

**ALL INDIA CO-ORDINATED RESEARCH
PROJECT ON FLORICULTURE**

ANNUAL REPORT - 2015-16

Coimbatore centre

DEPARTMENT OF FLORICULTURE AND LANDSCAPING

Horticultural College and Research Institute

Tamil Nadu Agricultural University

Coimbatore - 641 003

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ALL INDIA COORDINATED RESEARCH PROJECT ON FLORICULTURE
ANNUAL REPORT FOR 2015-16

1. Background Information

Name of the Centre	: Coimbatore
Name of the Institution	: Tamil Nadu Agricultural University Coimbatore - 641 003
Name of the Address of the Officer In charge	: Dr. M. Kannan Professor and Head Department of Floriculture & Landscaping Horticultural College & Research Institute Tamil Nadu Agricultural University Coimbatore - 641 003 Ph: 0422 - 6611230 Mobile No.: (0) 94432 54038 e-mail : flowers@tnau.ac.in
Personal email ID	: kannanflori@gmail.com
Division / Dept. / Status	: (i) Lead Centre - Coimbatore Department of Floriculture & Landscaping Horticultural College & Research Institute Tamil Nadu Agricultural University Coimbatore - 641 003
	: (ii) Sub centre - Ooty Horticultural Research Station Ooty, The Nilgiris
	: (iii) Voluntary centre - Periyakulam Horticultural College & Research Institute Periyakulam East - 625 604 Theni District, Tamil Nadu

2. STAFF POSITION

S. No.	Post sanctioned by ICAR	Name, Designation & Address	Present scale	Residential address Phone and Email
1.	Floriculturist (CBE)	Dr. M. Kannan Professor and Head Dept. of Floriculture & Landscaping, HC & RI, TNAU, Coimbatore - 3 Ph. (Off): 0422-6611230 0422-2444625	37400-67000+10000	13/54, Bharathiar Nagar Thondamuthur Road Vadavalli, Coimbatore - 41 Mobile: 094432 54038 Res. Phone : 0422 - 2422437 Email: kannanflori@gmail.com
2.	Asst. Floriculturist (CBE)	Dr. S.P. Thamaraiselvi Asst. Professor (Hort) Dept. of Floriculture & Landscaping, HC & RI, TNAU, Coimbatore - 3	15600-39100+7000	No. 21/1, Sivagami Nagar, 3 rd cross West, Sugarcane Breeding Institute (Post.), Veerakeralam, Coimbatore - 7. Mobile: 09843338666 Email:thamaraiflori@yahoo.com
3.	Agrl. Asst. (CBE)	Mr. G. Karuppusamy Junior Agrl. Officer Dept. of Floriculture & Landscaping, HC & RI, TNAU, Coimbatore – 3	15600-39100+5400	5-1, Chandru Soori Illam Sakthi Nagar Masakalipalayam Sowripalayam Coimbatore - 28 Mobile: 07200072821
4.	Agrl. Asst. (CBE)	Mr. R. Ruban Selvakumar Agrl. Supervisor Dept. of Floriculture & Landscaping, HC & RI, TNAU, Coimbatore – 3	9300-34800+4700	C46, Staff quarters TNAU Coimbatore - 3 Mobile: 09443381930

3. BUDGET DETAILS FOR THE YEAR 2015-16

Coimbatore & Ooty centres

S. No.	Sub Head	Budget Estimate 2015-16	Expenditure for the year 2015-16
1.	Pay and Allowances	Not communicated	68,53,386.00
2.	TA		73,551.00
3.	Recurring		5,60,000.00
4.	Non-recurring		-
	Total		74,85,937.00
	ICAR share 75%		56,14,453.00

Opening balance as on 01.04.2015	Grant received from the council	ICAR share of expenditure (75%)	Closing balance as on 31.03.2016
(-) 52,50,441.00	50,05,000.00	56,14,453.00	(-) 58,59,894.00

NRC items procured during the year 2015-2016 - NIL

4. RESEARCH PROJECTS UNDERTAKEN BY THE STAFF (2015-16)

COIMBATORE CENTRE

Project No.	Title	Project Leader
I. Germplasm conservation and Evaluation		
Chrysanthemum		
1.4.1	Collection, evaluation and maintenance of germplasm of chrysanthemum	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)
Anthurium		
1.6.1	Collection, evaluation and maintenance of germplasm of Anthurium	Dr. M. Kannan Prof & Head (Flori)
Tuberose		
1.7.1	Collection, evaluation and maintenance of tuberose germplasm	Dr. M. Kannan Prof & Head (Flori)
Landscape plant material		
1.15.1	Collection and evaluation of ornamental flowering shrubs for landscape use	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)
1.15.2	Collection and evaluation of turf grasses	Dr. M. Kannan Prof & Head (Flori)
II. Crop Improvement		
Chrysanthemum		
2.2.1	Testing of new genotypes of Chrysanthemum	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)
Tuberose		
2.3.1	Testing of new genotypes of Tuberose	Dr. M. Kannan Prof & Head (Flori)
Marigold		
2.4.1	Testing of new genotypes of Marigold for loose flower	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)
China Aster		
2.6.1	Testing of new genotypes of China Aster	Dr. M. Kannan Prof & Head (Flori)
III. Crop Management		
Tuberose		
3.2.1	Drip irrigation and fertigation studies in tuberose	Dr. M. Kannan Prof & Head (Flori)
Foliage plants		
3.9.1	a) Effect of colored shade nets on cut foliage plant <i>Asparagus plumosis</i> and <i>Nephrolepis</i>	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)
3.9.2	b) Efficacy of media incorporated with Pusa hydrogel on growth and production of quality foliage plants	Dr. S.P.Thamaraiselvi Asst. Prof (Hort.)

5. Salient Achievements (2015-16) - Coimbatore Centre

I. Germplasm conservation and Evaluation

Chrysanthemum

Evaluation of chrysanthemum germplasm collections revealed that among the **loose flower** varieties, **Punjab Anuradha** performed well under Coimbatore conditions and can be popularized for commercial cultivation. The performance of the variety **Red Gold** was also found superior in terms of number of branches (9.00) and yield per plant (178.20 g/plant) and attractive flower colour and hence can be recommended for cultivation as **cut flower**. The varieties, Gem and Mohini were found to perform well under pot culture with 116 and 110 flowers per plant and hence can be recommended.

Anthurium

Evaluation of anthurium germplasm collection comprising of Red, Pink and Orange group, revealed that the red group dominates and registered its superiority in flowering, yield and quality parameters.

S. No.	Spathe colour group	Best performing variety	Parameters	Values
1.	Red group	a) Rosetta	Increased spike length Increased plant height Increased leaf petiole length	52.57 cm 75.63 cm 54.17 cm
		b) Red Dragon	Highest no. of leaves / plant	7.20
		c) Temptation	Highest length and width of spathe	10.26 x 9.95 cm
		d) Fire	Desirable angle of spadix	48 ⁰ C
		e) Glamour	Increased duration of flowering Increased vase life in tap water	92.50 days 25.00 days
2.	Pink group	Diablada	Highest no. of suckers / plant Highest no. of spikes / plant Least time interval in successive flower production	10.28 9.00 29.70 days
3.	Orange group	Sunshine orange	Highest length of spadix	7.93 cm

Tuberose

Single and double types of tuberose were evaluated under Coimbatore conditions. Among the single types, Prajwal registered its superiority through higher flower yield (9.56 kg / plot), increased number and weight of florets / spike and earliness in spike emergence and opening of

florets. This variety also showed increase in bulb diameter (5.2 cm) and bulb weight (58.2 g). Among double types, “Suvasini” was found to be best variety as it has registered the highest spike yield (25.50 nos. / m² and 96.10 kg/plot), earliness in flowering, highest spike length (72.30 cm) and with long florets. However, for bulb production, Hyderabad double and Vaibhav found to be more suitable.

Landscape plant material

Ornamental Shrubs

Flowering shrubs were evaluated for their functional use in landscape. Based on the morphological characters and flower characters, the flowering shrubs viz., *Eranthemum nigrum*, *Graptophyllum pictum*, *Murraya exotica*, *Ixora coccinea*, *Tecomera capensis*, *Rondelitia odorata*, *Tabernamontana coronaria*, *Pseuderanthemum atropurpureum*, *Leucophyllum frutescens* and *Hibiscus rosa-sinensis* are suitable for shrub group, shrub border, as physical barrier and for screening. The fragrant shrubs, species *Murraya exotica*, *Hibiscus rosasinensis* and *Tabaernomontana coronaria* are suitable for butterfly gardens.

II. Crop Improvement

Chrysanthemum

Eight genotypes of chrysanthemum were evaluated under Coimbatore conditions. Among them, the variety Bidhan purna (145.00 flowers/plant) was found to perform better for loose flower cultivation, while, Pusa Aditya (66.00 flower per plant) and Pusa Chitraksha (48.00 flowers per plant) performed well for pot culture and can be popularized for commercial cultivation.

China Aster

Of the seven China aster genotypes evaluated, Hosur local recorded improved growth with respect to vegetative parameters, while Kamini and Poornima exhibited its superiority by registering increased flower yield of 4.3 and 4.2 t/ ha respectively. These two varieties are suitable for both cut and loose flower purpose as they possess increased stalk length with high loose flower yield.

III. Crop Management

Tuberose

The results of the first year trial on effect of fertigation in tuberose revealed that fertigation of the crop using 100% of RD of water soluble fertilizers found to be superior with respect to growth of the crop, flowering and yield parameters as indicated below.

S. No.	Parameter	Value
1.	Plant height	35.92 cm
2.	Earliness in spike emergence	83.47 days
3.	No. of spikes / clump	2.82
4.	Flower yield / plot (kg)	15.36
5.	Flower yield / ha (t)	15.76
6.	No. of bulbs / clump	8.35

The cost economics worked out indicated that the BCR was the highest (2.65) in the treatment 100% of RD of fertilizers using WSF followed by 125% of RD of fertilizers using WSF (2.48).

Foliage plants

Effect of Pusa hydrogel on the growth of *Schefflera arboricola* was studied. Incorporation of 40 g of hydrogel/5 kg potting media for *Schefflera arboricola* significantly increased the plant height (39.68 cm), plant spread (29.66 cm), no. of leaves (15.75 per plant) and leaf longevity (24.00 days). Hydrogel in the media also reduced the frequency of irrigation (5.43 days) and the quantity of water required (11.42 lit.) by saving 5.12 lit. of irrigation water, when compared to control which required an irrigation level of 16.56 lit.

I. GERMPLASM CONSERVATION AND EVALUATION

CHRYSANTHEMUM

1. **Project No.** : 1.4.1
2. **Title of the Project** : **Collection, evaluation and maintenance of germplasm of chrysanthemum**
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** : Continuing nature
6. **Technical programme** :
 - i) Germplasm collection of named varieties, promising lines/accession may be maintained
 - ii) Passport data to be prepared and submitted
 - iii) Recommendation of a variety for commercial cultivation in respective region

7. Progress of work done

The germplasm collections available at TNAU were assessed separately for their use as loose flower, cut flower and for pot culture. The best performing accessions were grouped as above and evaluated for the characters as mentioned in the technical programme. The total germplasm collections of 70 available at present has been grouped as follows,

S.No.	Group	No. of germplasm collections available
1.	Loose flower types	20
2.	Cut flower types	29
3.	Pot culture	21

8. Salient findings

Among the loose flower varieties, Punjab Anuradha performed well under Coimbatore conditions and can be popularized for commercial cultivation. The performance of the variety Red Gold was found superior in terms of number of branches (9.00) and yield per plant (178.20 g/plant) and attractive flower colour and hence can be recommended for cultivation as cut flower. The varieties, Gem and Mohini were found to perform well under pot culture with 116 and 110 flowers per plant and hence can be recommended as pot culture types.

