

**B.Sc. Horticulture [4-Year, 8- Semester]
CHOICE BASED CREDIT SYSTEM (CBCS)**

**B.Sc. Horticulture
[4-Year, 8- Semester]
CHOICE BASED CREDIT SYSTEM (CBCS)**

Effective from Academic Year 2015-2016

**H.N.B. GARHWAL UNIVERSITY
(A Central University)
Srinagar – Garhwal
Uttarakhand**

DEPARTMENT OF HORTICULTURE
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India-246 174
Course Curriculum for B. Sc. Horticulture, 2015-16 under CBCS Course offered

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester I					
Core					
SOA/HC 101 T	Fundamentals of Geology and Soil Science	100	30	70	2
SOA/HC 101 P	Fundamentals of Geology and Soil Science	100	-	100	1
SOA/HC 102T	Elementary Plant Biochemistry & Biotechnology	100	30	70	2
SOA/HC 102 P	Elementary Plant Biochemistry & Biotechnology	100	-	100	1
SOA/HC 103 T	Principles of Plant Physiology	100	30	70	2
SOA/HC 103 P	Principles of Plant Physiology	100	-	100	1
SOA/HC 104 T	Statistics & Computer Application	100	30	70	2
SOA/HC 104 P	Statistics & Computer Application	100	-	100	1
Ability Enhancement Compulsory Course (AECC)					
SOA/HAECC T 101	Structural Grammar and Spoken English	100	30	70	1
SOA/HAECC P 101	Structural Grammar and Spoken English	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 101 T	Introductory Economics	100	30	70	2
SOA/HE 102 T	Applied Mathematics	100	30	70	2
SOA/HE 103 T	Introductory Biology	100	30	70	1
SOA/HE 103 P	Introductory Biology	100	-	100	1
SOA/HE 104 T	Sericulture	100	30	70	1
SOA/HE 104 P	Sericulture	100	-	100	1
Total Credit to earn in the semester I					
Core	AECC	SEC	Elective	Total	
12	2	-	6	20	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

T- Theory
P-Practical

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester II					
Core					
SOA/HC 105 T	Introductory Microbiology	100	30	70	1
SOA/HC 105 P	Introductory Microbiology	100	-	100	1
SOA/HC 106 T	Principles of Genetics and Cytogenetics	100	30	70	2
SOA/HC 106 P	Principles of Genetics and Cytogenetics	100	-	100	1
SOA/HC 107 T	Apiculture	100	30	70	1
SOA/HC 107 P	Apiculture	100	-	100	1
SOA/HC 108 T	Medicinal and Aromatic Plants	100	30	70	2
SOA/HC 108 P	Medicinal and Aromatic Plants	100	-	100	1
SOA/HC 109 T	Soil Fertility and Nutrient Management	100	30	70	1
SOA/HC 109 P	Soil Fertility and Nutrient Management	100	-	100	1
Ability Enhancement Compulsory Course (AECC)					
SOA/HAECC T 102	Environmental Science	100	30	70	1
SOA/HAECC P 102	Environmental Science	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 105T	Fundamentals of Extension Education	100	30	70	1
SOA/HE 105P	Fundamentals of Extension Education	100	-	100	1
SOA/HE 106T	Fundamentals of Horticulture	100	30	70	1
SOA/HE 106P	Fundamentals of Horticulture	100	-	100	1
SOA/HE 107T	Agrometeorology	100	30	70	1
SOA/HE 107P	Agrometeorology	100	-	100	1
SOA/HE 108T	Introductory Agroforestry	100	30	70	1
SOA/HE 108P	Introductory Agroforestry	100	-	100	1
Total Credit to earn in the semester II					
Core	AECC	SEC	Elective	Total	
12	2	-	6	20	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

