Rs./ha)
- BCR

Observation on weeds

- Weed density at 20*, 40 and 60 DAS (* weed density observation should be taken before power weeder operation)
- Weed dry weight at 20, 40 and 60 DAS

Weeder evaluation

- Area coverage (m²/hr)
- Crop damage (%)

- Labour requirement in man days / ha

Co-ordinating centre and Scientist : Maize Research Station, Vagarai
Dr. P. Thukkaiyannan
Assistant Professor (Agronomy)

OFT centres and Scientists in-charge AC&RI, Madurai
Dr. E. Subramanian
Assistant Professor (Agronomy)
ARS, Bhavanisagar
Dr. S. K. Natarajan
Assistant Professor (Agronomy)
Maize Research Station, Vagarai
Dr. P. Thukkaiyannan
Assistant Professor (Agronomy)

Forage crops

Sl. No.	Project No. and Title	Remarks
1	DCM/CBE/AGR/FRG/2015/001 Performance evaluation of drip fertigation in Cumbu Napier hybrid grass Dr. S.D. Sivakumar, AP (Agronomy) March 2015 to May 2017	<ul style="list-style-type: none"> To be closed and findings can be given for information
2	DCM/CBE/AGR/FRG/2016/001 Developing package of practices for yield maximization in <i>Desmanthus</i> pre-release culture TND 1308 Dr. S.D. Sivakumar, AP (Agronomy) Jan. 2016 to June 2018	<ul style="list-style-type: none"> To be continued
3	DCM/CBE/AGR/FRG/2016/002 Fodder bank for balanced nutrition to livestock Dr. S.D. Sivakumar, AP (Agronomy) Dr. M. Sabapathy, AP (V &AS) August 2016 to July 2018	<ul style="list-style-type: none"> To be continued. Number of days taken for cutting rotation in different seasons may be assessed.
4	DCM/CBE/AGR/FRG/2016/001 Fodder preservation through silage making Dr. V. Vasuki, AP (Agronomy) Dr. M. Thirunavukkarasu, AP (V&AS) Sept. 2016 to Sept. 2018	<ul style="list-style-type: none"> To be continued
5	DCM/CBE/SAC/MAZ/2016/001 Economic evaluation of intensive cultivation of fodder maize and its impact on soil health Dr. K. Sathiya Bama, AP (SS&AC) Dr. R. Karthikeyan, AP (Agronomy) Dr. A. Ramalakshmi, AP (Agrl. Microbiology) August 2016 to July 2018	<ul style="list-style-type: none"> To be continued

FOR INFORMATION

DCM/CBE/AGR/FRG/2015/001- Performance evaluation of drip fertigation in Cumbu Napier hybrid grass (March 2015 – May 2017)

Paired row drip system (60/90 cm x 50 cm) + Drip irrigation at 100% PE + N fertigation at 125% RDN recorded

- 27.7 % of water saving as compared to surface irrigation
- with green fodder yield of 346.1 t/ha/yr
- Benefit cost ratio of 3.47.

CROP PROTECTION

General Remarks

1. All the survey data should accompany the GPS coordinate. (**Action: All Scientists**).
2. In the management trials, pesticides which are having CIB label claim alone should be tested. (**Action: All Scientists**).
3. The action plan on Post Flowering Stalk Rot in maize is to be proposed as University Research Project. (**Action: Dr.P.Renukadevi, Asst.Professor (Pl.Pathology)**).
4. The action plan on pearl millet rust is to be proposed as University Research Project (**Action: Dr.I. Johnson, Asst.Professor (Pl.Pathology)**).
5. Action plan proposed over years need to be completed without any deviation. (**Action: Dr. M. Rajesh, Assistant Professor (Plant Pathology)**).
6. A request may be sent to Professor and Head, Dept.of Pl.Pathology, TNAU, CBE for student SRF for the new externally funded project. (**Action: G. Senthilraja, Assistant Professor (Plant Pathology)**)

