



Department of Fruit Science
ASPEE College of Horticulture
Navsari Agricultural University
Navsari – 396 450



Activities and Achievements

ACADEMIC ACTIVITIES:

List of Courses offered by the Department for Under Graduate Programme(As per 5th Dean's Committee)

B. Sc. (Hons.) Horticulture				
SN	Sem.	Course No.	Title of Course	Credits
1	I	FRT.1.1	Fundamentals of Horticulture	3(2+1)
2	II	FRT.2.2	Plant Propagation and Nursery Management	2(1+1)
3	III	FRT.3.3	Temperate Fruit Crops	2(1+1)
4	IV	FRT.4.4	Tropical and Subtropical Fruits	3(2+1)
5	IV	FRT.4.5	Plantation Crops	3(2+1)
6	IV	FRT.4.6	Breeding of Fruit and Plantation Crops	3(2+1)
7	V	FRT.5.7	Orchard and Estate Management	2(1+1)
8	V	FRT.5.8	Dry land Horticulture	2(1+1)
Sub Total (A)				20 (12+8)
STUDENT READY-I: Experiential Learning Programme				
Model No. 2	VII	HWE7.2	Commercial Production of Horticultural Planting Materials	10 (0+10)
		HWE: 7.2.1	Propagation and Production of Propagules	6(0+6)
		HWE: 7.2.2	Packaging and Marketing of planting materials	4(0+4)
Sub Total (B)				10 (0+10)
STUDENT READY-II: Rural Horticultural Work Experience				
1	VIII	HWE. 8.5 (RHWE)	University farms (SDAU) and Visit to Horticulture Based Industries of North Gujarat Region	4 (0+4)
Sub Total (C)				04
Total (A+B+C)				34 (12+22)

List of Courses offered by the Department for Under Graduate Programme(As per 6th Dean's Committee)

SN	Sem.	Title of Course	Credits
1	I	Fundamentals of Horticulture	3(2+1)
2	I	Plant Propagation and Nursery Management of Fruit and Plantation crops	3(1+2)
3	III	Commercial Fruit Production	4(3+1)
4	III	SEC -Nursery Production in Horticulture crops	2(0+2)
5	V	Growth and Development of Horticultural Crops	3(2+1)
6	VI	Dry land Horticulture	3(2+1)
7	VI	Horticulture Based Integrated Farming System	3(2+1)

SN	Sem.	Title of Course	Credits
1	II	Commercial Production of Spices and Plantation Crops	3(2+1)

List of Courses offered by the Department for Post Graduate Programme (As per BSMA 2022-23)

S.N.	Sem.	Course No.	Title	Credits
1.	Odd	FSC 501*	Tropical Fruit Production	2+ 1
2.	Even	FSC 502*	Sub-Tropical and Temperate Fruit Production	2+ 1
3.	Odd	FSC 503*	Propagation and Nursery Management of Fruit Crops	2+ 1
4.	Even	FSC 504*	Breeding of Fruit Crops	2+ 1
5.	Odd	FSC 505	Systematics of Fruit Crops	2+ 1
6.	Even	FSC 506	Canopy Management in Fruit Crops	1+ 1
7.	Odd	FSC 507	Growth and Development of Fruit Crops	2+ 1
8.	Even	FSC 508	Nutrition of Fruit Crops	2+ 1
9.	Odd	FSC 509	Biotechnology of Fruit Crops	2+ 1
10.	Even	FSC 510	Organic Fruit Culture	2+ 1
11.	Odd	FSC 511	Export Oriented Fruit Production	2+ 1
12.	Even	FSC 512	Climate Change and Fruit Crops	1+ 0
13.	Odd	FSC 513	Minor Fruit Production	2+ 1
14.		FSC 591	Seminar	1+0
15.		FSC 599	Research	0+30

**List of Courses offered by the Department for Ph. D. Programme
(As per BSMA Committee-2009)**

Ph.D. Horticulture				
SN	Sem.	Course No.	Title of Course	Credits
1	Odd	FSC 601**	Advances in breeding of fruit crops	2+1
2	Even	FSC 602**	Advances in production of fruit crops	2+1
3	Odd	FSC 603	Advances in growth regulation of fruit crops	2+1
4	Even	FSC 604	Genomics and bioinformatics in horticulture	2+1
5	Odd	FSC 605	Biotic and abiotic stress management in horticultural crops	2+1
6	Even	FSC 606	Systematics of fruit crops	2+1
7	Odd	FSC 691	Doctoral Seminar-I	1+0
8	Even	FSC 692	Doctoral Seminar-II	1+0
9	Even/Odd	FSC 699	Doctoral Research	0+45
**Compulsory			Sub Total (A)	65 (14+51)
COMPULSORY NON-CREDIT COURSES				
1	Odd	PGS 501	Library and Information Service	0+1
2	Even	PGS 502	Technical writing and communications skills	0+1
3	Odd	PGS 503	Intellectual property and its management in Agriculture (e-course)	1+0
4	Even	PGS 504	Basic concept in laboratory techniques	0+1
5	Odd	PGS 505	Agril. Research, Research Ethics and Rural Development Programme (e-course)	1+0
6	Even	PGS 506	Disaster management	1+0
			Sub Total (B)	06 (3+3)
			Total (A + B)	71

