

Annual Report

2017-18



Pomology and Post Harvest Technology Uttar Banga Krishi Viswavidyalaya Pundibari : Cooch Behar

A. TEACHING AND NON- TEACHING STAFFS OF THE DEPARTMENT

1) TEACHING STAFF

a) **Cadre Posts:** Professor – 1, Associate Professor – 2, Assistant Professor – 3.

b) **Present Strength :**

Sl. No.	Name	Designation	Date of joining	Contact number	Email ID	Remark
1.	Prof. P. K. Paul	Professor & Head	10.12.2001	8016425515	prodyut24@yahoo.com	Continuing
2.	Dr. N. Bhowmick (Ph.D.w.e.f. 05.3.2018)	Assistant Professor, (Stage-3)	27.11.2007	9433438982	nileshbhowmick@gmail.com	Continuing
3.	Dr. M. Preema Devi	Assistant Professor (Stage-1)	07.07.2014	7063102366	preema.horti@gmail.com	Continuing
4.	Dr. A. Chakraborty	Assistant Professor (Stage-1)	20.10.2014	9432842864	aditi.chatterjee10@gmail.com	Continuing

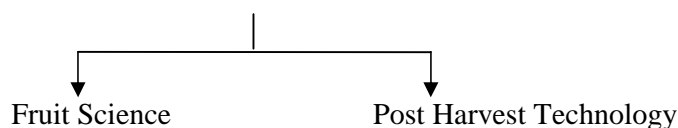
2) NON-TEACHING STAFF

Sl. No.	Name	Designation	Date of joining	Contact number	Remark
1.	Mr. Nitish Ch. Saha	Technical Assistant, Grade-I (Teaching)	03.7.1989	9475835338	Continuing
3.	Mr. Dibyendu Das	Junior Store Keeper	29.10.2014	9733196969	Continuing
4.	Mr. Ananda Sarkar	Laboratory Attendant (R)	01.09.2008	8927242990	Continuing

3) STUDENT STRENGTH

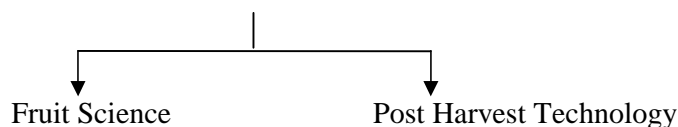
a) **B.Sc. (Hort.) Hons:-**20 in each Academic Session under the Faculty of Horticulture

b) **M. Sc. Students:**



- 5 in each academic session
- 5 in each academic session

c) **Ph.D. Students:**



- 2 University Research Scholar in each academic
- 2 University Research Scholar in each academic

session

each academic session

4) DEPARTMENTAL ACTIVITIES

(i) Teaching Programme

(a) Courses Offered in UG level

Sl. No.	Course No.	Course Title	Credit	Course Leader	Associated teachers
1.	PPT 101	Fundamentals of Horticulture	2+1	Mr. N. Bhowmick	1) Dr. S. Gurung 2) Dr. M. R. Bhanusree 3) Dept. of VSC
2.	PPT 102	Plant Propagation & Nursery Management	1+1	Mr. N. Bhowmick	Dr. M. R. Bhanusree
3.	PPT – 151	Orchard & Estate Management	1+1	Mr. N. Bhowmick	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
4.	PPT - 152	Dry Land Horticulture	1+1	Dr. A. Chakraborty	1. Dr. P. K. Paul 2. Mr. N. Bhowmick 3. Dr. A. Chakraborty
5.	PPT – 201	Temperate Fruit Crops (V th Deans' Committee)	1+1	Mr. N. Bhowmick	Dr. S. Gurung
6.	PPT – 201	Temperate Fruit Crops (IV th Deans' Committee)	1+1	Mr. N. Bhowmick	Dr. S. Gurung
7.	PPT – 251	Tropical & Sub-Tropical Fruits	3+1	Mr. N. Bhowmick	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
8.	PPT – 252	Production Technology of Fruit & Plantation Crops	1+1	Mr. N. Bhowmick	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty 3. Dept. of PCP
9.	PPT – 251	Tropical & Sub-Tropical Fruits – II (4 th Deans)	1+1	Mr. N. Bhowmick	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
10.	PPT – 252	Breeding of Fruit & Plantation Crops – II (4 th Deans)	1+1	Dr. A. Chakraborty	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
11.	PPT – 301	Post Harvest Management of Horticultural Crops	2+1	Dr. P. K. Paul	***
12.	PPT 302	Post Harvest Management & Value Addition of Fruits & Vegetables	1+1	Dr. P. K. Paul	***
13.	PPT 303	Fundamentals of Food Technology	1+1	Dr. P. K. Paul	***
14.	PCP 351	Processing of Horticultural Crops (Offered from Plantation Crops & Processing)	1+2	Teachers of PCP	Dr. M. Preema Devi Dr. P. K. Paul
15.	PCP 151	Growth and development of Horticultural Crops (Offered from Plantation Crops & Processing)	1+1	Teachers of PCP	Dr. A Chakraborty
16.	HORT 152	Principles of Horticultural Crops and Plant protection (Offered from Faculty of Technology)	1+1	Dr. J. C. Jana (Dean, F/Hort)	Dr. M. Preema Devi

(b) Courses Offered in PG level

Sl. No	Course No	Course Title	Credit	Course Leader	Associated teachers
1.	FSC – 504	Breeding of Fruit Crops	2+1	Dr. A. Chakraborty	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
2.	FSC – 506	Growth & Development of Fruit Crops	2+1	Mr. N. Bhowmick	1. Mr. N. Bhowmick 2. Dr. A. Chakraborty
3.	PHT – 502	Post Harvest Management of Fruits & Vegetables	2+1	Dr. P. K. Paul	1. Dr. P. K. Paul 2. Dr. M. P. Devi
4.	PHT – 504	Storage Systems & Operations	2+0	Dr. P. K. Paul	1. Dr. P. K. Paul 2. Dr. M. P. Devi
5.	PHT – 509	Drying & Dehydration Technology	1+1	Dr. M. P. Devi	1. Dr. P. K. Paul

