

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

41st Pulses Scientists Meet (17th and 18th April, 2023)

Lead Centre

National Pulses Research Centre
Vamban – 622 303
Pudukottai District

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore – 641 003

2023

PROCEEDINGS
41st Pulses Scientists Meet
(17th and 18th April, 2023)

The 41st Pulses Scientists Meet was held on April 18, 2023 in Seminar Hall I of Tamil Nadu Agricultural University, Coimbatore.

During the opening remarks, **Dr. V. Geethalakshmi**, Respected Vice-Chancellor emphasized the need for increasing the productivity of pulses through adopting high yielding varieties, improved crop management practices and plant protection measures. The introduction of new varieties and traditional pulses for sustaining the yield and quality of pulses, development of synchronized maturing varieties and varieties with increased resistance to MYMV and storage pests were also stressed upon. Madam had insisted the need for the development of effective forecast models for the management of major insect pests and diseases in pulses.

During the welcome address, **Dr. M. Raveendran**, Director of Research, TNAU, Coimbatore presented the overview of pulses cultivation and production in Tamil Nadu. He insisted the need for popularization of improved varieties and viable technologies for maximizing the yield of pulses. The significance of plant genetic resources in pulses and their effective utilization in the crop improvement programme were highlighted. It was insisted to propose theme based and problem-based research projects/action plans. It was emphasized to produce and supply quality seeds to farmers and stake holders in accordance with the indents given by the Department.

The progress on the externally funded research projects, ongoing University Research Projects, Action Plan Projects, On Farm Trials and AICRP projects was reviewed critically by the Vice-Chancellor.

Dr. R. Ravikesavan, Director (CPBG) presented the action taken on the recommendations of the previous Pulses Scientist Meet, research highlights and action plan for the ensuing year for Crop improvement.

Dr. M.K. Kalarani, Director (DCM) and **Dr. P. Balasubramaniam**, Director (NRM) made presentations on the research highlights and action plan for 2023-24 pertaining to Crop Management and Natural Resource Management respectively.

Dr. M. Shanthi, Director (CPPS) presented the research highlights and proposed the action plan for the year 2023-2024.

The meeting was concluded with the formal vote of thanks by **Dr. K. Subrahmaniyan**, Director, TRRI, Aduthurai.

The proceedings of the meet are given in the following sub-heads

I. CROP IMPROVEMENT

- A. Decisions made on the entries for Variety Release Proposal/ART/OFT/ MLT evaluation
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects/AICRP/Externally funded projects
- D. Action Plan 2023-2024

II. CROP MANAGEMENT

- A. Decisions made on OFT
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects /AICRP/ Externally funded projects
- D. Action plan 2023-2024

III. CROP PROTECTION

- A. Decisions made on OFT
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects /AICRP/ Externally funded projects
- D. Action plan 2023-2024

IV. REMARKS

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

A. Decision made on the entries for variety release proposal / ART / OFT / MLT evaluation

1. Cultures identified for variety release (2023-24)

a. Blackgram (Rice fallow)

S. No.	Culture (s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over		Special features
					ADT 6	VBN 9	
1.	VBG 13-003	KU 216 × VBN 3	70-75	732	4.0	5.8	<ul style="list-style-type: none"> • More basal branches • Determinate plant type with synchronized maturity

b. Greengram (*Kharif / Rabi & Summer*)

S. No.	Culture (s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over		Special features
					CO 8	VBN 4	
1.	VGG 18-002	EC 496839 × IPM 409-4	65-70	900	21.2	21.7	<ul style="list-style-type: none"> • Suitable for all seasons • Determinate plant type with synchronized maturity • Bold seeded (100 grain weight of 5.8 to 6.0 grams) • High Vitamin C (18.17 mg/100 g) Moderately resistant to MYMV and Powdery mildew

c. Greengram (Rice fallow)

S. No.	Culture (s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over	Special features
					ADT 3	
1.	COGG 13-39	CO 6 × SML 668	60-65	744	31.1	<ul style="list-style-type: none"> • Suitable for Rice fallow condition(s)

II. Cultures identified for the evaluation under OFT / ART (2023-24)

OFT - 2023-24

a. Blackgram

S. No.	Culture (s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over			Special features
					VBN 6	VBN 8	CO 7	
1.	COBG 13-04	T 9 × ADT 5	60-65	808	9.0	8.6	9.0	High yield; Resistant to YMV

OFT: 10 locations

ART 2023 – 24**a. Redgram (Short duration)**

S. No.	Culture(s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over		Special features
					VBN (Rg) 3	CO (Rg) 7	
1.	CRG 16-01	CO (Rg) 7 x AL 1738	110-115	1018	8.8	5.0	Early duration; Photo-insensitive; Moderately resistant to SMD and wilt
Check		CO (Rg) 7					
Season		<i>Kharif and Rabi</i>					
Districts		Dharmapuri, Krishnagiri, Vellore, Salem, Madurai, Thiruvannamalai (5 trials per Dist.)					
KVKs		Vellore, Madurai, Salem, Dharmapuri, Krishnagiri (5 trials per KVK)					

b. Redgram (Long duration)

S. No.	Culture(s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over		Special features
					CO 8	CO 9	
1.	CRG 17-008	CO 6 x ICP 11003	180	1458	10.20	23.14	High yield Resistant to SMD
Check		CO 8, CO 9					
Season		<i>Kharif</i>					
Districts		Dharmapuri, Krishnagiri, Vellore, Salem, Madurai, Thiruvannamalai (5 trials per districts)					
KVKs		Vellore, Madurai, Salem, Dharmapuri, Krishnagiri (5 trials per KVK)					

c. Blackgram (Rice Fallow)

S. No.	Culture(s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over	Special features
					VBN 9	
1.	VBG 18-043	VBN (Bg) 4 x Mash 114	75-80	712	10.0	Glabrous pod High yield MYMV resistant
2.	KKB 15-052	PU-06-20 x KKB 12-107	75-80	702	9.71	High yield MYMV resistant
Check		VBN 9, ADT 6, ADT 7				
Season		December - January				
Districts		Cuddalore, Thiruvarur, Nagapattinam, Mayiladuthurai, Thanjavur (125 trials @ 25 locations per district)				
KVKs		Sirugamani, Viridhachalam, Needamangalam (15 trials @ 5 trials in each KVK)				

d. Greengram (Rice Fallow)

S. No.	Culture(s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over	Special features
					ADT 3	
1.	VGG 17-036	VBN (Gg) 3 x PusaEm 14-01	70-75	735	10.0	High yield; Moderately

					resistance to YMV
Check	ADT 3, VBN 6				
Season	December - January				
Districts	Cuddalore, Tiruvarur, Nagapattinam, Mayiladuthurai, Thanjavur (125 trials @ 25 locations per district)				
KVKs	Sirugamani, Virudhachalam, Needamangalam (15 trials @ 5 trials in each KVK)				

e. Chickpea

S. No.	Culture(s)	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percent increase over		Special features
					CO 4	JG 11	
1.	ICCV181674	(Genesis 836 / GG2) x (ICC 4958TM/JG 11)	70-75	1363	10.50	12	Extra early High yield Tolerant to dry root rot
Check	CO 4, JG 11						
Season	<i>Rabi</i>						
Districts	Coimbatore, Tirupur, Dharmapuri, Salem, Erode, Krishnagiri (40 Trials – five trials in each district)						
KVKs	Tirupur, Dharmapuri and Salem (20 trials - Five trials in eachKVK)						

III. Cultures identified for evaluation under Multi location trial (2023-24)

1. Multi Location Trial - Redgram

a. Redgram (Short duration)

Design	:	RBD	No. of replications	:	Five
Plot size	:	6 rows - 4 × 5.4 m ²	Seed quantity	:	500g/entry/ location
Spacing	:	90 × 30 cm	Season	:	<i>Kharif</i> and <i>Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	CRG 18-02 (R)	CRG 18-02 / CO(Rg) 7 x BDN 2	120-130	1012	High yield Resistant to SMD
2.	VMRG 15-006 (R)	AL2025 x ICP 15598	120-130	1161	High yield
Checks	CO (Rg) 7, VBN (Rg) 3				
Locations (06)	Vamban, Coimbatore, Paiyur, Virinjipuram, Vazhavachanur and Bhavanisagar				

b. Redgram (Long duration)

Design	:	RBD	No. of replications	:	Four
Plot size	:	6 rows- 4 × 7.2 m ²	Seed quantity	:	500g/entry/ location
Spacing	:	120 × 30 cm	Season	:	<i>Kharif</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	VMRG 16-001 (R)	APK1 × Yelagiri local	160-180	1114	High yield
2.	CRG 19-007 (R)	CRG 19-007 / CO 6 x MA 6 × BDN 2	160-180	1306	High yield Resistant to SMD
3.	VMRG 16-005 (N)	LRG 41 × Yelagiri local	160-180	1386	High yield, SMD resistance

Checks	CO 8, CO 9
Locations (04)	Coimbatore, Paiyur and Virinjipuram

c. Redgram (Dual purpose)

Design	: RBD	No. of replications	: Five
Plot size	: 6 rows - 4 × 7.2 m ²	Seed quantity	: 500g/entry/ location
Spacing	: 150 × 90 cm	Season	: <i>Kharif</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	BSRG 20-029 (N)	PLS from BSR 1	180	2188	High yield than BSR 1, bold seed, green pod with purple streak
2.	BSRG 20-038 (N)	PLS from BSR 1	180	2062	High yield, bold seed
3.	BSRG 20-004 (N)	PLS from BSR 1	170	2084	Compact plant type, purple pod with green streak
Checks		BSR 1			
Locations (04)		Bhavanisagar, Paiyur, Vazhavachanur and Virinjipuram			

d. Redgram (Short duration hybrid)

Design	: RBD	No. of replications	: Three		
Plot size	: 12 rows - 8 × 10.8 m ²	Seed quantity	: 500 g/entry/ location		
Spacing	: 90 × 30 cm	Season	: <i>Kharif and Rabi</i>		
S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	ICPH 2438 (R)	ICPA 2039 x ICPR 2438	120-130	1320	High yield, Photo insensitive, short duration, CGMS based hybrid
Checks		CO (Rg) 7, National check			
Locations (06)		Vamban, Coimbatore, Bhavanisagar, Paiyur, Vazhavachnur, Virinjipuram			

2. Multi Location Trial – Blackgram

a. Blackgram (*Kharif and Rabi*)

Design	: RBD	No. of replications	: Three
Plot size	: 10 rows - 4 × 3 m ²	Seed quantity	: 200g/entry/ location
Spacing	: 30 × 10 cm	Season	: <i>Kharif and Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	VBG 19-010 (R)	BDR-1 X <i>V. mungo</i> var. <i>sylvestris</i> TCR 265	70-75	1250	High yield MYMV resistant
2.	KKB 19-003 (R)	VBN 8 x MASH 1008	65-70	1018	High yield MYMV resistant
3.	CO BG 19-12 (N)	VBN 4 x ADT 3	65-70	964	High yield MYMV resistant
4.	VBG 20-008 (N)	MDU 1 × MASH 114	70-75	1524	High yield, Erect MYMV resistant
5.	VBG 20-100 (N)	VBN 6 × <i>Vigna mungo</i> var. <i>sylvestris</i> TCR 265	75-80	1146	High yield MYMV resistant

Checks (<i>Kharif</i>)	VBN 8, VBN 11, CO 7
Locations (<i>Kharif</i>)	Vamban, Coimbatore, Paiyur, Madurai, Tindivanam, Melalathur, Virinjipuram, Vaigaidam
Checks (<i>Rabi</i>)	VBN 8, VBN 10, VBN 11, CO 7
Locations (<i>Rabi</i>)	Vamban, Coimbatore, Kovilpatti, Madurai, Tindivanam, Kudumiyanmalai, Killikulam and Veppanthatta,i Vaigaidam

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
Dept of Pulses, Coimbatore	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
CPMB, Coimbatore	-	MYMV through agro inoculation technique

b. Blackgram (Rice fallow)

Design	: RBD	No. of replications	: Four
Plot size	: 10 rows - 4 × 3 m ²	Seed quantity	: 200g/entry/ location
Spacing	: 30 × 10 cm	Season	: Rice fallow (Dec. - Jan.)

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	CO BG 19-12 (N)	VBN 4 × ADT 3	65-70	964	High yield Short duration
2.	VBG 20-008 (N)	MDU 1 × MASH 114	70-75	1524	High yield, Erect MYMV resistant
3.	VBG 20-100 (N)	VBN 6 × <i>V. mungo</i> var. <i>sylvestris</i> TCR 265	75-80	1146	High yield MYMV resistant
4.	ADBG 20027 (N)	CO 6 × LBG 17	65-70	756 (Rice Fallow)	High yield Suitable for rice fallow
Checks		ADT 7, VBN 9			
Locations		Aduthurai, Thanjavur, Keezhvelur, Killikulam			

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer and whitefly	MYMV, ULCV, Powdery mildew, root rot
Dept of Pulses, Coimbatore	Pod borer and whitefly	MYMV, ULCV, Powdery mildew, root rot
CPMB, Coimbatore	-	MYMV through agro inoculation technique

3. Multi Location Trial – Greengram

a. Greengram (*Kharif* and *Rabi*)

Design	: RBD	No. of replications	: Three		
Plot size	: 10 rows - 4 × 3 m ²	Seed quantity	: 200g/entry/ location		
Spacing	: 30 × 10 cm	Season	: <i>Kharif</i> and <i>Rabi</i>		
S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	VGG 20-157 (N)	VBN (Gg) 2 × MASH 114	65-70	1194	Early, High yield

2.	VGG 20-227 (N)	VBN 4 × VGG 16 - 045	70-75	1293	MYMV resistant Bold seed MYMV resistant
3.	VGG 20-235 (N)	VBN 4 × VGG 17 - 015	75-80	1573	Long pod, Bold seed MYMV resistant
4.	COGG 22-03 (N)	CO 7 X LRB 576 (Rice bean)	55-60	893	Short duration High yield Shiny bold seed
Checks (<i>Kharif and Rabi</i>)		VBN 5, CO 9, CO 8			
Locations (<i>Kharif</i>)		Vamban, Coimbatore, Paiyur, Madurai, Tindivanam, Melalathur, Virinjipuram, Vaigaidam			
Locations (<i>Rabi</i>)		Vamban, Coimbatore, Kovilpatti, Madurai, Tindivanam, Kudumiyamalai, Killikulam, Veppanthattai, Vaigai Dam.			

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
Dept of Pulses, Coimbatore	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
CPMB, Coimbatore	-	MYMV through agro inoculation technique

b. Greengram (Rice fallow)

Design	: RBD	No. of replications	: Three
Plot size	: 6 rows - 4 × 3 m ²	Seed quantity	: 200g/entry/ location
Spacing	: 30 × 10 cm	Season	: Rice fallow (Dec. – Jan.)

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	VGG 20-157 (N)	VBN (Gg) 2 × MASH 114	65-70	1194	Early, High yield MYMV resistant
2.	VGG 20-227 (N)	VBN 4 × VGG 16 - 045	70-75	1293	Bold seed MYMV resistant
3.	VGG 20-235 (N)	VBN 4 × VGG 17 - 015	75-80	1573	Long pod Bold seed MYMV resistant
4.	COGG 22-03 (N)	CO 7 X LRB 576 (Rice bean)	55-60	893	Short duration High yield Shiny bold seed
5.	ADGG20026 (N)	CO 8 x ML 2087	65-70	712 (Rice Fallow)	High yield Suitable for rice fallow
Checks		ADT 3, VBN 6			
Locations		Aduthurai, Thanjavur, Keezhvelur, Killikulam			

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
Dept of Pulses, Coimbatore	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
CPMB, Coimbatore	-	MYMV through agro inoculation technique

4. Multi Location Trial – Cowpea

Design	: RBD	No. of replications	: Four
Plot size	: 10 rows - 4 × 4.5 m ²	Seed quantity	: 500g/entry/ location
Spacing	: 45 × 15 cm	Season	: <i>Kharif and Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	VCP 21-001 (R)	P152 x TC 901	70-75	955	High yield Rust resistant
2.	VCP 18-007 (N)	VCP 09-13 x TV CP 9-30	70-75	1466	Early, High yield Moderately resistant to BCMV
3.	VCP 18-024 (N)	VCP 09-13 x TV CP 9-30	75-80	1405	High yield Moderately resistant to BCMV
Checks (<i>Kharif and Rabi</i>)		VBN 3, VBN 4			
Locations (<i>Kharif</i>)		Vamban, Coimbatore, Paiyur, Madurai, Virinjipuram and Killikulam			
Locations (<i>Rabi</i>)		Vamban, Coimbatore, Kovilpatti, Madurai, Trichy and Veppanthattai			

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban and Dept. of Pulses, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Aphids, Pod borer	BCMV, Root rot and Rust
Dept of Pulses, Coimbatore	Aphids, Pod borer	BCMV, Root rot and Rust

5. Multi Location Trial - Mochai

Design	: RBD	No. of replications	: Three
Plot size	: 12 rows - 4 × 7.2 m ²	Seed quantity	: 300g/entry/ location
Spacing	: 60 × 30 cm	Season	: <i>Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	PYR 21-05 (R)	HA 4 X Coll 29	80-85	920	Short duration Photo insensitive High yield
Checks		CO 2			
Locations		Coimbatore, Paiyur, Yethapur and Virinjipuram			

Note: Based on the availability of seeds, OFT may also be conducted. Artificial screening for the following pests and diseases will be carried out by Dept. of Pulses, Coimbatore and RRS, Paiyur

Name of the centre	Pests	Diseases
Dept of Pulses, Coimbatore	Aphids, Pod borer	Root rot

6. Multi Location Trial – Horsegram

Design	: RBD	No. of replications	: Three
Plot size	: 12 rows - 4 × 3 m ²	Seed quantity	: 200g/entry/ location
Spacing	: 30 × 10 cm	Season	: <i>Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	PYR 21-07 (R)	Mutant from Paiyur 2	100-105	1004	Short duration High yield
Checks		Chattisgarh Kufri, Paiyur 2			
Locations		Coimbatore, Paiyur, Yethapur, Melalathur and Virinjipuram			