Remarks on the ongoing Research Projects

S.No.	Project Details	Remarks
I. Agrl. Entomology		
1.	DRES /KPT/ AEN /013/ 002. Evaluation of sorghum cultures for their resistance to major pests. Aug.2013-July 2016)- Dr. P. Anandhi,Asst. Prof. (Agrl. Ent.),ARS, Kovilpatti	The completion report to be submitted for approval.
2.	CPPS/KPT/ENT/SOR/2015/001 Eco-friendly approaches for the management of important pests of sorghum. October 2014-September 2017. Dr. P. Anandhi, Asst. Prof. (Agrl. Ent.),ARS, Kovilpatti	The field experiments failed due to drought. Experiments to be repeated.
3.	CPPS/CBE/ENT/SOR/2015/001: Screening of sorghum accession against major pests of sorghum and its management. (September 2015 to September 2018). Dr.S.Manimegalai, Professor (Agricultural Entomology),Dept. of Entomology, TNAU, Coimbatore	Stem tunneling to be assessed to express the resistance level in addition to external damage level.
II.Pl. Pathology		
4.	“AICRP/PBG/CBE/MAZ/004” Screening of maize entries against sorghum downy mildew under artificial condition and documenting other diseases. (AICRP –Maize). Dr. P. Renukadevi,Asst. Prof. (Pl. Pathology), Dept. of Millets,Coimbatore	The project may be continued as per the technical programme of AICRP.

5.	UGC/CPPS/MDU/PAT/2014/R003 Exploiting genetic variability of Maize genotypes resistance to turicum leaf blight disease under artificial epiphytotic conditions – UGC- Externally project – (April 2013– March 2016). Dr. K. Sethuraman, Professor (Pl. Pathology),Maize Research Station, Vagarai	Based on the salient findings of the project a new University Research Project and externally funded project may be proposed to validate the findings and technology transfer.
6.	CPPS/VGI/PAT-MAZ/2016/001. Management of leaf blight diseases of maize caused by <i>Helminthosporium turcicum</i> (Pass). (Jan 2016 to Dec 2018). Dr.R.Radhajeyalakshmi Assistant Professor (Plant Pathology) Dr. K. Sethuraman,Professor and Head, Maize Research Station, Vagarai	There is no progress of work for the reporting period. The data on the disease incidence may be recorded at appropriate time and stage by conducting the trial in suitable season . The fungicides with CIB label claim alone should be used in the trial.
7.	AICRP/PBG/CBE/PEM/009 Evaluation of AICRP trials in Pearl millet: Performance of pearlmillet entries against major diseases under downy mildew sick plot conditions and management of pearlmillet downy mildew. AICRP- Pearl millet. Dr.I. Johnson, Assistant Professor (Pl. Pathology, Dept. of Millets, Coimbatore-3	The project may be continued as per the technical programme of AICRP.
8.	CPPS/ATL/PAT/SMM/2015/002. An investigation into the epidemiology and ecofriendly management of blast disease in finger millet. .(January 2015 to December 2017). G. Senthilraja, Assistant Professor (Plant Pathology), Centre of Excellence in Millets, Athiyandal	The progress of work is very poor. The PDI should be worked out in the management trial.
9.	CPPS/ATL/PAT/SMM/2014/001 Assessment and management of seed borne pathogens infection of Finger millet (<i>Elusinecoracana</i> (L.) Gaertn.) inTiruvannamalai District of Tamil Nadu. (October 2014 – September 2017). Dr. M. Rajesh, Assistant Professor (Plant Pathology), Centre of Excellence in Millets, Athiyandal.	There was no progress due to failure of crop. The work may be intensified in the ensuring year. A midterm correction may be sent to include the objectives of action plan.
10.	AICRP/PBG/ATL/SMM/008 AICRP on Small Millets. Dr. M. Rajesh, Assistant Professor (Plant Pathology), Centre Centre of Excellence in Millets, Athiyandal	The project may be continued as per the technical programme of AICRP.
11.	CPPS/PAI/PAT/SMM/2016/001. Management of finger millet blast.(October-	The project may be continued. Recommended to repeat the