6.	PPT – 591	Master's Seminar	1+0	Dr. A. Chakraborty (Seminar Leader)	2. Dr. M. P. Devi ***
7.	FSC - 501	Tropical & Sub – Tropical Fruit Production - I	2+1	Mr. N. Bhowmick	Dr. S. Gurung
8.	FSC - 502	Tropical & Sub – Tropical Fruit Production - II	2+1	Mr. N. Bhowmick	Dr. M.R. Bhanusree
9.	FSC - 603	Advances in production of fruit crops - II	2+1	Dr. S. Gurung	***
10.	PHT - 501	Post Harvest Physiology and Biochemistry of fruits & vegetables	2+1	Dr. P. K. Paul	***
11.	PHT - 502	Post Harvest Management of fruits & vegetables	2+1	Dr. P. K. Paul	***
12.	PHT – 503	Principles & methods of fruits & vegetables processing	2+1	Dr. P. K. Paul	***
13.	PPT – 501	Tropical and sub tropical fruit production I	2+1	Mr. N. Bhowmick	Dr. S. Gurung
14.	PPT - 502	Tropical and sub tropical fruit production II	2+1	Mr. N. Bhowmick	Dr. M.R. Bhanusree
15.	FSC – 601	Breeding of Fruit Crops	2+1	Dr. A. Chakraborty	Dr. A. Chakraborty
16.	PPT – 692	Doctoral Seminar	1+0	Dr. A. Chakraborty (Seminar Leader)	***

(c) Students of the Department:

Master Degree

Sl. No.	Name of the students	Semester	Thesis title	Advisory committee
1.	Santosh Kumar G.M. (H-2017-14-M)	1 st and 2 nd Semester	Response of shoot pruning on growth, flowering and fruiting characteristics of guava (<i>Psidium guajava</i> L.) under Sub – Himalayan Terai Region of West Bengal.	Dr. Nilesh Bhowmick (Chairman) Dr. A. Chakraborty Dr. A. N. Dey Dr. Puspendu Dutta
2.	Nim Tshering Sherpa (H-2017-08-M)	1 st and 2 nd Semester	Standardization of seed germination and stem cutting of <i>Baccaurea sapida</i> Muell. Arg.	Dr. A. Chakraborty (Chairman) Dr. Nilesh Bhowmick Dr. A. N. Dey Dr. Nandita Sahana
3.	Novin Chamling (H-2017-08-M)	1 st and 2 nd Semester	Effect of Secondary Hardening media on field performance of banana (Musa AAB) cv. Malbhog.	Dr. Nilesh Bhowmick (Chairman) Dr. A. Chakraborty Dr. Soumen Maitra Dr. Hossain Ali Mondal Dr. Surajit Khalko
4.	Jinnamu Aresh (H-2017-02-M)	1 st and 2 nd Semester	Effect of microbial isolates in removing ethylene for delayed ripening.	Prof. P. K. Paul (Chairman) Prof. A. Choudhury

Sl. No.	Name of the students	Semester	Thesis title	Advisory committee
				Dr. M. Preema Devi Dr. Surajit Khalko
5.	Binita Baidya (H-2017-04-M)	1 st and 2 nd Semester	Quality assessment of dried chrysanthemum flower as affected by pre drying and storage condition.	Dr. M. Preema Devi (Chairman) Prof. P. K. Paul Dr. A. Mondal Khan Dr. S. Khalko
6.	Abid Hayat (H-2015-02-M)	Completed	Evaluation of quality and stability of lemon based blended nectar	Dr. M. Preema Devi (Chairman) Prof. P. K. Paul Dr. P. Medda Dr. S. Khalko
7.	Arghya Mani (H-2015-4-M)	Completed	Studies on sodium substitution in mango pickle	Prof. P. K. Paul (Chairman) Dr. M. Preema Devi Dr. Somnath Mondal Dr. S. Khalko
8.	Sri Surya Venkatadevi Prasanna (H-2016-10-M)	3 rd and 4 th Semester	Effect of planting density and paclobutrazol on flowering and fruiting characteristics of Pineapple (<i>Ananas comosus</i> L. Merr) cv. Mauritius.	Mr. Nilesh Bhowmick (Chairman) Dr. A. Chakraborty Prof. S. Maitra Dr. M. K. Debnath
9.	Jannila Praveena (H-2016-6-M)	3 rd and 4 th Semester	Role of pollen on fruit characteristics of selected guava genotype.	Dr. Aditi Chakraborty (Chairman) Dr. Nilesh Bhowmick Dr. A. N. Dey Dr. Arup Sarkar
10.	Bijayanka Baidya (H-2016-1-M)	3 rd and 4 th Semester	Effect of Pre-harvest spray on shelf life quality of Strawberry.	Prof. P. K. Paul (Chairman) Dr. A. Chakraborty Dr. M. Preema Devi Mrs. Shrilekha Das

Doctoral Degree

Sl. No.	Name of the students	Semester	Thesis title	Advisory committee
1.	Kondle Ravi (H-2017-04-D)	1 st and 2 nd Semester	Effect of pruning and nutrient management on the performance of acid lime (<i>Citrus aurantifolia</i> Swingle) cv. Balaji under Sub-Himalaya Terai Region of West Bengal.	Dr. Sharad Gurung (Chairman) Dr. Nilesh Bhowmick Prof. P. K. Paul Dr. D. Mukhopadyay
2.	Sukanya Misra (H-2016-05-D)	3 rd and 4 th Semester	Effect of plant population and mulching on strawberry (<i>Fragaria ananassa</i>) cultivation under Terai Region of West Bengal.	Dr. Sharad Gurung (Chairman) Prof. P. K. Paul Dr. A. Chakraborty

				Dr. P. S. Medda Dr. M. K. Debnath
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(ii) Research Programme

(a) Departmental Research programme:

Sl. No.	Title	Associated Teacher	Status
1.	Nutritional management and pre-harvest treatments on growth, yield and quality of pineapple	Dr. N. Bhowmick	Completed
2.	Value addition of jackfruit grown in Terai region of West Bengal and evaluation of its storage stability	Dr. N. Bhowmik	Completed
3.	Evaluation of quality and stability of lemon based blended nectar	Dr. M. Preema Devi Dr. P. K. Paul	Completed
4.	Studies on sodium substitution in pickle	Dr. P. K. Paul Dr. M. Preema Devi	Completed
5.	Effect of Paclobutrazol in Guava var. L-49	Dr. A. Chakraborty Dr. N. Bhowmick	Completed
6.	Effect of planting density and paclobutrazol on flowering and fruiting characteristics of Pineapple (<i>Ananas comosus</i> L. Merr) cv. Mauritius.	Dr. N. Bhowmick Dr. A. Chakraborty	Completed
7.	Role of pollen on fruit characteristics of selected guava genotype.	Dr. Aditi Chakraborty Dr. Nilesh Bhowmick	Completed
8.	Effect of Pre-harvest spray on shelf life quality of Strawberry.	Prof. P. K. Paul Dr. A. Chakraborty Dr. M. P. Devi	Completed
9.	Evaluation of physico-chemical characteristics of Jalpai (Indian olive) and Pummelo	Dr. N. Bhowmick	Completed
10.	Flowering and fruiting characteristics of mango and litchi	Dr. N. Bhowmick A. Chakraborty	Continuing
11.	Response of shoot pruning on growth, flowering and fruiting characteristics of guava (<i>Psidium guajava</i> L.) under Sub – Himalayan Terai Region of West Bengal.	Dr. Nilesh Bhowmick Dr. A. Chakraborty	Continuing
12.	Standardization of seed germination and stem cutting of <i>Baccaurea sapida</i> Muell. Arg.	Dr. A. Chakraborty Dr. Nilesh Bhowmick	Continuing
13.	Effect of Secondary Hardening media on field performance of banana (Musa AAB) cv. Malbhog.	Dr. Nilesh Bhowmick Dr. A. Chakraborty	Continuing
14.	Effect of microbial isolates in removing ethylene for delayed ripening.	Prof. P. K. Paul Dr. M. Preema Devi	Continuing
15.	Quality assessment of dried chrysanthemum flower as affected by pre drying and storage condition.	Dr. M. Preema Devi Prof. P. K. Paul	Continuing
16.	Effect of plant population and mulching on strawberry (<i>Fragaria ananassa</i>) cultivation under Terai Region of	Dr. Sharad Gurung Prof. P. K. Paul	Continuing

Sl. No.	Title	Associated Teacher	Status
	West Bengal.	Dr. A. Chakraborty	
17.	Effect of pruning and nutrient management on the performance of acid lime (<i>Citrus aurantifolia</i> Swingle) cv. Balaji under Sub-Himalaya Terai Region of West Bengal.	Dr. S. Gurung Dr. N. Bhowmick	Continuing

(b) Project Handled

Sl. No.	Project Title	Sponsoring Authority	Associate Teacher
1	Quality Control Laboratory	MoFPI, GOI	Prof. P. K. Paul-Principal Investigator (PI)
2	Survey, Documentation, Collection and Maintenance of Jackfruit (<i>Artocarpus heterophyllus</i> Lam.) Germplasm Grown Under the Northern Parts of West Bengal	Intuition Project (UBKV)	Mr. N. Bhowmick- PI Dr. A. Chakraborty-Co-PI Dr. M. Preema Devi-Co-PI

(c) Research findings

Lemon based blended nectar:

Food or beverages which have physiological benefits beyond basic nutrition is being preferred now a day for reducing chronic diseases. The development of any process for its economical utilization would be of great benefit to the beverage industry. Nutritionally value added products could therapeutically help on improving the health of consumer's therefore introduction of new types of blended beverages might improve socio-economic status of the country. India can capitalize on consumer's interest in functional food by considering the major research in this area and developing the functional food or beverages from the sources which are cheaply available. The blending of juice is the best method to enhance the nutritional quality depending upon the types of fruits and vegetables used. Blending of fruit pulps in beverages adds more value in the form of new combinations of flavor, nutrients and also develop new formulation. Beverages based on lemon and ginger continues to receive a considerable amount of attention reflecting a growing awareness of the potential of this production in the market place. These beverages have high nutritional quality and increased energy value. These could be particularly useful in places where there is lack of food and improper nutrition leading to deficiency of certain nutrients. Lemon juice was aim to blend with spice extract like ginger to improve taste, aroma, palatability, nutritive value and for reducing the bitterness. The present investigations were carried out at the laboratory of Department of Pomology and Post Harvest Technology, Pundibari, Cooch Behar West Bengal in the year 2016 and 2017 with the following objectives. To develop and standardize lemon based nectar blended with ginger and to evaluate the stability of the produce.

Various treatment combinations adopted were, T1 (50% lemon juice + 50% ginger juice extract), T2 (60% lemon juice + 40% ginger juice extract), T3 (70% lemon juice + 30% ginger juice extract), T4 (80% lemon juice + 20% ginger juice extract), T5 (90% lemon juice + 10% ginger juice extract) and T6 (100% lemon juice) i.e. control. Observations on various

physico-chemical, microbial and sensory parameters were recorded during the entire storage period for both the year i.e. 2016 and 2017. The study revealed that the lemon based blended nectar was found to be stable and could be stored upto 3 months at room temperature and remain highly acceptable organoleptically. The blending of 80% lemon juice and 20% ginger juice extract (T₄) had maintained almost all the physico-chemical and microbial quality parameters followed by T₃ (70% lemon juice and 30% ginger juice extract) and T₅ (90% lemon juice and 10% ginger juice extract) in both the year and also in pooled data after the storage period. Also, the organoleptic score was highest in T₄ (80% lemon juice and 20% ginger juice extract) while T₆ (control) was lowest in both the year and also in pooled data after the storage period.

Hence, the formulation with 80% lemon juice and 20% ginger juice extract was considered to be the most appropriate for manufacturing nutritional and functional drinks with predicted sensory scores of colour (9), aroma (8.25), appearance (8), taste (9), and overall acceptability (8.25). The cost of production of nectar blended with 80% lemon juice and 20% ginger juice extract was found to be Rs. 10.14/200ml which is economically at par with same types of beverages available in the market.