7. Multi Location Trial – Chickpea

Design	: RBD	No. of replications	: Five
Plot size	: 10 rows - 4 × 3 m ²	Seed quantity	: 250 g/entry/ location
Spacing	: 30 × 10 cm	Season	: <i>Rabi</i>

S. No.	Culture(s)	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	COC 19-01 (R)	NBeG 49 X ICCV 9106	80	1328	Bold seeded (35.3g/100 seed wt.)
2.	COC 19-02 (R)	ICC 133124 X JC 14	80	1334	Bold seeded (36.2g/100 seed wt.)
Checks		CO 4, JG 11			
Locations		Coimbatore, Kovilpatti, Veppanthattai and Dharmapuri (KVK)			

Note: Screening for the following pests and diseases will be carried out by Dept. of Pulses, Coimbatore

Name of the centre	Pests	Diseases
Dept of Pulses, Coimbatore	Gram pod borer, Cut worm, semi looper	Powdery mildew, Alternaria blight, dry root rot

Important Dates in conduction of MLT and ART

Activities	Season	Last date for receipts	Date of Despatch
Receipt of seed material of the proposed ART entries at Vamban	<i>Kharif</i>	30.06.2023	15.07.2023
	<i>Rabi</i>	16.08.2023	05.09.2023
Receipt of seed material of the proposed MLT entries at Vamban	<i>Kharif</i>	30.06.2023	15.07.2023
	<i>Rabi</i>	15.08.2023	05.09.2023
	<i>Rice fallow</i>	30.11.2023	05.12.2023
Sowing report at Vamban	<i>Kharif</i>	30.07.2023	-
	<i>Rabi</i>	30.10.2023	
	<i>Rice fallow</i>	31.01.2024	
Visit of MLT / monitoring teams	<i>Kharif</i>	Sep. 2023	-
	<i>Rabi</i>	Dec. 2023	
	<i>Rice fallow</i>	Feb. 2024	
Date for receiving the trial results at Vamban for compilation	<i>Kharif</i>	15.12.2023	-
	<i>Rabi</i>	28.02.2024	
	<i>Rice fallow</i>	15.04.2024	

Monitoring team to visit MLT 2023 -24

Scientists	Centres
Dr. A. Yuvaraja, Prof.& Head, NPRC, Vamban Dr. K. Thiyagu, Asst. Prof. (PBG), NPRC, Vamban Dr. K. Amudha, Assoc. Prof. (PBG), ARS, Bhavanisagar Dr. R. Ramjegathesh, Asst. Professor (Pl. Path.), NPRC, Vamban	Coimbatore, Aduthurai Veppanthattai, Kudumiyamalai
Dr. M. Shanmuganathan, Assoc. Prof. (PBG), AC&RI, Kudumiyamalai Dr. R. Ramjegathesh, Asst. Professor (Pl. Path.), NPRC, Vamban	Eachangkottai, Keelvelur
Dr. S. Geetha, Prof. & Head, Dept. of Pulses, Coimbatore Dr. G. Senthilraja, AP (Plant Path.), Dept. of Pulses, Coimbatore Dr. P.S. Shanmugam, Assoc Prof. (Agrl. Ento), Dept. of Pulses, Coimbatore	Paiyur, Dharmapuri (KVK)
Dr. P. Jayamani, Professor (PBG), Dept. of Pulses, Coimbatore Dr. G. Senthilraja, AP (Plant Path.) Dept. of Pulses, Coimbatore Dr. P.S. Shanmugam, Assoc Prof. (Agrl. Ento), Dept. of Pulses, Coimbatore	Yethapur, Bhavanisagar
Dr. A. Gopikrishnan, AP (PBG), ARS, Virinjipuram Dr. G. Senthilraja, AP (Plant Path.) Dept. of Pulses, Coimbatore Dr. P.S. Shanmugam, Assoc Prof. (Agrl. Ento), Dept. of Pulses, Coimbatore	Vazhavachanur, Melalathur
Dr. E. Murugan, Professor (PBG), AC & RI, Madurai Dr. G. Senthilraja, AP (Plant Path.) Dept. of Pulses, Coimbatore Dr. P. S. Shanmugam, Assoc Prof. (Agrl. Ento), Dept. of Pulses, Coimbatore	Trichy, Vamban
Dr. K. Geetha, Professor (PBG), RRS, Paiyur	Virinjipuram
Dr. K. Shakthivel, Assoc. Prof. (PBG), AC&RI, Vazhavachanur	Tindivanam
Dr. R. Manimaran, Prof. (PBG), TRRI, Aduthurai Dr. P. Anandhi, Asst. Prof. (Agrl. Ento.), TRRI, Aduthurai	Tirur, Palur, Thanjavur
Dr. M. Gunasekaran, Prof. and Head, AC & RI, Madurai Dr. Zadda Kavitha Assoc Prof. (Agrl. Ento.), AC & RI, Madurai	Killikulam, Vaigaidam
Dr. D. Shoba, Asst. Prof. (PBG), AC&RI, Killikulam	Madurai, Kovilpatti, Ambasumudram

B. RESEARCH PROJECTS ON PULSES

Crop	Centre	URP	AICRP	EFP	Total	No. of Scientists
Crop improvement						
Redgram	Dept. of Pulses, Coimbatore	3	1	-	4	2
	ARS, Virinjipuram	1	1	-	2	1
	AC&RI, Vzhavachanur	1	-	-	1	1
Blackgram	NPRC, Vamban	1	1	1	3	2
	Dept. of Pulses, Coimbatore	1	1*	-	2	2
	TRRI, Aduthurai	1	1	-	2	1
	AC&RI, Killikulam	2	-	-	2	1
	AC&RI, Kudumiyamalai	1	-	-	1	1
	ARS, Thanjavur	1	-	-	1	-
Greengram	NPRC, Vamban	1	-	-	1	-
	Dept. of Pulses, Coimbatore	1	-	-	1	-
	TRRI, Aduthurai	1	-	-	1	-
	AC&RI, Eachangkottai	1	-	-	1	1
	ARS, Pattukkottai	1	-	-	1	1
Cowpea	NPRC, Vamban	1	1*	-	2	1
	Dept. of Pulses, Coimbatore	1	1*	-	2	-
	AC&RI, Madurai	1	1*	-	2	-
Horsegram	SRS, Melalathur	-	-	1	1	1
	RRS, Paiyur	1	1*	-	2	1
Chickpea	Dept. of Pulses, Coimbatore	1	1	-	2	-
Mochai	RRS, Paiyur	1	-	-	1	-
Soyabean	Dept. of Pulses, Coimbatore	1	-	-	1	-
Ricebean	Dept. of Pulses, Coimbatore	1	-	-	1	-
Mothbean	ARS, Bhavanisagar	1	-	-	-	1
Cluster bean	AC&RI, Madurai	1	-	-	1	1
Pulses	PGR, TNAU	1	-	-	1	1
Pulses - BSP	NPRC, Vamban	1	-	-	1	-
	Dept. of Pulses, Coimbatore	1	-	-	-	-
	ARS, Bhavanisagar	2	-	-	-	1
	RRS, Paiyur	1	-	-	-	1
	ARS, Pattukkottai	1	-	-	-	-
	AC&RI, Chettinad	1	-	-	-	1
	ARS, Thanjavur	1	-	-	-	-
Total		36	5+5*	2	48	22

URP : University Research Project
*AICRP - Voluntary centre

AICRP : ICAR funded AICRP projects
EFP : Externally funded projects.

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS / AICRP / EXTERNALLY FUNDED PROJECTS

Plant Breeding & Genetics

S. No.	Project No. and Title	Project leaders	Duration	Remarks
UNIVERSITY RESEARCH SUB PROJECTS				
REDGRAM				
1.	CPBG/CBE/PBG/RGR/2018/01 Evolution of high yielding short duration photo-insensitive Redgram varieties	Dr. S. Geetha Professor (PBG) and Head	May 2018- April 2023	The completion report may be submitted and new project proposal may be sent for RPAC approval.
2.	CPBG/CBE/PBG/RGR/2018/02 Evolution of high yielding grain and dual-purpose long duration varieties in redgram	Dr. S. Geetha Professor (PBG) and Head	May 2018- Apr 2023	The completion report may be submitted and new project proposal may be sent for RPAC approval.
3.	CPBG/CBE/PUL/PUL/2021/003 Development of CGMS based short duration hybrids in redgram (<i>Cajanus cajan</i>)	Dr. P. Jayamani Professor (PBG)	Sep 2021- Aug 2026	The project may be continued.
4.	CPBG/ VRI / PUL / 2022 / 001 Developing vegetable type pigeon pea for high nutritional and organoleptic qualities	Dr. A. Gopikrishnan Assistant Professor (PBG)	Jan 2021- Dec 2023	The project may be continued. The segregating material should be handled strictly under selfing. Post harvest processing may be studied simultaneously.
5.	CPBG/VAZ/PUL/2023/001 Evolution of Redgram varieties with Early Duration and High Yield suitable for Northern region of Tamil Nadu	Dr. K. Shakthivel Associate Professor (PBG)	Oct 2022 - Sep 2027	The project may be continued. The selection with regard to Early duration coupled with high yield and SMD resistance may be intensified.
Blackgram				
6.	CPBG/VMB/PUL/2023/001 Evolution of high yielding, MYMV resistant Blackgram (<i>Vigna mungo</i> L. Wilczek) genotypes	Dr. A. Yuvaraja Prof. (PBG) and Head Dr. R. Ramjegathesh Assistant Professor (Pl. Patho.)	June 2022- May 2027	The project may be continued. Genetic material to be shared to other centres
7.	CPBG/KDM/PBG/BGR/2020/001 Development of Blackgram [<i>Vigna mungo</i> L.] mutant to resistant to Leaf Crinkle Virus	Dr. M. Shanmuganathan Assoc. Prof. (PBG) Dr. R. Thilagavathy AP (Pl. Patho.)	June 2020 - May 2023	The project may be closed and new project proposal may be sent for RPAC approval.
8.	CPBG/ADT/PBG/PUL:/2021/003 Evolution of Blackgram (<i>Vigna mungo</i> (L.) Hepper) varieties suitable for rice fallow/summer irrigated conditions of CDZ	Dr. R. Manimaran Professor (PBG)	Dec 2021 - Dec 2024	The project may be continued. The PYT may be done in common evaluation mode at TRRI, Aduthurai using breeding material available from Aduthurai, Vamban, Killikulam, Coimbatore and any other centres.

9.	CPBG/KKM/PBG/BGR/20 20/001 Evolving high yielding YMV resistant black gram (<i>Vigna mungo</i> (L.) Hepper) genotypes suitable for Thimirabarani and deltazones	Dr. R. Latha Assoc. Professor(PBG) Dr. N. Rajinimala, Assoc. Professor (Pl. Pat.)	July 2019 - June 2022	The completion report should be submitted and new project proposal may be sent for RPAC approval. The genetic materials from the previous research project should be carried over the newproject.
10.	New: 'Evolving high yielding black gram (<i>Vigna mungo</i> (L.) Hepper) genotypes suitable for rice fallow tracts of Thimirabarani and Cauvery Delta zones'	Dr. D. Shoba Assistant Professor (PBG) Dr. J. Sheela Professor (Plant Pathology)	Dec 2022 - Nov 2025	RPAC approval may be obtained.
11.	CPBG/CBE/PUL/BG/2022/001 Evolution of high yielding blackgram varieties	Dr. P. Jayamani Professor (PBG)	June 2022 - May 2027	The project may be continued.
12.	CPBG/TNJ/PBG/BGR/2020/001: Evolution of high yielding Blackgram varieties suitable for rice fallow condition of Cauvery Delta Zone	Dr. S. Hari Ramakrishnan Assistant Professor (PBG)	Sep 2021 - Aug 2024	May be continued. Advanced breeding materials may be obtained from NPRC, Vamban for evaluation.
Greengram				
13.	CPBG/VMB/PUL/2023/002 Evolution of high yielding and MYMV resistant greengram (<i>Vigna radiata</i> (L.) Wilczek) genotypes with synchronized maturity	Dr. A. Yuvaraja Prof. (PBG) and Head Dr. R. Ramjegathesh Assistant Professor (Pl. Patho.)	June 2022- May 2027	The project may be continued.
14.	CPBG/ADT/PBG/GGR/2017/001 Evolution of high yielding MYMV resistant Greengram varieties suitable for rice fallow/summer irrigated conditions in CDZ	Dr. R. Manimaran, Professor (PBG)	Oct 2017- Sep 2022	The project may be closed and new project proposal may be sent for RPAC approval. The genetic materials from the previous research project should be carried over the newproject.
15.	CPBG/CBE/PUL/2021/002. Development of long pod and bold seeded greengram varieties suitable for Tamil Nadu	Dr. S. Geetha Professor (PBG) and Head	July 2021- May 2025	The project may be continued.
16.	CPBG/ECK/PBG/BGR/2021/001: Evolving high yielding short duration Greengram (<i>Vigna radiata</i> (L) Wilczek varieties suitable for Cauvery New Delta	Dr. S. Hari Ramakrishnan, Asst. Professor (PBG)	Apr 2021 - Mar 2024	May be continued. Advance breeding materials may be obtained from NPRC, Vamban for evaluation under rice fallow conditions.
17.	New: Evolution of Greengram (<i>Vigna radiata</i> (L.) wilczek) genotypes suitable for summer irrigated and rice fallow conditions of Cauvery Delta Zone through hybridization and mutagenesis	Dr. S. Chitra Assoc. Prof. (PBG) Dr. M. Dhandapani AP (PBG) Dr. R. Ramjegathesh AP (Pl. Patho.)	Dec 2022- Nov 2025	RPAC approval may be obtained.
Cowpea				
18.	CPBG/VBN/PBG/COP/2020/001 Evolution of high yielding	Dr. M. Gnanasekaran Associate Professor	Sep 2020 - Aug 2025	May be continued. The selection may be

	determinate cowpea genotypes (<i>Vigna unguiculata</i> (L.)) suitable for Tamil Nadu and maintenance of germplasm.	(PBG)		intensified for bold seed and determinate plant type.
19.	CPBG/CBE/PUL/PUL/2021/005 Evolving high yielding cowpea (<i>Vigna unguiculata</i> (L.) Walp.) Varieties superior than CO (CP) 7	Dr. K. Anandhi Assistant Professor (PBG)	Nov 2021 - Oct 2026	The project may be continued.
20.	CPBG/MDU/PBG/COP/2019 / 001 Development of short duration, determinate cowpea (<i>Vigna unguiculata</i> L.) variety suitable for southern districts of Tamil Nadu	Dr. K. Thangaraj Professor (PBG)	Sep 2019 - Aug 2022	The project may be closed and new project proposal may be submitted for RPAC approval. The genetic material of this project and BRNS Scheme should be carried over the newproject.
Horsegram				
21.	CPBG/PAI/PBG/PUL/2021/001 Development of high yielding medium duration photo-insensitive horsegram genotypes suited to rainfed tracts of North Western Zone through EMS induced mutagenesis	Dr. K. Geetha Professor (PBG)	Feb 2021 - Jan 2026	The project may be continued.
Chickpea				
22.	CPBG/CBE/PBG/PUL/2021/006 Evolving high yielding dry root rot resistant variety in chickpea	Dr. K. Anandhi Asst. Prof. (PBG) Dr. G. Senthilraja Asst. Prof. (Pl. Patho.)	Nov 2021 - Oct 2026	The project may be continued.
Mochai				
23.	CPBG/PAI/PBG/MOC/2022/New: Development of short duration high yielding photo-insensitive mochai (<i>Lablab purpureus var lignosus</i> L.)	Dr. K. Geetha Professor (PBG)	Sep 2022 - Sep 2027	May be continued. MLT & OFT may be conducted simultaneously during <i>Rabi</i> 2023-24.
Soyabean				
24.	CPBG/CBE/PUL/2021/007 Development of high yielding soyabean (<i>Glycine max</i>) variety suitable for Tamil Nadu	Dr. K. Anandhi Assistant Professor (PBG)	Nov 2021 - Oct 2024	The project may be continued.
Ricebean				
25.	CPBG/CBE/PUL/PUL/2021/004 Development of YMD resistant varieties in greengram through introgression of genes from ricebean (<i>V. umbellata</i>)	Dr. P. Jayamani Professor (PBG)	Sep 2021 - Aug 2026	The project may be continued.
Mothbean				
26.	CPBG/BSR/PBG/PUL/2020/001 Evolution of high yielding moth bean (<i>Vigna aconitifolia</i> (Jacq.) Marecha) varietiesuitable for Tamil Nadu	Dr. S. Utharasu Assistant Professor (PBG)	Nov 2020- Oct 2025	May be continued. Gamma irradiation and EMS may be attempted to create variability.
Clusterbean				
27.	CPBG / MDU / PBG / PUL / 2022 / 002 "Evaluation and development of new "Guar" gum -Clusterbean (<i>Cyamopsis tetragonoloba</i> (L.)	Dr. E. Murugan Professor (PBG)	Dec 2020- Mar 2023	Completion report may be submitted and new project proposal may be sent for RPAC approval.