Table 1. Evaluation of Chrysanthemum genotypes for loose flower

S.No	Name	Plant height when first bud appear (cm)	No of Branches per plant	Days taken for first bud appearance	Duration of flowering (days)	Diameter of flower (cm)	No of flowers per plant	Wt. of loose flowers (g/plant)	Shelf life in days	Flower colour and Flower form	
1.	Prince	58.00	5.00	123.00	78.00	2.90	68.70	56.30	5	Yellow	Semi-double
2.	Jaya	31.60	5.00	70.00	66.00	3.30	75.30	141.40	5	Dark pink	Intermediate
3.	X – yellow	50.00	5.00	130.00	42.00	5.20	52.00	83.00	3	Yellow with light red	Large semi-double
4.	Shweta	51.80	5.00	85.00	66.00	4.30	46.20	89.20	4	White with yellow disc	Intermediate
5.	Dalore	54.20	6.00	117.00	80.00	4.80	49.00	101.20	4	Yellow	Irregular incurve
6.	Meera White	57.50	6.00	70.00	68.0	3.00	110.00	84.00	5	White with yellow centre	Semi-double
7.	MDU - 1	48.00	5.00	112.00	59.00	4.80	55.00	79.00	5	Yellow	Intermediate
8.	RRS 85	70.00	7.00	132.00	40.00	3.50	87.00	163.80	5	White with yellow centre	Decorative
9.	Hosur - 1	42.00	6.00	123.00	60.00	5.30	45.00	63.70	5	Light yellow	Irregular incurve
10.	Hosur - 2	52.60	4.00	76.00	79.00	4.20	32.00	40.30	2	Milk white	Irregular incurve
11.	Hosur - 3	54.20	3.00	76.00	58.00	5.20	66.0	85.20	6	Red and yellow	Reflexing
12.	Hosur - 4	59.60	4.00	85.00	70.00	4.70	27.00	47.40	5	Yellow	Irregular incurve
13.	Hosur - 5	64.20	3.00	85.00	60.00	5.40	46.00	78.90	5	Dark yellow	Irregular incurve
14.	Local yellow	66.6	4.00	76.00	79.00	4.70	47.00	46.70	6	Yellow	Intermediate
15.	Indra	48.50	5.00	71.00	65.00	5.30	105.00	120.50	4	Yellowish orange	Intermediate
16.	Rani	48.60	5.00	76.00	79.00	4.10	57.40	21.30	3	Yellow	Incurving

17.	CO - 1	39.00	5.00	117.00	52.00	4.70	156.00	120.80	5	Deep yellow	Semi-double
18.	Baggi	38.90	4.00	110.0	60.00	3.60	73.00	143.60	3	White with yellow centre	Intermediate
19.	Punjab Anuradha	70.50	8.00	64.00	78.00	5.60	114.00	207.90	6	Bright yellow	Intermediate
20.	Dundi	41.20	6.00	108.00	58.00	3.10	46.00	54.0	3	Bright Yellow	Semi-double
Mean		51.48	5.10	95.30	63.90	4.45	66.93	91.41	4.45	-	-
SEd		2.51	0.24	4.65	3.04	0.21	3.50	5.08	0.21	-	-
CD (0.05)		5.09	0.49	9.41	6.15	0.44	7.08	10.29	0.42	-	-

Among the different varieties evaluated for loose flowers, the varieties, Punjab Anuradha and RRS 85 recorded the highest plant height of 70.50 cm and 70.00 cm at the time of first bud appearance and number of branches of 8.00 and 7.00 respectively and were on par with each other. Punjab Anuradha recorded the earlier flowering after 64 days of planting and flowering duration of 78.00 days when compared to all other varieties. The diameter of the flowers was highly significant in the varieties, Punjab Anuradha (5.60 cm) and Indira (5.30 cm). Highest number of flowers was recorded by the variety CO -1 (156 flowers per plant) followed by Punjab Anuradha (114 flowers per plant) and Meera White (110 flowers per plant) which were on par with each other. Punjab Anuradha recorded the highest yield per plant (207.90 g / plant) followed by RRS 85 (163.80 g/plant).

Table 2. Evaluation of Chrysanthemum genotypes for cut flower types (Both standard and spray)

S.No	Name	Plant height when first bud appear (cm)	No of Branches per plant	Days taken for first bud appearance	Duration of flowering (days)	Diameter of flower (cm)	No of flowers per plant	Wt. of flowers g/plant	Vase life in days	Flower colour	Flower form
1.	Megami	38.00	2.00	132.00	42.00	4.40	27.30	43.40	6	Light pink	Reflexing
2.	Harvest Home	57.10	5.00	100.00	56.00	4.20	47.10	120.10	4	Red and yellow	Large semi-double
3.	Shin Mei Getsu	50.10	6.00	76.00	72.00	6.60	78.00	99.20	4	Yellow	Incurved
4.	W – 10	41.90	5.00	132.00	40.00	4.00	87.00	125.10	3	White	Incurving
5.	DG. 10	41.70	6.00	74.00	66.00	4.20	50.50	110.40	4	White	Incurving
6.	Donald	45.40	4.00	74.00	66.00	5.00	53.00	81.80	3	Light pink	Incurving
7.	Perfecta	65.00	5.00	140.00	35.00	5.00	74.80	164.40	4	Light pink with yellow disc	Large single
8.	X ₂₄₅	51.70	6.00	85.00	60.0	4.80	26.00	41.60	3	Pink	Irregular incurve
9.	Valiant	48.00	6.00	117.00	54.00	4.30	85.00	144.20	5	Milk white	Incurving
10.	Gairik	40.00	5.00	85.00	58.00	5.80	47.00	80.80	5	Pink	Large single
11.	Red reflexed	63.10	5.00	85.00	58.00	6.00	31.00	50.40	5	Red and yellow	Irregular incurve
12.	Fleration	68.40	5.00	74.00	66.00	6.10	45.00	64.70	4	White	Spider
13.	Bhima	48.50	5.00	76.00	51.00	4.80	39.00	59.60	6	yellow	Irregular incurve
14.	Topaz	47.20	7.00	87.00	60.00	4.10	42.00	56.90	5	Light pink	Irregular incurve
15.	Akinokayanki	47.00	5.00	106.00	65.00	5.60	47.00	123.00	6	Light pink	Large semi-

											double
16.	Flirt	72.00	9.00	132.00	43.00	5.80	52.00	62.70	7	Dark maroon	Incurve
17.	Kalyanimawa	54.80	6.00	87.00	66.00	5.00	65.00	53.30	5	Light pink	Single
18.	Rekha	51.40	5.00	87.00	51.00	4.10	117.00	93.60	5	Light pink with yellow disc	Semi-double
19.	PS 80	49.10	7.00	87.00	60.00	4.90	44.00	62.50	5	White with light pink	Irregular incurve
20.	Velh	42.70	4.00	87.00	66.00	4.30	61.00	71.00	5	Red and yellow	Irregular incurve
21.	CO - 2	42.90	5.00	107.00	58.00	4.00	164.00	189.00	4	Purple	Semi-double
22.	Mary	42.20	3.00	76.00	64.00	3.70	43.00	58.00	3	Light pink	Semi-double
23.	Shyamal	35.70	4.00	110.00	70.00	4.00	98.00	134.60	5	Deep purple	Spoon type
24.	Birbal Sahni	33.80	4.00	110.00	65.00	3.30	61.00	133.70	5	White	Pompon
25.	Nanako	33.10	6.00	105.00	55.00	3.50	36.00	47.50	5	Yellow	Double Korean
26.	Red Gold	45.10	9.00	96.00	72.00	5.20	110.00	178.20	5	Red with yellow centre	Semi-double
27.	Ravikiran	39.00	5.00	140.00	56.00	3.90	92.00	145.80	5	Brownish red	Semi-double
28.	Nilima	54.50	4.00	78.00	66.00	3.70	120.00	143.60	4	Purple	Decorative
29.	Jwala	46.80	5.00	87.00	60.00	4.00	133.00	132.50	3	Red	Korean (double)
Mean		49.09	5.43	96.70	59.09	4.73	70.99	99.55	4.74	-	-
SEd		1.95	0.22	4.18	2.24	0.19	3.41	4.77	0.17	-	-
CD (0.05)		3.91	0.44	8.38	4.49	0.39	6.84	9.56	0.36	-	-

Both standard and spray types were evaluated under open field conditions. Among the 29 varieties evaluated, at the time of first bud appearance, highest plant height was observed in the variety Flirt with 72.00 cm followed by Flerration with 68.40 cm. The varieties Flirt and Red Gold registered highest number of branches (9.00). Earlier flowering after 74.00 days was observed in the varieties, DG 10, Donald and Flerration, while the duration of flowering was the highest (72.00 days) in the varieties Shin Mei Getsu and Red Gold. Highest flower diameter was registered by Shin Mei Getsu with 6.60 cm followed by Flerration and Flirt with 6.10 cm and 5.80 cm respectively. Highest number of flowers and flower yield per plant was recorded by CO. 2 with 164 flowers per plant and 189 g/plant. In CO. 2, the flowers are semi double and purple coloured. This was followed by the variety Red Gold with a yield of 178.20 g/plant when compared to other varieties.

Table 3. Evaluation of Chrysanthemum genotypes for Pot culture

S.No	Name	Plant height at first flower bud appearance (cm)	No. of branches per plant	Days taken for first flower bud appearance	Duration of flowering (days)	Diameter of flower (cm)	No. of flowers per plant	Wt. of flowers (g/plant)	Flower colour	Flower form
1.	Babe	41.50	4.00	76.00	66.00	3.30	40.20	46.90	Yellow	Semi-double
2.	Star of India	29.10	2.00	68.00	33.00	3.20	89.00	90.00	Light pink	Anemone
3.	Gem	37.80	5.00	130.00	42.00	3.30	116.00	107.80	Yellow	Pompon
4.	Sharad shoba	29.10	4.00	76.00	53.00	3.80	51.00	60.50	White	Double Korean
5.	Surya	30.80	7.00	87.00	66.00	3.50	42.70	53.50	Bright yellow with red tips	Single
6.	Anupam	26.50	3.00	87.00	66.00	4.10	65.00	70.40	Light white	Semi-double
7.	Alison	29.00	5.00	87.00	66.00	4.20	33.00	43.40	Pink	Spoon
8.	Aparajitha	31.00	7.00	72.00	58.00	2.40	44.00	48.00	Yellow	Anemone
9.	Alpana	29.00	6.00	74.00	62.00	1.20	58.00	62.00	Dark yellow	Buttons
10.	Little Pink	32.00	6.00	74.00	56.00	2.50	32.00	30.20	Light pink	Anemone
11.	Lalpari	31.20	5.00	85.00	66.00	1.80	28.00	30.00	Red	Single Korean