Sodium substitution in mango pickle:

A study was conducted for the purpose of reducing the sodium content in mango pickle without compromising with the pickle quality at maximum extent. As mango pickle is high salt containing product so there is large consumption of Na⁺ ions along with pickle. Hence an attempt had been made to partially reduce the consumption of Na⁺ by using alternative salts like KCl and CaCl₂. However, the maximum limit of KCl and CaCl₂ in a salt mixture has been set to 75% and 25% respectively. D-optimal mixture design was adopted to formulate 16 run. The 16 runs are actually the 16 different combinations of salts that are to be used for curing purpose. Each run was replicated thrice for precision. The pickles thus prepared were evaluated for the responses like water drawing capacity (g/100g salt), hardness of cured sample (N), water activity, sodium and potassium concentration in pickle (in ppm), LAB population (log CFU), total plate count (log CFU) and organoleptic properties based on Hedonic scale. The result shows that Water Drawing Capacity was of maximum value of 102.692 in the 6th run and minimum value of 58.364 in 2nd run. Hardness of cured sample (in N) was found to be maximum 8.470 in 11th run and minimum of 6.998 in 9th run. Water activity was found to be maximum in 9th run which is 0.974 and minimum of 0.968 in the 2nd run. Na concentration in final pickle sample (in ppm) was found to be highest in the 14th run which is 408.715 and lowest in 2nd run (68.715) and lower in the 1st run (70.408). K concentration in final pickle sample (in ppm) was found maximum in 6th run which is 472.222, and minimum in 9th run which is 28.744. Lactic acid bacteria count in log CFU was found to be maximum in 14th which was 6.452 and minimum in the 6th run which is of value 6.151. Total Plate Count (log CFU) was found to be maximum in 14th response which is 6.397 and minimum in 10th run which was 6.316. When organoleptic properties based on hedonic scale was evaluated, it was found that run number 14 and 12 have maximum score of 7.429 and 7.393 respectively whereas run

number 1 and 2 have minimum score of 6.552 and 6.616 respectively. Through numerical optimization, it is concluded that a salt mixture having 50% NaCl and 50% KCl can be used as salt mixture for curing mango pickle with a desirability constant of 0.658. However a salt mixture of 51.7% NaCl and 42.9% KCl can also be used as a salt mixture for curing mango pickle with a reasonably comparable desirability constant of 0.64.

Pineapple

Mauritius cultivar of pineapple was introduced first time in West Bengal from the south India and its growth performance under the integrated nutrient management practices was assessed with chemical fertilizer, organic manure and bio-fertilizer having eighteen treatment combinations. Chemical fertilizers were applied in 3 levels (zero, 75 percent and 100 percent recommended dose), organic manure were applied also in 3 levels (zero, FYM, Vermicompost), bio-fertilizer were applied in 2 levels (zero and Azotobactor + Phosphate Solublising Bacteria). The doses for integrated nutrient management was as follows: Regular Dosages of Fertilizer (RDF)= 12:4:12 g/plant, Farm Yard Manure (FYM) = 500g/ plant, Vermicompost = 300g/Plant, Azotobactor = 10g, Phosphate Solublising Bacteria (PSB) = 10g. The treatment combinations having chemical fertilizer, organic manure and bio-fertilizers showed better performance than the other treatment combinations. The plant height, canopy spread, number of leaves, D-leaf length, D-leaf breadth, and leaf area, flowering percentage, estimated fruit yield was recorded highest in with Chemical 75% RDF + Vermicompost + Bio-fertilizer.

Litchi

The effects of root promoting factors like IBA, sucrose and their interaction with stem girdling was experimented on litchi semi-hardwood cutting. Maximum rooting (58.33%) was observed in the treatment consisting IBA @5000ppm. IBA @1000 ppm (23.33%) has the maximum effect to induce earliest sprouting, maximum number of sprouts (2.93), highest root length (5.23 cm)and leaves (5.12) were recorded with T₈ (Sucrose @10%)per cuttings. The interaction effect between 10% sucrose × girdling showed maximum shoot length of 2.34. It was concluded that the cutting treated with a mixture of sucrose and IBA coupled with girdling can be very much effective in providing a higher rooting success in litchi semi-hardwood cuttings.

Indian Olive

The fruiting characteristic of Indian Olive(*Elaeocarpus floribundus*Blume.) was surveyed and the result revealed that the fruit weight, length, breadth was varied from 15.78 to 22.46 g, 4.07 to 4.49 cm and 2.62 to 2.89 cm, respectively. Among the bio-chemical properties the TSS, ascorbic acid content of different accessions varied from 8.20 to 11.33⁰brix and 12.65 to 18.72 mg/100g of fruit pulp. Among the different accessions, ACC-8 has showed the better results in terms of the most of the fruit physic-chemical properties and for the estimated fruit yield.

In an another study it was found that the accession, ACC-11 was characterized with a very highest value of TSS (7.07⁰B) followed by ACC (6.9⁰B). ACC-24 had high fruit weight of 20.83g which was high as compared to other accessions. ACC-30 showed a highest value of total sugar (7.50%) and high reducing sugar content (2.35%). ACC-20 not only had a high TSS value but also higher amount of total sugar content (6.85%). Similar trend was observed in ACC-29 where a high TSS (18.7⁰B), high reducing sugar (2.17%) and total sugar content (5.77%) were recorded. It was revealed that the accessions ACC-11, ACC-20 and ACC-29 are plants that yielded superior quality of Jalpai, whereas the accession ACC-30 exhibited fruit with high sugar and acid content.

Assam Lemon

The effect of pruning and nutrition management was assayed on Assam Lemon to study the reproductive behavior, quality and soil-leaf nutrient availability of Assam Lemon with four levels of pruning, seven levels of nutrient, consisting recommended dose of fertilizers (RDF) and different combinations of organic manure (Vermicompost), inorganic fertilizer, bio-fertilizer (*Azotobacter*), mycorrhiza (VAM). It was found that the reproductive parameters viz. number of flowers per plant, fruit set percentage and fruit yield were found highest in lightly pruned plants feed with 75% RDF + Vermicompost + *Azotobacter*+ Vesicular ArbuscularMycorrhiza at Ambe, Mrig and Hasthbar, respectively. Light pruning (25 cm pruning from the terminal portion of the shoot) along with integrated use of fertilizers viz. 75% RDF +Vermicompost + *Azotobacter*+ Vesicular ArbuscularMycorrhiza proved as best in terms of reproductive behaviour of Assam lemon and severe pruning (75 cm pruning from the terminal portion of the shoot) along with integrated use of fertilizers, viz. 75% RDF + vermicompost +azotobacter + vesicular arbuscularmycorrhiza proved best in terms of quality and soil-leaf nutrient availability.