	<i>Taub.</i>) variety suitable for southern districts of Tamil Nadu.			The genetic materials from the previous research project should be carried over the new project.
Plant Genetic Resources				
28.	CPBG/CBE/PBG/PUL/2023/002. <i>Ex-situ</i> conservation of germplasm in pulses, oilseeds, cotton, vegetables and miscellaneous crops and its management in seed gene bank	Dr. D. Malarvizhi Professor (PBG) Dr. P.R. Renganayaki Professor (SST)	Nov 2022- Oct 2025	The project may be continued.
AICRP on Pulses				
Redgram				
29.	AICRP/PBG/CBE/PIP/010 AICRP on Pigeonpea- Evaluation of redgram genotypes under AICRP	Dr. S. Geetha Professor (PBG) & Head	Continuous	The project may be continued.
30.	AICRP/PBG/CBE/PIP/010 AICRP on Pigeonpea- Evaluation of redgram genotypes under AICRP	Dr. A. Gopikrishnan Assistant Professor (PBG)	Continuous	The project may be continued.
Blackgram and Greengram				
31.	AICRP/PBG/VBN/MUL/013 All India Coordinated Research Project on MULLaRP	Dr. A. Yuvaraja Prof. (PBG) & Head Dr. K. Thiyagu Assistant Prof. (PBG)	Continuous	The project may be continued.
32.	AICRP/PBG/ADT/MUL/015 All India Coordinated Research Project on MULLaRP	Dr. R. Manimaran Professor (PBG)	Continuous	The project may be continued.
Chickpea				
33.	AICRP / PBG / CHB / 012 AICRP on Chickpea - Breeding	Dr. K. Anandhi Asst. Professor (PBG)	Continuous	The project may be continued.
AICRP - MULLaRP Voluntary Centre - Blackgram & Greengram				
34.	AICRP-VC/PBG/CBE/PUL/ 001 Evaluation of mungbean and urdbean coordinated trials on breeding	Dr. K. Anandhi Assistant Prof. (PBG)	Continuous	The project may be continued.
AINRP on Arid Legumes Voluntary centres				
35.	AINRP-VC/PBG/VBN/PUL/001 Voluntary centre under AINRP on Arid Legumes 2022-23	Dr. P. Shanthy Assoc. Prof. (PBG) (Up to October 2022) Dr. M. Gnanasekaran Assoc. Prof. (PBG)	Continuous	The project may be continued.
36.	AINRP-VC/PBG/CBE/PUL/001 Voluntary centre under AINRP on Arid Legumes 2022-23	Dr. K. Anandhi Assistant Professor (PBG)	Continuous	The project may be continued.
37.	AINRP-VC/PBG/MDU/PUL/001 Voluntary centre under AINRP on Arid Legumes 2022-23	Dr. M. Gunasekaran Professor (PBG) and Head	Continuous	The project may be continued.
38.	AINRP on Horsegram Voluntary centre under AINRP on Arid Legumes 2022 - 2023	Dr. K. Geetha Professor (PBG)	Continuous	The project may be continued.
External Funded Schemes				
39.	GOI/CPBG/VBN/PUL/2020/D 004 GOI-PPVFRA-Collaborating Centre for Blackgram	Dr. A. Yuvaraja Prof. (PBG) and Head Dr. C. Menaka Assoc. Prof. (Seed Tech.)	Continuous	The project may be continued.

40.	DST-SERB/TRRI/MEL/2022/R001 Molecular genetic dissection of growth habit, phenology and yield traits in horsegram (<i>Macrotyloma uniflorum</i>) Lam. Verde.	Dr. R. Sudhagar Professor (PBG) Dr. M. Raveendran Professor (Plant Biotechnology) Dr. C. Vanniarajan Professor (PBG)	Dec 2021 - Nov 2024	The project may be continued.
Breeder Seed Production				
41.	CPBG/VMB/PBG/BSP/2020/001 Maintenance breeding and breeder seed production in greengram, blackgram, redgram and Cowpea varieties	Dr. A. Yuvaraja Prof. (PBG) and Head Dr. M. Gnanasekaran Assoc. Prof. (PBG) Dr. K. Thiyagu Asst. Professor (PBG)	Apr 2020 - Mar 2023	The completion report may be submitted. Target may be achieved as per the indent.
42.	CPBG/CBE/PUL/PUL/2021/001 Maintenance of breeding in redgram varieties released from TNAU, Coimbatore	Dr. S. Geetha Prof. (PBG) and Head	Aug 2021 - July 2024	The project may be continued. Target may be achieved as per the indent.
43.	CPBG/BSR/PUL/2021/001 Breeder seed production of newly released crop varieties in pulses	Dr. K. Amudha Assoc. Prof. (PBG)	June 2021 - May 2024	The project may be continued. Target may be achieved as per the indent.
44.	CPBG/BSR/PBG/RGR/2020/001 Maintenance Breeding in Redgram variety BSR 1	Dr. K. Amudha Assoc. Prof. (PBG) Dr. S. Utharasu Asst. Prof. (PBG)	June 2020 - May 2025	The project may be continued. Target may be achieved as per the indent.
45.	DRES/PAI/PBG/BSP/2018/001: Maintenance and production of nucleus and breeder seeds of rice, horsegram and Millet varieties released from RRS, Paiyur.	Dr. K. Geetha Professor (PBG)	Dec 2018 - Dec 2023	The project may be continued. Target may be achieved as per the indent.
46.	CPBG/PAT/PUL/2023/001 Breeder seed production in Pulses and Groundnut	Dr. S. Chitra Associate Professor (PBG)	Nov 2022 - Oct 2025	May be continued. Target may be achieved as per the indent.
47.	CPBG/CHE/PUL/2023/001. Breeder seed production in pulses and groundnut	Dr. M. Jayaramachandran Assoc. Prof. (PBG)	Jun 2022 - May 2024	May be continued. Target may be achieved as per the indent.
48.	CPBG/TNJ/PBG/RIC/2022/001 Breeder seed Production in paddy and Pulses	Dr. S. Hari Ramakrishnan Asst. Prof. (PBG)	Sep 2021 - Aug 2024	May be continued. Target may be achieved as per the indent.

Seed Science and Technology

S. No.	Project No. & Title	Project Leader	Duration	Remarks
UNIVERSITY RESEARCH SUB PROJECTS				
1.	SEC/CBE/SST/PUL/2022/001 Development of neem based phyto-fumigant to maintain blackgram seed quality during storage	Dr. T. Eevera Assoc. Prof. (SST)	Oct 2022 - Sep 2024	The project may be continued
2.	SEC/CBE/SST/RGR/2020/001 Standardization of early seed harvesting method for speed breeding in pigeonpea	Dr. S. Lakshmi Professor (SST)	Apr 2020 - Mar 2023	May be closed and completion report may be submitted
3.	SEC/VMB/PUL/2023/002 Development of crop management strategies to mitigate hard seed formation in blackgram and greengram	Dr. C. Menaka Assoc. Prof. (SST)	Jan 2023 - Dec 2024	The project may be continued

CPMB&B

S. No.	Project No. and Title	Project leaders	Duration	Remarks
UNIVERSITY RESEARCH SUB PROJECTS				
1.	DBT/CPMB/CBE/DPB/2018R032-- Understanding the molecular mechanism of defense in pigeon pea (<i>Cajanus cajan</i>) due to infestation by <i>Helicoverpa armigera</i>	E. Kokiladevi Professor (Biotech.)	Sep 2018 - Sep 2022	Project may be closed. Publish the findings in >6 NAAS rating journal.
2.	DPB/CPMBB/Pul/2021/001 Evaluation of rice bean germplasm for yield and nutritional related traits	Dr. M. Sudha Asst. Professor (Biotechnology)	Dec 2020 - Dec 2023	Check units/ quantity of nutrients. List all identified compounds in report Project may be continued.
3.	CPMB/CBE/BIT/GGR/2020/001 Functional validation of mung bean (<i>Vigna radiata</i>) LEA genes for drought and salt stress tolerance in a bacterial expression system	Dr. S. Rajesh Asst. Professor (Biotechnology)	Apr 2020 - Mar 2023	Project may be closed. Publish the findings in >6 NAAS rating journal.
4.	CPMB/CBE/PMB/BGR/2021001 Comparative transcriptomic profiling to identify MYMV resistance genes and pathways in blackgram	Dr. M. Jayakanthan, Asst. Professor (Bioinformatics)	July 2021 - June 2023	Resequencing may be rechecked. Publications.
5.	PMB/VVR/BIC/PUL/2020/001: Studies on Biochemical status of Moth bean in various genotypes	S. Pandarinathan, Asst. Professor (Biochemistry)	Oct 2020 - Sep 2022	Project may be closed. Publish the findings in >6 NAAS rating journal.

D. ACTION PLAN 2023-24 (Ongoing)

Plant Breeding and Genetics

The action plan will be continued with identified scientists towards achieving the deliverables in Crop Improvement.

Theme. No.	Theme	Proposed plan of work (2023-24)
1.	Fast track release of short duration (120 - 130 days) redgram variety Centres Dr. S. Geetha, Dept. of Pulses, Coimbatore Dr. A. Yuvaraja, NPRC, Vamban Dr. A. Gopikrishnan, ARS, Virinjipuram Dr. R. P. Gnanamalar, AC&RI, Madurai Dr. K. Geetha, RRS, Paiyur Dr. M. Vaithiyalingan, CEM, Athiyanthal	Testing of short duration culture CRG 16-01 under ART/OFT
2.	Fast track release of new chickpea variety Centres Dr. K. Anandhi, Dept. of Pulses, Coimbatore Dr. P. Anantharaj, CRS, Veppanthattai Dr. N. Aanandhi, ARS, Kovilpatti Dr. K. Geetha, RRS, Paiyur	Grain Quality analysis of the culture ICCV 181674 and conducting of ART / OFT

3.	Evolving high yielding greengram genotypes with long pod Centres Dr. A. Yuvaraja, NPRC, Vamban Dr. S. Geetha, Dept. of Pulses, Coimbatore	The fresh cross between will be made by using long pod genotypes viz., IPM 409 - 4 and WGG 42 to develop genotype with long pod The direct and reciprocal crosses between IPM 409 - 4 x WGG 42 will be made for developing long pod type.
4.	Pyramiding of resistant genes for viral diseases (MYMV, ULCV), powdery mildew diseases and bruchid resistance in blackgram Centres Dr. A. Yuvaraja, NPRC, Vamban Dr. P. Jayamani, Dept. of Pulses, Coimbatore Dr. M. Sudha, CPMB&B, Coimbatore	The pyramided lines are subjected to gene specific SSR markers for MYMV and powdery mildew available with the Centre for Molecular Breeding to confirm disease resistance. Shuttle breeding between NPRC Vamban and Dept. of Pulses, Coimbatore to assess the performance.
5.	Identification of genotypes for salinity tolerance in greengram and blackgram Centre Dr. A. Yuvaraja, NPRC, Vamban	Conducting five numbers of trials with promising genotypes in target locations viz., Valangaiman, Nimmeli and Peravurani identified at Thanjavur District to evaluate the field tolerance.
6.	Development of pre-breeding population in blackgram and greengram Centres Dr. A. Yuvaraja, NPRC, Vamban Dr. P. Jayamani, Dept. of Pulses, Coimbatore Dr. R. Manimaran, TRRI, Aduthurai	Fresh crosses will be attempted with <i>Vigna radiata</i> var. <i>sublobata</i> and <i>Vigna umbellata</i> to develop pre breeding lines. The segregating generations of VBN 4 x <i>V. umbellata</i> will be critically evaluated at NPRC, Vamban.
7.	Evolving high yielding bold seeded blackgram genotypes with higher test weight Centres Dr. A. Yuvaraja, NPRC, Vamban Dr. S. Geetha, Dept. of Pulses, Coimbatore	The fresh crosses attempt between CO 7 & VBN 11, CO 7 & VBG 18052, VBN11 & VBG 18052 and VBN 11 & COBG18-05 to be made. The bold seed Blackgram culture COBG 18-05 available at Dept. of Pulses, Coimbatore to be used for crossing programme for developing bold seed type.

CPMB & B

Theme No.	Theme	Proposed plan of work for 2023-24	
1.	Exploring <i>Vigna</i> genetic diversity for MYMV resistant genes Centres Dr. M. Sudha, CPMB&B, Coimbatore Dr. M. Raveendran, CPMB&B, Coimbatore Dr. N. Senthil, CPMB&B, Coimbatore Dr. G. Karthikeyan, Dept. of Pathology, CPPS, Cbe Dr. M. Pandiyan, AC&RI, Eachangkottai	<ol style="list-style-type: none"> 1. Evaluation of backcross population(s) between mungbean and ricebean derivative against MYMV 2. Understanding the mechanism(s) of MYMV resistance in rice bean (<i>Vigna umbellata</i>) 3. Comparative metabolic profiling of resistant and susceptible genotypes of mungbean in response to MYMV 	
2	Next generation genomics for accelerating genetic gains in pulses		
	2.1. Accelerating Genetic Gains in mungbean through MAGIC/ Genomic Selection Centre Dr. M. Sudha, CPMB&B, Coimbatore Dr. N. Senthil, CPMB&B, Coimbatore	No. of crosses	Two-way Crosses
		A x B	IC47139 (Synchronous maturity) x EC396115 (Bold)
		C x D	VBN 4(Elite line) x VGGRU1 (MYMV resistant)

		E x F	C0 8 (Elite line) x IC436542 (Bold grain+ grain number)										
		G x H	IC343868 (Pod number) x IC398984 (Grain number)										
	<p>2.2. Nutrigenomics in Pulses</p> <p>Centres Dr. D. Uma, CPMB&B, Coimbatore Dr. M. Sudha, CPMB&B, Coimbatore Dr. V.P. Santhanakrishnan, CPMB&B, Cbe Dr. S. Pandarinathan, AC & RI, Vazhavachanur</p>	<p>Study of metabolites and Nutraceutical and Therapeutic properties in Pulses (2023-24)</p> <table border="1"> <thead> <tr> <th>Metabolites</th> <th>Nutraceutical and Therapeutic property</th> </tr> </thead> <tbody> <tr> <td>Catechin</td> <td>Flavonoid, mediator of cardiovascular health</td> </tr> <tr> <td>Rutin</td> <td>Natural flavonoid, Antioxidant to treat osteoarthritis</td> </tr> <tr> <td>Genestein</td> <td>Isoflavones, Anticancerous and Antidiabetic property</td> </tr> <tr> <td>Kaempferol</td> <td>Flavonoid, Reduces the risk of chronic disease</td> </tr> </tbody> </table>		Metabolites	Nutraceutical and Therapeutic property	Catechin	Flavonoid, mediator of cardiovascular health	Rutin	Natural flavonoid, Antioxidant to treat osteoarthritis	Genestein	Isoflavones, Anticancerous and Antidiabetic property	Kaempferol	Flavonoid, Reduces the risk of chronic disease
Metabolites	Nutraceutical and Therapeutic property												
Catechin	Flavonoid, mediator of cardiovascular health												
Rutin	Natural flavonoid, Antioxidant to treat osteoarthritis												
Genestein	Isoflavones, Anticancerous and Antidiabetic property												
Kaempferol	Flavonoid, Reduces the risk of chronic disease												
	<p>2.3. Whole Genome Sequencing for accelerating gene discovery in pulses</p> <p>Centres Dr. M. Jayakanthan, CPMB&B, Coimbatore Dr. M. Sudha, CPMB&B, Coimbatore</p>	<ul style="list-style-type: none"> •Study of upregulated and down regulated genes and ERF transcription factors in pulses •Development of high-density mapping 											

NEW ACTION PLAN 2023-24

Plant Breeding and Genetics

Theme No.	Theme	Plan of work
1.	<p>Development of dual purpose redgram variety</p> <p>Centres Dr. S. Geetha, Dept. of Pulses, Coimbatore Dr. A. Gopikrishnan, ARS, Virinjipuram Dr. K. Amudha, ARS, Bhavanisagar Dr. S. Utharasu, ARS, Bhavanisagar Dr. K. Geetha, RRS, Paiyur Dr. K. Sakthivel, AC & RI, Vazhavahanur</p>	<p>The dual purpose redgram genotypes collections <i>viz.</i>, 21 ICRISAT, two local, one BSR 1 and BRG 1,2 and 3 were assembled at ARS Vrinjipuram. In addition to that ICRISAT and local collections to be added.</p> <p>The promising dual purpose redgram cultures BSRG 20-029, BSRG 20-038 and BSRG 20-004 are to be critically evaluated in multilocation trials at four locations during kharif season</p>
2.	<p>Bio-fortification of Iron and Zinc in greengram</p> <p>Centres Dr. P. Jayamani, Dept. of Pulses, Coimbatore Dr. A. Yuvaraja, NPRC, Vamban Dr. R. Manimaran, TRRI, Aduthurai Dr. M. Sudha, CPMB&B, Coimbatore Dr. T. Chitdeswari, Dept. of SS & AC, Coimbatore</p>	<p>Collection of released varieties, germplasm, pre breeding lines and donors from other institutes</p> <p>Evaluation of germplasm at three locations <i>viz.</i>, Coimbatore, Vamban and Aduthurai under control and Zn/Fe applied soils</p> <p>Estimation of grain Fe and Zn content (AAS/XRF) and identification of potential genotypes with high and low Fe and Zn content</p>

3.	<p>Development of drought tolerant variety in blackgram and greengram</p> <p>Centres Dr. P. Jayamani, Dept. of Pulses Coimbatore Dr. K. Anandhi, Dept. of Pulses, Coimbatore Dr. A. Yuvaraja, NPRC, Vamban Dr. P. Boominathan, Dept. of CRP, Coimbatore</p>	<p>PEG 6000 mediated in vitro screening: Standardization of PEG 6000 concentration for seedling stage drought tolerance</p> <p><i>In vitro</i> screening of genotypes: A set of blackgram and greengram genotypes including varieties advanced cultures, germplasm and pre-breeding lines will be screened for seedling stage drought tolerance</p> <p>Confirmation study of in vitro screening: The shortlisted genotypes will be subjected for confirmation study under in vitro screening</p> <p>Field screening (Greengram): The shortlisted greengram genotypes will be evaluated for reproductive stage drought tolerance under rain out shelter (ROS) conditions</p>
4.	<p>Development of suitable ricebean genotypes through mutation breeding</p> <p>Centres Dr. P. Jayamani, Dept. of Pulses, Coimbatore Dr. M. Sudha, CPMB&B, Coimbatore</p>	<p>The desirable ricebean mutants for non-shattering, early maturity with determinant growth habit will be identified with the following plan</p> <p>Determination of LD 50: LD 50 (gamma ray) value will be determined using the variety RBL 35 M0-M1:</p> <p>Seeds of RBL 35 cultivar (M0) will be mutagenized with gamma ray (LD 50) and mutated seeds (M1) will be raised and harvesting of individual plants</p> <p>M2: M2 population will be raised selection will be made for the desirable mutants</p>

Seed Science and Technology

Theme No.	Theme	Plan of work
1	<p>Performance of early harvested redgram seed to accelerate generation advancement for speed breeding</p> <p>Centre Dr. S. Lakshmi, Prof (SST), DODL Dr. K. Sundaralingam, Prof (SST) Dept. of Pulses</p>	<ol style="list-style-type: none"> 1. Confirmation of the quality of seeds harvested at 24, 35 DAA and at Physiological maturity 2. Confirmation of the effect of standardized nursery medium on quality seedling production 3. Confirmation of the date of transplantation to maintain field population
2	<p>Study of disintegration of cuticle and palisade layer in hard and normal seed of blackgram during storage</p> <p>Centre Dr. C. Meneka, Assoc. Prof (SST) NPRC, Vamban Dr. R. Vigneshwari, Asst. Prof (SST) Dept. of SST, TNAU, Coimbatore</p>	<ol style="list-style-type: none"> 1. Collection of seed lots, separation of hard seeds and storage of seeds. 2. Analysis of anatomical structures at 15 days interval.