12.	Dolly orange	37.80	6.00	73.00	62.00	1.90	40.00	42.00	Yellowish orange	Anemone
13.	Teri	27.50	6.00	72.00	64.00	2.50	36.00	45.00	White	Anemone
14.	Cindrella	25.60	7.00	73.00	63.00	2.00	48.00	42.00	Yellow	Anemone
15.	White queen	30.50	6.00	78.00	59.00	1.80	28.00	26.00	White	Semi-double
16.	Anmol	31.20	4.00	68.00	64.00	2.00	32.00	34.00	Yellowish pink	Decorative
17.	Kuga Bright Orange	37.20	5.00	74.00	62.00	2.50	25.00	26.00	Bright orange	Semi-double
18.	Saffin Pink	32.40	5.00	72.00	63.00	2.10	26.00	28.00	Pinkish white	Intermediate
19.	Basanthi	39.10	5.00	68.00	66.00	4.40	74.00	81.40	Dark yellow	Pompon
20.	Shanthi	41.30	6.00	79.00	66.00	4.30	47.90	82.00	White	Decorative
21.	Mohini	36.80	6.00	66.00	72.00	4.40	110.00	118.80	Red	Decorative
Mean		33.30	5.24	78.05	60.71	2.95	50.75	55.61	-	-
SEd		1.60	0.24	3.69	2.72	0.15	2.85	3.04	-	-
CD (0.05)		3.23	0.50	7.46	5.51	0.30	5.77	6.15	-	-

Among the varieties evaluated for pot culture types plant height was lowest in Cindrella (25.60 cm), Teri (27.50) and Anupam (26.50 cm) which were on par with each other followed by the varieties, Star of India, White Queen, Alison, Alpana, Surya and Lalpari. The varieties, Surya, Aparajitha and Cindrella recorded the highest number of branches of 7.00 followed by Mohini, Shanthi, Alpana, White Queen, Teri and Dolly Orange (6.00). Earlier flowering was noticed in the varieties Mohini (66.00 days) followed by Star of India and Basanthi (68.00 days). Duration of flowering was also highest in the variety Mohini (72.00 days) while the varieties, Basanthi, shanthi, Lalpari, Anupam, Alison, Surya and Babe recorded 66.00 days and were on par with each other. The variety Alpana had a Button flower form and recorded the least flower diameter of 1.20 cm while the highest flower diameter was noticed in Mohini and Basanthi with 4.40 cm. Highest number of flowers and flower weight per plant was registered by the Gem (116.00 flower per plant and 107.80 g/plant) followed by the variety Mohini (110.00 flower per plant and 118.80 g/plant) respectively.

ANTHURIUM

- 1. Project No.** : **1.6.1**
- 2. Title of the Project** : **Collection, evaluation and maintenance of germplasm of Anthurium**
- 3. Location** : TNAU, Coimbatore
- 4. Duration** : 3 years
- 5. Year of Start** : 2015-16
- 6. Technical programme** :
 - Germplasm collection of named varieties only, but in case of promising lines / accession, accession number may be maintained.
 - Passport data of the existing and new collections must be prepared by the centre and should be sent to the Director, ICAR-DFR, Pune. The passport data should include name of species / variety, parental details, year of release, country of origin, name of the breeder, form and colour, source and date, salient features, remarks, name of the person who has collected the variety and a photograph of the variety.
 - Collection of species, cultivars and important hybrids from indigenous and exotic sources
 - Recommendation of a variety for commercial cultivation in respective region based on extensive evaluation should be submitted to the Director, ICAR-DFR, Pune every year along with the proposal for testing in the other centres, if any.
 - The concerned scientists need to maintain passport data of newly collected varieties and obtain the IC/EC number from ICAR-NBPGR, New Delhi.

7. Progress of work done

A total of 28 genotypes are being maintained in the germplasm of Anthurium at Coimbatore centre. The classification of germplasm based on colour of spathe indicated that red group dominates (13 Nos.) followed by Orange (4 Nos.), Pink (4 Nos.), White (3 Nos.), Obake (2 Nos.) and each one of Violet and Peach colour spathes. The evaluation of germplasm was done for growth, flowering and yield parameters.

Among the 28 genotypes evaluated during 2015-16, 'Rosetta' recorded the highest values in respect of growth parameters viz., plant height (75.63 cm), total leaf area (266.01 cm²)

plant⁻¹), leaf petiole length (54.17 cm) and flower stalk length (52.57 cm). The highest number of leaves per plant (7.20) recorded in the genotype Red Dragon while the highest number of suckers per plant (10.28) and number of spikes per plant (9.00) observed in the genotype Diablada. The maximum spathe length (10.26 cm) and width (9.95 cm) observed in the genotype Temptation. Spadix length (7.93 cm) was found to be the highest in the genotype Sunshine Orange. The desirable angle of spadix (48°) observed in the genotype Fire. The lowest time interval for successive flower production (29.70 days) observed in the genotype Diablada. Longevity of flowers in plants (92.50 days) and vase life in tap water (25.00 days) observed to be the highest in the genotype Glamour.

8. Salient findings

Among the germplasm collection, the red group dominates and registered its superiority in flowering, yield and quality parameters.

S. No.	Spathe colour group	Best performing variety	Parameters	Values
1.	Red group	a) Rosetta	Increased spike length Increased plant height Increased leaf petiole length	52.57 cm 75.63 cm 54.17 cm
		b) Red Dragon	Highest no. of leaves / plant	7.20
		c) Temptation	Highest length and width of spathe	10.26 x 9.95 cm
		d) Fire	Desirable angle of spadix	48 ⁰ C
		e) Glamour	Increased duration of flowering Increased vase life in tap water	92.50 days 25.00 days
2.	Pink group	Diablada	Highest no. of suckers / plant Highest no. of spikes / plant Least time interval in successive flower production	10.28 9.00 29.70 days
3.	Orange group	Sunshine orange	Highest length of spadix	7.93 cm

Table 4. Evaluation of Anthurium germplasm at Coimbatore

Name of the variety	Plant height (cm)	Leaf area (cm ²)	No. of suckers / plant	No. of leaves/ plant	Days to flowering	Duration of flowering (Days)	Length of spike (cm)	No. of Spikes/ plant/ Yr (nos.)	Angle of spadix	Vase life (days)	Spathe colour (As per the Hortl. Colour chart)
Red Dragon	51.65	174.03	1.65	7.20	94.00	76.80	38.85	5.00	66.00	12.00	Red
Temptation	50.10	222.87	1.40	4.98	74.00	72.25	32.71	5.46	64.00	10.00	Light Red
Glamour	49.28	195.09	1.05	4.15	93.00	92.50	46.72	4.66	63.00	25.00	Dark Red
Honduras	58.08	205.50	1.83	6.80	49.00	69.60	43.57	5.14	61.00	13.00	Red
Sunshine Orange	46.16	155.66	2.07	5.23	63.60	72.50	49.36	5.00	72.00	23.00	Orange
Linda	30.79	74.19	1.61	4.91	72.50	64.50	32.50	4.50	68.50	16.00	Pale violet
Sunset Orange	31.34	76.23	1.41	4.92	83.50	62.30	37.05	5.00	82.00	9.00	Orange
Meringue	44.31	134.05	2.05	4.81	86.00	82.40	34.35	4.77	61.00	21.00	Liver red
Bonfire Orange	35.66	91.96	1.29	5.42	63.00	62.70	25.62	3.06	53.00	16.00	Orange
Leema White	26.29	55.45	1.13	4.20	78.50	65.00	26.56	3.92	54.00	12.00	White
B-13	34.44	98.55	2.17	4.67	79.50	88.50	24.45	4.00	64.00	21.00	Red
Passion	33.38	94.82	1.37	5.55	112.70	71.60	27.81	3.57	53.00	9.00	Pale Red
Gloria	43.71	143.44	1.44	5.72	76.50	78.50	27.58	4.22	54.00	15.00	Pink
Tinora	30.42	75.76	1.78	5.30	74.50	60.50	28.50	4.30	58.00	14.00	Obake
Rosetta	75.63	266.01	2.03	4.37	55.00	89.00	52.57	5.53	75.00	21.00	Red
Hawaiin Red	36.92	112.79	1.20	4.52	98.60	87.20	27.17	3.70	57.00	20.00	Red

Candy Queen	36.31	97.91	1.78	5.72	121.40	71.40	30.90	3.50	60.00	12.00	Red
Tropical Red	30.25	78.01	1.05	4.25	59.00	41.05	18.00	5.45	55.00	11.00	Red
Colorado Red	38.11	111.78	1.87	3.97	90.00	69.50	31.77	3.80	60.00	21.00	Red
Lady Jane	29.04	90.32	1.14	5.53	52.00	81.70	22.85	5.00	70.00	3.00	Pink
Diablada	36.29	64.57	10.28	5.05	29.70	75.10	22.68	9.00	62.00	11.00	Pink
Fire	29.38	69.05	1.05	3.52	95.00	75.00	20.85	3.16	48.00	9.00	Red
Moments	32.50	72.86	1.92	3.97	97.60	72.30	20.69	3.80	58.00	7.00	White
Sharan	28.94	69.72	1.05	4.05	77.00	81.00	20.49	3.50	60.00	5.00	Dark Orange
Cheers	30.08	60.46	1.57	3.53	92.60	75.90	28.40	3.75	53.00	7.00	Peach
Simba	32.81	77.94	1.05	4.05	47.50	78.00	27.39	3.50	50.00	15.00	Obake
Xavia	31.38	81.37	1.05	3.88	102.00	70.10	20.40	3.20	20.00	13.00	Pink
Lumina	29.56	79.87	1.62	4.92	73.50	81.00	21.04	4.75	60.00	21.00	Creamy
Mean	37.96	111.79	1.82	4.83	78.63	71.50	28.97	4.62	59.24	14.00	-
SEd	1.61	5.08	0.10	0.20	3.34	3.10	1.25	0.45	2.47	0.62	-
CD (0.05)	3.23	10.16	0.20	0.40	6.69	6.25	2.51	0.92	4.94	1.25	-

TUBEROSE

- 1. Project No.** : **1.7.1**
- 2. Title of the Project** : **Collection, evaluation and maintenance of tuberose germplasm**
- 3. Location** : TNAU, Coimbatore
- 4. Duration** : 3 years
- 5. Year of Start** : 2011-12
- 6. Technical programme** :
 - Germplasm collection of named varieties only, but in case of promising lines/accession, accession number may be maintained.
 - Passport data of the existing and new collections must be prepared by the centres and should be sent to the Director, ICAR-DFR, Pune. The passport data should include name of species/variety, parental details, year of release, country of origin, name of the breeder, form and colour, source and date, salient features, remarks, name of the person who has collected the variety and a photograph.
 - Collection of different genotypes from various indigenous and exotic sources
 - Evaluation of collected germplasm and identification of promising cultivars
 - Single and Double types to be evaluated separately
 - Recommendation of a variety for commercial cultivation in respective region based on extensive evaluation should be submitted to the Director, ICAR-DFR, Pune every year along with the proposal for testing in the other centres, if any.
 - The concerned scientists are advised to maintain passport data of newly collected varieties and obtain the IC/EC number from ICAR-NBPGR, New Delhi for records.

7. Progress of work done

A total of 16 single types and 5 double types of tuberose have been evaluated for their performance during 2015-16. The results of the study are presented in **Tables 5,6,7 & 8**.

Single types

Eleven parameters have been observed and recorded in tuberose germplasm. Among the 16 single types evaluated “Prajwal” was found to be superior in eight parameters *viz.*, no. of leaves / plant (260), Earliness in flowering (76.50 days) and first floret opening (88.08 days), no. of florets / spike (48.0), length of floret (6.50 cm), weight of florets / spike (75.50 g), no. of spikes / m² (48.00) and yield of flowers / plot (9.56 kg). Nilakottai local recorded increased plant height (119.54 cm) while rachis length was higher in Pune single (36.80 cm). However, the spike length was the highest in Variegated single (103.50 cm) (**Table 5**).