T- Theory

P-Practical

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester III					
Core					
SOA/HC 110 T	Tropical and Subtropical Fruits	100	30	70	2
SOA/HC 110 P	Tropical and Subtropical Fruits	100	-	100	1
SOA/HC 111 T	Weed Management in Horticultural Crops	100	30	70	1
SOA/HC 111P	Weed Management in Horticultural Crops	100	-	100	1
SOA/HC 112T	Tropical and Subtropical Vegetables	100	30	70	2
SOA/HC 112P	Tropical and Subtropical Vegetables	100	-	100	1
SOA/HC 113T	Orchard Management	100	30	70	1
SOA/HC 113P	Orchard Management	100	-	100	1
SOA/HC 114T	Principles of Plant Breeding	100	30	70	2
SOA/HC 114P	Principles of Plant Breeding	100	-	100	1
Skill Enhancement Compulsory Course (SEC)					
SOA/HSEC 101 T	Propagation and Nursery Management	100	30	70	1
SOA/HSEC 101 P	Propagation and Nursery Management	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 109T	Fundamentals of Entomology & Nematology	100	30	70	1
SOA/HE 109P	Fundamentals of Entomology & Nematology	100	-	100	1
SOA/HE 110 T	Introduction to Major Field Crops	100	30	70	1
SOA/HE 110 P	Introduction to Major Field Crops	100	-	100	1
SOA/HE 111 T	Fundamentals of Plant Pathology	100	30	70	1
SOA/HE 111 P	Fundamentals of Plant Pathology	100	-	100	1
Total Credit to earn in the semester III					
Core	AECC	SEC	Elective	Total	
13	-	2	6	21	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester IV					
Core					
SOA/HC 115 T	Spices and Condiments	100	30	70	1
SOA/HC 115 P	Spices and Condiments	100	-	100	1
SOA/HC 116 T	Temperate Fruits	100	30	70	2
SOA/HC 116P	Temperate Fruits	100	-	100	1
SOA/HC 117T	Ornamental Horticulture	100	30	70	2
SOA/HC 117P	Ornamental Horticulture	100	-	100	1
SOA/HC 118T	Water Management in Horticultural Crops	100	30	70	1
SOA/HC 118P	Water Management in Horticultural Crops	100	-	100	1
SOA/HC 119T	Plantation Crops	100	30	70	2
SOA/HC 119P	Plantation Crops	100	-	100	1
Skill Enhancement Compulsory Course (SEC)					
SOA/HSEC 102 T	Organic Farming	100	30	70	1
SOA/HSEC 102 P	Organic Farming	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 112T	Breeding of Fruits and Plantation Crops	100	30	70	1
SOA/HE 112P	Breeding of Fruits and Plantation Crops	100	-	100	1
SOA/HE 113 T	Growth and Development of Horticultural Crops	100	30	70	1
SOA/HE 113 P	Growth and Development of Horticultural Crops	100	-	100	1
SOA/HE 114 T	Genetic Resources of Horticultural Crops	100	30	70	1
SOA/HE 114P	Genetic Resources of Horticultural Crops	100	-	100	1
Total Credit to earn in the semester IV					
Core	AECC	SEC	Elective	Total	
13	-	2	6	21	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester V					
Core					
SOA/HC 120 T	Temperate Vegetables	100	30	70	2
SOA/HC 120 P	Temperate Vegetables	100	-	100	1
SOA/HC 121 T	Principles of Landscape Gardening	100	30	70	1
SOA/HC 121P	Principles of Landscape Gardening	100	-	100	1
SOA/HC 122T	Farm Power and Machinery	100	30	70	1
SOA/HC 122P	Farm Power and Machinery	100	-	100	1
SOA/HC 123T	Diseases of Fruit, Plantation, Medicinal and Aromatic Crops	100	30	70	2
SOA/HC 123P	Diseases of Fruit, Plantation, Medicinal and Aromatic Crops	100	-	100	1
SOA/HC 124T	Insect Pests of Fruit, Plantation, Medicinal & Aromatic Crops	100	30	70	2