II. CROP MANAGEMENT

a. Decisions made on OFT

A 1. For Adoption

1. Evolving System of Pulses Intensification in Blackgram

Centers: Dept. of Pulses, CBE, NPRC, Vamban, AEC & RI, Kumulur and AC & RI, Killikulam

System of Pulses Intensification (SPI) Technology

Land configuration	Raised bed of 90 cm with furrow of 30cm
Seed treatment	Imidacloprid (5 ml kg ⁻¹) + <i>Bacillus subtilis</i> (10 g kg ⁻¹) + <i>Rhizobium</i> and Phosphobacteria (30 g kg ⁻¹ each)
Spacing	30 x 15 cm
Irrigation	Drip system of irrigation
Nutrient management	Drip fertigation of 25 :50 :25: 40 kg NPKS ha ⁻¹
Weed management	PE application of Pendimethalin + Imazethapyr (32% EC) @1 kg a.i ha ⁻¹ followed by EPoE tank mix application of Quizalofop-ethyl @ 50 g ha ⁻¹ and Imazethapyr @50 g ha ⁻¹ at 15- 20 DAS
TNAU Pulse wonder application	TNAU pulse wonder @ 5 kg ha ⁻¹ at peak flowering stage

Adoption of above SPI technology helps to achieve higher blackgram yield of 1202 kg/ha, net return of Rs. 36970/ha and BCR of 2.02 as compared to recommended practices.

NATURAL RESOURCE MANAGEMENT

A I. FOR ADOPTION

Soil Science and Agricultural chemistry

1. Zinc Nutrition of Blackgram in Alkali Soil

For alkali soils, application of soil test based NPK along with 18.75 kg ZnSO₄ ha⁻¹ and zinc solubilizing bacteria (ZSB) at 500 ml ha⁻¹ as basal can be recommended for achieving higher grain yield (840 kg ha⁻¹), BCR (2.1), zinc uptake (67.4 g ha⁻¹), zinc use efficiency (223 kg kg⁻¹), post- harvest DTPA -Zn (1.84 mg kg⁻¹) and fertilizer saving (6.25 kg ZnSO₄ ha⁻¹, Rs.406/ ha).

2. Bio-fortification of Zinc& Iron in Blackgram and Greengram

Application of soil test based NPK +12.5 kg ZnSO₄ ha⁻¹ as basal + foliar spraying of 0.50% ZnSO₄ twice at 30 and 45 DAS can be recommended for getting higher grain yield (985 & 897 kg ha⁻¹), grain Zn content (28.7 & 26.8 mg kg⁻¹) and Zn enrichment ratio (1.22 & 1.27) with the BCR of 2.34 and 2.13 in blackgram and greengram respectively. The same treatment resulted in reduced grain phytic acid content in both the crops (10-15%). The Zn distribution in different plant parts is in the order of haulm > seed > seed coat.

Application of soil test based NPK +25 kg FeSO₄ ha⁻¹ as basal + foliar spraying of 0.50% FeSO₄ twice at 30 and 45 DAS can be recommended for achieving higher grain yield (1031 & 858 kg ha⁻¹), grain Fe content (46.4 & 50.2 mg kg⁻¹) and Fe enrichment ratio (1.46 & 1.31) respectively in blackgram and greengram respectively. The same treatment reduced the grain phytic acid content in both the crops (8.2-14%). The Fe distribution in different plant parts is in the order of haulm > seed > seed coat.

3. Organobiochar enriched Phosphorus fertilizers on P availability, uptake and yield of Blackgram and Redgram in low pH Alfisol

Application of SSP enriched organobiochar @ 750 kg + 2 kg PSB ha⁻¹ to low pH Alfisol for blackgram recorded higher seed yield (1012 kg ha⁻¹) and BCR (1.90) with the yield increase of 16% over SSP alone. Besides soil phosphorus availability (28.4 kg ha⁻¹; 18%) and phosphorus uptake was also improved as compared to SSP (13.8 kg ha⁻¹; 37%) with the Phosphorus Use Efficiency of 20.2 kg kg⁻¹.

Application of rock phosphate enriched organobiochar @ 750 kg + 2 kg PSB ha⁻¹ to low pH Alfisol for redgram recorded higher seed yield (1150 kg ha⁻¹), BCR (1.80) with the yield increase of 15% over rock phosphate alone. The same technology improved the soil phosphorus availability (28.2 kg ha⁻¹; 22%) and phosphorus uptake as compared to rock phosphate (20 kg ha⁻¹; 30%) with higher Phosphorus Use Efficiency (23 kg kg⁻¹).

Agricultural Microbiology

1. Study on the effect of *Rhizobium* isolate-VUC on growth and yield of blackgram

Application of *Rhizobium* isolate VUC along with PSB + KRB + 75% RDF recorded higher number of nodules per plant (34/plant) which is 14% increase over the standard strain BMBS 47. Nodule dry weight was increased (18%) due to inoculation of *Rhizobium* isolate VUC over the standard strain BMBS 47. VUC recorded 6% increase in yield (963 kg/ha) over the standard strain BMBS 47 (873 kg/ha).

2. Study on the effect of *Rhizobium* isolate-VMF on growth and yield of green gram

Higher number of nodules/plant (37) was recorded with application of *Rhizobium* isolate VMF along with PSB + KRB + 75% RDF which is 9% increase over the standard strain BMBS 47. *Rhizobium* isolate VMF along with PSB + KRB + 75% RDF recorded the higher grain yield of 1007 kg/ha which is 11% increase over the standard strain BMBS 47 (909 kg/ha).

A II. For Information

1. Screening of Greengram and Blackgram genotypes for Boron efficiency

Among the genotypes tested (Greengram - 6 nos.; Blackgram -8 nos.), maximum yield response was noted up to soil test based NPK+10 kg borax ha⁻¹. The genotypes VBN 4, CO 6 and CO 7 in greengram and VBN 8, CO5, VBN 4 in blackgram were found to be B efficient with higher B absorption (68.4 to 80%) and utilization efficiency (53.8 to 63.5%). The genotypes MDU 1 and VBN 2 in greengram and MDU 1 in blackgram were inefficient with lesser B absorption (61.7%) and B utilization efficiency (51.6%). Rest of the genotypes viz., CO 8 in greengram and VBN 11, VBN 6, CO7, CO 6 in blackgram were having moderate B efficiency.

2. Optimising Micronutrients (Zn & Fe) recommendations for rainfed greengram and blackgram

- Zinc : Basal application of soil test based NPK + 15 kg ZnSO₄ ha⁻¹ was observed to be superior in improving the grain yield (605 & 653 kg ha⁻¹, BCR : 1.87 & 2.02) of rainfed greengram and blackgram besides sustaining soil Zn availability.
- Iron : Basal application of soil test based NPK + 25 kg FeSO₄ ha⁻¹ recorded higher grain yield (610 & 671 kg ha⁻¹) and BCR (1.93 & 2.13) followed by NPK+ 20 kg FeSO₄ ha⁻¹ as basal (585 & 639 kg ha⁻¹). This also recorded higher Zn/Fe content, uptake, availability, plant enzymes (Super Oxide Dismutase, Peroxidase) and quality of rainfed pulses.

3. Bio-activation of Elemental Sulphur (BES) to enhance productivity of Blackgram in Calcareous soil

Bioactivation of Elemental Sulphur to supply 40 kg S ha⁻¹ with *Methylobacterium thiocyanatum* VRI 7- A4 conjoint with Soil test based NPK in medium calcareous soil reduced the soil pH and Free CaCO₃ by 4.90 and 12.59 %, respectively and increased the grain yield over RDF of 25:50:25 kg of N, P₂O₅, K₂O ha⁻¹ by 21.7 %.

4. STCR-IPNS based Fertilizer Recommendation for Blackgram on Alfisol

STCR-IPNS based Fertilizer Recommendation for Blackgram has been developed for Red non-calcareous soil (Palaviduthi soil series) and ready reckoner for fertiliser doses were formulated.

Fertilizer Prescription Equations for Blackgram (*var. VBN 8*)

$$\text{FN} = 9.81 \text{ T} - 0.32 \text{ SN} - 0.77 \text{ ON}$$

$$\text{FP}_2\text{O}_5 = 10.05 \text{ T} - 1.53 \text{ SP} - 0.75 \text{ OP}$$

$$\text{FK}_2\text{O} = 9.06 \text{ T} - 0.18 \text{ SK} - 0.69 \text{ OK}$$

Fertiliser saving of 39, 19 and 34 kg N, P₂O₅ and K₂O, respectively was obtained when FYM was applied at 12.5 t ha⁻¹ (moisture content -24%, 0.54% N, 0.26% P & 0.51% K).

5. STCR-IPNS based Fertilizer Recommendation for Greengram on Alfisol

STCR-IPNS based Fertilizer Recommendation for Greengram has been developed for Red non-calcareous soil (Palaviduthi soil series) and ready reckoner for fertiliser doses were formulated.

Fertilizer Prescription Equations for Greengram (*var. CO 8*)

$$\text{FN} = 9.75 \text{ T} - 0.29 \text{ SN} - 0.70 \text{ ON}$$

$$\text{FP}_2\text{O}_5 = 12.12 \text{ T} - 2.83 \text{ SP} - 0.79 \text{ OP}$$

$$\text{FK}_2\text{O} = 8.65 \text{ T} - 0.14 \text{ SK} - 0.62 \text{ OK}$$

6. Development of liquid bioinoculant consortium and its effect on growth & productivity of red gram

The solubilization zone & Pi solubilization formed by phosphobacteria and EPS production and K dissolution by KRB was comparatively higher in individual inoculum than the consortium. Bacterial population persist upto 10^9 CFU upto 300 DAI and best suited for consortium development.

6. Development of salt tolerant *Rhizobium* for enhancing productivity of rice fallow pulses under salinity stress

Saline tolerant *Rhizobium* NAG1 recorded maximum nodulation (26.8 Nos.) and yield 495.5 kg/ha) which is 15 % and 27% increase over the standard strain (23.3 Nos. 387 kg/ha) respectively and recorded BC ratio of 2.77. The strain *Rhizobium* NAG 1 can be used in saline soil condition for improving the growth and yield of green gram.

7. Field evaluation of Nodule Associated plant probiotics in greengram and redgram

Greengram: Higher number of nodules/plant (36) was recorded in T₃ which received application of probiotic consortia (*Rhizobium* VRE1+AMF+*C. tropicalis* YW1 + *P. taichungensis* TNEB6 + 75% RDF) which is 11.7% increase over the standard strain CoC10. Application of probiotic consortia recorded the higher grain yield of 994 kg/ha and this is 10% increase over the standard strain CoC10 (902 kg/ha).

Redgram: Application of *Rhizobium* VRE1+AMF+*C. tropicalis* YW1 + *P. taichungensis* TNEB6 + 75% RDF recorded 10% increased nodule count over the standard strain CC1. The same treatment recorded 26% higher yield (1556 kg/ha) than the standard strain CC1 (1233 kg/ha).

8. Interaction of Nodule Associated Microbes (NAM) and *Rhizobium* sp. for enhanced drought tolerance in Horse gram (*Macrotyloma uniflorum*)

- Diversity and abundance of bacterial community present in different niches such as soil, rhizosphere, root nodules, and seeds of horsegram explored using 16S rRNA metagenomics sequencing technology revealed the existence of functional metabolism like ammonium oxidizing, nitrite reducing were found through comparative metagenome analysis.
- Genes of various functional traits such as biosynthesis of amino acids, nitrogen fixation present across the four niche of horse gram
- Root exudates metabolomics study reveals that most of the compounds are known to possess several antibacterial, antifungal, and also herbicidal activities.
- Root exudates metabolites such as glucopyranoside and pyrimidinedione dehydrate produced by the NAM under deficit moisture stress are involved in the signaling mechanisms for effective colonization.
- Co-inoculum of NAMs (*Rhizobium* sp.HGR1, *Pseudomonas indoloxydans* HGB2 and Yeast HGY1) improved seed germination and plant growth under induced moisture stress.

A III. For OFT

OFT: 1 Water Saving and Cost-Effective Irrigation Technology for Blackgram Cultivation

Objective: To find out the low-cost effective irrigation technology for blackgram cultivation

Centres & Scientist In-charge:	Season	Treatments	Observations to be recorded:
Coordinating Centre: CSRC, Ramnad: Dr. S. Vallal Kannan, Associate Professor (Agronomy) Sub- centres: NPRC, Vamban: Dr. P. Rajarathinam, Asst. Prof. (Agron.) AC & RI, Kudumiyamalai: Dr. S. Marimuthu, Assoc. Prof. (Agron.) KVK, Madurai: Dr. E. Subramanian, Assoc. Prof. (Agron.) ADAC & RI, Trichy: Dr. T. Ramesh, Assoc. Prof. (Agron.)	<i>Kharif</i> Variety: VBN11	T ₁ : Check basin method T ₂ : Rain hose irrigation system	Plant population /m ² , plant height, dry matter production, No. of pods /plant, grain yield and water use efficiency, water productivity, economics

OFT 2 -Evaluation of Crop Geometry and Nipping in Redgram

Objective: To find out suitable crop geometry and nipping practice for long duration redgram

Treatments

T₁: 90 x 30 cm spacing

T₂: 120 x 45 cm spacing with chemical nipping by mepiquat chloride @ 500 ppm

Note: Foliar spray at bud initiation stage

Season: *Kharif* **Variety:** CO 9

Observations to be recorded

Plant height, No. of branches /plant, stem girth, Days to 50 % flowering, No. of pods /plant, grain yield, stalk yield and economics.

Centres & Scientist In-charge

Coordinating Centre:

Dept. of Pulses, TNAU, CBE: Dr. S. Anitta Fanish, Assistant Professor (Agronomy)

Sub- centres:

RRS, Paiyur: Dr. C. Sivakumar, Professor (Agronomy)

NPRC, Vamban: Dr. P. Rajarathinam, Assistant Professor (Agronomy)

AC&RI, Killikulam: Dr. S. Subbulakshmi, Assistant Professor (Agronomy)

OFT 3. Redgram based Intercropping System for Enhancing Profitability

Objectives: To evolve the profitability of redgram based intercropping system

Treatments

T₁: Sole Redgram (120 x 45 cm)

T₂: Redgram + Sweetcorn (1:2) (sweet corn 60 x 20 cm)

Season: *Kharif* **Variety:** CO 9

Observation to be recorded

Plant height, No. of pods /plant, grain yield, inter crop yield and economics

Centres & Scientists In-Charge

Coordinating Centre:

Dept. of Pulses, TNAU, CBE: Dr. S. Anitta Fanish, Assistant Professor (Agronomy)

Sub- centres:

RRS, Paiyur: Dr. C. Sivakumar, Professor (Agronomy)

NPRC, Vamban: Dr. P. Rajarathinam, Assistant Professor (Agronomy)

ARS, Kovilpatti: Dr. J. Bhuvaneshwari, Assistant Professor (Agronomy)

AC&RI, Vazhavachanur: Dr. P. Ayyadurai, Assistant Professor (Agronomy)

OFT 4 - Intercropping of Groundnut with Medium Duration Redgram under Rainfed *alfisols*

Objective: To study the effect of groundnut as intercrop in medium duration redgram under rainfed *alfisols*

Treatments

T₁ : Sole Redgram (45 x 30 cm)

T₂: Redram+ Groundnut (2:6) (45 x 30, 30 x 10 cm)

Season: *Rabi* **Variety:** Redgram Co (RG) 7

Observations to be recorded

Plant height, No. of branches /plant, stem girth, No. of pods /plant, grain yield, stalk yield groundnut yield and economics.

Centres & Scientist In-charge

Coordinating Centre:

ARS, Kovilpatti: Dr. S. Manoharan, Assistant Professor (Agronomy)

Sub- centres:

DARS, Chettinad: Dr. C. Umamaheswari, Professor (Agronomy)

AC&RI, Kudumiyanmalai: Dr. S. Marimuthu, Associate Professor (Agronomy)

AC & RI, Vazhavachanur: Dr. R. Chandrasekar, Professor (Agronomy)

RRS, Paiyur: Dr. C. Sivakumar, Professor (Agronomy)

OFT 5 - Intercropping of nutri cereals with medium duration redgram under rainfed *vertisols*

Objective: To study the effect of nutri cereals as intercrop in medium duration redgram under rainfed *vertisols*

Treatments

T₁: Sole Redgram (45 x 30 cm)

T₂: Redgram + Tenai (2:6) (45 x 30, 25 x 5 cm)

Season: *Rabi* **Variety:** Redgram Co (RG) 7

Observations to be recorded

Plant height, No. of branches /plant, stem girth, No. of pods /plant, grain yield, stalk yield intercrop yield and economics.