Regarding bulb characters, Arka Niranthara registered increased no. of bulbs / clump (19 nos.) and length of bulb (7.0 cm) while Prajwal recorded increased bulb diameter (5.2 cm) and bulb weight (58.2 g). The number of bulblets / clump was the highest in Calcutta single (88 nos.) (**Table 6**).

Double types

Among five double types evaluated, variety “Suvasini” registered its superiority in ten parameters among 11 studied. This variety recorded increased plant height (87.80 cm), no. of leaves/plant (274), early days for spike emergence and first floret opening (83.00 and 94.56 days respectively), spike length (72.30 cm), no. of florets / spike (56.00), floret length (7.55), weight of florets / spike (149.50 g) and yield of spikes (25.50 nos. / m² and 96.10 kg / plot) (**Table 7**).

Regarding bulb production, Hyderabad double and Vaibhav produced more bulbs / clump (18 & 17 respectively) while higher production of bulblets /clump observed in Vaibhav and Pearl double (105 & 102 nos. respectively). These two varieties also showed improved diameter and weight of bulbs (4.05 and 4.21 cm; 48.31 and 48.33 g respectively) (Table 8).

8. Salient findings

- Among the single types, Prajwal registered its superiority through higher flower yield (9.56 kg / plot), increased number and weight of florets / spike and earliness in spike emergence and opening of florets. This variety also showed increase in bulb diameter (5.2 cm) and bulb weight (58.2 g).
- Among double types, “Suvasini” was found to be best variety as it has registered the highest spike yield (25.50 nos. / m² and 96.10 kg/plot), earliness in

flowering, highest spike length (72.30 cm) and with long florets. However, for bulb production, Hyderabad double, Pearl double and Vaibhav found to be more suitable.

Table 5. Evaluation of tuberose germplasm (single) for growth, yield and quality parameters

S. No.	Genotypes	Plant height (cm)	No. of leaves / plant	Days to spike emergence	Days to opening of first floret	Spike length (cm)	Rachis length (cm)	Number of florets/ spike	Length of the floret (cm)	Weight of florets per spike (g)	Number of spikes/m ²	Yield of florets/ plot (4* 1 m) (kg)
1	Calcutta Single	79.26	245.00	93.00	102.31	64.62	17.50	26.10	6.20	30.15	32.10	3.67
2	Hyderabad Single	81.24	224.00	89.00	100.53	66.50	16.40	44.50	6.30	33.50	35.50	5.93
3	Kahikuchi Single	78.10	258.00	85.00	99.55	63.45	19.30	39.60	6.45	45.10	34.10	5.10
4	Mexican Single	92.23	238.00	87.00	100.51	77.50	22.10	27.50	6.30	29.40	33.15	3.70
5	Navsari Local	93.14	242.00	90.50	102.22	78.45	28.40	46.00	6.40	34.50	26.50	3.86
6	Phule Rajani	73.40	251.00	84.50	98.53	53.40	24.10	41.20	6.20	48.30	36.40	6.20
7	Prajwal	114.50	260.00	76.50	88.08	99.10	29.32	48.00	6.50	75.50	48.00	9.56
8	Pune Single	111.50	232.00	81.50	95.98	96.70	36.80	38.00	6.20	44.60	39.50	5.98
9	Shringar	92.76	245.00	82.30	85.34	77.80	23.40	43.00	6.40	52.56	41.00	6.36
10	Variegated Single	118.65	253.00	80.50	94.52	103.50	21.56	29.50	6.25	40.20	34.50	4.89
11	Arka Niranthara	115.34	214.00	95.00	98.51	95.21	25.34	39.00	6.30	70.36	33.42	5.80
12	Arka Suganthi	90.45	198.31	80.00	99.32	70.78	18.97	29.00	5.20	35.84	31.93	4.10
13	Bidhan Rajani 1	110.56	220.52	85.00	95.21	79.35	15.45	30.00	5.90	32.96	34.67	4.67
14	Bidhan Rajani 2	107.67	231.43	89.00	90.51	89.34	17.93	37.00	5.50	30.21	32.95	5.00
15	Bidhan Rajani 3	100.36	234.23	90.00	93.33	75.78	18.45	29.00	5.50	47.13	36.21	5.12
16	Nilakottai Local	119.54	215.22	85.00	93.05	95.92	22.14	38.00	6.10	56.79	31.73	5.88
	SE(D)	2.76	7.10	2.68	2.56	2.46	0.74	1.21	0.24	1.23	1.34	0.14
	CD (0.5)	5.93	15.27	5.76	5.39	5.29	1.59	2.60	0.52	2.64	2.88	0.30

Table 6. Evaluation of tuberose germplasm (single) for bulb production

S.No.	Genotypes	No. of bulbs/clump	No. of bulblets/clump	Length of bulb (cm)	Diameter of bulb (cm)	Diameter of bulblet (cm)	Wt. of single bulb (g)	Weight of single bulblet (g)
1	Calcutta Single	14	88	3.8	3.3	1.3	23.5	12.98
2	Hyderabad Single	10	50	5.2	5.4	2.4	39.9	10.02
3	Kahikuchi Single	13	44	5.0	3.8	1.5	29.9	7.58
4	Mexican Single	14	26	4.0	2.1	1.9	37.6	9.96
5	Navsari Local	9	34	5.0	4.8	2.0	25.3	12.46
6	Phule Rajani	3	27	6.5	4.0	2.0	45.0	5.78
7	Prajwal	5	41	4.0	5.2	2.4	58.2	12.98
8	Pune Single	14	37	4.9	4.1	1.9	28.9	8.40
9	Shringar	14	46	5.4	4.1	1.8	31.4	8.98
10	Variegated Single	10	26	4.8	4.5	2.3	25.4	11.57
11	Arka Niranthara	19	58	7.0	4.8	1.5	50.0	13.01
12	Arka Suganthi	5	25	3.5	2.5	2.0	18.2	6.46
13	Bidhan Rajani 1	15	30	5.5	2.9	2.21	38.9	12.88
14	Bidhan Rajani 2	5	27	4.8	3.4	1.7	23.7	8.18
15	Bidhan Rajani 3	4	30	3.0	2.5	1.3	18.2	2.50
16	Nilakottai Local	8	24	4.8	7.5	1.8	18.4	7.34
	SE(D)	1.06	3.64	0.48	0.41	0.20	3.43	0.42
	CD (0.5)	2.20	7.48	1.04	0.90	0.44	6.94	0.98

Table 7. Evaluation of tuberose germplasm (double) for growth, yield and quality parameters

S. No.	Genotypes	Plant height (cm)	No. of leaves/ plant	Days to spike emergence	Days to opening of first floret	Spike length (cm)	Rachis length (cm)	Number of florets/ spike	Length of the floret (cm)	Weight of florets per spike (g)	Number of spikes/m ²	Yield of florets/ plot (4* 1 m) (kg)
1	Calcutta Double	74.80	249.00	84.00	99.03	59.20	39.15	37.00	7.12	114.20	24.00	87.50
2	Hyderabad Double	70.20	238.00	87.00	98.65	54.10	34.50	36.00	6.80	110.25	15.50	58.10
3	Pearl Double	70.80	241.00	85.00	98.51	55.60	43.50	32.00	7.50	112.20	22.50	80.50
4	Suvasini	87.80	274.00	83.00	94.56	72.30	45.20	56.00	7.55	149.50	25.50	96.10
5	Vaibhav	82.50	253.00	84.00	97.76	67.50	55.10	46.00	7.25	123.50	22.80	82.60
	SE(D)	0.39	2.02	6.42	0.89	0.32	1.20	1.06	0.24	10.02	1.98	6.15
	CD (0.5)	0.84	4.34	13.80	1.86	0.69	2.60	2.28	0.52	21.55	4.26	13.22

Table 8. Evaluation of tuberose germplasm (double) for bulb production

S.No.	Genotypes	No. of bulbs/clump	No. of bulblets/clump	Length of bulb (cm)	Diameter of bulb (cm)	Diameter of bulblet (cm)	Wt. of single bulb (g)	Weight of single bulblet (g)
1	Calcutta Double	8	66	6.31	3.90	1.85	23.45	4.86
2	Hyderabad Double	18	36	4.50	3.35	2.32	45.08	9.06
3	Pearl Double	16	102	5.22	4.21	1.80	48.33	8.58
4	Suvasini	7	81	5.26	3.16	4.64	46.22	4.66
5	Vaibhav	17	105	5.23	4.05	1.35	48.31	10.33
	SE(D)	0.98	3.28	0.41	0.36	0.24	0.62	0.62
	CD (0.5)	1.99	6.74	0.86	0.79	0.56	1.36	1.34

LANDSCAPE PLANT MATERIAL

1. **Project No.** : 1.15.1
2. **Title of the Project** : **Collection and evaluation of ornamental flowering shrubs for landscape use**
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** : 2015-16
6. **Technical programme** : Thirty ornamental shrubs to be evaluated for their aesthetic and functional uses in landscape.

7. Progress of work done

Twenty numbers of foliage and flowering shrubs have been assembled at the Shrubbery of the Department of Floriculture and Landscaping, of which ten flowering shrubs were evaluated for their morphological characters. Among the shrubs evaluated, highest plant height was observed in *Eranthemum nigrum* (2.12 m) followed by *Murraya exotica* (1.72), while highest plant spread was noticed in *M. exotica* (1.80 m) followed by *Tecoma capensis* (1.57 m). Least plant height was recorded by *Rondeletia odorata* (0.78 m), while least plant spread was recorded by *Graptophyllum pictum* (0.63 m). Highest internodal length was registered by *E. nigrum* (10.30 cm), followed by *G. pictum* (6.60 cm), while the least was found in *Leucophyllum frutescens* (1.68 cm).

The highest leaf length was noticed in *Ixora coccinea* (13.28 cm), while the highest leaf breadth was recorded by *Hibiscus rosa sinensis* (7.38 cm). This was followed by *E. nigrum* with a leaf length and leaf breadth of 8.08 and 5.82 cm respectively. *H. rosa sinensis* also recorded the highest values for leaf petiole length and petiole girth of 4.20 cm and 1.04 cm respectively. Sessile leaves were noticed in *R. odorata* and *L. frutescens*. The leaf colour was dark green on the upper side and light green on the lower side for all the shrubs except, *E. nigrum* with dark purple on the lower side, *G. pictum* has purplish green colour on both sides while *L. frutescens* has greyish green on both sides. Flowers were found in clusters in all the shrubs except, *H. rosa sinensis* and *L. frutescens*, which exhibited solitary flowers.

The flowering characters of these ten flowering shrubs have to be studied and along with the morphological characters evaluated, these will be grouped to evaluate their aesthetic and functional uses.

8. Salient findings

Based on the morphological and flower characters, the flowering shrubs viz., *Eranthemum nigrum*, *Graptophyllum pictum*, *Murraya exotica*, *Ixora coccinea*, *Tecoma capensis*, *Rondeletia odorata*, *Tabernamontana coronaria*, *Pseuderanthemum atropurpureum*, *Leucophyllum frutescens* and *Hibiscus rosa-sinensis* are suitable for group planting of shrubs, shrub border, as physical barrier and for screening purposes. The fragrant shrub species, *Murraya exotica*, *Hibiscus rosasinensis* and *Tabaernomontana coronaria* are suitable for butterfly gardens.