**List of Courses offered by the Department for Ph. D. Programme
(As per BSMA 2022-23)**

S. N.	Sem.	Course No.	Title	Credits
1	Odd	FSC 601*	Innovative Approaches in Fruit Breeding	3+0
2	Even	FSC 602*	Modern Trends in Fruit Production	3+ 0
3	Odd	FSC 603	Recent Developments in Growth Regulation	3+ 0
4	Even	FSC 604	Advanced Laboratory Techniques	1+ 2
5	Odd	FSC 605	Arid and Dry Land Fruit Production	2+ 0
6	Even	FSC 606	Abiotic Stress Management in Fruit Crops	2+ 1
7	Odd	FSC 607	Biodiversity and Conservation of Fruit Crops	2+ 1
8	Even	FSC 608	Smart Fruit Production	2 + 0
9	-	FSC 691	Seminar-I	1+ 0
10	-	FSC 692	Seminar-II	1+ 0
11	-	FSC 699	Research	0+ 75

Activities under ELP

Commercial Production of Horticultural Crops		
Year	Students	Revenue Generated (Rs)
2011-12	-	Project Sanctioned
2012-13	10	253065
2013-14	12	270926
2014-15	25	20194
2015-16	26	145285
2016-17	25	93400
2017-18	28	172224
2018-19	19	223755
2019-20	20	312492
2020-21	25	107150
2021-22	47	151960
2022-23	47	354794
2023-24	43	246675

Course No.	Name of Model	No. of Students trained
	Commercial Horticulture	43
HWE 7.2.1	Propagation and Production of propagules	
HWE 7.2.2	Packaging and marketing of planting materials	



Sowing of Coconut seednut



Pineapple Crowns preparation for sowing



Insecticide spraying on vegetable seedlings



Air layering in Citrus



Cuttings of different Fruit Crops



Preparation of Lanolin paste



Preparation of nursery bed



Sowing of vegetable seeds



Preparing Drumstick Seedlings



Selling of Drumstick Seedlings



Sowing of Coconut seednut



Mango seedling sowing in bags



Preparation of Lanoline paste



Preparing mango epicotyl grafting



Air layering in white jamun



Preparing different cuttings of fruit crops



Sowing of vegetable seeds

Filling plug tray for vegetable seedlings



Sowing of Drumstick seeds



Taking vegetable seedlings for selling

Number of students awarded degree since commencement of PG programme in the Department (2022-23)

M.Sc. Horticulture	Ph. D. Horticulture
35	13

Number of students enrolled in PG Programme (2023-24)

M.Sc. Horticulture	Ph. D. Horticulture
71	51

Post Graduate Students who have cleared NET in the Discipline of Fruit Science (2023-24)

SN	Name
1	Nil

Medalist Students of the Department

SN	Name of Student	Name of Medal	Year
1	Rakshita V. R. M.Sc. (Horti)	ASPEE foundation Gold Plated Silver Medal	2022-23

Exposure Visits of PG Students

Nil

RESEARCH ACTIVITIES

Focus Areas

1. Development of hybrid variety in important fruit crops for stable production. to minimize yield gap between zone, area and soil type
2. To speed- up the activities of research in the area of Fruit Science.
3. Introduction to evaluation of new fruit crops.
4. To develop production technology for high yield and better quality fruits, including orchard management like nutrition, water management and use of plant growth regulators, Special horticultural plant production techniques etc.
5. Standardization of propagation technique in fruit crops.
6. Inter disciplinary approach to the special problem like irregular bearing, spongy tissue and insect pest management in mango. Crop regulation and corkyness in sapota. Stunted fruit growth in banana.
7. The research work will be strengthening on the following crops: Mango, Sapota, Banana, Papaya, Guava and Ber.
8. Collection of different Fruitcropsgermplasm and evaluation for their performance.
9. To identify high yielding, superior quality varieties of different fruit crops.
10. Development of suitable agro-techniques with respect to yield and quality of fruits Crops.
11. Dissemination of knowledge on improved techniques of crop production in relation to fruit crops to fruit growers
12. Research on underutilized and unutilized fruits crops