	2016-Oct.2019). Dr.T.Anand, Assistant Professor (Pl.Pathology), RRS, Paiyur.	management experiment at Paiyur, Athiyandal, Vazhalavachanur and Pappalapatti to get consistent data.
III.Nematology		
12.	CPPS/ATL/NEM/SMM/2016/001 Studies on the root knot nematode, <i>Meloidogyne</i> sp. in samai (<i>Panicum sumatranse</i>). (October, 2016 – October, 2019). Dr. M. ShanmugaPriya, Assistant Professor (Nematology), Centre of Excellence in Millets, Athiyandal	Proposal may be submitted to keep the project in abeyance, since the project leader has been transferred.
13	CPPS/ATL/NEM/SMM/2014/001. Studies on the occurrence of plant parasitic nematodes associated with small millets in Tiruvannamalai District. (November, 2014 – October, 2016). Dr. M. ShanmugaPriya, Assistant Professor (Nematology), Centre of Excellence in Millets, Athiyandal	The completion report may be submitted for approval.

IV. Action plan for 2016-2019 on the identified themes

I.Plant Pathology:

Maize		Theme 1: Disease management in Maize			
Theme leader		Dr.P.Renukadevi, Asst.Professor (Pl.Path), Dept. of Millets, TNAU, CBE			
S.No	Activity	Year 2016-17	Year 2017-18	Year 2018-19	Deliverables/ expected outcome
1.	Integrated management of Post Flowering stalk rot in maize.	Survey and identifying virulent isolate	<p>1.Survey and identifying virulent isolate will be continued.</p> <p>2.Screening of bioagents (<i>Trichoderma asperellum</i> ,<i>T. harzianum</i>, <i>Pseudomonas fluorescens</i> and <i>Bacillus amyloliquefaciens</i>), fungicides (carbendazim, benomyl , propineb, trifloxystrobin +tebuconazole), Copper oxy chloride under <i>in vitro</i></p> <p>3.ISR studies (PO, PPO and PAL) of effective treatment upon artificial inoculation of the pathogen in maize</p>	<p>Management with effective bioagents, fungicides under field condition in two seasons (<i>Kharif</i> and <i>Rabi</i> crop)</p> <p>Consolidation of the results</p>	Identification of suitable combination of bioagent, fungicide and organic manure for the management of PFSR and package will be given for the maize growers.

Theme 2: Leaf blights management in Maize					
Theme leader		Dr.R. Radhajeyalakshmi, Asst.Professor (Pl.Path), MRS, Vagarai			
S.No	Activity	Year 2016-17	Year 2017-18	Year 2018-19	Deliverables
1.	Developing IDM Package for managing leaf blight diseases of maize	Survey and identifying virulent isolates of leaf blight pathogens of maize. (<i>Helminthosporium turcicum</i> and <i>Helminthosporium maydis</i>)	1. Survey and identifying virulent isolates of leaf blight pathogens of maize. (<i>Helminthosporium turcicum</i> and <i>Helminthosporium maydis</i> to be continued). 2. <i>In vitro</i> screening of bioagents (<i>Bacillus subtilis</i> , <i>Pseudomonas fluorescens</i> (Seed treatment - @ 10 g/kg) ; fungicides (Mancozeb (0.2%), Azoxystrobin (0.3%) and Propiconazole (0.1%)) against leaf blight. 3. Pot culture testing and mechanism of action related to ISR.	Field testing of the best treatment for the management of leaf blight pathogens during <i>Kharif</i> and <i>Rabi</i> seasons	Management technique for Leaf blight diseases of maize.
Pearl Millet					
Theme leader		Theme 1:Disease management in Pearl Millet Dr.I. Johnson, Asst. Professor (Pl.Path), Dept. of Millets, TNAU, CBE			
S.No	Activity	Year 2016-17	Year 2017-18	Year 2018-19	Deliverables
1.	Management of rust disease in Pearl Millet	Survey on rust disease and assessing the susceptibility of different released varieties/hybrids for further studies	Field screening of systemic acquired resistance compounds viz., methyl salicylate, prochloraz and acibenzolar S methyl and fungicides viz., tebuconazole, difenoconazole, azoxystrobin and trifloxystrobin against rust disease under field conditions (<i>kharif</i> season)	Management studies with effective compounds and fungicides (<i>Kharif</i> and summer crop continued). Consolidation of the results	Systemic resistance inducing compound/fungicide for an effective management of rust disease