SOA/HC 124P	Insect Pests of Fruit, Plantation, Medicinal & Aromatic Crops	100	-	100	1
Skill Enhancement Compulsory Course (SEC)					
SOA/HSEC 103 T	Communication Skills & Entrepreneurship Development	100	30	70	1
SOA/HSEC 103 P	Communication Skills & Entrepreneurship Development	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 115T	Soil and Plant Analysis	100	30	70	1
SOA/HE 115P	Soil and Plant Analysis	100	-	100	1
SOA/HE 116 T	Mushroom Culture	100	30	70	1
SOA/HE 116 P	Mushroom Culture	100	-	100	1
SOA/HE 117 T	Fundamentals of Food Technology	100	30	70	1
SOA/HE 117P	Fundamentals of Food Technology	100	-	100	1
Total Credit to earn in the semester V					
Core	AECC	SEC	Elective	Total	
13	-	2	6	21	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester VI					
Core					
SOA/HC 125 T	Potato and Tuber crops	100	30	70	1
SOA/HC 125 P	Potato and Tuber crops	100	-	100	1
SOA/HC 126 T	Breeding of Vegetable, Tuber and Spice Crops	100	30	70	2
SOA/HC 126P	Breeding of Vegetable, Tuber and Spice Crops	100	-	100	1
SOA/HC 127T	Post harvest Management of Horticultural Crops	100	30	70	2
SOA/HC 127P	Post harvest Management of Horticultural Crops	100	-	100	1
SOA/HC 128T	Seed production of Vegetable, tuber and Spice Crops	100	30	70	2
SOA/HC 128P	Seed production of Vegetable, tuber and Spice Crops	100	-	100	1
SOA/HC 129T	Insect Pests of Vegetable, Ornamental and Spice Crops	100	30	70	2
SOA/HC 129P	Insect Pests of Vegetable, Ornamental and Spice Crops	100	-	100	1
Skill Enhancement Compulsory Course (SEC)					
SOA/HSEC 104 T	Commercial Floriculture	100	30	70	1
SOA/HSEC 104 P	Commercial Floriculture	100	-	100	1
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 118T	Breeding and Seed Production of Ornamental Plants	100	30	70	1
SOA/HE 118P	Breeding and Seed Production of Ornamental Plants	100	-	100	1
SOA/HE 119 T	Diseases of Vegetable, Ornamentals and Spice Crops	100	30	70	1
SOA/HE 119 P	Diseases of Vegetable, Ornamentals and Spice Crops	100	-	100	1
SOA/HE 120 T	Protected Horticulture	100	30	70	1
SOA/HE 120P	Protected Horticulture	100	-	100	1
Total Credit to earn in the semester VI					
Core	AECC	SEC	Elective	Total	
14	-	2	6	22	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester VII					
Core					
SOA/HC 130 T	Processing of Horticultural Crops	100	30	70	2
SOA/HC 130 P	Processing of Horticultural Crops	100	-	100	1
SOA/HC 131 T	Protected Cultivation of High Value Horticultural Crops I. Project preparation	100	30	70	3
SOA/HC 132T	Nursery Production and Management I. Project preparation	100	30	70	3
Skill Enhancement Compulsory Course (SEC)					
SOA/HSEC 105 T	Horti-Business Management	100	30	70	2
Elective					
Student has to earn 6 credits from the electives. Student can choose any elective from same department or other department of School of Agriculture & Allied Sciences.					
SOA/HE 121P	Protected Cultivation of High Value Horticultural Crops II. Report writing, presentation and discussion.	100	-	100	6
SOA/HE 122P	Nursery Production and Management II. Report writing, presentation and discussion.	100	-	100	6
Total Credit to earn in the semester VII					
Core	AECC	SEC	Elective	Total	
09	-	2	6	17	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