Centres& Scientist In-charge

Coordinating Centre:

ARS, Kovilpatti: Dr. S. Manoharan, Assistant Professor (Agronomy)

Sub- centres:

CRS, Veppanthattai: Dr. S. Somasundaram, Professor and Head

RRS, Aruppukottai: Dr. Chelvi Ramesh, Professor and Head

OFT6. Melatonin Mediated Drought Tolerance in Greengram under Drought and High Temperature Stress

Objectives: To study the effect of melatonin on drought and high temperature tolerance in greengram

Treatments

T₁ : Control

T₂: Seed treatment with 100 µM melatonin + Foliar spray of 100 µM melatonin at flowering

Season: *Kharif* **Variety:** Greengram CO 8

Observations to be recorded

Plant height, root length, RWC, No. of pods /plant, Yield, BCR

Co-ordinating Centre

Dr. M. K. Kalarani & Dr. A. Senthil

Department of Crop Physiology, TNAU, Coimbatore

Sub-centres:

NPRC, Vamban: Dr. P. Rajarathinam, Asst. Prof. (Agronomy)

AC & RI, Kudumiyamalai: Dr. C. Rajkumar, Asst. Prof. (Crop Physiology)

AC & RI, Killikulam: Dr. S. Srinivasan, Professor (Crop Physiology)

OFT New 1: Evaluation of *Rhizobium* TRY3 suitable for sodic soils in green gram

Objectives:

- To evaluate *Rhizobium* TRY3 suitable for sodic soils in green gram

Treatments

T1 Uninoculated control

T2 RDF alone (100%)

T3 Standard strain + Phosphobacteria +KRB + 75% RDF

T4 *Rhizobium* TRY3 + Phosphobacteria +KRB + 75% RDF

Design: RBD Replications: Five Season: *Kharif* Variety: Local

Observation to be recorded

- Nodulation
- Growth and yield attributes
- Grain yield

Centres to be involved:		
Lead Scientist and Centre in-charge	:	Dr. M. Sundar, Professor (Ag. Micro), AC&RI, Kudumiyamalai
Coordinating centre and Scientist in-charge	:	AC&RI, Killikulam: Dr. K.G. Sabarinathan, Assoc. Prof. (AGM) ORS, Tindivanam: Dr. E. Jamuna, Assoc. Professor (AGM) ADAC&RI, Trichy: Dr. T. Uma Maheswari, Asst. Prof (AGM) NPRC, Vamban: Dr. R. Uma Sankareswari, Asst. Prof (AGM) TRRI, Aduthurai : Dr. T. Sivasankarai devi, Asst. Prof (AGM)

OFT New 2: Evaluation of saline tolerant *Rhizobium* NAG 1 for enhancing productivity of green gram in saline soil

Objectives:

- To improve growth and yield of green gram in saline soil

Treatments

- T₁ Uninoculated control;
T₂ RDF alone (100%);
T₃ *Rhizobium* TNAU standard+ PSB +KRB+ 75% RDF;
T₄ *Rhizobium* NAG1 + PSB +KRB+ 75% RDF

Design: RBD Replications: Five Season: *Kharif* Variety: Local

Observation to be recorded

- Seed yield
- Growth and yield attributes
- Soil Physico-chemical characters
- Plant nutrient uptake
- Postharvest soil analysis

Lead centre& Scientist In-charge : Dr. T. Sivasankari Devi, Asst. Prof. (AGM) TRRI, Aduthurai
Dr. R. Parimala Devi, Assoc. Prof. (AGM), NPRC, Vamban
Coordinating centre and Scientist incharge Dr. R. Uma Sankareswari, Asst. Prof (AGM), AC&RI, Madurai
Dr. J. Prabhakaran, Assoc. Prof. (SS&AC), ORS, Tindivanam
Dr. E. Jamuna, Assoc. Professor (AGM)

b. Research Projects on Pulses

Crop	Centre	Action plan	URP	AICRP	Externally funded	Student thesis	OFT	Total
Agronomy								
Blackgram	NPRC, Vamban	1	1	1	-	-	-	3
	TRRI, Aduthurai	-	-	3	-	-	-	3
	AEC&RI, Kumulur	-	1	-	-	-	-	1
	Dept. of Agronomy, TNAU, Coimbatore	1	-	-	-	-	-	1
	CWGS, TNAU, Coimbatore	1	-	-	-	-	-	1
	Dept. of Pulses, Coimbatore	1	-	-	-	-	-	1
	NOFRC, TNAU, Coimbatore	1	-	-	-	-	-	1
	ARS, Kovilpatti	-	-	1	-	-	-	1
	CSRC, Ramnad	-	-	-	-	-	1	1
Greengram	NPRC, Vamban	-	-	2	-	-	-	2
	TRRI, Aduthurai	-	-	2	-	-	-	2
Redgram	Dept. of Pulses, Coimbatore	-	1	2	-	-	2	5
	ARS, Kovilpatti	-	-	3	-	-	2	5
Total		5	3	14	-	-	5	27
Crop Physiology								
Blackgram	Dept. of CRP, TNAU, Coimbatore	-	1	-	-	-	-	1
Greengram		-	1	-	-	-	-	1
Redgram		1	-	-	-	-	-	1
Total		1	2	-	-	-	-	3
Soil Science and Agricultural Chemistry								
Blackgram	Dept. of Pulses, Coimbatore	-	-	2	1(OFT)	3	2	8
Greengram	Dept. of Pulses, Coimbatore	1(New)	-	-	-	-	-	1
	ADAC&RI, Trichy	1(New)	-	-	-	-	-	1
Total		2	-	2	1	3	2	10
Agricultural Microbiology								
Pulses	CSC&RI, Madurai	-	1	-	-	-	-	1
	KVK, Tindivanam	-	1	-	-	-	-	-
Greengram	TRRI, Aduthurai	-	-	-	-	-	1 (New)	1
	ADAC&RI, Trichy	1	-	-	-	-	1 (New)	1
	NPRC, Vamban	2	-	3	-	-	-	4
Blackgram & Greengram	Dept. of Microbiology, TNAU, CBE	2	-	-	-	-	-	1
Blackgram	NPRC, Vamban	1 (New)	-	-	-	-	-	1
Horsegram	Dept. of Microbiology, TNAU, CBE	1 (New)	-	-	-	1	-	1
Total		7	2	3	-	1	2	15
Total		15	7	19	1	4	9	55

C. Remarks on the ongoing Action Plans /URPs/ Core/ AICRPs/ Externally Funded Projects

CROP MANAGEMENT

S. No.	Project No. and Title	Remarks
ACTION PLAN		
1	<p>Standardization of drip bio-fortification of Zinc for nutritional security in blackgram (2022-23 to 2023-24) NPRC, Vamban Dr. P. Rajarathinam, Asst. Professor (Agronomy) Dr. R. Uma Sankareswari, Asst. Professor (Agrl. Microbiology) AC & RI, Madurai Dr. P. Kannan, Associate Professor (SS&AC) Dept. of Pulses, TNAU, CBE Dr. S. Anitta Fanish, Asst. Professor (Agronomy) Dr. M. Gnanachitra, Professor (Agrl. Microbiology) AC & RI, Madurai Dr. T. Sampathkumar, Asst. Professor (Agronomy) Dr. M. Jeyabharathi, Asst. Professor (Agrl. Microbiology)</p>	To be continued
2	<p>Weed management with new generation herbicides through Drones in Black gram (2022-23 to 2023-24) Dept. of Agronomy, TNAU, CBE Dr. P. Parasuraman, Professor & Head Dept. of Pulses, TNAU, CBE Dr. S. Anitta Fanish, Asst. Prof. (Agronomy)</p>	To be continued
3	<p>Water saving and cost-effective irrigation technology for blackgram cultivation (2021-22 to 2022-23) CWGS, TNAU, Coimbatore Dr. S. Pazhanivezhan Director, CWGS, TNAU, Coimbatore NPRC, Vamban Dr. P. Rajarathinam, Asst. Professor (Agronomy) AEC& RI, Kumulur Dr. P. Rajarathinam, Asst. Professor (Agronomy)</p>	<ul style="list-style-type: none"> • Project to be closed. • It may be recommended for OFT.
4.	<p>Evolving System of Pulses Intensification (SPI) in Blackgram (2021-22 to 2022-23) Dept. of Pulses, TNAU, CBE Dr. S. Anitta Fanish, Asst. Prof. (Agronomy) NPRC, Vamban Dr. P. Rajarathinam, Asst. Professor (Agronomy) AEC & RI, Kumulur Dr. P. Rajarathinam, Asst. Prof (Agronomy) AC & RI, Killikulam Dr. S. Subbulakshmi, Asst. Prof. (Agronomy)</p>	<ul style="list-style-type: none"> • Project to be closed. • Technology may be recommended for adoption.
5	<p>Response of different varieties of blackgram for organic farming NOFRC, TNAU, CBE Dr. R. Krishnan, Professor and Head Dr. M. Suganthy, Professor (Agricultural Entomology)</p>	<ul style="list-style-type: none"> • Project to be closed. • Results may be given for information.
UNIVERSITY RESEARCH PROJECTS		
Redgram		
1	<p>DCM/ CBE/ AGR / RG / 2021/001 Effect of crop geometry and nipping practice in redgram Dr. S. Anitta Fanish, Asst. Prof. (Agronomy) Department of Pulses, TNAU Coimbatore Duration: Jun, 2021 to June 2023</p>	<ul style="list-style-type: none"> • The project to be closed and result may be proposed for OFT.

AICRP PROJECT: Blackgram		
1	AICRP/PBG/VBN/MUL/017 U3: Effect of seed inoculation, weed management and foliar nutrition on urdbean for higher productivity (June 2020 - May 2023) Dr. P. Rajarathinam, Asst. Prof. (Agronomy) NPRC, Vamban Duration: April 2020-March 2023	• The project to be closed.
2	AICRP/PBG/ADT/MUL/015 Effect of seed inoculation, weed management and foliar nutrition on urdbean for higher productivity Dr.S.AnandhaKrishnaveni, Associate Prof. (Agronomy) TRRI,Aduthurai Duration: April 2020-March 2023	• The project to be closed.
3	AICRP/PBG/ADT/MUL/015 Agronomic evaluationofAVT-2 <i>Rabi</i> urdbean genotypes under varied time of sowing Dr.S.AnandhaKrishnaveni, Associate Prof. (Agronomy), TRRI,Aduthurai Duration: June 2021 to May 2023	• The project to be closed.
4	AICRP/PBG/ADT/MUL/015 Yield maximization in rice fallow blackgram through agronomic management Dr.S.Anandha Krishnaveni, Associate Prof. (Agronomy), TRRI, Aduthurai Duration: April 2019 to March 2023	• The project to be closed.
5	AICRP/DCM/KPT/AGR/003 Effect of weather conditions on powdery mildew disease in blackgram Dr. S. Kokilavani, Asst. Prof. (Agricultural Meteorology), ARS, Kovilpatti Duration: September 2015 to March 2023	• The project to be closed.
AICRP PROJECT: Greengram		
6	AICRP/PBG/VBN/MUL/017 M3: Effect of seed inoculation, weed management and foliar nutrition on mungbean for higher productivity Dr. P. Rajarathinam, Asst. Prof.(Agronomy), NPRC, Vamban Duration:June 2022 – May 2023	• The project to be closed.
7	Agronomic evaluation of AVT2 <i>rabi</i> Mungbean genotypes under varied date of sowing Dr. P. Rajarathinam, Asst. Prof.(Agronomy), NPRC, Vamban Duration: June 2022 – May 2023	• The project to be closed
8	AICRP/PBG/ADT/MUL/015 Effect of foliar spray of nutrients for yield maximization of mungbean Dr. S. Anandha Krishnaveni, Associate Prof. (Agronomy) TRRI, Aduthurai Duration: June 2021 to March 2023	• The project to be closed.
9	AICRP/PBG/ADT/MUL/015 Effect of seed inoculation, weed management and foliar nutrition on Mungbean for higher productivity Dr. S. Anandha Krishnaveni, Associate Prof. (Agronomy), TRRI, Aduthurai Duration: June 2021 to March 2023	• The project to be closed.
AICRP PROJECT: Redgram		
10	AICRP/PBG/CBE/PIP/010 Evaluation of pigeonpea + specialty corn and parching sorghum intercropping system Dr. S. Anitta Fanish, Asst. Prof. (Agronomy), Dept. of Pulses, TNAU Duration: June 2021 to March 2024	• The project to be continued.

11	AICRP/PBG/CBE/PIP/010 Agronomic fortification of pigeonpea with Zn and Fe Dr. S. Anitta Fanish, Asst. Prof. (Agronomy), Dept. of Pulses, TNAU Duration: June 2021 to March 2024	• The project to be continued.
12	AICRP/DCM/KPT/004 Intercropping of nutricereals and pulses with medium duration pigeon under <i>alfisols</i> condition Dr. S. Manoharan, Asst. Prof. (Agronomy), ARS, Kovilpatti Duration: June 2019 to March 2023	• The project to be closed. The result may be proposed for OFT.
13	AICRP/DCM/KPT/004 Intercropping of nutricereals with medium duration pigeon under <i>vertisols</i> condition Dr. S. Manoharan, Asst. Prof. (Agronomy), ARS, Kovilpatti Duration: June 2019 to March 2023	• The project to be closed. The result may be proposed for OFT.
14	AICRP/DCM/KPT/004 Effect of Pulse based cropping systems under rainfed <i>Vertisols</i> conditions Dr. S. Manoharan, Asst. Prof. (Agronomy), ARS, Kovilpatti Duration: Aug.2022 to July 2025	• The project to be continued

CROP PHYSIOLOGY

S. No.	Project No. and Title	Remarks
Action Plan		
1.	Drone application of TNAU Pulse wonder for yield enhancement in redgram (2022-23 to 2023-24) Dr. A. Senthil, Professor and Head Dr. V. Babu Rajendra Prasad, Asst. Prof. (CRP), Dept. of Crop Physiology, TNAU, Coimbatore Dr. M. Kumara Perumal, Asst. Prof. (RS&GIS)	To be continued.
University Research Project		
1.	DCM/CBE/CRP/GGR/2021/001: Study on melatonin induced changes in physiology and metabolome of greengram (<i>Vigna radiata</i> L.) under drought and high temperature stresses. (2020 to 2022) Dr. M.K. Kalarani, Prof. and Head (Crop Physiology). Dept. of Crop Physiology TNAU, Coimbatore	The project to be closed. The result may be recommended for OFT
2.	DCM/YTP/PUL/2022/001. Effect of exogenous growth regulators and rhizobial inoculants on physiology traits associated with drought tolerance in blackgram Dr. C. Tamilselvi, Asst. Prof. (Crop Physiology), AC & RI, Eachangkottai, Thanjavur Duration: June 2022 to Sep 2024	To project to be continued.

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

S. No.	Project Number and Title	Name and Designation of the Project leader	Duration	Remarks of the Technical Director
Soil Science and Agricultural Chemistry				
OFT				
1.	OFT on Zinc nutrition of blackgram in alkali soil	Lead Centre and Scientists Dr. B. Bhakiyathu Saliha, Professor (SS&AC) Dept. of Soil and Env., AC&RI, Madurai Dr. K. Kumutha, P&H (AGM)	2022-23	The technology has been recommended for adoption.

		Dept. of Agrl. Microbiology, AC&RI, Madurai Dr. R. Indrani, Professor (SS&AC) AC&RI, Chettinad Co-Ordinating centres & Scientists In- charge ADAC & RI, Trichy Dr. D. Janaki, Assoc. Professor (SS&AC) CSRC, Ramanathapuram Dr. J. Prabhakaran, Assoc. Prof (SS&AC)		
2.	OFT on Screening pulses genotypes for Zn and Fe efficiency and Bio-fortification	Dr. T. Chitdeshwari, Professor (SS&AC), Dept. of SS&AC TNAU, Coimbatore-3 Dr. M. Vijayakumar, Asst. Prof. (SS&AC), AC&RI, KDM Dr. M. Gopalakrishnan, Asst. Prof. (SS&AC), HC&RI, Jeenur.	2022-23	The technology has been recommended for adoption.
3.	OFT on Effect of organo-mineral biochar phosphorus fertilizer on phosphorus availability, utility and yield of pulse crop in low pH Alfisol. (Externally Funded project)	Dr. P. Kannan, Assoc. Prof. (SS&AC) Dept of Soils &Envi., AC&RI, Madurai Dr. K. Kumutha, P &H (AGM) AC&RI, Madurai Dr. S. Marimuthu, Assoc. Prof. (Agronomy) NPRC, Vamban Dr. M. Vijayakumar, Assist. Prof. (SS&AC), AC&RI, KDM	2022-23	The technology has been recommended for adoption.
AICRP projects				
1.	AICRP/NRM/CBE/SAC/004/ Programme5: Screening pulses genotypes for Boron(B) efficiency and fortification	Dr. T. Chitdeshwari, Professor (SS&AC), Dept. of SS&AC, TNAU, Cbe	2022 - 24	The research findings to be given for information and a new action plan to be proposed. Biometric observations on seed diameter and seed filling are to be recorded and documented with photographs
2.	AICRP/NRM/CBE/SAC/004 All India Co-ordinated Research Project on Micro and Secondary nutrients and pollutant elements in soil and plant Programme4. Optimizing micronutrients recommendations for rainfed pulses.	Dr. S. Suganya, Assoc. Professor (SS&AC) Dept. of SS&AC, TNAU, Cbe	2022 - 24	The research findings to be given for information. Treatments with the combination of Zn and Fe may be tried for green gram and blackgram in the ensuing experiments. The project work to be continued.