Table 9. Evaluation of flowering shrubs for morphological characters

S.No.	Flowering shrub and family	Plant height (m)	Spread (m)	Internodal length (cm)	Leaf length (cm)	Leaf breadth (cm)	Leaf petiole length (cm)	Leaf petiole girth (cm)	Leaf colour		Flower type and colour	Fragrance
									Upper	Lower		
1	<i>Eranthemum nigrum</i> <i>Acanthaceae</i>	2.12	1.38	10.30	8.08	5.82	1.26	1.00	Dark green	Dark purple	Cluster, white with purple spots	Absent
2.	<i>Graptophyllum pictum</i> <i>Acanthaceae</i>	1.00	0.63	6.60	7.80	4.84	0.80	1.04	Purplish green	Purplish green	Cluster, dark purplish	Absent
3.	<i>Murraya exotica</i> <i>Rutaceae</i>	1.72	1.80	2.30	4.06	2.04	1.38	0.78	Dark green	Light green	Cluster, creamy white	Strong
4.	<i>Ixora coccinea</i> <i>Rubiaceae</i>	1.33	1.22	5.50	13.28	5.36	0.70	1.08	Dark green	Light green	Cluster, dark red	Absent
5.	<i>Tecomeria capensis</i> <i>Bignoniaceae</i>	1.13	1.57	3.28	1.96	1.56	1.10	0.72	Dark green	Light green	Cluster, dark orange	Absent
6.	<i>Rondelitia odorata</i> <i>Rubiaceae</i>	0.78	0.72	2.80	2.90	1.46	Sessile	Sessile	Dark green	Light green	Cluster, dark orange	Absent
7.	<i>Tabernamontana coronaria</i> <i>Apocyanaceae</i>	1.05	0.82	4.30	11.52	3.78	0.82	0.80	Dark green	Light green	Cluster, pure white	Mild
8.	<i>Pseuderanthemum atropurpureum</i> <i>Acanthaceae</i>	1.18	1.02	3.26	5.48	4.06	0.32	0.84	Dark green	Light green	Cluster, white with purple spots	Absent
9.	<i>Leucophyllum frutescens</i> <i>Lamiaceae</i>	1.15	1.10	1.68	2.36	1.10	Sessile	Sessile	Greyish green	Greyish green	Solitary, violet	Absent
10.	<i>Hibiscus rosa-sinensis</i> <i>Malvaceae</i>	1.49	0.85	3.30	8.82	7.38	4.20	1.04	Dark green	Light green	Solitary, dark red	Mild
	Mean	1.30	1.11	4.33	6.63	3.74	1.32	0.91	-	-	-	-
	SEd	0.08	0.07	0.30	0.49	0.27	0.10	0.05	-	-	-	-
	CD (0.05)	0.17	0.15	0.65	1.04	0.57	0.21	0.11	-	-	-	-

TURF GRASS

1. **Project No.** : 1.15.2
2. **Title of the Project** : Collection and evaluation of turf grasses
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** : 2013-14
6. **Technical programme** :

Different species / varieties of ornamental turf grasses will be collected and evaluated based on their colour, texture, density, hardiness and reaction to insect and disease, etc. These species will also be screened for the aesthetic and functional uses in landscaping.

7. Progress of work done

Investigations were carried out during 2015-16 with nine grass genotypes collected from various places, to study the *per se* performance, magnitude of variability, correlation between the traits and genetic diversity. Documentation of morphological characters were done and based on that the descriptors were developed for each of the grass. Physiological observations like chlorophyll and proline content were estimated. Scoring was done to sequence the grasses based on turf quality. Stomatal index, vernation, ligule and auricle of the grasses were studied during the experimental period.

8. Salient findings

- Among the twelve grass species evaluated, number of nodes per 10 cm² was found to be high in the treatment (T₁₁) *Z. japonica* (14.20) followed by the treatments (T₁₂) *Z. tenuifolia* (12.10), (T₅) *C. dactylon* x *C. transvaalensis* (11.20) and the least number of nodes per 10 cm² was recorded in the treatment (T₇) *O. japonicus* (2.00).
- Number of leaves per node was found to be high in the treatment (T₇) *O. japonicus* (15.50). Lowest number of leaves per node (1.10) was noticed in the treatments (T₂) *B. reptans*, (T₃) *D. bicornis*, (T₄) *C. ciliaris* (1.00), (T₆) *D. aegyptium* (1.05), (T₈) *P. vaginatum* (1.10), (T₁₁) *Z. japonica* (1.05) and (T₁₂) *Z. tenuifolia* (1.05).

- Among the grass species studied, maximum internodal length (10.60 cm) was obtained in the treatment (T₉) *S. secundatum* and the lowest internodal length (0.80 cm) was recorded in the treatment (T₇) *O. japonicus*.
- The number of roots was the highest in (T₅) *C. dactylon* x *C. transvaalensis* (268.00) followed by (T₂) *B. reptans* (261.00) and it was least in (T₄) *C. ciliaris* (70.00).
- Root length was higher in the treatment (T₉) *S. secundatum* (17.10 cm) followed by (T₄) *C. ciliaris* (16.90 cm) and it was lowest in the treatment (T₁₁) *Z. japonica* (6.50 cm) and (T₇) *O. japonicus* (6.90 cm).
- The species *viz.*, *Zoysia japonica* and *Z. tenuifolia* were also found to be promising based on turf quality and shorter internodes. These grasses can hence be recommended for sports turfs, golf courses and for landscaping purposes.

Table 10. Per se performance of grass species

Treatment Details		Fresh wt. of clipping (shoot) (g)	Dry wt. of clipping (g)	Root length (cm)	Root density	Scoring of Leaf blade colour	Scoring of Leaf Texture	No. of leaves/ 10cm ²	No. of roots/ 10cm ²	Nature of growth	Growth habit
T ₁	<i>Axonopus compressus</i> (Cow grass)	15.13	2.96	13.50	5.50	3.20	6.85	3.72	106	Stoloniferous	Spreading
T ₂	<i>Bracharia reptans</i> (Running grass)	66.41	16.90	13.20	7.45	3.50	3.10	3.45	262	Bunch	Spreading
T ₃	<i>Cenchrus ciliaris</i> (African foxtail grass)	22.31	4.97	16.30	7.00	3.55	3.10	4.80	70	Bunch/ Rhizomatous	Upright
T ₄	<i>Cynodon dactylon</i> x <i>Cynodon transvaalensis</i> (Bermuda hybrid grass)	30.17	4.90	9.59	8.08	8.30	7.89	3.60	272	Rhizomatous/ Stoloniferous	Upright/ Spreading
T ₅	<i>Ophiopogon japonicas</i> (Mondo grass)	10.10	3.12	6.20	5.50	8.50	3.50	2.10	97	Bunch/ Rhizomatous	Upright/ Spreading
T ₆	<i>Paspalum vaginatum</i> (Seashore paspalum)	25.34	3.18	10.20	6.00	8.10	7.50	2.70	140	Rhizomatous/ Stoloniferous	Spreading
T ₇	<i>Stenotaphrum secundatum</i> (St. Augustine grass)	52.37	10.08	16.50	6.50	3.15	3.90	10.30	170	Stoloniferous	Upright/ Spreading
T ₈	<i>Zoysia japonica</i> (Korean grass)	8.84	2.46	5.60	7.50	8.35	7.56	2.50	205	Rhizomatous	Spreading
T ₉	<i>Zoysia tenuifolia</i> (Mexican grass)	15.42	4.03	15.00	7.50	8.50	8.64	2.90	215	Rhizomatous	Spreading
Mean		27.34	5.84	11.79	6.78	-	-	4.01	170.78	-	-
SEd		4.14	1.41	1.58	1.36	-	-	0.41	5.41	-	-
CD (0.05)		8.40	2.90	3.24	2.82	-	-	0.89	10.90	-	-

Table 11. Nature and growth of different grass species

Treatment Details		Growth habit	Nature of growth	Ligule	Auricle	Leaf tip	Vernation
T ₁	<i>Axonopus compressus</i>	Stoloniferous	Spreading	Membranous	Absent	Boat shaped	Folded
T ₂	<i>Bracharia reptans</i>	Bunch	Spreading	Fringe of Hairs	Absent	Pointed	Folded
T ₃	<i>Cenchrus ciliaris</i>	Bunch/ Rhizomatous	Upright	Fringe of Hairs	Absent	Pointed	Folded
T ₄	<i>Cynodon dactylon</i> x <i>Cynodon transvaalensis</i>	Rhizomatous/ Stoloniferous	Upright/ spreading	Fringe of hairs	Absent	Pointed	Folded
T ₅	<i>Ophiopogon japonicus</i>	Bunch/ Rhizomatous	Upright/ spreading	Absent	Absent	Pointed	Absent
T ₆	<i>Paspalum vaginatum</i>	Stoloniferous/ Rhizomatous	Spreading	Membranous	Absent	Pointed	Folded
T ₇	<i>Stenotaphrum secundatum</i>	Stoloniferous	Upright/ spreading	Fringe of hairs	Absent	Boat shaped	Folded
T ₈	<i>Zoysia japonica</i>	Rhizomatous	Spreading	Fringe of hairs	Absent	Pointed	Rolled
T ₉	<i>Zoysia tenuifolia</i>	Rhizomatous	Spreading	Fringe of hairs	Absent	Pointed	Rolled

II. CROP IMPROVEMENT

CHRYSANTHEMUM

1. **Project No.** : 2.2.1
2. **Title of the Project** : Testing of new genotypes of chrysanthemum
3. **Location** : TNAU, Coimbatore
4. **Duration** : Three years (2015-16 onwards)
5. **Year of Start** : 2015-16

6. **Technical programme :**

A. Testing for loose flower

Entries for testing from centre:

- i. **Hyderabad:** HCC-1, HCC-2 & HCC-3
- ii. **Kalyani:** Bidhan Madhuri, Bidhan Jayanti and Bidhan Purna
- iii. **Hessaraghatta:** Arka Gold, Arka Chandrika

No. of replications : Three

Design of experiment : RBD

No of plants per replication : 30

Spacing : 40 cm x 30 cm

B. Testing for pot culture

Entries for testing from centre:

- i. **Solan:** UHFS Chr-56 and UHFS Chr-68
- ii. **New Delhi:** Pusa Aditya, Pusa Chitraksha
- iii. **Kalyani:** Bidhan Mum and BCH 14-1
- iv. **Bengaluru:** Arka Pink Star, Arka Kirti and Arka Usha Kiran

7. **Progress of work done**

Testing for loose flower (Table 12)

The genotypes Bidan Madhuri, Bidhan Mallicka and Bidhan Purna were tested during 2015-16. The planting materials from Hyderabad and IIHR were received during November 2015 only. The planting has to be done during May 2016 and evaluated further as the season falls in June 2016 only.

Among the three genotypes tested for loose flower under Coimbatore conditions, Bidhan Purna performed better with the highest plant height (48.40 cm), earlier flower bud appearance (74.00 days), highest flower diameter (3.00 cm), highest number of flowers per plant (145.00) and highest duration of flowering (45.00 days) as compared to the other two varieties.