Pummelo

The pummelo fruits from 22 genotypes were collected from different locations of North Bengal in ripe condition and their physio-chemical characteristics were assayed. There was a wide variability exists among different fruit samples collected from distinct locations. The fruit skin colour showed variation from greenish-yellow to orange, most of the fruits are round shaped whereas some fruits are oval as well. The placental tissues shows colour variability from whitish to pink and even reddish as well. The taste of the juice are classified as sour in some occasions to sweet in many occasions and very sweet in few occasion. Accession-17 showed the maximum average weight of fruit whereas the minimum fruit weight was observed in accession-16. The length and breadth of the fruit was found maximum in accession 17 and 20 and minimum in accession 14 and 11 respectively. The peel-pulp ratio was maximum in accession 13 and minimum in accession 3. Juice content was found maximum in accession 4 and minimum in accession 3. The TSS was found maximum in accession 15 and minimum in accession 13.

Indian Hog Plum

Stem cuttings in Indian Hog Plum (*Spondiaspinnata*) with different cutting (10, 15 and 20 cm) length and different concentrations of IAA (control, 500, 1000 and 1500 ppm) resulted that 15 cm length of cuttings treated with 1500 ppm IAA gave the best results in terms of earliest bud (13.27 days after planting) and leaf (16.32 days after planting) initiation, highest success (66.67%), shoot length (34.89 cm), root length (13.49 cm), collar diameter (20.50 mm), root number (9.53), root diameter (6.91 mm), fresh shoot weight (45.47g), fresh leaf weight (14.07 g), dry shoot weight (21.15 g), dry root weight (2.67 g) and total biomass (29.80 g/plant).

Plum

Fully mature local plum (*Prunusdomestical*.) fruits were coated to assess the effects of corn starch coating in storage life. Among various treatments, corn starch 1% showed the lowest physiological loss in weight (10.28%) and also reduced the incidence of decay (2.41%) as compared to fruits under control with physiological loss in weight of 32.99% and decay percentage of 4.5% at the end of study. Besides, ascorbic acid and total phenol were also

retained much better with 23.63 mg/100g of pulp ascorbic acid and 201mg/100g of pulp total phenolic in 1% corn starch as compared to untreated fruits. The results reflected that 1% Corn starch treatment is effective for maintaining physico-chemical characteristics and prolonging of shelf life in plums

(iii) Developmental Programme:

Sl. No.	Title	Associated Teacher	Status
1	Maintenance of Fruit Nursery for production of quality planting materials	N. Bhowmick	Continuing
2	Development and maintenance of different pineapple varietal block	N. Bhowmick	Continuing
3	Maintenance of Assam Lemon block and propagation practices for raising of saplings	N. Bhowmick	Continuing
4	Maintenance of Litchi Varietal block and propagation practices for raising of saplings	N. Bhowmick	Continuing
5	Collection of different banana germplasm and establishment of banana block	N. Bhowmick	Continuing
6	Maintenance of guava varietal block and propagation practices for raising of saplings	N. Bhowmick	Continuing
7	Maintenance of mango mother block	N. Bhowmick	Continuing
8	Maintenance of mango varietal block	N. Bhowmick Dr. A. Chakraborty	Continuing
9	Collection and maintenance of different strawberry cultivars	N. Bhowmick Dr. A. Chakraborty	Continuing
10	Establishment of litchi orchard var Bedana	N. Bhowmick Dr. M. P. Devi	Completed
11	Maintenance of mother block of litchi and guava for raising of saplings	N. Bhowmick Dr. A. Chakraborty	Continuing
12	Maintenance of citrus rootstock, water apple orchard	Dr. M. P. Devi	Continuing
13	Development and maintenance of jackfruit genotypes block	N. Bhowmick Dr. A. Chakraborty Dr. M. P. Devi	Continuing

5) PUBLICATIONS

(a) Research Paper

1. P., Suresh Kumar, Kumari K. U., **M. Preema Devi**, Choudhary V. K. and Sangeetha A. (2017). Bamboo shoot as a source of nutraceuticals and bioactive compounds: A review. *Indian Journal of Natural Products and Resources*. **8**(1): 32-46 **NAAS Rating -4.08**

2. **M. Preema Devi**, L. Hemanta, **A. Chakraborty** and S. Chakrabarty. (2017). Agrometeorological indices : effect on growth and flowering behaviour in marigold. *Journal of Crop and Weed*. **13**(3): 82-85 **NAAS Rating -5.28**
3. L. Hemanta, R. Srivastava and **M. Preema. Devi**. (2017). Studies on floral biology of Tuberose (*Polianthes tuberosa* L.) under Terai regions of Uttarakhand. *Journal of Crop and Weed*. **13**(2): 106-111 **NAAS Rating -5.28**
4. **M. Preema Devi**, Laishram Hemanta, Rocky Thockhom, S. Chakrabarty and R.S. Dhua. (2017). A Study on Different Packaging Materials affect Shelf Life of Marigold at Different Harvesting Seasons under West Bengal Condition. *International Journal of Current Microbiology and Applied Sciences*. **6**(8): 1665-1673 **NAAS Rating -5.38**
5. Mani, A, **Bhowmick.**, N, Sau, S., Singh, S, Yadav, V.K. (2018).Efficacy of different root promoting factors and stem girdling on rooting success of Litchi cuttings.*Research Journal of Chemical and Environmental Sciences*,**6**(1):61-66, ISSN 2321-1040, **NAAS rating-4.64**
6. **Bhowmick, N.**, Ghosh, S. K., Munsu, P. S., Deb, P., and Ghosh, A. (2017).Effect of integrated nutrient management on flowering and fruiting characteristics of Pineapple cv. Mauritius.*Journal of Crop Weed*, **13** (2): 144-156, ISSN: 0974-6315, **NAAS Rating-5.28**
7. **Bhowmick, N.** (2017). Fruiting characteristics of jalpai-the Indian olive (*Elaeocarpus floribundus* Blume.).*Journal of Pharmacognosy and Phytochemistry*, **6**(5): 608-609, ISSN-2349-8234, **NAAS Rating-5.21**
8. **Bhowmick, N**, Mani, A., Paul, P. K and Prasanna, V.S.S.V. (2017).Physio-chemical properties of Pummelo[*Citrus grandis*(L.) Osbeck] grown under northern parts of West Bengal. *Journal of Plant Development Sciences*, **9**(9):897-900,ISSN: 0974-6382, **NAAS Rating-4.57**
9. **Bhowmick, N.**, Dey, K., Ghosh., A., and Dutta, P. (2017). Efficacy of corn starch for improvement of quality and shelf life of local plum fruits grown under sub-Himalayan Terai region of West Bengal.*International Journal of Chemical Studies*, **5**(5):683-687, ISSN:2321-4902, **NAAS Rating-5.31**
10. **Bhowmick, N.**,Munsu, P. S., Ghosh, S. K., Deb, P., and Ghosh, A. (2017).Growth behavior of pineapple cv. Mauritius under integrated nutrient management in northern part of West Bengal, India.*International Journal of Current Microbiology and Applied Sciences*,**6**(9):2471-2488,ISSN 2319-7692,**NAAS Rating -5.38**
11. Ghosh, A, Dey, K., **Bhowmick, N.**, Ghosh, S. K., Bandyopadhyay, S., Medda, P. S., and Ghosh, A. (2017). Lemon cv. Assam lemon (*Citrus limon*Burm.) quality and soil-leaf nutrient availability affected by different pruning intensities and nutrient management,