Research Schemes in Operation

SN	Title of Research Project	Year of Commencement & Budget Head	PI & Co-PI	Funding Agency
A	Plan Schemes			
1	Research and Development in Fruit Crops	2012-13 (B. H.: 329/12025)	PI: Dr. V. K. Parmar Co-PI: Dr. B. M. Tandel	Govt. of Gujarat, Gandhinagar
2	Research in Dragon fruit and possibility of dragon fruit in coastal area of Gujarat	2022-23 (B.H.: 329/12087)	PI: Dr. B. M. Tandel Co-PI: Dr. V. K. Parmar	Govt. of Gujarat, Gandhinagar
B	Non-Plan Schemes			
1	Research in Fruit Crops	1965 (B. H.: 329/5014)	PI: Dr. B. M. Tandel Co-PI: Dr. V. K. Parmar	Govt. of Gujarat, Gandhinagar
2	Establishment of Department of Horticulture	- (B. H.: 329/6503/03)	PI: Dr. V. K. Parmar	Govt. of Gujarat, Gandhinagar

1. Research and Development in Fruit Crops (B. H. 329/12025)

Objectives:

- Introduction, maintenance, evaluation and characterization of new fruit crops for crop improvement.
- To develop the production technology for high yield, better quality fruits including the orchard management like high density planting, nutrition, water management, use of plant growth regulators, rejuvenation, special horticultural plant production, etc.
- To standardize rootstocks for advance technology for multiplication of true-to-type planting material for ultra high density of fruit crops.
- To undertake basic and applied multi-disciplinary research for developing climate smart technology to enhance productivity of fruit crops.
- Qualitative studies of important fruits and their post harvest studies of biochemical and physiological aspects such as extension of shelf life, nomination of post harvest indices in view of marketability.
- Inter disciplinary approach to develop human resources through training and demonstrations.

2. Research in Fruit Crops (B. H. 329/5014)

Objectives:

- To find out the optimum nutrient requirement of major horticultural crops viz., mango, sapota and coconut.
- To introduce new fruit crops for the region.
- To supply true to type planting material.
- To produce new variety this may be superior to local in mango and sapota.

3. Establishment of Department of Horticulture (B. H. 6503/03)

Objectives:

- To arrange research on Horticulture and P. G. training.
- To review and coordinate the Horticulture research
- To prepare research on Horticultural crops and to implement among the different center.
- To implement results of research for Horticultural crops through wings of Extension Education of University and State Department of Agriculture.
- To arrange the short term trainings for farmers
- To guide PG students through university and research.

4. Research in Dragon fruit and possibility of dragon fruit in coastal area of Gujarat

Objectives:

- To identify and develop high yielding varieties which are resistant to biotic and abiotic stress and high yield potential
- To conduct demonstration of dragon fruit in coastal area
- To develop technologies for current issues like uneven size of fruit, flower drop and yellowing etc
- To develop technology for off season flowering and fruit production
- To find out suitable technology for packaging, storage and value addition in dragon fruit
- To aware farmers and entrepreneurs again new developed technologies through TOT

: Research Recommendations:

A) Production Technology:

Year: 2006

1. Effect of planting material and split application of nitrogen on growth and yield of banana (*Musa paradisiaca*) cv. Grand Nain

Farmers of south Gujarat heavy rainfall agro-climatic Zone-I (AES-III) are advised to use tissue culture plant for planting banana cv. Grand Nain. Further, they are also advised to apply 300g nitrogen/plant in four equal splits at 2,3,4 and 5 months after planting. The basal dose of FYM 10 kg/plant at the time of planting, 90 g phosphorus/plant at 3 months after planting and 200 g potash/plant in three equal splits at 3, 4 and 5 months after planting should also be applied.

2. Integrated nutrient management in banana cv. Grand Nain

Farmers of south Gujarat heavy rainfall agro-climatic Zone-I (AES-III) are advised to apply 10 kg FYM, 250 g nitrogen, 45 g phosphorus and 200 g potash per plant along with 6 kg PSM/ha and 6 kg Azotobacter/ha for getting maximum net return with higher cost benefit ratio. FYM should be applied as basal before planting. The bio-fertilizers should be applied in two equal splits after 1st and 2nd month of planting, full dose of phosphorus after 3rd month of planting while nitrogen and potash should be applied in 3 equal splits after 3rd, 4th and 5th month of planting.

Year: 2007

1. Nutritional studies in banana cv. Grand Nain

The farmers of South Gujarat heavy rainfall zone – I Agricultural Situation – III growing banana cv. Grand Nain are advised to apply 300 g N, 90 g P and 200 g K per plant for obtaining maximum net return with higher benefit cost ratio. Farm yard manure 10 kg per plant should be applied as basal. Nitrogen should be applied in four equal splits at 2, 3, 4 and 5 months after planting; full dose of phosphorus should be applied at three months after planting and potash should be applied in three equal splits at 3, 4 and 5 months after planting.

Year: 2008

1. Performance of mango cv. Kesar raised by approachgraft, softwood graft and softwood graft *in situ*

The farmers of Gujarat desiring to establish new orchard of mango cv. Kesar are advised to adopt softwood graft *in situ* for higher yield and net return.