Course no.	Paper Title	Total marks	Theory marks		Credits
			Internal	External	
Semester VIII					
Core					
SOA/HC 132 T	Horticultural Work Experience(HWE) I. Project preparation	100	30	70	6
SOA/HC 133 P	Horticultural Work Experience(HWE) II. Field Work	100	-	100	6
SOA/HC 134 T	Horticultural Work Experience(HWE) III. Report writing, presentation and discussion	100	30	70	6
Total Credit to earn in the semester VIII					
Core	AECC	SEC	Elective	Total	
18	-	-	-	18	

Theory and practical are linked to each other.

In Theory, One credit = 1 hr

In practical, One credit= 3 hrs

T- Theory

P- Practical

Summary of credits:

Semester	Core	AECC	SEC	Elective	TOTAL
I	12	2	-	6	20
II	12	2	-	6	20
III	13	-	2	6	21
IV	13	-	2	6	21
V	13	-	2	6	21
VI	14	-	2	6	22
VII	09	-	2	6	17
VIII	18	-	-	-	18
TOTAL	104	4	10	42	160

Note: Practicals in affiliated colleges/ institute shall be conducted by the university appointed examiner.

Semester I

SOA/HC 101 T: Fundamentals of Geology and Soil Science (2)

Composition of earth's crust, soil as a natural body major components by volume pedology rocktypes Igneous sedimentary and metamorphic classification soil forming minerals. Definition classification – silicates, oxides, carbonates, sulphides, phosphates occurrence. Weathering of rocks and minerals, weathering factors: physical, chemical, biological agents involved, weathering indices, factors of soil formation, land forms parent, material climate organism, relief time soil forming processes eluviations and illuviation formation of various soils. Problem soils: salted soils, permeable, flooded, sandy soils properties. Physical parameters texture definition methods of textural analysis textural classes, absolute specific gravity definition apparent specific gravity/bulk density factors influencing field bulk density. Relation between BD, PD Practical Problem. Pore space definition, factors affecting capillary and noncapillary porosity, soil colour definition, its significance, colour variable hue, value, chroma, Munsell colour chart, factors influencing parent material soil moisture organic matter, soil structure, types of structure, factors influencing genesis of soil structure. Soil air air composition, amount of air space, soil air renewal, soil temperature sources and distribution of heat, chemical properties humus inorganic secondary silicate clay hydrous oxides. Soil organic matter decomposition, pH nutrient availability, soil buffering capacity, soil water forms, hygroscopic, capillary and gravitational, soil moisture constants, hygroscopic coefficient, wilting point, field capacity, moisture equivalent, maximum water holding capacity, energy concepts, pF scale measurement- gravimetric, electric and tensiometer methods. Soil water movement, saturated and unsaturated infiltration and percolation. Soils of different eco-systems and their properties.

SOA/HC 101 P: Fundamentals of Geology and Soil Science (1)

Identification of rocks and minerals; Collection and preparation of soil samples; Soil analyses for moisture, colour, bulk density, organic matter, pH, EC; Textural analysis by hydrometer method; Study of soil profile I & II; Excursion tour for identification of rocks and minerals and profile studies; Practical introduction to Tensiometer, pressure plate and neutron probe etc.

SOA/HC 102 T: Elementary Plant Biochemistry and Biotechnology (2)

Biochemistry: Carbohydrates-occurrence and classification-structures of glucose, fructose, ribose, maltose, lactose, starch and cellulose, physical and chemical properties of carbohydrates-isomerism, optical activity, reducing property, reaction with acids and alkalis- osazone formation. Lipids classification- important fatty acids and triglycerides, essential fatty acids -rancidity of oils acids value, saponification value & iodine value -phospholipids- types and importance-plant pigments structure and function of chlorophyll and carotenoids- sterols-basic structure. Protein - classification - functional and solubility - amino acids- classification and structure essential amino acids - properties of amino acids-colour reactions, amphoteric nature and isomerism-structure of proteins – primary, secondary, tertiary and quaternary properties and reactions of proteins. Enzymes-classification and mechanism of action-factors affecting enzyme action-cofactors and coenzymes - vitamins and mineral as coenzymes/cofactors .Carbohydrate -metabolism of lipids - lipases and phospholipases-fatty acid oxidation. Biosynthesis of fatty acids, protein metabolism proteolytic enzyme.

Biotechnology: Structure and component of nucleic acids, replication, transcription and translation. Historical developments in bio-technology. Application of plant tissue culture in plant improvement Micropropagation: Principales and application in forestry trees and medicinal plants; meristem culture; plant cell and suspension cultures; organogenesis and regeneration in vitro and somaclonal variations; genetic engineering techniques; transgenic

plants with case studies of tree species to diseases, production of secondary metabolites; germplasm conservation; An introduction to bioinformatics, genomics and proteomics, biodegradation of forestry wastes through genetically engineered microbes.

SOA/HC 102 P: Elementary Plant Biochemistry and Biotechnology (1)

Preparation of standard solutions and reagents – carbohydrates – qualitative reactions, estimation of starch, reducing and non-reducing sugars-reactions of proteins and amino acids-estimation of proteins by Lowry method – determination of acid value, saponification value, iodine number of vegetable oils-vitamins-estimation of ascorbic acids paper and thin layer chromatography. Sterilization techniques; preparation of culture medium for establishment of explants of horticultural plants, multiplication of shoots, induction of roots; meristem culturing; callus cultures, induction of organogenesis;

SOA/HC 103 T: Principles of Plant Physiology (2)