Student thesis (PG & Ph.D. Research)				
1.	Chemistry of BioSulphur in calcareous soil and its influence on growth and yield of Blackgram	Student: Ms. G. Akila, Chairperson Dr. S. Thiyageshwari, Professor (SS&AC), Dept. of SS&AC, TNAU, Cbe-3	-	The research findings to be given for information.
2.	Soil Test based Targeted Yield Equations for Blackgram through Integrated Plant Nutrition System on <i>Alfisol</i>	Student E. Amuthasankari Chairperson: Dr. R. Santhi, P&H (SS&AC) Dept. of SS&AC, TNAU, Cbe-3	-	The research findings to be given for information
3.	Recalibration of Targeted Yield Equations through Integrated Plant Nutrient System for greengram on <i>Alfisol</i> .	Student: Chelli Lalitha Chairperson Dr. S. Maragatham, Professor (SS&AC), Dept. of SS&AC, TNAU, Cbe-3	-	The research findings to be given for information

AGRICULTURAL MICROBIOLOGY

S. No.	Project Number and Title	Name and Designation of the Project Leader	Remarks of the 41st CSM 23
University Research Project			
1.	NRM/MDU/AGM/PUL/2020/001 Development of efficient indigenous <i>Rhizobium</i> strains for yield maximization of pulses in Madurai district (Sept.2020 to Oct. 2023)	Dr. M. Jeya Bharathi Asst. Professor (Agrl. Microbiology) Dr. E. Subramani Assoc. Professor & Head <i>i/c</i> , (Agronomy), KVK, Madurai	The project may be extended for one more year with an instruction to carry out focused research as per the proposed work plan
2.	NRM/ADT/AGM/PUL/2020/001: Development of salt tolerant <i>Rhizobium</i> for enhancing productivity of rice fallow pulses under salinity stress (August'2020 to August'2022)	Dr. T. Sivasankari Devi, Asst. Prof. (Agrl. Micro) TRRI, Aduthurai	Molecular Characterization has to be done Completion report has to be submitted Findings may be proposed for OFT in three locations (Nagapattinam, Thivarur and Ramnad)

Action plan			
3.	Action plan 8: Evaluation of <i>Rhizobium</i> strain for greengram suitable for sodic soils -(2019-2022)	Co-ordinating Centre: Dr. M. Sundar, Prof. (Agrl. Micro.), AC&RI, Kudumiyamalai Sub centres: Dr. E. Jamuna, Assoc. Prof. (Agrl. Micro.), Vazhavachanur, Dr. K.G. Sabarinathan, Assoc. Prof. (Agrl. Micro.), AC&RI Killikulam	OFT could be undertaken for one more year. Molecular identification of the strain has to be done

4.	<p>NRM/TRRI/VBN/BGR/2021/001(2021-Actionplan6) Study on the effect of <i>Rhizobium</i> isolate-VUC on growth and Yield of blackgram (July,2021toJune,2023)</p>	<p>Co-ordinating Centre: Dr. R. Uma Sankareswari, Asst. Prof. (AGM), NPRC, Vamban Sub centres: Dr. K. Kumutha, P&H, Dept. of Agrl. Microbiology AC&RI, Madurai Dr. R. Parimaladevi, Assoc. Prof. (AGM), TNAU, Coimbatore Dr. M. Gnanachitra, Prof. (AGM), Dept. of Agrl. Micro, TNAU, Coimbatore Dr. E. Jamuna, Assoc. Prof. (Agrl. Micro.) Vazhavachanur, Tiruvannamalai Dr. T. Sivasankari Devi, Asst. Prof. (Agrl. Micro.), TRRI, Aduthurai</p>	Findings may be recommended for adoption. Molecular identification of the strain has to be done
5.	<p>NRM/TRRI/VBN/GGR/2021/001(2021-Actionplan7) Study on the effect of <i>Rhizobium</i> isolate-VMF on growth and yield of green gram</p>	<p>Co-ordinating Centre: Dr. R. Uma Sankareswari, Asst. Prof. (AGM), NPRC, Vamban Sub centres: Dr. K. Kumutha, P&H, Dept. of Agrl. Microbiology, AC&RI, Madurai Dr. R. Parimaladevi, Assoc. Prof. (AGM), TNAU, Coimbatore Dr. M. Gnanachitra, Prof. (AGM), Dept. of Agrl. Micro, Coimbatore Dr. E. Jamuna, Assoc. Prof. Agrl. Micro.) Vazhavachanur Dr. T. Sivasankari Devi, Asst. Prof. (Agrl. Micro.), TRRI, Aduthurai</p>	Findings may be recommended for adoption. Molecular identification of the strain has to be done
6.	<p>NRM/CBE/AGM/PUL/001 Field Evaluation of Nodule Associated Plant Probiotics in greengram and redgram (April 2022 to March 2024)</p>	<p>Co-ordinating Centre Dr. U. Sivakumar, Prof.& Head, (Agrl. Micro.) Coimbatore-3. Sub centres Dr. R. Parimaladevi, Assoc. Professor (Agrl. Micro.), TNAU, Coimbatore Dr. J. Prabina, Professor (Agrl. Micro.), AC & RI, Killikulam Dr. E. Jamuna, Assoc. Prof. (Agrl. Micro.), ORS, Tindivanam Dr. T. Sivasankari Devi, Asst. Prof. (Agrl. Micro.),</p>	The Project may be continued

		TRRI, Aduthurai Dr. A. Ramalakshmi, Assoc. Professor (AGM) TNAU, Coimbatore-3.	
7.	Student thesis Interaction of Nodule Associated Microbes (NAM) and <i>Rhizobium</i> sp. for enhanced drought tolerance in Horse gram (<i>Macrotyloma uniflorum</i>)	Dr. U. Sivakumar Professor (Agrl. Micro.), Dept. of Agrl. Microbiology, TNAU, Coimbatore-3.	Findings may be given for information
8.	NRM/TVM/AGM/PUL/2022/001: Development of liquid bioinoculant consortium and its effect on growth and productivity of Redgram (January 2022- December 2024)	Dr. R. Brindavathy, Professor (Ag. Microbiology) KVK, Tindivanam	Findings may be given for information
AICRPs			
9.	AICRP/PBG/VBN/MUL/013 Study on the effect of bio-inoculants on blackgram (April, 2019-March, 2022)	Dr. R. Uma Sankareswari Assistant Professor (AGM), NPRC, Vamban	The project is to be continued
10.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Mungbean) (April, 2019-March, 2022)	Dr. R. Uma Sankareswari Assistant Professor (AGM), NPRC, Vamban	The project is to be continued
11.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Pigeonpea) (April, 2019-March, 2022)	Dr. R. Uma Sankareswari Assistant Professor (AGM), NPRC, Vamban	The project is to be continued

D. New Action Plan for 2023–2024

I. Crop Management

Action plan1: Evaluation of New Generation Herbicide for Effective Weed Control in Short Duration Pulses (2023 -2025)

Objectives

- To identify suitability of EPoE herbicide Sodium acifluorfen+ Clodinafop-propargyl for short duration pulses

Treatments

- T₁ - PE Pendimethalin @ 1 kg a.i./ha on 3 DAS + one HW on 25 DAS
- T₂ – EpO E Imazethapyr @ 50 g a.i./ha + quizalofop ethyl @ 50 g a.i./ ha (tank mix) at 15-20 DAS
- T₃ – EpO E Sodium acifluorfen + Clodinafop-propargyl @ 175 g /ha at 15 - 20 DAS
- T₄ - PE Pendimethalin on 3 DAS *fb* EPoE Sodium acifluorfen + Clodinafop-propargyl at 15-20 DAS
- T₅ - Hand weeding on 20 and 40 DAS
- T₆ - Weedy check

Crops: Blackgram (VBN 11), Greengram (CO 9), Cowpea (VBN 4)

Design: RBD **Replications:** Three **Season:** *Kharif & Rabi*

Observations to be recorded:

Plant population, weed count at 15 & 30 DAS, weed dry matter, 15 & 30 DAS, Phytotoxicity symptoms, growth and yield parameters, grain yield and economics.

Co ordinating centre

Department of Agronomy, TNAU, CBE: Dr. P. Parasuraman, Professor and Head

Implementing Centres& Scientist in-charge:

Department of Pulses, TNAU, CBE: Dr. S. Anitta Fanish, Asst. Prof. (Agronomy)
NPRC, Vamban: Dr. P. Rajarathinam, Asst. Prof. (Agronomy)
ARS, Kovilpatti: Dr. J. Bhuvaneshwari, Asst. Prof. (Agronomy)
RRS, Paiyur: Dr. C. Sivakumar, Professor (Agronomy)

Action plan 2: Farm Mechanization – Technology Capsule Development for Rainfed Blackgram (2023-24 to 2024-25)

Objectives: To develop technology capsule for farm mechanization in rainfed blackgram

Treatments

T₁- Complete farm mechanization from sowing to harvest	T₂ - Existing practices for blackgram cultivation
<ul style="list-style-type: none">• Sowing by seed cum fertilizer drill at 45x10 cm spacing• EPoE herbicide application by drone followed by inter cultivation with tractor drawn weeder• Foliar application of nutrients and pesticides by Drones• Harvest by combine harvester	<ul style="list-style-type: none">• Sowing by seed cum fertilizer drill by 25x10 cm spacing• EPoE herbicide spray at 15 DAS + Hand weeding at 30 DAS• Foliar application of nutrients and pesticides by sprayers• Manual harvesting and machine threshing

Co – ordinating centre

Dept. of Agronomy, TNAU, Coimbatore: Dr. P. Parasuraman, Professor and Head

Centres& Scientist in-charge

ARS, Kovilpatti - Dr. S. Manoharan, Asst. Prof. (Agronomy)
CSRC, Ramnad - Dr. S. Vallalkannan, Assoc. Prof. (Agronomy)
AC & RI, Kudumiyamalai - Dr. S. Marimuthu, Assoc. Prof. (Agronomy)

Observations to be recorded

Crop establishment, plant growth and yield attributes, grain yield and haulm yield
Economics: Gross return, net return, BCR.

Action plan 3: Management of *Cuscuta chinensis* Incidence in Blackgram in Cauvery Delta Region (2023-24 to 2024-25)

Objectives: To find out management strategy for parasitic weed *Cuscuta chinensis* in Blackgram

Treatments

T₁ - Pre emergence application of Pendimethalin 1.0 kg/ha
T₂ - EPoE application of Fluazifop – p-butyl 11.1 % + Fomesafen 11.1 % at 250 g/ha
T₃ - EPoE application of Propaquizafop 2.5 % + imazethapyr 3.75% at 125 g/ha
T₄ - EPoE application of Clodinafop propargyl 8%+acifluorfen Sodium 16.5 % at 185 g/ha
T₅ - Un weeded control
Note: EPoE - 15 -20 days after sowing or 2-3 leaf stage of weeds

Co ordinating centre:

Department of Agronomy, TNAU, CBE: Dr. S. Radhamani, Professor (Agronomy)

Implementing Centres and Scientist in-charge

KVK, Needamangalam: Dr. V. Karunakaran, Asst. Prof. (Agronomy)
ARS, Thanjavur: Dr. T. Parthiban, Asst. Professor (Agronomy)
TRRI, Aduthurai: Dr. S. AnandhaKrishnaveni, Associate Professor (Agronomy)
AC&RI, Eachangkottai: Dr. S. Marimuthu, Associate Professor (Agronomy)

Action Plan 4: Assessment of liquid Pulse Wonder through Drone Application on Yield Enhancement in Blackgram and Greengram

Objectives: To assess the impact of liquid Pulse Wonder through drone application on yield in Blackgram and Greengram

Coordinating Centre

Department of Crop Physiology, TNAU, CBE:
Dr. A. Senthil, Professor & Head
Dr. V. Babu Rajendra Prasad, Asst. Prof. (CRP)

Implementing Centres and Scientist in-charge

AC&RI, Eachangkottai : Dr. C. Tamil Selvi, Asst. Professor (CRP)
NPRC, Vamban : Dr. P. Rajarathinam, Asst. Professor (AGR)
AC&RI, KDM : Dr. C. Rajkumar, Asst. Professor (CRP)
RRS, Aruppukottai : Dr. C. Raja Babu, Assoc. Professor (CRP)

Treatment Details:

Treatment details		Mode of application	Time of application
T ₁	Control – TNAU Pulse Wonder Spray	Hand operated sprayer	One Spray at Flowering stage
T ₂	Control - TNAU Pulse Wonder (Powder form) (3%)	Drone application	
T ₃	3% TNAU Pulses Wonder liquid		
T ₄	4% TNAU Pulses Wonder liquid		
T ₅	5% TNAU Pulses Wonder liquid		

Two Season Trials (*Kharif and Rabi*)

Observations to be recorded:

Leaf area index, fertility coefficient, partitioning efficiency (Total dry weight, root, stem, leaf, economic parts dry weight), No. of pods per plant, 100 seed weight, yield and economics.

II. Soil Science and Agricultural Chemistry

1. Bio-fortification of Boron in Blackgram

Objective: To develop and optimize fortification technology for B in Blackgram

Treatments

T₁: Soil test based NPK
T₂: Soil test based NPK + 5 kg Borax ha⁻¹
T₃: Soil test based NPK + 7.5 kg Borax ha⁻¹
T₄: Soil test based NPK + 10 kg Borax ha⁻¹
T₅: Soil test based NPK + 5 kg Borax as basal + 0.20% Boric acid foliar spray twice at 30 & 45 DAS ha⁻¹
T₆: Soil test based NPK + 7.5 kg Borax as basal + 0.20% Boric acid foliar spray twice at 30 & 45 DAS ha⁻¹
T₇: Soil test based NPK + 10 kg Borax as basal + 0.20% Boric acid foliar spray twice at 30 & 45 DAS ha⁻¹
Genotypes: VBN 8 & CO 5 Design: FRBD Replications: Three Period: 1 year

Observations and Analysis

Growth and yield attributes, seed and haulm yield, HWS - B, B content & uptake, B enrichment in grains, B efficiency and grain quality

Lead centre & Scientist In-charge

Dept. of SS&AC, DNRM, TNAU, Coimbatore: Dr. T. Chitdeshwari, Prof. (SS&AC)
Dept. of Crop Physiology, DCM, TNAU, Cbe: Dr. P. Boominathan, Prof. (CRP)

Co-ordinating centre & Scientist In-charge

AC&RI, Killikulam: Dr. D. Lenin Raja, Asst. Professor (SS&AC)
Dr. S. Srinivasan, Professor & Head (CRP)

2. Evaluation of different Greengram varieties for their tolerance to sodicity Objectives

- ✓ To assess the effect of different levels of soil ESP on growth, yield and K uptake by greengram varieties.
- ✓ To fix the tolerance limits of ESP for Greengram varieties

Treatments

Main plot : Six ESP Levels (8, 16, 24, 32, 40 and 48%)
Strip plot : Four Greengram varieties (VBN(Gg) 3, CO(Gg) 7, CO 8 and VBN 4)
Replications : Three
Design : Strip Plot Design

Observation & Analysis

Growth and Yield, Na & K uptake, changes in pH, EC & ESP, Na/K ratio

Scientists in-charge:

Dr. M. Baskar, Professor and Head (SS & AC), ADAC & RI, Trichy
Dr. S. Rathika, Associate Professor (AGR), ADAC & RI, Trichy

III. Agricultural Microbiology

Action Plan New 1	Evaluation of Nodule Associated Plant Probiotics (NAPPs) in Horse gram		
Theme leader	Dr. U. Sivakumar, Prof. and Head (Agrl. Microbiology), TNAU, Coimbatore		
Activity	Name of the Scientist(s) and Centre(s) - Proposed	Observations to be recorded	Deliverables/ expected outcome
<ul style="list-style-type: none">Objectives To evaluate nodule associated plant probiotics for enhanced crop productivity under pot culture and field conditionsEffect of Co-inoculum of NAPPs (<i>Rhizobium</i> sp. HGR1, <i>Pseudomonas indoloxydans</i>HGB2 and Yeast HGY1)Identification of Root exudates metabolomics secreted upon the interaction of NAM under moisture deficit stress.	Sub centres Dr. R. Brindhavathy, Professor (AGM), ORS, Tindivanam Dr. R. Uma Sankareswari, AP (AGM) NPRC, Vamban Dr. E. Jamuna, Assoc. Prof (AGM) AC&RI, Vazhavachanur Dr. R. Senthilkumar, Professor (AGM) AC&RI, Eachangkottai Dr. Sangeetha, AP, RRS, Paiyur Dr. S. Gayathry, KVK Vridhachalam	<ul style="list-style-type: none">Plant biometrics Defence hormone and genes, signalling molecules under <i>invitro</i> conditionsNodule and yield parameters.	Nodule Associated Plant Probiotics (NAPP'S) had effective colonization in Horse gram and improve the yield

Action Plan New 2		Evaluation of Nodulation responsive genotypes in blackgram	
Theme leader		Dr. R. Uma Sankareswari, Asst. Prof. (Agrl. Microbiology), NPRC, Vamban	
Activity	Name of the Scientist(s) and Centre(s) - Proposed	Observations to be recorded	Deliverables/ expected outcome
Objectives <ul style="list-style-type: none"> Screening genotypes of blackgram for rhizobial response for nodulation. Profiling root exudates and identify signal molecules. Identify the root exudates metabolites and modify rhizosphere. 	Sub centres Dr. A. Ramalakshmi, Assoc. Prof (AGM) TNAU, Coimbatore Dr. T. Siva Sankari Devi, Asst. Prof (AGM), TRRI, Aduthurai Dr. E. Jamuna, Assoc. Professor (AGM), AC&RI, Vazhavachanur Dr. J. Prabhakaran, Assoc. Prof. (SS&AC) AC&RI, Madurai	<ul style="list-style-type: none"> Plant biometrics Signalling molecules Root exudates metabolites under <i>in vitro</i> conditions Nodule and yield parameters. 	Evaluating black gram genotypes in nodulation pattern and modified rhizosphere would help to sustain productivity with reduced usage of fertilizers

Large Scale Demonstrations in Farmers' field during 2023 - 2024

S. No.	Title of the technology	Location and Demonstrations (Nos.)	Scientists In-charge
AGRONOMY			
1.	Promising redgram transplanting techniques for better crop establishment	Dept. of Agronomy, Coimbatore (4)	Dr. S. Anitta Fanish
		AC&RI, Madurai (5)	Dr. R. Durai Singh
		RRS, Paiyur (5)	Dr. C. Sivakumar
		ARS, Bhavanisagar (3)	Dr. K. Ramah
		NPRC, Vamban (4)	Dr. P. Rajarathinam
2.	System of Pulses Intensification in blackgram	KVK, Aruppukottai (4)	Dr. Chelvi Ramesh
		Dept. of Agronomy, Coimbatore (5)	Dr. S. Anitta Fanish
		NPRC, Vamban (5)	Dr. P. Rajarathinam
		AC&RI, Kudumiyamalai (5)	Dr. S. Marimuthu
		AC&RI, Killikulam (5)	Dr. S. Subbulakshmi
3.	Enhancing productivity of green gram through foliar spray of fermented fish waste extract	KVK, Madurai (5)	Dr. E. Subramanian
		ADAC&RI, Trichy (5)	Dr. T. Ramesh
		Dept. of Agronomy, Coimbatore (4)	Dr. S. Anitta Fanish
		KVK, Madurai (4)	Dr. E. Subramanian
		ARS, Kovilpatti (4)	Dr. S. Manoharan
4.	Augmentation of green gram productivity in problem soils through suitable variety and phosphorus fertilization	AC&RI, Kudumiyamalai (4)	Dr. S. Marimuthu
		KVK, Vamban (4)	Dr. M.P. Kavitha
		AC&RI, Madurai (5)	Dr. S. Marimuthu
		ADAC&RI, Trichy (10)	Dr. T. Sampathkumar
5.	TNAU Horsegram wonder	AC&RI, Madurai (5)	Dr. S. Radhika
		ADAC&RI, Trichy (10)	Dr. S. Radhika
		ADAC&RI, Trichy (10)	Dr. S. Radhika
CROP PHYSIOLOGY			
5.	TNAU Horsegram wonder	AC&RI, Vazhavachanur (15)	Dr. K. Anandhi
		RRS, Paiyur (15)	Dr. C. Sivakumar
		Dept. of Crop Physiology (15), Coimbatore	Dr. R. Sivakumar

III. CROP PROTECTION

AI. Technologies for Adoption/OFT/Information

I. Technology for Adoption:

Management strategies for *Maruca vitrata* in lablab

Application of Novaluron 10 % EC @ 750 ml/ha at flowering, Flubendiamide 480 SC @ 100 ml/ha at early pod formation and Emamectin benzoate 5% SG @ 220 g/ha at pod maturity recorded the lowest spotted pod borer damage with higher yield (10.01 t/ha) & BCR (2.99).