Year: 2009

1. Mixed planting with other mango varieties in Alphonso

The farmers of South Gujarat heavy Rainfall zone-I, AES-III desiring to establish new orchard of mango cv. Alphonso are advised to plant a filler tree of cv. Neelphonso in the centre of regularly planted four Alphonso trees at 10 m x 10 m spacing upto 12 years of age for getting higher net realization and BCR.

2. Effect of post shooting treatments on yield, quality and maturity of banana (*Musa paradisiaca* L.) cv. Grand Nain

The farmers of South Gujarat heavy rainfall Zone –I, AES-III growing banana cv. Grand Nain are advised to spray GA₃ 100 mg l⁻¹ on banana bunch after complete opening and covering the bunch with blue polyethylene sleeve (50 micron) for better quality, higher production and net return.

3. Induction of early flowering in mango through chemicals

The farmers of South Gujarat heavy rainfall Zone –I, AES-III are advised to drench Paclobutrazol at 5 g a.i./tree in more than 35 years old mango cvs. Alphonso, Kesar and Rajapuri to obtain early flowering, higher net realization and BCR.

4. Feasibility of organic farming in guava (*Psidiumgaujava* L.) cvs. Allahabad Safeda and Sardar

The farmers of South Gujarat heavy rainfall Zone –I, AES-III are desiring to grow Sardar (L-49) variety. They are advised to apply FYM@ 60 kg/tree (equal to 500 g Nitrogen/tree) along with bio-fertilizer 100 g/tree each of Azatobacter and PSB after mrigbahar treatment for getting higher net realization.

Year: 2010

1. Effect of maturity and storage temperature on shelf life and quality of banana cv. Grand Nain

The farmers of South Gujarat heavy rainfall zone-I, AES-III growing banana cv. Grand Naine under medium black and clay loam soils are recommended to harvest banana (1) at 75% maturity stage (75 days after shooting) and store in cold storage at 12⁰ C for export purpose (bunch weight will be decreased up to 19.55% at 75% maturity as compared to 100% maturity) (2) at 90% maturity stage (90 days after shooting) and store in cold storage at 14⁰ C for distant market (bunch weight will be decreased up to 10.07% at 90% maturity as compared to 100 % maturity) (3) at 100% maturity stage (100 days after shooting) and store in cold storage at 16⁰C for local market. These treatments increase shelf life of banana fruits for 29.13, 25.17 and 21.00 days in 1, 2 and 3 case, respectively without deterioration in quality.



Year: 2011

1. Fertiligation in papaya var. Madhubindu

The farmers of south Gujarat heavy rainfall zone (AES-III) growing papaya var. MadhuBindu are advised to adopt fertigation and apply 80% recommended dose of N and K₂O (160 g N and 200 g K₂O/plant) in 12 equal splits starting from 45 days after transplanting and subsequently at 15 days interval through drip irrigation along with 10 kg FYM/pit as basal and 100 g P₂O₅/plant at 1¹/₂ month and at 3 months after

transplanting as soil application. By adopting drip method of irrigation and fertigation, farmers can get 32 per cent increase in yield and 20 per cent saving of water and fertilizer as compared to conventional method of irrigation along with maximum benefit cost ratio of 3.50.

The system details are:

Lateral (16 mm) spacing = 2.1 m

Dipper spacing = 30 cm (either side of the plant trunk)

Dipper discharge = 8 lph

No. of dripper per plant = 2

Operating pressure = 1.2 kg/cm²

Operational frequency = Alternate day

Operating time:

August to September = 50 min (except rainy days)

October to February = 70 min

March onwards = 2.0 hrs

2. Effect of packaging, pre-colling and cold storage on shelf-life of sapota fruits

The wholesale buyers of sapota fruit (co-operatives/ traders) are recommended to establish a cold chain for extending shelf life of sapota fruits. Immediately after harvest, sapota fruits should be pre-cooled at 10 °C for 8 hrs in pre-cooling chamber. Subsequently, pre-cooled sapota fruits should be packed in perforated polythene bag (50 micron, 1.2 % vent) and kept in CFB box and then stored at 12 °C temperature with 85 to 90% relative humidity in cold storage. These treatments extend the shelf life of sapota fruits up to 15 days without adverse effect on quality.

3. Effect of calcium hydroxide and ripening retardants on shelf life of sapota fruits

The sapota growers of Gujarat are advised to dip sapota fruits in 1 % calcium hydroxide for 5 minutes and wet rubbed after drying for improving the appearance of fruits then again dipped in 2, 4-D 4 mg/l for extending the shelf life without affecting quality of sapota fruits as compared to farmers practice *i.e.* wet or dry rubbing only.