Water relations in plants: role of water in plant metabolism, osmosis, imbibition, diffusion, water potential and its components, absorption of water, mechanisms of absorption, ascent of sap. Stomata, structure, distribution, classification, mechanisms of opening and closing of stomata, guttation, transpiration, factors affecting transpiration. Different types of stresses: water, heat and cold tolerance, mechanism of tolerance. Plant nutrition: essentiality, mechanism of absorption, role in plant metabolism, Photosynthesis, importance of photosynthesis, Structure and function of chloroplast, dark and light reactions, CO₂ fixation, C₃, C₄ and CAM, advantages of C₄ pathway, photorespiration and its implications. Factors affecting the photosynthesis. Respiration, glycolysis, TCA cycle and Electron transport chain, ATP synthesis and factors affecting the respiration. . Photohormones, physiological role in controlling plant process.

SOA/HC 103 P: Principles of Plant Physiology (1)

Measurement of water potential by different methods, Osmosis – demonstration, Plasmolysis – demonstration, Root pressure – demonstration, Transpiration rate, Studying the structure of stomata, studying the opening and closing of stomata, Demonstration of importance of light in photosynthesis, Separation of xanthophyll, Chlorophyll in plants, Studying the activity of catalase, Detection of phenols in plants, Studying the plant movements, Root initiation in cuttings.

SOA/HC 104 T: Statistics & Computer Application (2)

Basic concepts: Variable statistics, types and sources of data, classification and tabulation of data, construction of frequency distribution, tables, graphic representation of data, simple, multiple component and percentage, bar diagram, pie diagram, histogram, frequency polygon and frequency curve. Average and measures of location, mean, mode, median, geometric mean, harmonic mean, percentiles and quadriles, for raw and grouped data. Dispersion: Range, standard deviation, variance, coefficient of variation for raw and grouped data.

Probability: Basic concept, additive and multiplicative laws. Theoretical distributions, binominal, poison and normal distributions. Correlation: Scatter diagram, correlation coefficient and its properties, regression, fitting of simple linear regression. Test of significance: Basic concepts, Test of equality of one mean, Chi-square test for application of attributes and test for goodness of fit. Computer application: Introduction to computers and personal computers, basic concepts, hardware and software, input and output devices, operating system, Windows, MS Office , MS word, MS Power point, MS Excel.

SOA/HC 104 P: Statistics & Computer Application (1)

Variables and source of data, Construction of frequency distribution table, Bar chart-simple, multiple, component and percentage bar charts, Pie chart, histogram, polygon, frequency curve. Mean, Median and mode for raw and grouped data, range, standard deviation, variance and coefficient of variation for raw and grouped data.

Probability and additive and multiplicative laws, normal distribution and properties. 't' test for independent test, chi-square test for contingency tables and theoretical ratios. Correlation and Linear regression.

MS Office- Word, Excel, Power Point.

SOA/HE 101 T: Introductory Economics (2)

Nature and scope of economics, definition and concepts, divisions of economics, economic systems, approaches to the study of economics. Consumption – theory of consumer behaviour, laws of consumption, classification of goods. Wants – their characteristics and classification, utility and its measurement, cardinal and ordinal, law of diminishing marginal utility, law of equi-marginal utility, indifference curve and its properties, consumer equilibrium. Theory of demand, demand schedule and curve, market demand. Price, income and cross elasticities, Engil' s law of family expenditure – consumer' s surplus. Theory of firm, factors of production – land and its characteristics, labour and division of labour, theories of population. Capital and its characteristics – classification and capital formation. Enterprises – forms of business organization – merits and demerits. Laws of return – law of diminishing marginal return – cost concepts. Law of supply – supply schedule and curve elasticities. Market equilibrium, distribution – theories of rent, wage, interest and profit. Price determination and forecasting under various market structures.

SOA/HE 102 T: Applied Mathematics (2)

General Concepts; Elementary ideas of complex number; Arithmetic and geometric progression.

Elementary idea of permutation and combinations; Binomial theorem for positive integral index, any index and their applications, addition and subtraction formulae; Elementary idea of probability theory. Basic trigonometry, Trigonometric A, B and C, D formulae. Inverse Trigonometric functions. Elementary differentiation and integration.

Introduction to matrices and determinants, special type of matrices, addition, subtraction and multiplication of matrices. Inverse of a matrix solution of system of linear equations using Cramer's rule and matrices method.