Management of pigeonpea sterility mosaic disease

Seed treatment with imidacloprid 600 FS @ 5 g/kg seed along with spraying of fenazaquin 10 EC @ 1ml/lit at 35 DAS was found to be effective in reducing the incidence of pigeonpea sterility mosaic disease (10.77 %), vector (mite) population (3.24 no's/leaf) and increasing the yield (1050 kg/ha) as against 33.02 %, 10.01 and 834 kg/ha respectively with high BC ratio of 2.14.

II. Technology for OFT

OFT 1: IPDM strategy for managing sterility mosaic and phytoplasma diseases with their vectors in redgram

Treatments

T1	IPM Package (SMD / Phytoplasma) <ul style="list-style-type: none"> ❖ Seed treatment with <i>Bacillus subtilis</i> (Bbv 57) @ 10g/kg and <i>Rhizobium</i> 25g/kg of seed followed by imidacloprid 600 FS @ 5g/kg ❖ Intercropping with sorghum ❖ Rogue out infected plants upto 45 DAS ❖ Foliar spray of <i>Bacillus subtilis</i> @ 1% at 30DAS ❖ Need based spraying of azadirachtin 1000 ppm or fenazaquin 10 EC @ 1 ml/lit for mites and thiamethoxam 25% WG @ 0.25g/lit for hoppers
T2	Farmer's practice
T3	Untreated check

Design: RBD; Replications: 7; Season: *Kharif* Variety: ICP 8863

Observation to be recorded

- ❖ Per cent disease incidence
- ❖ Vector population (mite and leaf hoppers) & Yield

Centres to be involved:	
TNAU, Coimbatore [TL]*	: Dr. L. Karthiba, Asst. Professor (Plant Pathology) Dr. G. Senthilraja Asst. Professor (Plant Pathology) Dr. P.S. Shanmugam, Associate Professor (Entomology)
NPRC, Vamban	: Dr. R. Ramjegathesh, Asst. Professor (Plant Pathology) Dr. R. Ramesh, Assistant Professor (Entomology)
KVK, Virinjipuram	: Dr. V. Sendhilvel, Associate Professor (Plant Pathology) Dr. P. Thilagam, Assistant Professor (Entomology)
KVK, Papparpatti	: Dr. P. Deivamani, Assistant Professor (Plant Pathology) Dr. D. Rajabaskar, Assistant Professor (Entomology)

* TL -Team Leader

II. For Information

1. Agricultural Entomology

- The spotted pod borer and gram pod borer incidence was observed from 36th and 43rd SW respectively in pigeonpea. The maximum activity of *Helicoverpa armigera* was noticed during 46th SW with 5.30 larvae per plant at Department of Pulses, TNAU, Coimbatore.
- The leafhopper population was more during this year and observed from 36th SW to 46th SW in redgram. The maximum leafhopper population was recorded during 42nd SW (28.40 hoppers/plant). The blue butterfly and plume moth incidence was noticed from 37th SW with peak incidence at 45th SW.
- In blackgram, whiteflies were recorded from 37th SW to 46th SW. The maximum whiteflies activity was recorded from 1st SW to 8th SW. The spotted pod borer incidence was noticed from 39th SW to 45th SW and 1st SW to 8th SW.
- *Spodoptera litura* and whitefly were observed between 3rd and 9th week after sowing (WAS) at NPRC, Vamban in blackgram. Aphids infestation was started from 3rd WAS and observed till 9th WAS. Pod bugs infestation was observed from 5th WAS till harvest of the crop.
- Blister beetle and *Maruca vitrata* were observed between 5th and 10th WAS. *Spodoptera litura*, whitefly, leafhopper, aphid and blister beetles were positively correlated with maximum temperature. Pod bug, *M. vitrata* and *H. armigera* were negatively correlated with maximum temperature at NPRC, Vamban.
- Peak activity of thrips and flea beetle in blackgram was recorded in 27th standard week at TRRI, Aduthurai. The blue butterfly population was ranged from 0 to 4.0 Nos. per plant with peak activity at 30th SW.
- The whiteflies activity was recorded from 37th SW to 43rd SW and 50th SW to 6th SW in greengram at Dept. of Pulses, TNAU, Coimbatore. The leafhopper activity also showed similar trend in greengram. Rainfall was negatively correlated with the incidence of whitefly, leafhopper, spotted pod borer and pod bug in greengram at Coimbatore.
- The leaf webber damage in greengram was observed from 3rd week after sowing and continued till 7th WAS at NPRC, Vamban. The whitefly population started their infestation at 3rd WAS and continued till 8th WAS. Pod bugs infestation was observed from 5th WAS till harvest of the crop.
- The leaf webber damage in Cowpea was observed from 3rd WAS and continued till 8th WAS at NPRC, Vamban. *Spodoptera litura* and whitefly were observed between 3rd and 9th WAS.
- Redgram PYT entries 21-01, 21-02 and 21-03 showed tolerance to the pod borer complex with pest severity index of 18.18, 14.77 and 16.48 respectively at Department of Pulses, TNAU, Coimbatore. The short duration MLT entries K 21-01, K 21-02, K21-04 and K 21-05 were moderately resistant to pod borers.
- Blackgram entries 22-03 and 22-05 were moderately resistant to pod borer complex in both season with pest severity index of 40.15 and 35.91 respectively. Among the six greengram entries, 22-01 was moderately resistant to pod borers in both seasons.
- Among the cowpea entries 22-03 was tolerant to pod borers in both seasons.
- At NPRC, Vamban, blackgram entries BG K 22-05 and BG K 22-06 were moderately resistant to pod bug and *M. vitrata* during Kharif 2022 and BG K 22-02 & BG K 22-04 during Rabi 2022. Among greengram entries, GG K 22-03 and GG K 22-04 were

moderately resistant to pod bug and *M. vitrata* during *Kharif* 2022 and GG K 22-02 & GG K 22-04 during *Rabi* 2022. Among cowpea entries CP R 22-01 and CP R 22-04 were moderately resistant to pod bug and *M. vitrata* during *Rabi* 2022.

- The molecular analysis of pod fly samples collected from seven locations revealed that these are *Melangaromyza obtusa* only. There is no variation in the collected samples.
- Eight different insecticide schedules were evaluated against pod borers in pigeonpea and two combinations *viz.*, Indoxacarb 14.5 SC (60 g a.i./ha) - Chlorantraniliprole 18.5 SC – Lufenuron 5.4 EC (30 g a.i./ha) – Deltamethrin 2.8EC (12.5 g a.i./ha) (T5) and Indoxacarb 14.5 SC (60 g a.i./ha) - Flubendiamide 480 SC (48 g a.i./ha) – Lufenuron 5.4 EC (30 g a.i./ha) – Deltamethrin 2.8EC (12.5 g a.i./ha) (T6) were found to be highly effective insecticide schedule to manage the pod borer complex in pigeonpea. These combinations recorded yield and BCR of 930 & 941 kgs/ha and 1.76 and 1.73 respectively.
- In redgram, Spinosad 48 SC @ 56 g a.i /ha was effective against blister beetle (10 numbers/ 10 plants) followed by Indoxacarb 14.5 SC @ 50 g a.i /ha (11 Nos / 10 plants) at 10 days after spraying. These treatments recorded the highest yield of 994.78 and 947.90 tonnes per hectare respectively at NPRC, Vamban.
- The survey conducted in farmers field revealed the higher pod fly incidence in late sown pigeonpea. The incidence of *M. vitrata* and *H. armigera* ranged between 12 – 22 and 10 – 24 per cent across all the surveyed areas

2. Plant Pathology

- Incidence of phyllody disease was observed in redgram (5.66 %) during 2022-23 in Surapalli village, Salem district in Tamil Nadu.
- The incidence of powdery mildew disease in blackgram, greengram and redgram was found to be positively correlated with the minimum temperature and relative humidity.
- The sterility mosaic disease in redgram and the yellow mosaic disease in blackgram and greengram were positively correlated with maximum temperature and relative humidity.
- The MLT entries of blackgram *viz.*, MLT BGK22-01, MLT BGR22-01 and MLT BGR22-01 were found to be resistant to yellow mosaic disease under both field and artificial screening conditions.
- Field and artificial screening of MLT entries of greengram revealed that the entries *viz.*, MLT GGK22-04, MLT GGK22-06 and MLT GGR22-07 were found to be resistant to leaf crinkle disease, both during *kharif* and *rabi*.
- The MLT redgram entries *viz.*, RG MLT (E)-K-22-003, CRG 21-002, CRG 21-006, CRG 21-007, CRG 20-01, CRG 20-03, CRG 20-04, CRG 20-06 and CRG 20-07 were found to be resistant to sterility mosaic and wilt diseases under field and artificial screening.
- Transcriptome analysis of symptomatic leaf crinkle and healthy samples of blackgram revealed a total of 1166 differentially expressed genes. Among them, 615 were up-regulated and 551 were down-regulated, which shows that a significant change has occurred in host plant in response to leaf crinkle disease.
- The PCR amplification of a DNA fragment of ~1.8 kb and ~1.2 kb from phyllody infected blackgram samples and the nucleotide sequence of phytoplasma infecting blackgram had more than 98% identity with other isolates from NCBI. The results confirmed the association of *Candidatus Phytoplasma aurantifloia* 16SrII group in blackgram phyllody.

- Foliar spraying of 3 per cent *Ampelomyces* as liquid formulation at initial appearance of the disease symptom was found to be effective in reducing the blackgram powdery mildew (12.97 %) and increasing the grain yield (870kg/ha) with BC ratio of 2.15.
- Seed treatment with *Clonostachys rosae* (CR4) @ 4 g / kg seed + soil application of *C. rosae* (CR4) @ 2.5 kg / ha recorded the minimum incidences of blackgram root rot disease with higher yield and BC ratio of 2.13.
- Seed treatment with consortium of *Bacillus subtilis* and *Bacillus amyloliquefaciens* (@1:1 ratio) @ 10 g/ kg + soil application of VAM @ 50 kg/ha on 20 DAS + soil application of consortium @ 2.5 kg/ha on 40 DAS was found to be effective for blackgram root rot disease with cent per cent inhibition in pot culture.
- *Streptomyces rochei* inhibited the mycelia growth of *Machrophomina phaseolina* causing blackgram root rot disease to an extent 49.49 per cent under *in vitro*. Secondary metabolites identified from the effective *Streptomyces rochei* as *n-Hexadecanoic acid*, Squalene, Tetradecanoic acid, Minoxidil and 2-Decenoic acid and Methyl ester compounds which will be used for further studies.
- The shelf life of *Streptomyces rochei* bioformulations based on various organic and inorganic carrier revealed that even after 180 days of storage at room temperature (28±2 °C) the rice husk ash and zeolite based bioformulation maintained higher population (92 x 10⁷ CFU/ g) and (37 x 10⁷ CFU/ g) respectively.
- The shelf life of *Actinoalloteichus cyanogriseus* bioformulations based on various organic and inorganic carrier revealed that after 180 days of storage at room temperature (28±2 °C) the rice husk recorded higher population (2.34 x 10⁵ CFU/ g).
- A significant remission of YMD symptoms was observed in blackgram (cv. CO-5 plants) treated with both dsRNA alone and nano based dsRNA targeting the coat protein gene of MYMV at 25 days post inoculation. There was no symptom development in the dsRNA treated plants as against 48 per cent in the inoculated control plants.

B. Research Project on Pulses

Total Number of Projects in Crop Protection

Type of project	AEN	PAT	Total
University sub projects	2	10	12
AICRP projects	3	5	8
Student thesis	3	3	6
Externally funded project	-	1	1
Total	8	19	27

C. Remarks on the ongoing URP/AICRIP/EPF/UCF

1. AGRICULTURAL ENTOMOLOGY

S. No.	Project Number and Title	Scientist In charge	Duration	Remarks
UNIVERSITY RESEARCH PROJECTS				
1.	CPPS/VAM/PUL/2022/001 Population dynamics of pod bugs in major pulse crops and its management	Dr. R. Ramesh Assistant Professor (Agrl. Entomology)	September 2021 to August 2024	Project may be continued
2.	CPPS/MDU/PUL/2022/001 Identification of olfactory and visual cues involved in host finding behavior of blister beetles, <i>Hycleus biundulatus</i> (Pallas) the flower feeders in pulses	Dr. Zadda Kavitha Assoc. Professor (Agrl. Entomology) AC & RI, Madurai	June 2022 to May 2024	Project may be continued

AICRP				
REDGRAM				
3.	AICRP / PBG - Cbe / PIP / 010 AICRP on Pigeonpea	Dr. P.S Shanmugam Associate Professor (Agrl. Entomology)	2023-24	Project may be continued
4.	AICRP/PBG/VRM/PIP/01 AICRP on Pigeonpea	Dr. P. Thilagam Associate Professor (Agrl. Entomology)	2023-24	Project may be continued
BLACKGRAM AND GREENGRAM				
5.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP	Dr. R. Ramesh Assistant Professor (Agrl. Entomology)	2023-24	Project may be continued

II. PLANT PATHOLOGY

S. No.	Project Number and Title	Name and Designation of the Project leader	Duration	Project wise remarks
UNIVERSITY RESEARCH PROJECTS				
REDGRAM				
1.	CPPS/VNJ/PUL/2023/001: Development of biocontrol consortia against wilt disease of redgram caused by <i>Fusarium oxysporum</i> f. sp. <i>udum</i>	Dr. V. Sendhilvel Associate Professor (Plant Pathology)	Nov 2022 to Nov 2025	<ul style="list-style-type: none"> The project may be continued Endophyte mediated strategy may be concentrated
BLACKGRAM				
2.	CPPS/CBE/PAT/BGR/2019/001: Exploring <i>Clonostachys</i> fungal biocontrol agents against root rot disease of blackgram.	Dr. L. Karthiba Assistant Professor (Plant Pathology)	July 2019 to June 2022	The project may be closed and the completion report may be submitted immediately and publish a paper on a peer review journal.
3.	CPPS/VBN/PAT/BGR/2020/001: Mycoparasitic potential of <i>Ampelomyces</i> sp for the management of powdery mildew disease in blackgram	Dr. P. Ahiladevi Assistant Professor (Plant Pathology)	July 2020 to March 2023	The project may be closed and the completion report may be submitted and publish a paper on peer review journal.
4.	CPPS / CBE / PAT / PUL / 2021 / 001: Development of a consortium using bacterial bio-agents for the management of dry root rot of black gram [<i>Vigna mungo</i> (L.)] caused by <i>Macrophomina phaseolina</i> (Tassi) Goid	Dr. M. Muthamilan, Professor (Plant Pathology) Dr. L. Rajendran, Associate Professor (Plant Pathology)	September 2021 to August 2024	The project may be continued with Dr. L. Rajendran as project leader
5.	CPPS/CBE/PAT/SOR/2021/001: Development of actinobacteria consortia for the effective biological management of <i>Macrophomina phaseolina</i> (Tassi.) Goid.	Dr. K. Angappan Professor (Plant Pathology)	April 2021 to March 2024	The project may be continued