Year: 2014

1. Effect of foliar application of Ca, Zn, Fe and B on growth, yield and quality of papaya cv. Taiwan Red Lady

The farmers of south Gujarat heavy rainfall zone growing papaya cv. Taiwan Red Lady are advised to spray Calcium nitrate – 1000 + Borax – 30 + Zinc sulphate - 200 + Ferrous sulphate – 200 mg/l at 60, 90 and 120 days after transplanting along with the application of RDF. By adopting 3 foliar sprays of combined micronutrients, farmers can 15 increase the yield with better quality of fruits along with higher net realization.

2. Feasibility of organic farming in mango cv. Kesar

The farmers of south Gujarat heavy rainfall zone intend to adopt organic farming in mango cv. Kesar (20 years old tree) are advised to apply 100 % RDN through 17 kg Neem cake (4.5 % nitrogen) with 100 kg FYM + *Azotobacter*(Navsari isolate) @ 250 g + PSB (Navsari isolate) @ 250 g/plant in the month of June. By adopting this organic farming, farmers can get higher yield and better quality fruits in terms of TSS, acidity and shelf life and higher net realization as compared to inorganic farming. It also improves the soil properties.

Year: 2015

1. Effect of post-shooting bunch spray of fertilizers on banana (*Musa paradisiaca*L.) cv. Grand Naine

The farmers of south Gujarat heavy rainfall zone growing banana cv. Grand Naine are advised to apply two spray of 1.5% Sulphate of Potash (SOP) on bunch after complete emergence and 15 days after first spray to get higher yield with quality fruits. Keep the

with

(18



bunch covered blue polythene sleeve μ).

2. Effect of different organics on growth, yield and quality of mango cv. Kesar under high density plantation

The farmers of south Gujarat heavy rainfall zone intend to adopt organic farming in high density plantation (5 m x 5 m) adult mango cv. Kesar are advised to apply N 80 % of RDN from Neem Cake at 11.5 kg/ tree (5.22 % nitrogen) with Azotobacter + PSB (108 cfu) 50 ml each /tree in the month of June to get higher yield with quality production. It also improves the soil properties.



3. Effect of heading back and training on growth, flowering, yield and quality of fruit in old orchard of mango cv. Kesar

The farmers of south Gujarat heavy rainfall zone are advised to head back their high density planted (5 m x 5 m) old mango tree cv. Kesar at 4 to 5 m height from ground level and maintain 6 newly emerged tertiary limbs to get higher yield with quality production.

Note:

1. Rejuvenation should be done after completion of monsoon (in month of October).
2. For rejuvenation slant cut should be made and cut portion should be treated with copper fungicide.
3. Care should be taken for controlling frequent visit of stem borer by rejuvenated orchard.



Year: 2016

1. Effect of heading back and training on growth, flowering, yield and quality in old orchard of mango cv. Rajapuri

The farmers of south Gujarat heavy rainfall Agro-climatic zone are advised to head back their above 30 years old mango tree cv. Rajapuri at 4 to 5 m height from ground level and maintain 6 newly emerged tertiary limbs to get higher yield with quality production.

Note:

1. Rejuvenation should be done after completion of monsoon in month of October.
2. For rejuvenation slant cut should be made and cut portion should be treated with copper fungicide paste (100 g lit⁻¹) and frequently visit to rejuvenated orchard for controlling stem borer.

Year: 2018

1. Effect of time of inarch grafting on success and survival in mango cv. Kesar.

The Farmers and nurserymen of South Gujarat Heavy Rainfall Agro-climatic Zone I (AES-III) preparing inarch graft of mango are advised to prepare grafts throughout the year with uniform success rate and survival.

2. Effect of time and dose of fertilizer application on yield and quality of sapota cv. Kallipati

The Farmers of South Gujarat Heavy Rainfall Zone-I (AES-III) having sapota orchard with adult trees of cv. Kalipatti are recommended to apply 100 percent recommended dose of fertilizers @ 1000-500-500g NPK/tree/year in three splits i.e. 250-125-125g NPK/tree in June along with FYM @ 100kg/tree/year. Remaining 250-125-125g NPK/tree in October and 500-250-250g NPK/tree in February instead of two equal split i.e. in June and October. This treatment gives higher fruit yield of sapota with higher net realization in winter season in comparison to summer season.

Year: 2019

1. Effect of foliar spray of KNO and plant growth regulators on flowering and fruiting behaviour of mango cv. Alphonso.

The farmers of South Gujarat having adult mango orchard of Alphonso variety are advised to apply paclobutrazol 5.0 g a.i./tree at 1st fortnight of August in soil and two foliar spray of 2% KNO₃ (20g/litre) during starting of third week of October and November to increase the yield and improve quality of fruits along with higher net realization.

Year: 2020

1. Integrated nutrient management in sapota cv. Kalipatti

The farmers of South Gujarat having adult tree of sapota orchard cv. Kalipatti are recommended to apply 50 kg farm yard manure and 80 per cent recommended dose of chemical fertilizer (800-400-400 NPK g/tree in three split of NPK i. e. 200:400:100 g/tree in June, 400:00:200 g/tree in August and 200:00:100 g /tree in October) along with soil application of bio fertilizers (Azatobactor, phosphorus solubilizing bacteria and potash mobilizing bacteria) @ 50 ml/tree of each in June, October and February month for getting higher yield, TSS of fruit and net return.