3. Small millets		Theme 1: Documentation of small millet diseases			
Theme leader		Dr. G. Senthilraja, Asst.Professor (Pl.Path), CEM, Athiyandal			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables/ expected outcome
1.	Survey and documentation of diseases of small millets	<ul style="list-style-type: none"> Collection , isolation and identification of pathogens Cultures will be deposited to the Indian Type Culture Collection, IARI, New Delhi and culture collection Bank at the Dept. of Plant Pathology, TNAU, Coimbatore 			<ul style="list-style-type: none"> Documentation of different diseases in small millets Maintenance of pure culture for further studies Preparation of bulletins to create awareness among farmers
Theme 2: Assessment of finger millet blast incidence					
Theme leader		Dr. M. Rajesh, Asst.Professor (Pl.Path), CEM, Athiyandal			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables
1.	Fortnightly sowing of finger millet for blast disease assessment	<ul style="list-style-type: none"> Sowing of finger millet (CO(Ra)14) at fortnight interval during the <i>kharif</i>, <i>rabi</i> and summer seasons to assess the incidence of blast disease (leaf, neck and finger blast). Standard meteorological week for sowing , occurrence of disease and weather factors will be correlated 			Prediction of the occurrence of blast in finger millet for taking up timely disease management.
Theme 3: Cross infectivity study rice and finger millet blast pathogens					
Theme leader		Dr. G. Senthilraja, Asst. Professor (Pl.Path), CEM, Athiyandal			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables
1.	Host pathogen interaction studies pertaining to leaf, neck and finger /panicle blast in finger millet & Rice	Isolation of blast pathogen from ragi and rice.	Characterization of blast pathogen and proving pathogenicity of <i>M. grisea</i> in susceptible cultivar (Ragi: CO(Ra)14; Rice: White ponni).	Cross infectivity studies between the isolates infecting rice and ragi.	Host specificity & virulence of the <i>M. grisea</i> isolates will be identified. Newer races if any will be identified and documented.

Theme 4: Yield loss assessment					
Theme leader		Dr. M. Rajesh, Asst.Professor (Pl.Path), CEM, Athiyandal			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables/
1.	Assessment of yield loss in finger millet due to blast disease	Yield loss due to the occurrence of blast disease in finger millet will be assessed under field conditions without imposing any treatments.			Yield loss in ragi due to blast disease will be estimated.
Theme 5 : Management of finger millet blast					
Theme leader		Dr. T. Anand, Asst.Professor (Pl.Path), RRS, Paiyur			
		Members Dr. G. Senthilraja, Asst. Prof (Pl. Path),CEM, Athiyandal Dr. M. Rajesh,Asst. Prof (Pl. Path),CEM, Athiyandal			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables/
1.	Management of finger millet blast using biocontrol agents and fungicides	Field trials for the management of finger millet blast using biocontrol agents and fungicides with the following treatments, <ul style="list-style-type: none"> •T1: ST @ 10g/kg +two sprays of talc formulation of TNAU-Pf1 @ 10g/l •T2: ST @ 2 g/kg of seed + two sprays of Tricyclazole @ 1 g/l •T3: ST with talc formulation of TNAU-Pf1 @ 10g/kg + two sprays of Tricyclazole @ 1 g/l •T4: ST with Tricyclazole @ 2 g/kg of seed + two foliar sprays of talc formulation of TNAU-Pf1 @ 10g/l •T5: Untreated check Foliar application of bioagent & fungicide will be given during Maximum tillering and heading phase Design: RBD; Variety: CO(Ra)14; Replications : 4 Observation to be recorded: <ul style="list-style-type: none"> A. Incidence of different types of blast •Leaf blast (PDI), neck blast (%), nodal blast (%) and finger blast (%) B.Growth and yield attributes • Plant height, No. of productive tillers/hill, grain yield, B:C ratio 			Effective treatment will be identified for the management of finger millet blast