Table 12. Evaluation of chrysanthemum genotypes for loose flower under Coimbatore conditions

Varieties tested	Plant height (cm)	Days taken for first bud appearance	Days taken for bud opening	Flower type	Diameter of flower (cm)	No of flowers per plant	Wt. of flowers per plant (g)	Duration of flowering	shelf life in days	Reaction to insect and disease	Flower colour
Bidhan Madhuri	37.40	82.00	7.00	Semi-double	2.80	120.00	0.96	40.00	3.00	Nil	Pink
Bidhan Purna	48.40	74.00	6.00	Semi-double	3.00	145.00	1.20	45.00	3.00	Nil	Yellowish with brown tinge
Bidhan Mallicka	30.80	78.00	6.00	Semi-double	2.30	90.00	0.85	42.00	3.00	Nil	Bright yellow
Mean	48.40	82.00	6.00	-	3.00	145.00	1.20	45.00	3.00	-	-
SEd	3.21	2.26	-	-	0.17	5.12	0.05	1.24	-	-	-
CD (0.05)	6.44	4.14	NS	-	0.37	10.98	0.12	2.49	NS	-	-

Table 13. Evaluation of chrysanthemum genotypes for pot culture under Coimbatore conditions

Varieties tested	Plant height (cm)	Plant spread (cm)	No. of sprays per plant	Days taken for first flower bud appearance	Days taken for flower bud opening	Flower type	Diameter of flower (cm)	No. of flowers per plant	Duration of flowering (days)	Reaction to insect and disease	Flower colour
Pusa Aditya	36.40	45.20	25.00	62.00	8.00	Semi-double	3.40	66.00	60.00	Nil	Light yellow with violet tinge
Pusa Chitraksha	33.80	40.40	18.00	65.00	10.00	Spoon	3.20	48.00	55.00	Nil	Dark pink
Bidhan Mum	29.40	16.00	3.00	68.00	8.00	Pompon	1.80	10.00	30.00	Nil	Reddish orange
BCH 14-1	28.70	18.00	3.00	66.00	8.00	Intermediate	2.10	8.00	35.00	Nil	Yellow
Arka Kirthi	32.50	28.50	28.00	75.00	10.00	Intermediate	3.30	48.00	42.00	Nil	Pinkish with yellow tinge
Mean	35.93	31.33	14.13	71.25	8.38	-	2.74	66.38	43.48	-	-
SEd	2.21	2.13	1.11	4.26	0.51	-	0.17	5.12	2.86	-	-
CD (0.05)	4.74	4.58	2.31	9.14	1.11	-	0.37	10.98	6.14	-	-

Testing for pot culture (Table 13)

Five genotypes viz., Pusa Aditya, Pusa Chitraksha, Bidhan Mum, BCH 14-1, Arka Kirthi were tested under Coimbatore conditions and among them, **Pusa Aditya** with light yellow tinged with violet flowers exhibited significantly the highest plant height (36.40 cm) and spread (45.20 cm), highest number of sprays per plant (25.00), earlier bud appearance (62.00 days), extended duration of flowering (60.00 days), highest number of flowers (66.00) and flower diameter (3.40 cm). This was followed by Pusa Chitraksha with attractive dark pink and spoon shaped flowers.

As the planting materials from IIHR were received during November 2015 only, planting has to be done during the season May 2016 and evaluated further.

8. Salient findings

The varieties, Bidhan purna (145.00 flowers/plant) for loose flower cultivation and Pusa Aditya (66.00 flower per plant) and Pusa Chitraksha (48.00 flowers per plant) for pot culture performed well under Coimbatore conditions and can be popularized for commercial cultivation.

TUBEROSE

1. **Project No.** : 2.3.1
2. **Title of the Project** : Testing of new genotypes of tuberose
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** : 2015-16
6. **Technical programme** :

Entries for testing from centre (100 bulbs each per centre)

- i. **Kalyani** : Bidhan Rajani H-1 and Bidhan Rajani H-2
- ii. **Pune**: GK-T-C4 (Single)

Check cultivars: Prajwal, Phule Rajani, Arka Nirantara and Local Check

Experimental Design	:	RBD
No. of replications	:	Three
Spacing	:	30 cm x 30 cm
No. of plants/replication	:	30

7. Progress of work done

The trial with seven varieties was laid out during 2015-16. Bulbs of varieties from BCKV, Kalyani (Bidhan Rajani 1, Bidhan Rajani 2) and one variety MPKV, Pune *viz.*, GKT-C4 along with check cultivars *viz.*, Prajwal, Phule Rajani, Arka Niranthara and Nilakkottai local were planted for testing.

Among the varieties, the variety 'Prajwal' registered its superiority followed by GKFC-4 by their earliness in days to spike emergence (76.50 ; 78.90 days), days to flowering (88.08 ; 89.50), spike length (99.10 ; 93.20 cm), Rachis length (29.32 ; 27.50 cm), no. of florets / spike (48.00 ; 45.50), length of floret (6.50 ; 6.10 cm), weight of florets / spike (75.50 ; 71.20 g), no. of spikes / m² (48.00 ; 40.50), yield of florets / plot (9.56 ; 6.40 kg) and estimated yield / ha (16.02 ; 10.70 t /ha). However, Phule Rajani & GKT-C4 were found to be on par each other in respect of flower yield / ha (10.10 and 10.70 t / ha respectively).

8. Salient findings

Among seven varieties tested for their performance at Coimbatore conditions, the variety "Prajwal" was found to be superior in respect of growth, flowering and yield parameters. This variety registered an estimated yield of 16.02 t / ha which was followed by GKT-C4 (10.70 t/ha) and Phule Rajani (10.10 t / ha).

Table 14. Testing of genotypes in tuberose (single) for growth, yield and quality parameters

S. No.	Genotypes	Days to spike emergence	Days to opening of first floret	Spike length (cm)	Rachis length (cm)	Number of florets/spike	Length of the floret (cm)	Weight of florets per spike (g)	Number of spikes/m ²	Yield of florets/ plot (4* 1 m) (kg)	Est. yield (t/ha)	No. of bulbs/c lump	No. of bulblets/clump
1	Bidhan Rajani 1	85.00	95.21	79.35	15.45	30.00	5.90	32.96	34.67	4.67	7.80	15	30
2	Bidhan Rajani 2	89.00	90.51	89.34	17.93	37.00	5.50	30.21	32.95	5.00	8.05	5	27
3	GKT – C4	78.90	89.50	93.20	27.50	45.50	6.10	71.20	40.50	6.40	10.70	4	28
4	Phule Rajani	84.50	98.53	53.40	24.10	41.20	6.20	48.30	36.40	6.20	10.10	3	27
5	Prajwal	76.50	88.08	99.10	29.32	48.00	6.50	75.50	48.00	9.56	16.02	5	41
6	Arka Niranthara	95.00	98.51	95.21	25.34	39.00	6.30	70.36	33.42	5.80	9.71	19	58
7	Nilakottai Local	85.00	93.05	95.92	22.14	38.00	6.10	56.79	31.73	5.88	9.80	8	24
	SE(D)	2.39	2.18	2.26	1.28	1.42	0.19	2.10	1.54	0.60	0.49	0.91	1.71
	CD (0.05)	4.90	4.45	4.86	2.65	2.92	0.42	4.26	3.18	1.26	1.06	1.89	3.49

MARIGOLD

1. **Project No.** : **2.4.1**
2. **Title of the Project** : **Testing of new genotypes of marigold for loose flower**
3. **Location** : TNAU, Coimbatore
4. **Duration** : Three year (2015-16 onwards)
5. **Year of Start** : 2015
6. **Technical programme** : **Entries for testing from centre.**
 - i. **Solan:** UHFS-FM-Mari-786
 - ii. **Kalyani:** Bidhan Marigold -1, Bidhan Marigold -2, Bidhan Marigold -3
 - iii. **Hessaraghatta:** Arka Bangara, IIHRMO-2, IIHRMO-4 and IIHRFm-1

Check: Three (Pusa Narangi Gainda for African marigold and Jafri for French marigold)

Design : RBD
No. of replications : Three
No. of plants/replication : 30
Spacing : 40m × 40 cm
Plot size :

7. Progress of work done

Seeds and planting materials were received from IIHR, Bangalore during October 2015. As the germination was poor, the materials were again received during March 2016 and were sown and transplanted during April 2016. The plants are in young stage. The trial is in progress.

8. Salient findings : ----

CHINA ASTER

1. **Project No.** : 2.6.1
2. **Title of the Project** : **Testing of new genotypes of China Aster for cut and loose flowers**
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** : 2015-16
6. **Technical programme** :
 - i. The experiment will be laid out in randomized complete block design with 3 replications and 30 plants per replication at spacing of 30 cm x 30 cm. Five randomly tagged plants per replication to be used for recording various observations on growth and flowering parameters.
 - ii. Varieties / entries will be evaluated in their colour group e.g. white coloured variety will be evaluated with white coloured variety / local variety.
 - iii. Local varieties of the region such as 'Local White', 'Local Pink' and 'Local Violet' may be used as check for comparison in their respective colour group.
 - iv. Varieties / entries for testing from IIHR, Hessaraghatta, (3 nos.) are Arka Aadya, Arka Archana and Kamini

7. Progress of work done

Seven genotypes / varieties of China Aster have been tested for its suitability for cut and loose flower production at Coimbatore conditions during 2015-16. The results revealed that among the seven genotypes evaluated during 2015-16, Hosur local recorded the maximum plant height (71.31 cm) and was on par with varieties Shashank (69.51 cm) and Kamini (64.81 cm). The genotype Belagavi local recorded minimum plant height of 30.87 cm. The genotype Hosur local also recorded the highest plant spread (46.89 cm), highest number of branches plant⁻¹ (38.85), and earliness in flower bud appearance (53.25 days) and thereafter earliness in opening of flower (80.55 days). It also took earlier days (90.20) for 50 per cent flowering.

The variety Kamini recorded the longest duration of flowering (58.20 days), maximum longevity of flowers on plant (12.45 days), highest flower diameter (7.46 cm) and longest flower stalk length of 65.68 cm. Further, the maximum weight of individual flower was observed in the variety Kamini (5.21 g) with a mean flower yield of 164.07 g /plant, 3.91 kg/ plot (size 4 x 2 m) and 4.30 t/ha, thus exhibiting its superiority over other varieties. Next to this variety, Poornima registered an yield of 4.2 t/ha which is on par with Kamini.

8. Salient findings

Of the seven China aster genotypes evaluated, Hosur local recorded improved growth with respect to vegetative parameters, while Kamini and Poornima exhibited its superiority by registering increased flower yield of 4.3 and 4.2 t/ ha respectively. These two varieties are suitable for both cut and loose flower purpose as they possess increased stalk length with high loose flower yield.