2. Effect of graded doses of paclobutrazol on flowering, yield and quality of mango cv. Alphonso

The farmers of South Gujarat having more than 35 years old mango orchard of Alphonso variety are recommended to apply paclobutrazol through soil drenching during 1st fortnight of August in the ratio of 10:5:10:5 g a.i./tree in 1st, 2nd, 3rd and 4th year, respectively along with 150 % RDF (150 kg FYM and 1125:240:1125g NPK per tree) for getting early flowering, higher fruit yield and net return.

3. Effect of post flowering spray of chemicals on fruit retention and yield of mango cv. Kesar

The farmers of South Gujarat having mango orchard of Kesar variety are recommended to spray 2% novel organic liquid nutrients at pea and marble stage to increase the yield and improve quality of fruits along with higher net return.

4. Impact of pre-soaking treatments on germination and growth of mango (*Mangifera indica* L.) stones.

Farmers and nurserymen of South Gujarat are recommended to sow the mango stones after soaking in solution of GA₃ 100 mg/litre for 24 hours to get mango seedlings with better plant growth and higher survival.

Year: 2021

1. Evaluation of different bio fertilizers with graded chemical fertilizers for nutrient management in papaya var. Red Lady

The farmers of South Gujarat growing papaya var. Red Lady are recommended to apply 60 per cent recommended dose of chemical fertilizer (120-120-150 NPK g/plant, As per the schedule given in table below) along with soil application of biofertilizers (*Azotobacter*, *Phosphate solubilizing bacteria*, *Potash mobilizing bacteria*) @ 20 ml per plant of each at the time of planting, 3 and 6 months after planting for getting higher yield and net realization

Time of Fertilizer application	Application of Fertilizer					
	N (g/plant)	P (g/plant)	K (g/plant)	<i>Azotobacter</i> (1 x)	PSB (1 x)	KMB (1 x)

				10 ⁸ cfu/ml (ml/plant)	10 ⁸ cfu/ml (ml/plant)	10 ⁸ cfu/ml (ml/plant)
At the time of planting	-	-	-	7.00	7.00	7.00
Two month after planting	30	30	30	-	-	-
Three month after planting	-	-	-	6.50	6.50	6.50
Four month after planting	30	30	30	-	-	-
Six month after planting	30	30	30	6.50	6.50	6.50
Eight month after planting	30	30	30	-	-	-

Year: 2022

1. Effect of liquid fertilizers foliar spray on growth, yield and quality of sapota cv. Kalipatti

Farmers of South Gujarat growing sapota cv. Kalipatti are recommended to apply foliar spray of 1 % potassium nitrate (13:00:45) (100 g in 10 liter water) in adult orchard during second fortnight of September. November and January months along with RDF (100 kg FYM + 1000 : 500: 500 NPK g/plant) for obtaining higher yield and net returns.

Year: 2023

1. Effect of PGR on yield and quality of sapota cv. Kalipatti

The farmers of South Gujarat growing sapota cv. Kalipatti are recommended to apply foliar spray of CCC 100 mg l⁻¹ (10 g in 100 L water) in April month and GA₃ 50 mg l⁻¹ (5 g in 100 L water) in September and November month on adult tree along with RDF (100 kg FYM + 1000 : 500 :500 NPK g/plant) for obtaining higher yield and net returns.

Year: 2024

1. Effect of pruning on sapota cv. Kalipatti planted at normal distance

The farmers of South Gujarat are recommended to headed back of overcrowded (above 25 year) old sapota tree cv. Kalipatti at two meter height from ground level and subsequently pruned mature shoot at 45 cm length after 6 to 8 month for maintaining canopy without application of paclobutrazol to get higher yield and net return.

2. Feasibility of planting and pruning intensity of meadow orchard in guava cv. Lalit

The farmers of south Gujarat are recommended to grow guava cv. Lalit in meadow orchard at 2m × 2m planting distance and pruned ³/₄ current season shoot growth in second fortnight of may month after two years plantation for getting maximum yield and net return.

Year: 2014**1. Standardization of preservative solution for different fruits as sample**

The fresh fruits of different varieties of mango and citrus can be preserved with their natural colour at acceptable level up to six months in Ethanol 75% solution compared to other solutions viz. general solution (50 ml Formaldehyde 40% + 300 ml Ethyl Alcohol 95% + 2000 ml water) and Hessler's solution. Banana fruits could not be preserved in any tested solution.