SOA/HE 103 T: Introductory Biology (1)

Introduction to the living world and classification of plant kingdom, binomial Nomenclature; characteristics of algae, fungi, bryophyte, pteridophyta; angiosperms and gymnosperms-structure and functions. Morphology and important modification of root, stem and leaf, inflorescence, flower and fruit, seed structure and germination; cytology and histology (plant cell and tissues, internal structure of dicot and monocot plants).

General classification of animal kingdom; characteristics of major groups of Non-chordata and chordata; cell structure and function- cell as unit of life, prokaryotes, eukaryotes, cell organelles; cell division- mitosis, meiosis; origin of life and an elementary knowledge of animal evolution; histology of gut, liver, kidney, ovary, testis and skeletal system of rabbit; physiology of digestion, respiration, circulation, excretion, coordination, endocrine and

reproductive system; economic importance of animals in Forestry/Agriculture.

SOA/HE 103 P: Introductory Biology (1)

Important characters of algae, fungi, bryophytes, pteridophytes and gymnosperms; morphology of flowering plants and their parts i.e. root, stem and leaf modification, inflorescence and flowers; internal morphology (anatomy) of root, stem and leaf of both dicot and monocots; study of some important specimens from protozoa to mammals; skeleton of rabbit; study of slides of gut, liver, kidney, ovary and testis of rabbit.

SOA/HE 104 T: Sericulture (1)

Importance and history of sericulture, future scope, mulberry cultivation geographical distribution, species and varieties, classification, climate, nursery and propagation, field preparation, planting methods, irrigation, manuring, pruning and training, insect pests and diseases and their management, types of silk worms, morphology and life cycle, rearing appliances and methods, maintenance of sericulture units, egg production techniques and post cocoon technology, pests and diseases of silk moth, properties of silk, uses. Economics of sericulture. Recent trends in sericulture. Biology and behaviour of lac insect, host plants, lac cultivation, manufacture of shellac and its uses.

SOA/HE 104 P: Sericulture (1)

Mulberry- morphology and cultivation; anatomy and biology of silk worm, rearing appliance and method of rearing, enemies and disease of silk worm, visit to a silk worm rearing and silk reeling unit, economics of sericulture.

SOA/HA ECC 101 T: Structural Grammar and Spoken English (1)

Introduction to word classes; structure of the verb in English. Uses of tenses. Study of voice. Use of conjunctions and prepositions. Sentence patterns in English. Spoken English: conversations of different situations in everyday life. The concept of stress, stress shift in words and sentences. Words with silent letters and their pronunciations. The basic intonation patterns.

SOA/HA ECC 101 P: Structural Grammar and Spoken English (1)

Exercises in word classes. Study of verb patterns. Use of tenses and voice. Exercises in the use of conjunctions and prepositions. Exercises in sentence patterns. Writing reports on topics relating to horticulture/forestry, using active and passive sentences. (i) conversations related to everyday situations, (ii) selection and practice of conversations for the study of the concept of stress, stress shift, silent letters in words and basic intonation patterns. Mostly focused on spoken and writing English skill development.

Semester II

SOA/HC 105 T: Introductory Microbiology (1)

History and Scope of Microbiology: The discovery of micro-organism, spontaneous generation conflict, germ theory of diseases, microbial effect on organic and inorganic matter. Development of microbiology in India and composition of microbial world. Microscopy and Specimen Preparation: The bright field microscope, fixation, dyes and simple staining, differential staining. Difference between prokaryotic and eucaryotic cells. Prokaryotic cell structure and functions. Types of culture media and pre-culture techniques. Microbial growth in models of bacterial, yeast and mycelial growth curve. Measurement of bacterial growth. General properties of viruses and brief description of bacteriophages. General principle of

bacterial genetics, DNA as genetic material. Antibiosis, symbiosis, intramicrobial and extra-microbial association.

SOA/HC 105 P: Introductory Microbiology (1)

Examination of natural infusion and living bacteria; examination of stained cells by simple staining and Gram staining. Methods for sterilization and nutrient agar preparation. Broth culture, agar slopes, streak plates and pour plates, turbidometric estimation of microbial growth.