6.	CPPS/CBE/PAT/PUL/2021/002: Evaluation of microbial enriched spent mushroom compost against root rot diseases of black gram.	Dr. G. Thiribhuvanamala, Professor (Plant Pathology)	Sep 2021 to August 2023	May be extended up to Aug 2024. Proposal for extending the project period may be submitted immediately.
7.	CPPS/CBE/PAT/PUL/2023/001: Developing bioformulation of antiviral principles for the management of Tobacco Streak Virus (TSV) infecting blackgram and greengram	Dr. R. Kannan Professor (Plant Pathology)	January 2023 to December 2025	The project may be continued
8.	CPPS/CBE/PAT/PUL/2023/001: Diagnosis of blackgram diseases using deep learning models	Dr. L. Karthiba Assistant Professor (Plant Pathology)	October 2022 to September 2024	The project may be continued
9.	CPPS/VMB/PUL/2023/001: Characterization of <i>Candidatus</i> phytoplasma inciting pulses phyllody	Dr. R. Ramjegathesh AP (Plant Pathology) Dr. R. Ramesh AP (Agrl. Ento.)	August 2022 to July 2025	Seed transmission study may be taken up and the project may be continued
GREENGRAM				
10.	CPPS/TRY/PAT/CGR/2019/001: Management of root rot of green gram using salt tolerant biocontrol agents	Dr. P.T. Saravanan Associate Professor (Plant Pathology)	November 2019 to October 2022	Awaiting RAPC approval. A new URP may be proposed immediately.
AICRP				
REDGRAM				
11.	AICRP/PBG/CBE/PIP/010 AICRP on Pigeonpea (Plant Pathology)	Dr. L. Karthiba Assistant Professor (Plant Pathology)	Continuous	The project may be continued
BLACKGRAM & GREENGRAM				
12.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Plant Pathology)	Dr. R. Ramjegathesh Assistant Professor (Plant Pathology)	Continuous	The project may be continued
13.	AICRP/PBG/ADT/MUL/015 AICRP on MULLaRP (Plant Pathology)	Dr. K. Chitra Assistant Professor (Plant Pathology)	Continuous	The project may be continued
14.	AICRP/STR/CBE/SEP/001 AICRP on NSP (Crops) - Seed Technology Research. Impact of different storage conditions and longevity on seed associated mycoflora of greengram / blackgram	Dr. T. Anand Associate Professor (Plant Pathology)	Continuous	The project may be continued
CHICKPEA				
15.	AICRP / PBG / CHP / 012 AICRP on Chickpea (Plant Pathology)	Dr. G. Senthilraja Assistant Professor (Plant Pathology)	Continuous	The project may be continued

D. Action plan (2023-24)

1. Agricultural Entomology

1.	Theme areas
	<ol style="list-style-type: none"> 1. Changing pests scenario in relation to weather parameters 2. Identification of resistant sources and mechanism of resistance 3. Management modules for emerging pests of pulses

Action Plan 1		Monitoring of insect pests of pulses	
Theme Leader		Dr. R. Ramesh, Assistant Professor (Agrl. Entomology), NPRC, Vamban	
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
1. Monitoring the pests of pulses 2. Keeping vigilance on emerging pests either through introduction or shift in pest status. <ul style="list-style-type: none"> Assessment of insect pests and natural enemies population <i>in situ</i> Fixed and roving survey in the district identified during specific crop season On campus fixed plot study at weekly interval in identified crops at VBN & CBE. Roving study at fortnightly interval by all the participating Scientists in the identified Centres. Developing AI module for identification of pest incidence. 	<p>Fixed Plot Survey Dr. P. S. Shanmugam, TNAU, Coimbatore Dr. R. Ramesh, NPRC, Vamban Dr. P. Thilagam, ARS, Virinjipuram</p> <p>Roving Survey Dr. M. Ravi, KVK, Salem Dr. D. Rajabaskar, KVK, Dharmapuri Dr. K. Suresh, KVK, Madurai Dr. B. Usharani, KVK, Aruppukottai Dr. L. Alwin, KVK, Ramnad Dr. P. Ananthi, TRRI, Aduthurai</p>	<ul style="list-style-type: none"> Incidence of stem fly, sucking pests, pod bugs, pod borers, pod fly and natural enemies once in a week through <i>in situ</i>, observation and pheromone traps catches in fixed plot and fortnightly observations in roving plot survey Identification of natural enemies for stem fly, pod fly and pod borers Correlation and regression analysis with weather parameters and development of forewarning model at CBE, VRM & VBN. Collection of photos (major insect pests and their symptoms) from all the pulses @ 500/pulse crop by each scientist for development of AI module. 	<ul style="list-style-type: none"> Forewarning on emerging pests.

Action Plan 2		Identification of resistant sources for major insect pests in pulses	
Theme Leader		Dr. P. S. Shanmugam, Associate Professor (Agrl. Entomology), TNAU, Coimbatore	
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
Identification of resistance sources by field screening and artificial screening as per standard protocol <ol style="list-style-type: none"> Screening of TNAU (MLT/ART) entries Screening of local germplasms Field screening: Stemfly, whitefly, aphids, pod bugs, defoliators, pod fly, pod borers etc. Artificial screening: Whitefly, podborer under free choice and no choice test. <ol style="list-style-type: none"> Mechanism of resistance for entries identified in 2022-23 	Dr. P. S. Shanmugam, TNAU, CBE (TL) Dr. R. Ramesh, NPRC, VBN Dr. P. Thilagam, ARS, VRM	<ul style="list-style-type: none"> Incidence of stem fly, sucking pests, pod bugs, pod borers and pod fly once in a week following standard procedure in field screening Artificial screening for expression of resistance against whitefly and pod borers in pulse crops following standard procedures Mechanism of resistance only for identified resistant entries against major pest of pulses 	<ul style="list-style-type: none"> Promising resistance entries with known resistance mechanisms against major insect pests will be available for further breeding purpose.

Action Plan 3		Species complex and management of blister beetle in redgram		
Theme Leader		Dr. R. Ramesh, Assistant Professor (Agrl. Entomology), NPRC, Vamban		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables	
Documenting the species complex of blister beetles in redgram and weed hosts Blister beetle management in redgram T1: Azadirachtin 1500ppm @ 2500 ml / ha T2: Spinosad 48 SC @ 56 g ai/ha T3: Indoxacarb 14.5 SC@ 50 g ai/ha T4: Lambada cyhalothrin 5EC @ 25 g a.i/ha, T5: Flubendiamide 480 SC @ 48 g a.i/ha, T5: Control Design: RBD Replications: 4	1. Dr. R. Ramesh, NPRC, VBN 2. Dr. P. S. Shanmugam, TNAU, CBE 3. Dr. P. Thilagam, ARS, VRM 4. Dr. Zadda Kavitha, Dept. of Agrl. Entomology, AC & RI, MDU	<ul style="list-style-type: none"> • Incidence of blister beetle in redgram and other weed hosts • Documentation of alternate weed host • Taxonomic identification of blister beetles collected from different locations • Effect of different treatments on the infestation of blister beetle in redgram 	<ul style="list-style-type: none"> • Species complex of blister beetle • Suitable management technology • Identification of alternate host to break the lifecycle. 	

Action Plan 4. Studies on web forming lepidopteran insects in pigeonpea ecosystem			
THEME LEADER		Dr. P Thilagam, Associate Professor (Agrl. Entomology), ARS, Virinjipuram	
Treatments	Name of the Scientist(s) and Centre(s)	Observations to be recorded	Deliverables
Population dynamics of web forming Lepidopteran in pigeonpea ecosystem (Long duration pigeonpea)	1. Dr. P. Thilagam, ARS, VRM 2. Dr. P. S. Shanmugam, TNAU, CBE 3. Dr. R. Ramesh, NPRC, VBN	<ul style="list-style-type: none"> • Composition of different web forming Lepidopteran • Extent of damage caused by the different Lepidopteran species. • Identification of natural enemy complex associated with web forming Lepidoptera. 	<ul style="list-style-type: none"> • The composition of different species will be useful to devise management strategies and also to identify the natural enemies associated with them.

2. Plant Pathology

II. Theme areas
Changing disease scenario in relation to weather parameters 2. Development of management strategy for major diseases in pulses

Action Plan 1: Monitoring of diseases in pulses and data set for AI based diagnosis

Theme Leader	Dr. R. Ramjegathesh, Assistant Professor (Plant Pathology), NPRC, Vamban		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverable / expected out come
A. Monitoring the incidence of important diseases of pulses ✓ Roving survey ✓ Fixed plot survey B. Collection of good quality images Machine learning algorithms	1. Dr. R. Ramjegathesh - NPRC, Vamban (Blackgram, Greengram, Redgram) 2. Dr. L. Karthiba / Dr. G. Senthilraja - TNAU, Coimbatore (Redgram, Greengram, Blackgram) 3. Dr. K. Chitra - TRRI, Aduthurai (Blackgram, Greengram) 4. Dr. N. Rajinimala - RRS, Ambasamudram (Blackgram, Greengram) 5. Dr. M. Deivamani - KVK, Papparettipatti (Redgram, Blackgram, Greengram) 6. Dr. V. Sendhilvel - KVK, Virinjipuram (Redgram, Blackgram, Greengram)	<ul style="list-style-type: none"> Incidence of diseases, viz., yellow mosaic, wilt, sterility mosaic disease, powdery mildew, rust, anthracnose, root rot have to be monitored throughout the crop period The severity of emerging disease symptoms like little leaf and phyllody. Correlation of weather factors with disease severity Collection of minimum 500 images for each major diseases in each crop covering all the seasons / varieties 	<ul style="list-style-type: none"> Forewarning models Correlation of weather data with disease severity Aiming to develop AI based disease diagnostics in pulses
	Dr. S. Kokilavani, Agrl. Meteorology, ACRC, Cbe	<ul style="list-style-type: none"> Incidence of disease has to be correlated with the weather parameters 	
	Four years data collection for SMD in redgram (Dr. L. Karthiba) Three years for MYMV in blackgram and greengram (Dr. R. Ramjegathesh, NPRC, VBN)	<ul style="list-style-type: none"> Forewarning model development involving Dr. S. Kokilavani, Agrl. Meteorology, 	

Action Plan 2: Bio-management strategy for powdery mildew diseases of Pulses (Continued)

Theme leader	Dr. R. Ramjagathesh, Assistant Professor (Plant Pathology), NPRC, Vamban		
Activity	Name of the Scientist(s) and Centre(s) - Proposed	Observations to be recorded	Deliverables/ expected outcome
Biological management of powdery mildew in blackgram and greengram with <i>Ampelomyces</i> T1- FS of 2% <i>Ampelomyces</i> as liquid formulation T2- FS of 3% <i>Ampelomyces</i> as liquid formulation T3- FS of 4% <i>Ampelomyces</i> as liquid formulation T4 - FS of 5 % <i>Ampelomyces</i> as liquid formulation T5- FS of Propiconazole 25 EC @ 1 ml/lit T6- Untreated Control (First spray at initial appearance of the symptom and second spray one week later) <i>Ampelomyces</i> formulation will be supplied by Dr. G. Senthilraja / Dr. L. Karthiba by availing from Dr. L. Rajendran, Associate Professor (Pl. Path.) Season: <i>Rabi</i> Design: RBD Replication: 4	1. Dr. R. Ramjagathesh - NPRC, Vamban 2. Dr. G. Senthilraja / Dr. L. Karthiba - TNAU, Coimbatore 3. Dr. K. Chitra - TRRI, Aduthurai	Field evaluation of <i>Ampelomyces</i> <ul style="list-style-type: none"> • Per cent disease index • Yield • CB ratio 	Eco-friendly management strategy will be evolved for powdery mildew disease in pulses

Action Plan 3: Biological management of root rot disease in blackgram by *Clonostachys rosea* (CR4)

Theme Leader	Dr. L. Karthiba/ Dr. G. Senthilraja, Asst. Prof. (Plant Pathology), TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverable / expected outcome
Biological management of root rot disease in blackgram using <i>Clonostachys rosea</i> (CR4) 1. Seed treatment @ 4g/kg + soil application @ 2.5 kg/ha of <i>Clonostachys rosea</i> (CR4) 2. Seed treatment @ 4g/kg + soil application @ 2.5 kg/ha of <i>Trichoderme asperillum</i> 3. Seed treatment with carbendazim 2g/kg of seed + 0.1% soil drenching 4. Untreated control (CR4) talc formulation will be supplied by TNAU centre Season: <i>Kharif</i> Design: RBD Replication: 6	1. Dr. G. Senthilraja / Dr. L. Karthiba - TNAU, Coimbatore 2. Dr. R. Ramjagathesh - NPRC Vamban 3. Dr. K. Chitra - TRRI, Aduthurai	Field evaluation of <i>Clonostachys rosea</i> <ul style="list-style-type: none"> • Per cent disease incidence • Population of <i>Clonostachys</i> in soil • Yield • CB ratio 	Eco-friendly management strategy will be evolved for root rot disease in blackgram

Action Plan 4: Management of leaf crinkle, stem necrosis and phyllody diseases in pulses

Theme leader	Dr. K. Chitra, Asst Prof (PAT), TRRI, Aduthurai and Dr. N. Rajinimala, Assoc. Prof (PAT) - RRS, Ambasamudram		
Activity	Name of the scientist and centre	Observations to be recorded	Deliverables/ expected outcome
Develop suitable management strategy for leaf crinkle, stem necrosis and phyllody diseases in pulses T1- IDM Package ✓ ST with <i>Bacillus subtilis</i> (Bbv 57) 10g/kg and <i>Rhizobium</i> 25g/kg of seed followed by imidacloprid 600FS @ 5g/kg ✓ Rogue out virus infected plants up to 25 DAS ✓ Foliar spraying of Antiviral principle @ 10 % at 30 DAS ✓ Need based spraying of thiamethoxam 25 WG 0.5g/lit 15 DAS & 45 DAS T2- Untreated control Season: <i>Kharif</i>	1. Dr. G. Senthilraja / Dr. L. Karthiba - TNAU, Coimbatore 2. Dr. R. Ramjegathesh - NPRC Vamban 3. Dr. K. Chitra - TRRI, Aduthurai 4. Dr. N. Rajinimala-RRS, Ambasamudram	<ul style="list-style-type: none"> • Record the incidence of leaf crinkle, stem necrosis and phyllody diseases • Yield parameters 	Effective management strategy will be developed for the management of leaf crinkle, stem necrosis and phyllody diseases

IV. REMARKS

a. General recommendations

- Impact of TNAU released pulses varieties may be evaluated by involving a third-party (**Action:** DCARDS & DCPBG)
- Community based seed production in pulses may be intensified to accomplish the indent raised by DoA, Chennai (**Action:** Director, Seed Centre).
- Efforts may be taken to popularize the newly released pulses varieties (**Action:** DEE)
- Multidisciplinary research projects may be taken up addressing the region-specific issues (**Action:** All Directorates).
- Redgram transplanting technology and its impact may be evaluated involving a third-party (**Action:** DCARDS & DCM)
- Theme based research may be focused to increase the yield potential of major pulses and the action plans may be proposed accordingly in the forthcoming Crop Scientist Meet (**Action:** All Directorates)
- Frequent reviews may be taken up by the Technical Directors/Deans to follow up the Action taken and to monitor the progress made by the Scientists (**Action:** All Directorates).
- All the scientists may be motivated to publish research articles in peer reviewed Journals of NAAS rating more than 7.0 (**Action:** All Scientists)
- Scientists may be encouraged to submit research proposals for external funding (**Action:** All Directorates).

b. Crop Improvement

- Efforts may be taken to develop dual purpose redgram varieties (**Action:** P&H, Dept. of Pulses, CPBG, Coimbatore)
- Breeding for resistance to viral diseases and storage pests in major pulses may be intensified (**Action:** DCPBG, DCPPS & DCPMB&B).
- Bio-fortification research to improve Iron and Zinc in major pulses may be intensified (**Action:** DCPMB&B & DCPBG)
- Research on *Kodi ulundhu* and *Naattu payaru* may be initiated (**Action:** P&H, Dept. of Pulses, CPBG, Coimbatore & NPRC, Vamban)
- Next generation tools may be deployed for accelerating development of MST lines in major pulses (**Action:** DCPMB&B/DCPBG/DCM)
- Genetic improvement of Mochai, Horsegram and Chickpea may be taken up (**Action:** P&H, RRS, Paiyur, Dept. of Pulses, CPBG, Coimbatore)
- Priority may be given for the development of salinity tolerant varieties in greengram and blackgram (**Action:** P&H, NPRC, Vamban)
- Germplasm enhancement and identification of new donors for utilization in resistance breeding programme (**Action:** P&H, Dept. of Pulses, CPBG, Coimbatore & NPRC, Vamban)

- Pre-breeding genetic stocks identified may be shared among the centres for further utilization (**Action:** P&H, Dept. of Pulses, CPBG, Coimbatore & NPRC, Vamban)
- Timely supply of Breeder seeds may be ensured (**Action:** All BSP centres)

c. Crop Management

- Soil health, properties and residues may be studied consecutively for three years before undertaking research on organic farming in pulses (**Action:** P&H, Dept. of SS&AC, TNAU, CBE, NOFRC, DNRM & DCM)
- Economics on drought mitigation studies using PGRs may be worked out and documented (**Action:** DCARDS)
- Crop management technologies released in pulses may be brought out in Crop Production Guide with necessary proof (**Action:** DNRM & DCM).
- All the isolated microbial strains may be properly documented and repositied (**Action:** Dept. of Microbiology, TNAU, CBE & DNRM)
- Biofortification of boron in Blackgram with essential micronutrients may be initiated (**Action:** Dept. of SS&AC, TNAU, CBE, DNRM & CPMB&B)

d. Crop Protection

- Artificial screening may be done for the cultures received from breeders for the development of resistance varieties against pest and diseases. The test entries may be screened after noticing 90 % of target pest incidence in the susceptible check (**Action:** All Scientists).
- Effective forecast models may be developed for the major insect pests and diseases of pulses in association with AMRC, TNAU, Coimbatore (**Action:** DCPPS & DCM).
- The identified scientists for development of forewarning models may visit any leading institute for fixing thumb rules and developing models. Necessary proposals may be sent to the University through proper channel.
- The Scientists identified for pest and disease surveillance in the state are requested to upload the data in the Google Forms for consolidation by the Head of the Departments. The Heads of the Department are instructed to submit the monthly pest and disease surveillance report to the Director CPPS on or before 25th of every month without fail (**Action:** All Scientists).

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