Table 15. Testing of new genotypes of China aster (*Callistephus chinensis* L. Nees) for growth and yield parameters

Genotypes	Plant height (cm)	Plant spread (cm)	No. of branches per plant	Days to 50 % flowering	Duration of flowering (days)	Longevity of flowers on plant (days)	Flower diameter (cm)	Flower stalk length (cm)	No. of flowers plant⁻¹	Wt. of 100 flowers (g)	Av. Flower yield plant⁻¹ (g)	Est. flower yield ha⁻¹
Kamini (deep pink)	64.81	32.64	17.25	114.10	58.20	12.45	7.46	65.68	38.15	515.23	164.07	4.3
Poornima (white with yellow centre)	69.51	29.39	25.55	97.05	51.55	9.60	6.78	64.05	42.85	423.02	163.79	4.2
Shashank (white)	56.44	37.14	27.30	99.65	49.45	10.70	6.68	62.22	36.20	396.23	144.08	3.9
Hosur local (pink)	71.31	46.89	38.85	90.20	38.55	9.75	5.98	49.17	30.50	460.87	138.31	3.8
Belagavi local (light pink)	30.87	20.81	10.30	111.05	41.60	9.90	6.18	41.78	19.95	367.50	75.31	3.2
White doubled (white)	49.91	31.59	21.40	105.05	45.70	10.05	6.94	56.36	36.50	400.31	137.33	3.8
Dwarf double mixed	46.82	34.65	20.60	100.90	51.35	9.65	6.29	51.88	32.80	343.62	99.73	2.8
Mean	55.24	33.30	23.04	102.57	48.06	10.30	6.47	56.16	33.56	415.25	131.80	3.23
SEd	4.639	2.294	2.363	2.503	0.740	0.287	0.251	2.812	2.331	16.302	9.136	0.212
CD (0.05)	9.747	4.819	4.964	5.259	1.554	0.602	0.528	5.908	4.898	34.251	19.195	0.432

III. CROP MANAGEMENT

TUBEROSE

1. **Project No.** : 3.2.1
2. **Title of the Project** : Drip irrigation and fertigation studies in tuberose
3. **Location** : TNAU, Coimbatore
4. **Duration** : 3 years
5. **Year of Start** :
6. **Technical programme** :

i.	Design: Randomized Block Design
ii.	No. of treatments: Seven
iii.	Treatment details: T ₁ - 75% of RD of fertilizers using WSF T ₂ - 100% of RD of fertilizers using WSF T ₃ - 125% of RD of fertilizers using WSF T ₄ - 75% WSF + 25% Straight Fertilizer T ₅ - 50% WSF + 50% Straight Fertilizer T ₆ - 25% WSF + 75% Straight Fertilizer T ₇ - 100% Straight Fertilizer (Control)
iv.	Recommended dose of fertilizers: 200 : 200 : 200 kg NPK/ha
v.	Plot size: 10 x 0.9 m (9 m ²)
vi.	Spacing (Row / plant): 120 x 40 x 40 cm
vii.	No. of replications: Three
viii.	Cultivar: Prajwal
ix.	Bed height: 25 cm
x.	Bed width: 90 cm
xi.	Distance between two beds: 30 cm
xii.	System of planting: Double row
xiii.	Drip lateral size: 16 mm
xiv.	Distance between two laterals: 1.2 m
xv.	Emitter spacing: 30 cm
xvi.	Water discharge: 4 lph
xvii.	Emitter type: Online dripper
xviii.	Fertigation tank capacity: 60 lit

7. Progress of work done

The results of the experiment conducted on standardization of fertigation levels is presented in the Table 16. The treatments comprised of 7 levels of fertigation (F₁ to F₇) with

different combinations of water soluble and straight fertilizers. Tuberose bulbs were planted in raised beds in paired row system at a spacing of 45 x 45 cm. The distance between laterals is 1.5 m. One 16 mm lateral was laid out between the two rows of tuberose with the emitter spacing of 45 cm and with a discharge rate of 4 lph. Drip irrigation was done once in 2 days and fertigation once in week based on fertigation schedule worked out for tuberose cv. Prajwal.

The results revealed that the treatment F₂ (100% of recommended dose of water soluble fertilizers) recorded increased plant height (35.92 cm), no. of leaves (21.67 / pl), total leaf area (2467.65 / pl), early spike emergence (83.47 days), no. of spikes / clump (2.82) and floret length (6.41 cm), with respect to flower yield, this treatment has recorded an increased yield of 0.531 g/ plant, 15.36 kg/plot (size 6.5 m²) and 15.76 t / ha. The shelf life of flowers also showed improvement in this treatment (2.05 days under room temperature and 5.17 days under refrigerated condition). Followed by this, the treatment F₃ showed its superiority in all the above parameters and is on par with F₂.

The study on bulb characters indicated that the treatment F₂ also registered increased no. of bulbs / clump (8.35) and no. of bulblets / clump (27.54). This treatment also showed increased chlorophyll content (0.86 mg g⁻¹). The BCR was also the highest in the treatment F₂ (2.65) followed by F₃ (2.48).

8. Salient findings

The results of the first year trial on effect of fertigation in tuberose revealed that fertigation of the crop using 100% of RD of water soluble fertilizers (F₂) found to be superior with respect to growth of the crop, flowering and yield parameters as indicated below.

S. No.	Parameter	Value
1.	Increased plant height	35.92 cm
2.	Earliness in spike emergence	83.47 days
3.	Increased no. of spikes / clump	2.82
4.	Highest flower yield / plot (kg)	15.36
5.	Highest flower yield / ha (t)	15.76
6.	More no. of bulbs / clump	8.35

The cost economics worked out indicated that the BCR was the highest (2.65) in the treatment F₂ followed by F₃ (2.48).

Table 16. Effect of fertigation on growth and yield characters of tuberose cv. Prajwal

Treatment	Plant height (cm)	Number of leaves	Total leaf area (cm ²)	Days taken for spike emergence (Earliness)	Number of spikes per clump	Floret length (cm)	Flower yield per plant (kg)	Flower yield per plot (kg/6.5m ²)	Est. flower yield ha ⁻¹ (tonnes)	shelf life (days)	
										Room temperature	Refrigerator (7°C)
F₁	30.48	16.23	2043.93	87.70	2.20	6.27	0.437	12.63	13.26	1.58	4.09
F₂	35.92	21.67	2467.65	83.47	2.82	6.41	0.531	15.36	15.76	2.05	5.17
F₃	35.38	20.44	2426.49	84.21	2.70	6.38	0.474	13.69	14.06	1.88	4.74
F₄	32.13	17.24	2086.72	86.70	2.44	6.31	0.457	13.21	13.57	1.70	4.23
F₅	29.32	15.07	1845.16	88.55	2.02	6.23	0.440	12.71	13.05	1.48	3.84
F₆	34.09	17.42	2043.93	86.29	2.53	6.32	0.465	13.44	13.79	1.78	4.41
F₇	27.46	13.75	1417.58	100.11	1.91	6.12	0.425	12.29	12.62	1.43	3.63
Mean	32.11	17.40	2045.92	88.19	2.36	6.29	0.46	13.33	13.73	1.70	4.30
SEd	0.722	0.805	25.311	0.382	0.084	0.021	0.016	0.91	0.89	0.94	0.21
CD(0.05)	1.459	1.628	50.643	0.964	0.171	0.044	0.034	1.89	1.82	0.192	0.46

F₁ – 75% of RD of fertilizers using WSF **F₂** – 100% of RD of fertilizers using WSF **F₃** – 125% of RD of fertilizers using WSF
F₄ – 75% of WSF + 25% Straight fertilizer **F₅** – 50% of WSF + 50% Straight fertilizer **F₆** – 25% of WSF + 75% Straight fertilizer
F₇ – 100% Straight fertilizer (control)

Table 17. Effect of fertigation on bulb character, available NPK, total chlorophyll and BCR of tuberose cv. Prajwal

Treatment	Number of bulbs per clump	Number of bulblets/clump	Available soil nitrogen (kg ha⁻¹)	Available soil phosphorus (kg ha⁻¹)	Available soil potassium (kg ha⁻¹)	Total chlorophyll content (mg g⁻¹)	BCR ratio
F₁	6.47	18.71	186.05	30.42	742.92	0.6755	2.48
F₂	8.35	27.54	134.77	24.17	603.90	0.8622	2.65
F₃	7.66	24.68	143.80	25.22	623.50	0.7677	2.39
F₄	6.83	20.19	162.09	26.72	663.52	0.7289	2.41
F₅	6.17	17.16	174.51	28.64	720.21	0.6266	2.39
F₆	7.22	22.23	125.15	22.04	587.84	0.7522	2.30
F₇	5.91	15.44	152.19	27.65	667.54	0.6177	2.36
Mean	6.94	20.85	154.08	26.41	658.49	0.72	-
SEd	0.054	0.160	1.275	0.273	0.273	0.0098	-
CD(0.05)	0.109	0.324	2.578	0.552	0.552	0.0199	-

F₁ – 75% of RD of fertilizers using WSF **F₂** – 100% of RD of fertilizers using WSF **F₃** – 125% of RD of fertilizers using WSF
F₄ – 75% of WSF + 25% Straight fertilizer **F₅** – 50% of WSF + 50% Straight fertilizer **F₆** – 25% of WSF + 75% Straight fertilizer
F₇ – 100% Straight fertilizer (control)

FOLIAGE PLANTS

1. **Project No.** : 3.9.1
2. **Title of the Project** : **Effect of colored shade nets on cut foliage plants (*Asparagus plumoses* and *Nephrolepis*)**
3. **Location** : TNAU, Coimbatore
4. **Duration** : Three year (2015-16 onwards)
5. **Year of Start** : 2015
6. **Technical programme** : **Treatments:**
 - i. White coloured shade nets (50%)
 - ii. Green coloured shade net (50%)
 - iii. Red coloured shade net (50%)
 - iv. Control (without shade net)Replications : Three (10 pots in each replication)
Design : Randomized Block Design

7. Progress of work done

Due to insufficient funds for erection of shade net house, the trial could not be carried out during 2015-16. It will be initiated after the erection of shade net house during 2016-17.

8. Salient findings : -----

FOLIAGE PLANTS

1. **Project No.** : 3.9.2
2. **Title of the Project** : **Efficacy of media incorporated with Pusa hydrogel on growth and production of quality foliage plants**
3. **Location** : TNAU, Coimbatore
4. **Duration** : Three year (2015-16 onwards)
5. **Year of Start** : 2015
6. **Technical programme** : **Treatment:**
 - i. Control
 - ii. Pusa Hydrogel @ 10, 20, 30 and 40 g/5 kg potting media
 - iii. Pusa Hydrogel @ 20 g/5 kg potting media
 - iv. Pusa Hydrogel @ 30 g/5 kg potting media
 - v. Pusa Hydrogel @ 40 g/5 kg potting mediaName of foliage plant: Philodendron
Size of pot : 10 inch
No. of replication : Four
Number of pots per replication: Ten
Design of experiment : RBD

The potting media should consist of
Soil+FYM+Sand (1:1:1 v/v)

7. Progress of work done

The trial was conducted with the foliage plant *Shefflera arboricola*, a popular indoor plant. Pusa hydrogel was incorporated in the potting media as per the technical programme and observations were recorded.

Incorporation of pusa hydrogel @ 40 g/5 kg potting media was significant in increasing the plant height(39.68 cm), plant spread (29.66 cm), no. of leaves (15.75 per plant), leaf area (896.84 sq.cm.), leaf production interval (8.76 days), number of primary roots (28.61) and petiole girth (1.08 cm) and leaf longevity (24.00 days).

8. Salient findings

Incorporation of 40 g of hydrogel/5 kg potting media for *Schefflera arboricola* was found to be superior by reducing the frequency of irrigation (5.43 days) and the quantity of water

required (11.42 lit.) by saving 5.12 lit. of irrigation water, when compared to control which required an irrigation level of 16.56 lit.