SOA/HC 106 T: Principles of Genetics and Cytogenetics (2)

Historical background of genetics, theories and hypothesis. Physical basis of heredity, cell reproduction, mitosis, meiosis and its significance. Gametogenesis and syngamy in plants. Mendelian genetics–Mendel's principles of heredity, deviation from Mendelian inheritance, pleiotropy, threshold characters, co-dominance, penetrance and expressivity. Chromosome theory of inheritance, gene interaction. Modification of monohybrid and dihybrid ratios. Multiple alleles, quantitative inheritance linkage and crossing over, sex linked inheritance and characters. Cytoplasmic inheritance and maternal effects. Chemical basis of heredity, structure of DNA and its replication. Evidence to prove DNA and RNA – as genetic material. Mutations and their classification. Chromosomal aberrations, changes in chromosome structure and number.

SOA/HC 106 P: Principles of Genetics and Cytogenetics (1)

Study of fixatives and stains; Preparation of slides showing various stages of mitosis; Preparation of slides showing various stages of meiosis; Testing the viability and germination of pollen grains; Solving the problems on monohybrid and dihybrid crosses; Estimation of linkages/ chromosome mapping. Problem solving on Mendelian principles.

SOA/HC 107 T: Apiculture (1)

Importance and history of apiculture, different species of bees, morphology, anatomy, colony organization and life cycle, bee-keeping equipment, social behaviour, reproduction, queen rearing, bee pasturage, seasonal management, economics of beekeeping. Bee enemies, diseases of bees, role of bees in increasing the productivity of horticultural crops in India economy, bee products and their uses. Recent trends in apiculture.

SOA/HC 107 P: Apiculture (1)

Acquaintance with honey bee species, morphology, structural adaptation, biology-castes-bee-keeping equipment, bee forage plants. Collection and preservation of bee flora, enemies and diseases of bees. Handling of bee colonies and manipulation for honey production.

SOA/HC 108 T: Medicinal and Aromatic Crops (2)

History, scope, opportunities and constraints in the cultivation and utilisation of medicinal and aromatic plants in India. Importance, origin, distribution, production, climatic and soil requirements, propagation and nursery techniques, planting and aftercare, training, Therapeutic and pharmaceutical uses and pruning, nutritional and water requirements, plant protection, harvesting, processing, and economics of under mentioned important medicinal and aromatic plants. Medicinal Plants : pepper, cardamom, clove, ginger, turmeric, betelvine, periwinkle, Rauvolfia, Dioscorea, isabgol, Ammi majus, belladonna, Cinchona, pyrethrum and other species relevant to local conditions.

Aromatic Plants : Citronella grass, khus grass, sweet flag (bach), lavender, geranium, patchouli, bursera, Mentha, muskdana (musk mallow), Ocimum and other species relevant to the local conditions. Endangered medicinal and aromatic plants of India and their conservation. Study of chemical composition of a few important medicinal and aromatic

plants, their extraction and use. Therapeutic and pharmaceutical uses of important species.

SOA/HC 108 P: Medicinal and Aromatic Crops (1)

Morphological description and identification of various medicinal plants. Collection of medicinal plants and plant parts from natural habitats. Survey and study of nursery techniques including training and pruning of medicinal plants. Harvesting, drying, grading, storage and processing techniques. Study of plant parts used in drug making. Visit to a nearby medicinal and aromatic plantation area /nursery /ayurvedic pharmacies /pharmaceutical industries.

SOA/HC 109 T: Soil Fertility and Nutrient Management (1)

Introduction to soil fertility and productivity- factors affecting. Essential plant nutrient elements- functions, deficiency systems, transformations and availability. Acid, calcareous and salt affected soils –characteristics and management. Role of microorganisms in organic matter-decomposition – humus formation. Importance of C:N ratio and pH in plant nutrition. Integrated plant nutrient management. Soil fertility evaluation methods, critical limits of plant nutrient elements and hunger signs. NPK fertilizers: composition and application methodology, luxury consumption, nutrient interactions, deficiency symptoms, visual diagnosis.

SOA/HC 109 P: Soil Fertility and Nutrient Management (1)

Analysis of soil for organic matter, available N,P,K and Micronutrients and interpretations. Gypsum requirement of saline and alkali soils. Lime requirement of acid soils.