Current Science, **112**(10):2051-2065, doi: 10.18520/cs/v112/i10/2051-2065, ISSN: 0011-3891, **NAAS Rating-6.97**

12. Ghosh, A., Dey, K., Bhowmick, N., Medda, P. S., Dey, A. N. and A. Ghosh (2017). Reproductive behaviour of Lemon (*Citrus limon* Burm.) affected by different pruning intensities and integrated nutrient management under various growing seasons. *International Journal of Current Microbiology and Applied Sciences*, **6**(4):606-604, ISSN 2319-7692, **NAAS Rating - 5.38**
13. Dey, K., Ghosh, A., Dey, A. N., Bhowmick, N. (2017). Efficacy of IAA concentration and cutting length on rooting of stem cuttings in *Spondias pinnata* Linn. *Indian Journal of Horticulture*, **74**(1):127-131, DOI:10.5958/0974-0112.2017.00028.7, ISSN:0972-8538, **NAAS Rating -6.13**
- 14.

2. Book Published

1. Deb. P., Bhowmick, N., Munsri, P. S., and Ghosh, S. K. (2017). *Innovative Horticulture: Concepts for sustainable development, recent trends*. Vol-II, New Delhi Publishers. New Delhi, India. ISBN 978-93-8645307-5 (Edited book)

3. Book Chapter

1. Bhowmick, N. and Chakraborty, B. (2017). Burmese grape (*Baccaureasapida* Muell. Arg.). In: *Underutilized Fruit Crops: Importance and Cultivation (Part-I)*, eds Ghosh, S. N., Singh, A and Thakur, A. Jaya Publishing House, Delhi-110095, pp. 21-30 (ISBN 978-93-86110-09-1)

6) EXTENSION PROGRAMME

(a) Training/Demonstration Programme

Sl. No.	Subject	Period	Venue	Organizer	Resource Person
1	Improved production technology on important fruit crops	05.08.2017	Maranaotara 5 th Plan Primary School, Dhangdhingguri, Cooch Behar	District Horticulture Officer, Cooch Behar, Dept. of FPI & Horticulture (Memo no. 194 dt 02.6.2017)	N. Bhowmick

(b) Farmers Advisory Services Regarding Agricultural Tips

Sl. No.	Name and address of the farmers	Problem addressed	Date	Associated Teacher
1	Nanigopal Saha, Parengerpar, Khalisamari, PO-Baganbari, Dist-Alipurduar, Mob-8436241595	Litchi mite and fruit drop of litchi	28.4.2017	N. Bhowmick
2	Abdul Gaffur Mian, Vill-Kalipur, PO-Raichanga, Dist-Alipurduar	Banana nutritional and disease management	03.5.2017	N. Bhowmick

Sl. No.	Name and address of the farmers	Problem addressed	Date	Associated Teacher
3	Milan Biswas, Vill-Bash Dahanati Bari, PO-SajerparGhoramara, Dist-Cooch Behar, Mob-9932831796	Pest problem of pomegranate	16.05.2017	N. Bhowmick
4	AvijitDebnath, Vill+PO-Pestarjhar, Dist-Cooch Behar-736156, Mob-9002625634	Dragon fruit cultivation	26.05.2017	N. Bhowmick
5	Jayanta Barman, Vill-SalkumarSuripara, PO-Sidhabari, Dist-Alipurduar, Mob-9647832639	Concept of different plant propagation	14.07.2017	N. Bhowmick
6	ApurbaPakhadhara, Tufanganj, Gandhipara, PO+PS-Tufanganj, Dist-Cooch Behar, Mob-8759793733	Strawberry cultivation	28.07.2017	N. Bhowmick

7) OTHER ACTIVITIES:

(a) Members of different committee, Assignment, Additional responsibility

Sl. No.	Committee/Assignment	Teacher associated
1.	Member, Faculty Council, Faculty of Horticulture (Ref No. 1126/UBKV/Est(F.C.-Hort.)/31 dt 20.11.2015)	Dr. P. K. Paul & N. Bhowmick
2.	Provost, M. N. Saha Hall (Ref No. 2129/UBKV/Est. (Trans.)/T/NT-40 dt 30.3.17)	N. Bhowmick
3.	Convenor, Faculty Curriculum Committee (Ref No. 2161 dt 18.01.2018)	N. Bhowmick
4.	Member, Accreditation Committee of the University (Convener, College of Horticulture, Information of Individual Colleges) [vide Ref No. 656/UBKV/Est. (Acre.)-170 dt 01.09,2016]	N. Bhowmick
5.	Member, Special Study & Coaching, Pundibari Campus Sub-Cell (Ref No. 388/D-F/Ag-UBKV dt 28.10.16)	N. Bhowmick
6.	Member, Editorial & Publishing Committee, <i>UttorerKrishikatha</i> (Vide Notification No. DEE/UBKV/13-14/58 dt 19.9.2013)	N. Bhowmick
7.	Member, Central Level Committee for Presentation of Teacher –Seminar, Symposium, Training programme (Ref No. 183-D-F/Ag-UBKV)	N. Bhowmick
8.	Member, Task force for Women Empowerment, Nutritional Security and Homestead Intervention of University Adopted Village (Vill-Uttar Chokoakheti, Dist-Alipurduar) [Ref No. VC/UBKV-601 dt 16.02.2015]	N. Bhowmick
9.	Member, Anti Ragging Squad [Ref No. 611/UBKV/Est.(Anti.rag-167) dt 26.7.2017]	N. Bhowmick
10.	Member, Hostel Management Committee (Ref No. Admn/UBKV/243 dt 14.6.2013)	N. Bhowmick
11.	Member, Co-Ordination committee for preparation of Comprehensive Agricultural Development Plan (C-DAP) of Cooch Behar, Alipurduar&Jalpaiguri district (Ref No. UBKV/DR-433 dt 07.02.2018)	N. Bhowmick
12.	Member, RAWE programme for students of College of Agriculture, Majhian, UBKV (Ref No. KVK/COB/17-18/504 dt 15.02.2018)	N. Bhowmick
13.	Member, Accommodation & Transport Committee of UBKV Annual Athletic Meet-2018 held on 09.3.2018 (Ref No. UBKV/DSW-162 dt 13.02.2018)	N. Bhowmick