Year: 2017**1. Seasonal influence on nutritional and physiological changes associated with flowering and fruiting behaviors in mango**

- The nutrient contents viz. nitrogen, potassium, calcium, magnesium, manganese, iron and zinc in leaves of mango cultivar 'Kesar' and 'Alphonso' were higher during the months of October to January, thereafter the nutrient contents started to decrease and were recorded lower during the months of April to July. Photosynthetic rate and internal CO₂ content of leaves of cultivar 'Kesar' and 'Alphonso' increased significantly during the months of November to March and declined during the months of August-September.
 - Correlation analysis indicated that nitrogen, potassium, calcium, magnesium, sulphur, manganese, photosynthetic rate and internal CO₂ content of leaves of cultivar 'Kesar' and 'Alphonso' have significant negative correlation with minimum temperature and maximum relative humidity.
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Year: 2018**1. Screening of salt tolerant rootstock for mango from South Gujarat region**

Genotype 73-2 was found better in terms of germination, seedling growth and survival at EC 4 to 5 dSm⁻¹ salinity level. Scientists, those who are interested to work on salt tolerant rootstock of mango may take advantage in hybridization programme.

2. Determination of nutritional composition of minor fruits

Minor fruits (mentioned below) of South Gujarat are found rich in following parameters as compared to banana and sapota.

Fruits	Composition better than banana and sapota
Palmyra palm	K (3902ppm), Ca(739ppm), P (268ppm) and Zn(2.79ppm)
Jamun	Total phenol (241.6 mg/100g), Antioxidant activity (126.5 mg/100g), Ca (324ppm) and Mg(241ppm)
White wax apple	Antioxidant activity (16.4 mg/100g)
Carambola	Vitamin-C (16.1 mg/100g), Total phenol (20.8 mg/100g), Antioxidant activity (28.4 mg/100g), K(4099ppm), Ca (657ppm), Mn (3.01ppm) and Cu(2.75ppm)
Tamarind	Carbohydrates (62.8%), Protein (2.81%), Vitamin-C (18.9 mg/100g), Total phenol (25.6 mg/100g), Antioxidant activity (30.4 mg/100g), K(12433ppm), Ca (2759ppm), Mg (1286ppm), P(1099ppm), Fe (154.3ppm), Mn (6.47ppm), Zn(7.11ppm) and Cu (6.13ppm)
Jackfruit	Total phenol (31.8 mg/100g), Antioxidant activity(62.9 mg/100g), K (5135ppm), Ca (405ppm), Mg(533ppm) and Mn (5.12ppm)

Star gooseberry	Protein (4.31%), carotene (100.7 µg/100g), Vitamin-C (17.1), Total phenol (105.0 mg/100g), Antioxidant activity (83.7 mg/100g), K(4411ppm), Ca (4933ppm), Mg (1518ppm), P(545ppm), Fe (17.2ppm) and Zn (3.94ppm)
Lasoda	carotene (62.7 µg/100g), Total phenol (41.8mg/100g), Antioxidant activity (55.7 mg/100g), K (4644ppm), Ca (656ppm), P (431ppm), Mn(3.51ppm) and Zn (2.06ppm)
Kair	Protein (2.24%), Total phenol (61.5 mg/100g), Antioxidant activity (77.7 mg/100g), K(7313ppm), Ca (1011ppm), Mg (723ppm), P(999ppm) and Zn (4.71ppm)
Rayan	carotene (87.63µg/100g), total phenol (157.4 mg/100g), Antioxidant activity (92.6 mg / 100g), Ca(284ppm) and P (321ppm)

3. Assessment of genetic diversity through molecular markers in mango (*Mangifera indica* L.)

Scientific community is informed to use markers OPA-04, OPG-17, OPA-18 and OPB-19 for genetic diversity analysis in mango. Amarapali and Dashehari varieties were found to be genetically most similar, followed by Sonpari and Baneshan; Neelphanso and Sonpari; Dashehari and Mallika; Ratna and Sindhu and Sonpari and Alphanso. Whereas, Banglora and Neelphanso were found to be genetically most diverse varieties followed by LalMalgoa and Amrutang; and LalMalgoa and Vanraj.

Year: 2019

1. Effect of environment on behaviors and structures of flowering, pollen and fruit set characters in mango.

- Pollen viability was higher in 'Kesar' and 'Alphonso' mango, but the flowers with germinated pollen in-vivo were very less (20- 23%) in field conditions. Pollen germination at 35° C decreased by 3.87 and 5.00 % in Kesar and Alphonso, respectively; when compared with 20° C.
- Correlation of weather data with different flowering and fruit set parameters of 'Kesar' mango indicated that, the number of male flowers per panicle was positively correlated with minimum relative humidity but negatively correlated with sunshine hours. Ovule dimension was negatively correlated with minimum temperature and minimum relative humidity whereas positively correlated with sunshine hours. Fruit set at marble stage was negatively correlated with maximum temperature in 'Kesar' variety.
- Correlation of weather data with different flowering and fruit set parameters of 'Alphonso' mango indicated that, the length of panicle was negatively correlated with minimum temperature while width of panicle was negatively correlated with sunshine hours. Style dimension was negatively correlated with maximum temperature. Pollen viability was negatively correlated with minimum relative humidity.