Table 18. Effect of Pusa Hydrogel (HG) on the growth of *Schefflera arboricola*

Treatments	Plant height (cm)	No. of leaves/plant	Leaf area (sq. cm)	Plant spread (cm)	Leaf production interval (days)	Leaf longevity (days)
T ₀ – Control	18.32	3.47	125.44	20.31	15.41	12.50
T ₁ – 10 g HG	19.48	3.46	151.11	21.78	13.42	13.50
T ₂ – 20 g HG	21.50	3.69	364.19	22.41	12.18	15.50
T ₃ – 30 g HG	26.55	5.72	365.19	23.46	11.07	18.50
T ₄ – 40 g HG	39.68	15.75	896.84	29.66	8.76	24.00
SEd	0.85	0.27	20.16	0.69	0.47	0.91
CD (0.05)	1.79	0.57	42.37	1.45	1.00	1.91

Table 19. Effect of Pusa Hydrogel (HG) on the growth of *Schefflera arboricola*

Treatments	No. of primary roots/plant	Petiole girth	Irrigation frequency (days)	Quantity of water applied (lit)	Leaf longevity (days)
T ₀ – Control	15.43	0.39	1.73	16.56	12.50
T ₁ – 10 g HG	17.05	0.57	2.66	15.13	13.50
T ₂ – 20 g HG	18.07	0.74	2.88	14.37	15.50
T ₃ – 30 g HG	21.23	0.79	4.86	13.21	18.50
T ₄ – 40 g HG	28.61	1.08	5.43	11.42	24.00
SEd	0.45	0.02	0.12	0.46	0.91
CD (0.05)	0.96	0.04	0.25	0.98	1.91

Annexure

6. Meteorological data for Coimbatore centre for the period 2015 -16

Months	Temperature		Relative Humidity		Wind (km/hr)	Sun shine (hrs)	Rain (mm)	Evaporation (mm)
	Max	Min	Max	Min				
2015								
April	34.3	24.0	83	47	5.0	7.2	62.7	6.1
May	32.7	23.5	91	61	4.1	5.9	195.8	4.8
June	32.3	23.7	82	55	9.6	5.8	46.9	6.2
July	32.2	22.9	85	50	8.7	6.9	5.1	6.7
August	32.3	23.2	86	51	7.8	7.5	28.1	6.5
September	33.0	23.8	83	47	8.3	7.2	66.2	6.9
October	31.6	23.3	87	52	5.1	7.4	65.2	5.4
November	28.6	22.0	93	71	4.9	4.7	191.3	3.1
December	29.0	21.5	90	62	5.8	5.6	24.1	3.7
2016								
January	30.2	19.5	86	46	5.3	6.8	0.2	4.6
February	33.4	21.5	81	36	6.1	8.4	0	6.5
March	35.7	24.0	82	37	7.0	8.9	0	7.1

7. Research publications of the project staff related to AICRP on Floriculture

List of Booklets

- M. Kannan, M. Jawaharlal, M. Ganga, K.P. Singh, T.N. Saha, S.P. Thamaraiselvi and P. Ranchana. 2015. Present status and prospects of floriculture in Tamil Nadu. DFR technical bulletin No. 20

List of Research Papers Published (Full papers)

National

1. Anitha, M and **M. Kannan**. 2015. Effect of Water soluble fertilizers on composition of chlorophyll, Total phenols, IAA oxidase activity and Major Nutrients (N, P & K) in *Dendrobium* orchid cv. Earsakul. Trends in Biosciences,8(6):1587-1590
2. Anitha, M and **M. Kannan**. 2015. Effect of Water soluble fertilizers on Growth and Yield of *Dendrobium* orchid cv. Earsakul. Trends in Biosciences,8(6):1591-1594
3. Vinodh Subramani, **Kannan Manickam** and Jawaharlal Murugaiah. 2015. Standardization of fertigation schedule for grn house grown Asiatic Lilium hybrids in nilgiris. Annals of Plant and Soil Research, 17(Special Issue):91-95.
4. Ranchana,P., **M. Kannan** and M. Jawaharlal. 2015. Evaluation of pollen viability under *in vitro* conditions in tuberose (*Polianthes tuberosa*). The Bioscan, 10(2):807-812.
5. Ranchana,P., **M. Kannan** and M. Jawaharlal. 2015. Analysis on biochemical basis of root knot nematode (*Meloidogyne incognita*) resistance in tuberose genotypes (*Polianthes tuberosa*). The Bioscan, 10(2):943-947.
6. Vishnupriya,K., M. Jawaharlal and **M. Kannan**. 2015. Correlation studies in African marigold (*Tagests erecta* L.). Trends in Biosciences, 8(8):2023-2025.

Popular Articles

S. No.	Title of the Article	Authors	Name & Year of Publication
1.	Celosia: A wonderful & versatile annual for landscaping	M. Kannan , P. Aruna and P. Ranchana	Floriculture Today. Vol. 20. No. 3. P: 52. 2015.
2.	Crossandra: A promising commercial flower crop of south india	M. Kannan , P. Aruna and P. Ranchana	Floriculture Today. Vol. 20. No. 4. P: 26. 2015.
3.	Doum Palm	M. Kannan , P. Ranchana and M. Ganga	Floriculture Today. Vol. 20. No. 4. P: 38. 2015.

4.	Noxious ornamental plants	P. Ranchana, M. Ganga, C. Nivethitha and M. Kannan	Floriculture Today. Vol. 20. No. 4. P: 30. 2015.
5.	Sterculia Wealth in India	P. Ranchana, M. Kannan and M. Ganga	Floriculture Today. Vol. 20. No. 7. P: 38. 2015.

Tamil Articles

1. **kh. fz]zd;** kw;Wk; g. u";rdh. Fz;Lky;ypapy; Jy;ypag; gz;iz rhFgo Kiwfs;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 7-11
2. F.,uh. ,uh\$Jiu/ br. fnz#; kw;Wk; **kh. fz]zd.**; brz;Lky;ypapy; Jy;ypag; gz;izak;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 15-17
3. **rP.g. jhkiur;bry;tp/** br. fnz#] kw;Wk; **kh. fz]zd.**; cjphp kyh; kw;Wk; bfha; kyh; brt;te;jp rhFgoapy; cahpa bjhHpy;El;g';fs;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 18-24
4. bg. mUzh/ R. tpndhj; kw;Wk; **kh. fz;zd.**; fdfhk;guk;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 25-29
5. K. gpug[kw;Wk; **kh. fz;zd.**; nfhHpf;bfhz;il/ musp kw;Wk; thlhky;yp rhFgo bjhHpy;El;g';fs;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 30-34
6. f. nQkgpugh/ k. f';fh kw;Wk; **rP.g.jhkiu bry]tp.** kyh; gaph;fspy; jpR tsh;g;g[bjhHpy;El;g';fs;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 36-37
7. K.\$tQh]yhy], k.f';fh kw;Wk] **rP.g.jhkiu bry]tp.** ky;ypif kyh; Vw;Wkjpf;fhd bgl;lf;g;Lj;Jk; bjhHpy;El;gk;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 42-43
8. br. fnz#;/ F.,uh. ,uh\$Jiu kw;Wk; **kh. fz;zd.**; kyh;fis re;ijg;gLj;Jk; bjhHpy;El;g';fs;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 44-47
9. k. f';fh/ g. u";rdh kw;Wk; **kh. fz;zd.**; kyh; gaph;fspy; mwpt[rhh;e;j brhj;Jhpik eph;thfk;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 52-55
10. K. \$tQh;yhy;/ **kh.fz;zd;** kw;Wk; k. f';fh. kyh; rhFgoapd; btw;wp bgw;w tptrhapapd; mDgtk;. cHthpd; tsUk; ntshz;ik/ khh;r; 2016. 7 (9) : 56-58

CD's released

- EDI sponsored training programme on Landscaping & Floriculture by **M. Kannan**, M.Ganga, M.Aruna, K.R.Rajadurai, **S.P.Thamariselvi**, M.Prabhu, K.Hemaprabha, P.Ranchana and S.Vinodh.2015. Dept. of Floriculture & Landscaping, HC &RI, TNAU, Coimbatore.

8. Training / Symposium / Seminar attended by the project staff

S. No.	Title	Period	Venue
Dr. M. Kannan, Professor & Head			
1.	XXIV Annual group meeting of AICRP on Floriculture	17.04.2015 to 19.04.2015	Sher-E Kashmir University of Agrl. Sciences and Technology, Shalimar Campus, Srinagar
2.	31 st Crop Scientists' Meet	30.04.2015	Seminar Hall - I, AC & RI, TNAU,

	(Horticulture) - 2015		Coimbatore
3.	3 rd Agricultural Graduate Students Conference "Impact of climate risks on Agrl. & Hortl. productivity	13.05.2015	Golden Jubilee Hall, TNAU, Coimbatore
4.	National Conference on Dynamics of smart horticulture for livelihood and rural development	28.05.2015 to 31.05.2015	MGCGV, Chitrakoot, Madhya Pradesh
5.	81 st Scientific Workers' Conference - 2015	12.06.2015	Anna Auditorium, TNAU, Coimbatore
6.	45 th Foundation Day of TNAU, Coimbatore	01.07.2015	Convocation Hall, TNAU, Coimbatore
7.	AGRI INTEX 2015, Coimbatore	17.07.2015 to 20.07.2015	CODISSIA Trade Fair Complex, Avinashi road, Coimbatore
8.	Third International Symposium on Underutilized plant species - Exploration and Conservation for Future Generation	05.08.2015 & 06.08.2015	KVK, AC & RI, Madurai
9.	National Conference on Yoga, Herbal and Traditional Medicine	07.08.2015	Convocation Hall, TNAU, Coimbatore
10.	36 th Convocation Function of TNAU, Coimbatore	17.08.2015	Convocation Hall, TNAU, Coimbatore
11.	National Conference on 'Indian Botanic Gardens' at NBRI, Lucknow and present a paper 'Treasure of Orchids	18.11.2015 to 20.11.2015	CSIR, NBRI, Lucknow
12.	National symposium on Spices and Aromatic Crops 2015 (SYMSAC-VIII)	16.12.2015 to 18.12.2015	Anna Auditorium, TNAU, Coimbatore
13.	State level Farmers' Day and New crop variety release function - 2016	08.01.2016	Convocation Hall, TNAU, Coimbatore
14.	16 th All India Inter Agricultural Universities Sports and Games Meet - 2016	22.02.2016 to 26.02.2016	TNAU Stadium, Coimbatore
15.	Krishi Unnati Mela - 2016, New Delhi	19.03.2016 to 21.03.2016	IARI, Pusa, New Delhi
Dr. S.P. Thamaraiselvi, Asst. Professor (Hort.)			
16.	31 st Crop Scientists' Meet (Horticulture) - 2015	30.04.2015	Seminar Hall - I, AC & RI, TNAU, Coimbatore
17.	81 st Scientific Workers' Conference - 2015	12.06.2015	Anna Auditorium, TNAU, Coimbatore
18.	AGRI INTEX 2015	17.07.2015 to	CODISSIA Trade Fair Complex, Avinashi road, Coimbatore

		20.07.2015	
19.	Third International Symposium on Underutilized plant species - Exploration and Conservation for Future Generation	05.08.2015 & 06.08.2015	KVK, AC & RI, Madurai
20.	National Conference on Yoga, Herbal and Traditional Medicine	07.08.2015	Convocation Hall, TNAU, Coimbatore
21.	National symposium on Spices and Aromatic Crops 2015 (SYMSAC-VIII)	16.12.2015 to 18.12.2015	Anna Auditorium, TNAU, Coimbatore
22.	16 th All India Inter Agricultural Universities Sports and Games Meet - 2016	22.02.2016 to 26.02.2016	TNAU Stadium, Coimbatore