(b) Act as Resource person in Training/Meeting/Workshop/Interaction

Sl. No.	Subject	Period	Venue	Organizer	Resource Person
1	Exposure visit of a farmer group of Tapan Block	13-14 th July, 2017	Laboratory, Dept. of Pomology and Post Harvest Technology, UBKV, Pundibari, Cooch Behar, W.B.	Assistant Director of Agriculture & convenor of BTT,FIAC, ATMA, Tapan, Dakshin Dinajpur, W.B.	Dr. M. Preema Devi
2	Training on fruit processing of B.Ed. students	18-19 th July, 2017	Laboratory, Dept. of Pomology and Post Harvest Technology, UBKV, Pundibari, Cooch Behar, W.B.	B.Ed. Evening college, Cooch Behar, W.B.	Prof. P. K. Paul Dr. M. Preema Devi

(c) Resource person in Seminar/Symposium/Conference/Workshop

Sl. No.	Subject	Period	Venue	Organizer	Responsibility	Resource Person
1						

(d) Participation in Summer/Winter School/Training:

Sl. No.	Subject	Period	Venue	Organizer	Associated Teacher
1					

(e) Participation in Seminar/Symposium/Conferences/Workshop

Sl. No.	Subject	Period	Venue	Organizer	Title of the Paper presented	Associated Teacher
1	4 th International Conference on Environment and Ecology	12.2.2018 - 14.2.2018	Gauhati University, Assam	International Foundation for Environment & Ecology, Kolkata	Influence of Shoot Pruning & Nutrient Management on Assam Lemon (<i>Citrus limon</i> Burm)-Oral	N. Bhowmick
2	1 st Farm Innovation Congress, 2018 & National Conference on Innovative Farming	12-13.01.2018	Bidhan Chandra KrishiViswa vidyalaya, West Bengal	Society for Advancement of Agricultural Innovation &	Influence of Nutrient Management on Flowering and Fruiting of	N. Bhowmick

Sl. No.	Subject	Period	Venue	Organizer	Title of the Paper presented	Associated Teacher
	for Food and Livelihood Security in Changing Climate			AICRP on Soil Test Crop Response Correlation, BCKV	Pineapple	

8) OTHER ACADEMIC ACTIVITIES:

a) Award

Name of Award/Recognition	Name of Sponsoring Organization	Year	Associate Teacher
Young Scientist of the Year 2017 Award	International Foundation for Environment & Ecology, Kolkata	12-14.2.2018	NileshBhowmick
Best Presentation Award (Oral) for research paper	4 th International Conference on Environment & Ecology, Gauhati University, Assam organized by International Foundation for Environment & Ecology, Kolkata	12-14.2.2018	NileshBhowmick
Best Oral Presentation Award for research paper	1 st Farm Innovation Congress, 2018 & National Conference held at Bidhan Chandra KrishiViswavidyalaya, West Bengal	12-13.01.2018	NileshBhowmick

b) Paper Setter/Moderator/Evaluation of Answer Script

Sl. No.	Name of the Course	University	Associate Teacher
1.	End Term Question paper setter for FSC-222: Breeding of Fruits & Plantation Crops (2+1)	College of Horticulture & Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh (Ref No. CHF/CAU/ACAD/Exam (H)/2016/446 dt 22.5.2017)	NileshBhowmick
2.	End Term Question paper setter for AHT 302	Bihar Agricultural University, Sabour, Bhagalpur (Ref No. 161/Exam.Cell/BAU, Sabourdt 06/10/2017)	NileshBhowmick
3.	End Term Question paper setter for HORT-256: Breeding of Horticultural Crops-I (1+1)	Bidhan Chandra KrishiViswavidyalaya (via email dt 14.01.2017)	NileshBhowmick
4.	End Term Question paper setter for HORT-352: Breeding of Horticultural Crops-II (1+1)	Bidhan Chandra KrishiViswavidyalaya (via email dt 14.01.2017)	NileshBhowmick
5.	Evaluator of End Term Answer scripts for HORT-256: Breeding of Horticultural Crops-I (1+1)	Bidhan Chandra KrishiViswavidyalaya (Ref No. F. Hort/182 dt 07.09.2017)	NileshBhowmick
6.	Evaluator of End Term Answer scripts for HORT-352: Breeding of Horticultural Crops-II (1+1)	Bidhan Chandra KrishiViswavidyalaya (Ref No. F. Hort/182 dt 07.09.2017)	NileshBhowmick
7.	End Term Question Paper Setter for HORT-121: Principles of Horticultural Crops & Plant	Bidhan Chandra KrishiViswavidyalaya (Ref No. FAE/Exam/1704/2017 dt)	NileshBhowmick

Sl. No.	Name of the Course	University	Associate Teacher
	Protection	16.06.2017)	
8.	End Term Question paper setter for FSC-211: Temperate Fruit Crops (1+1)	College of Horticulture, Central Agricultural University, Bermiok, Sikkim (Ref No. CAU/COH-SK/Acad/15-16/6/15 dt 23.11.2017)	NileshBhowmick
9.	Evaluator for Hort. 204: Post Harvest Management of Horticultural Crops I for B.Sc. (Horti)	Bidhan Chandra Krishi Viswavidyalaya [Ref no. F.Hort./503 dt 28.03.17]	Dr. M. Preema Devi
10.	Evaluator for Hort.301: Fundamentals of Food Technology for B.Sc. (Horti)	Bidhan Chandra Krishi Viswavidyalaya [Ref no. F.Hort./503 dt 28.03.17]	Dr. M. Preema Devi
11.	Question Paper setter for APH 301: Post Harvest Management of Horticultural Crops for B.Sc. (Horti)	Bihar Agricultural University [Rf. No. 48/Exam Cell/BAU, Sabour dt 13.04.2017]	Dr. M. Preema Devi

c) Member of the Advisory Committee:

Sl. No.	Name of Student	Course	Department	Associated Teacher
1	Kshouni Das (H-2015-05M)	MSc	Vegetable & Spice Crops	NileshBHowmick
2	Archana. C (H-2015-03 M)	MSc	Plantation Crops & Processing	NileshBhowmick
3	Arijit Singh Sardar (A-2015-02-M)	MSc	Agril Extension	NileshBhowmick
5	Mingma Diki Sherpa (H-2016-07 M)	MSc	Floriculture, Medicinal & Aromatic Plants	Dr. M. Preema Devi
6	Manas Mandal (H-2015-08 M)	MSc	Floriculture, Medicinal & Aromatic Plants	Dr. M. Preema Devi
8	Archana. C (H-2015-03 M)	MSc	Plantation Crops & Processing	Dr. M. Preema Devi

d) Reviewer of Journal

Topic	Name of journal and year	Associated Teacher
Customized foliar nutritive fluids as a function of leaf nutrient effects, crop load and russeting in Gala apples in dry temperate environment	The Indian Journal of Agricultural Sciences (22.7.2017 via email)	NileshBhowmick
Effect of different edible coatings on physical and bio-chemical characteristics and their shelf life of papaya fruits during storage	The Indian Journal of Agricultural Sciences (25.4.2017 via email)	
Efficacy of storage duration and pre-sowing treatments on seed germination, seedling growth and longevity of karonda (<i>Carissa carandas</i> Linn.)	The Indian Journal of Agricultural Sciences (22.7.2017 via email)	NileshBhowmick
Induction of synchronized vegetative growth for	The Indian Journal of	NileshBhowmick

controlling alternate bearing in mango	Agricultural Sciences (20.8.2017 via email)	
Relationship between post veraison temperature and the dynamics of anthocyanin development and berry quality in red wine grape cultivars 'Shiraz' and 'Cabernet Sauvignon'	The Indian Journal of Agricultural Sciences (19.8.2017 via email)	NileshBhowmick
Growth, flowering and fruiting behaviour of different blueberry genotypes under mid hill conditions of HP, India	The Indian Journal of Agricultural Sciences (20.8.2017 via email)	NileshBhowmick
Influence of organic nutrient management practices for Noni (<i>Morindacitrifolia</i>) when grown as intercrop in coconut garden	The Indian Journal of Agricultural Sciences (13.6.2017 via email)	NileshBhowmick
Effect of direct sowing and transplanting on seed yield of Babchi	International Journal of Minor Fruits, Medicinal and Aromatic Plants (14.6.2017)	NileshBhowmick

e) Internal Question Setter

Sl. No.	Paper	Associated Teacher
1.	Preparation of End term Question of PPT 505	Dr.P.K.Paul & Dr. M. Preema Devi
2.	Preparation of End term Question of PPT 506	Dr.P.K.Paul & Dr. M. Preema Devi

f) Evaluator of answer scripts

Sl. No.	Paper	Associated Teacher
1	PPT 152 (Ref No. 634/Exam/UBKV dt04.09.2017)	Dr. N Bhowmick

9) ADDITIONAL RESPONSIBILITIES

(i) Mr. N. Bhowmick

- a) Member, Editorial Board of the International Journal of Minor Fruits, Medicinal & Aromatic Plants
- b) Member, Co-ordinator team of RHWE (Ref No.: UBKV/Hort./1096/2016-17 dt 09-01-2017)
- c) Perform invigilation duty on 15.01.18 (vide Ref. No. 1123/EXAM/UBKV dt10.01.18), 13.11.2017, 29.11.2017 (UBKV/Hort./597 dt 06.11.17)

(ii) Dr. Mutum Preema Devi

- a) Preparation of Question bank for MSc Entrance Test, 2017
- b) Seminar leader for the year 2017-18
- c) Associated teacher at Industrial training program for BSc. (Hort) student, 2017-18
- d) Head Charge [Ref No. UBKV/Hort/PPHT/286, dt. 14.03.18; UBKV/Hort/PPHT/52, dt. 02.06.17; UBKV/Hort/PPHT/29, dt. 12.05.17]
- e) Invigilation duty for UG Mid term exam [Ref No. UBKV/Hort/197, dt. 04.05.17]

- f) Invigilation duty for UG End term exam [Ref No. UBKV/Hort/1294, dt. 15.03.18;
UBKV/Hort/478, dt. 19.07.17; UBKV/Hort/429, dt. 05.07.17]

(iii) **Dr. Aditi Chakraborty**

10) LIFE MEMBERSHIP OF PROFESSIONAL SOCIETIES/JOURNALS

Sl. No.	Name of the Journal/Society	Address	Teacher
1	Society for Advancement of Horticulture (The Horticultural Journal)	B.C.K.V., Mohanpur, Nadia, WB	N. Bhowmick
2	Crop and Weed Science Society (Journal of Crop and Weed)	B.C.K.V., Mohanpur, Nadia, WB	N. Bhowmick
3	Horticulture Society of India (Indian Journal of Horticulture)	I.A.R.I., New Delhi	N. Bhowmick
4	Society Promotion of Horticulture (Journal of Horticultural Science)	I.I.H.R., Bangaluru	N. Bhowmick
5	Indian Society for Plant Physiology (Indian Journal of Plant Physiology)	I.A.R.I., New Delhi	N. Bhowmick
6	Forum of Scientists, Engineers and Technologists (Thought)	Kolkata	N. Bhowmick
7	Fruit Science Society of Bangladesh	Bangladesh Agricultural University, Mymensingh, Bangladesh	N. Bhowmick
8	Cooch Behar Association for Cultivation of Agricultural Sciences (Journal of Agricultural Technology)	U.B.K.V.	Dr. P.K.Paul N. Bhowmick Dr. M. Preema Devi Dr. A Chakraborty
9	Association of Food Scientist and Technologist	CFTRI, Mysore	Dr. M. Preema Devi Dr. P.K.Paul

11) ANNUAL MEMBERSHIP OF PROFESSIONAL SOCIETIES/JOURNALS

Sl. No.	Name of the Journal/Society	Address	Teacher
1	Indian Horticulture	ICAR, New Delhi	Mr. N. Bhowmick

PHOTO GALLERY



Mr. Nitish Chandra Saha conducting propagation practical



Students conducting practical class at laboratory of the Department