II. Agrl. Entomology

Theme 1: Sorghum pest management					
Theme Leader		Dr. P. Anandhi, Asst. Professor (Agrl Entomology)			
S.No	Activity	2016-17	2017-18	2018-19	Deliverables/ expected out come
1.	Evaluation of non-sorghum bund crop vegetations for enhancing natural enemies and pest management in sorghum	<p>1. Suitable bund crops will be identified. (coriander, cowpea, sesame, okra, cluster bean, black gram and gingelly, sunflower, maize, bajra and vegetable lab lab)</p> <p>2. Identification of pests and natural enemies by using standard taxonomic keys.</p> <p>• Crop failed due to drought. To be repeated in 2017-18</p>	<p>1. Suitable intercrops will be identified (coriander, cowpea, sesame, okra, cluster bean, black gram and gingelly, sunflower, maize, bajra and vegetable lab lab)</p> <p>2. Identification of pests and natural enemies by using standard taxonomic keys</p>	<p>1. Comparing intercrop & bund crop with non-IPM module</p> <p>2. Identifying orientation behaviour of parasitoids and predators towards flower and leaf samples of sorghum and non-sorghum crops using olfactometer and EAG</p> <p>3. Identification and estimation of volatile compounds of flower and leaf samples of sorghum and non-sorghum crops using GC-MS</p>	<p>☐ Suitable bund & intercrop will be identified for the pest management of sorghum</p>
Theme 2.	Development of IPM strategies for major insect pests of sorghum under rainfed conditions	<p>1. Validation of the IPM strategies against major pests of sorghum</p> <p>2. Identification of naturally occurring parasitoids/ predators</p> <p>Objectives are merged in theme . 3</p>	Confirmation of the IPM strategies against major pests of sorghum	<p>1. Comparing IPM with non-IPM module</p> <p>2. Confirmation of the parasitoids/ predators by using standard taxonomic keys</p>	<p>Identifying best IPM modules</p> <p>Naturally occurring parasitoids/ predators will be identified</p>

Theme 3: Identification of resistance mechanism and validating IPM modules for resistant entries

Theme Leader: Dr. S. Manimegalai, Professor (Agrl. Entomology)
Member: Dr. P. Anandhi, Assistant Professor (Agrl. Entomology), ARS, Kovilpatti

Activity	2016 – 17	2017 – 18	2018 – 19	Deliverables
Screening of sorghum accession against major pests of sorghum and its management.	TNAU entries were screened against shoot fly and stem borer both during <i>Rabi</i> 2016 (Kovilpatti, Coimbatore) and Summer 2017 (Coimbatore)	Morphological & biochemical basis of resistance will be studied in the promising entries in comparison with resistant and susceptible check. * Effect of Vetiver as trap crop as suggested in the pre review meeting will be carried out.	Response of resistant varieties to IPM practices in comparison with susceptible entries.	Basis of resistance will be identified one each in resistant, moderately resistant and susceptible entry. Response of IPM modules will be assessed for one moderately resistant and one susceptible variety.