Year: 2021

1. Response of media, fertilizer and chemicals application on growth of mango rootstock

Scientists those who are working on raising of mango rootstock are recommended to sow the mango stone in poly bag having potting media of red soil + FYM + vermicompost (2:1:0.5) and to fertilize @ 75:16:75 mg NPK /Kg through soil application with foliar application of Novel organic liquid nutrients 10 ml per litre at 2nd and 3rd MAS for better germination, growth and higher survival of mango rootstock.

Year: 2023

1. Response of media, fertilizer and chemicals application on growth of mango rootstock.

The sowing of sapota seeds after soaking in cow dung slurry (250g cow dung per liter water) for 24 hours during January for higher seed germination, growth and survival of seedlings.

2. Phytochemical screening and determination of antioxidant activity of different mango cultivars.

Mango cv. Langra has considerable amount of nutraceuticals with highest amount of total polyphenols and ascorbic acid in the pulp and peel. Maximum total flavonoids were found in Langra peel with highest antioxidant activities in pulp, peel and kernel. Majority of phenolic acids were found in Langra cultivar. Phytochemicals in their relative abundance make the Langra superior than other selected cultivars and can be useful for further varietal improvement programme as well as for food purpose.

Our Products

Year: 2023-24	
Planting material	Numbers
Mango Graft	11687
Sapota Graft	2617
Coconut Seedlings	4304
Other fruit crops graft	651
Fruit crop sapling	930
Vegetable seedling	64334

Production of planting material under ELP Programme

Year: 2023-24	
Fruit Planting material	
Planting Material	Numbers
Coconut seedling	1500
Cherry Air Layers	10
Citrus seedlings	45
Pomegranate plants	39
Mulberry plants	29
Black Jamun seedlings	24

Jackfruit seedling	44
White Jamun air-layers	106
Custard apple seedling	37
Red Jamun air layers	440
Pineapple plants	30
Phalsa seedling	29
Aonla seedlings	46
Citrus Air layers	48
Red Jamun Seedlings	29
Vegetable Planting material	
Moringa seedling	2914
Brinjal seedling (jambli)	3850
Tomato seedling	9025
Chilli seedling	9240
Cabbage seedlings	3840
Cauliflower seedling	1660

EXTENSION ACTIVITIES

- ❖ Participation of faculty in *Krusha Mahotsava* Programme of GoG
- ❖ Participation in *Krishi Mahotsava*- a flagship programme of GoG.
- ❖ Diagnostic visits at farmers' fields.
- ❖ Organizing fruit exhibition-cum-competition, Farmers' training, *shibir* etc.
- ❖ Dissemination of technology through publications.
- ❖ TV telecast and radio talks on various aspects of fruit crops.
- ❖ "*Mera Gaon Mera Gaurav*" programme related activities.
- ❖ The articles related to different fruit crops are published in vernacular language for the benefits for farmers.
- ❖ Training to subject matter specialist is imparted under T&V programme.
- ❖ The training to farmers is also given which is organized by SSK and FTC.
- ❖ Participation in farmer's day.



Farmer Shibir



Diagnostic visit at farmer field



Diagnostic visit at farmer field



KrushiMahotsav

TRANSFER OF TECHNOLOGY (ToT)



Interaction with farmers in *KrushiMahotsava* an on/off-campus Training

Diagnostic visit at farmers' field

Training at Farmers' Field

On Farm interaction with farmers

❖ Lecture Delivered



Lecture delivered in Sapota Training Programme



Lecture delivered in Mango chiku *Shibir*



Lecture delivered in online workshop on Horticulture Nurseries: Scope and Technology



Lecture delivered at KVK Training



Lecture delivered in online workshop on Horticulture Nurseries: Scope and Technology



Lecture delivered in SSK, Navsari

❖ Horticultural Exhibition at different places



Horti Sangam 2016



Krishi Mahostav



Agricultural Fair at Surkhai



World Coconut Day 2nd September



Mango Exhibition

Infrastructure Available (Fruit Science & PSMA combined)

Department

- Different Laboratories:
- Wi-Fi facility.
- Naturally Ventilated Polyhouse and Net House for EPL activities.
- List of important equipment and machines at department of Fruit science

Vacuum oven	Seed germinator
Weight balance	Freeze
Oven or dryer	Seed cabinet
Seed cabinet	Microscope
Blue indiment	pH meter
Trigo new	Projector
Autoclave with S. S. Basket	Canon copier.

Farm

- Experimental Farm Area: 26.0 ha
- Nursery:4.0 ha
- Naturally Ventilated Polyhouses: 04 no.
- Storage Godown: 01 ha
- Borewell: 03 no.
- Pond :0.5 ha
- Tractor : 04