SOA/HE 105 T: Fundamentals of Extension Education (1)

Extension education: meaning, definition, nature, scope, objectives, principles, approaches and history. Forestry extension: process, principles and selected programmes of leading national and international forest institutes. People's participation in forestry programmes. Motivation of women community, children, youth and voluntary organizations for forestry extension work. Rural Development: meaning, definition, objectives and genesis. Transfer of technology programmes like lab to land programme (LLP) national demonstration (ND), front line demonstration (FLD) Krishi Vigyan Kendras (KVK), Technology Assessment and Refinement Programme (TARP) etc. of ICAR. Communication: meaning, definition, elements and selected models. Audio – visual aids: importance, classification and selection. Programming planning process – meaning, scope, principles and steps. Evaluation: meaning, importance and methods. Scope and importance of Participatory Rural Appraisal (PRA) & Rapid Rural Appraisal (RRA). Management and administration: meaning, definition, principles and functions. Concepts of human resource development (HRD), rural leadership.

SOA/HE 105 P: Fundamentals of Extension Education (1)

Visits to study structure, functions, linkages and extension programmes of ICFRE institutes/voluntary organizations/Mahila Mandal, Village Panchayat, State Deptt. Of Forests/All India Radio (AIR). Exercises on distortion of message, script writing for farm broadcasts and telecasts, planning, preparation & use of NPVA like poster, chart, flash cards, folders etc. and AVA like OHP & 35 mm slide projector transparencies. Identification of local leaders to study their role in extension work. Evaluation of some selected case studies of forestry extension programmes. Preparation of Village Agricultural productions plan.

SOA/HE 106 T: Fundamentals of Horticulture (1)

Economic importance and classification of horticultural crops and their culture and nutritive value, area and production, exports and imports, fruit and vegetable zones of India and of different states, nursery management practices, soil and climate, vegetable gardens, nutrition and kitchen garden and other types of gardens – principles, planning and layout, management of orchards, planting systems and planting densities. Production and practices for fruit, vegetable and floriculture crops, nursery techniques and their management. Principles and methods of pruning and training of fruit crops, types and use of growth regulators in horticulture, water management, weed management, fertility management in horticultural crops, cropping systems, intercropping, multi-tier cropping, mulching, bearing habits, factors influencing the fruitfulness and unfruitfulness. Rejuvenation of old orchards, top working, frame working, principles of organic farming.

SOA/HE 106 P: Fundamentals of Horticulture (1)

Features of orchard, planning and layout of orchard, tools and implements, layout of nutrition garden, preparation of nursery beds for sowing of vegetable seeds, digging of pits for fruit plants, planting systems, training and pruning of orchard trees, preparation of fertilizer mixtures and field application, preparation and application of growth regulators, layout of different irrigation systems, identification and management of nutritional disorder in fruits and vegetables, assessment of bearing habits, maturity standards, harvesting, grading, packaging and storage.

SOA/HE 107 T: Agrometeorology (1)

Agrometeorology-definition, aim and scope. Factors and elements of weather and climate. Composition and structure of atmosphere. Air and soil temperature regimes, atmospheric humidity, types of clouds and precipitation, hails and frost. Cyclones, anticyclones and thunderstorms. Solar radiations-components and effect on plant growth. Wind as a source of energy. Effect of weather and climate on the growth and development of crops. Climatic normals for crops. Agroclimatic zones of India and Himachal Pradesh. Evaporation and transpiration. Use of remote sensing techniques in agrometeorology. Agriculture weather forecasting.

SOA/HE 107 P: Agrometeorology (1)

Study of temperature instruments, pressure instruments, humidity instruments, wind instruments, rain instruments and wind rose. Solar radiation instruments with pyranometer. Monthly variation of rainfall at Nauni. Lay out of an agromet observatory and types. Measurement of wind and evaporation. Measurement of sunshine hours. Measurement of soil temperature and dew.

SOA/HE 108 T: Introductory Agroforestry (1)

Agroforestry – definition, objectives and potential. Distinction between agroforestry and social forestry. Status of Indian forests and role in India farming systems. Agroforestry system, sub-system and practice: agri-silviculture, silvipastoral, horti-silviculture, hortisilvipastoral, shifting cultivation, taungya, home gardens, alley cropping, intercropping, wind breaks, shelterbelts and energy plantations. Planning for agroforestry – constraints, diagnosis and design methodology, selection of tree crop species for agro-forestry. Agroforestry projects – national, overseas, MPTS – their management practices, economics of cultivation – nursery and planting (*Acacia catechu*, *Dalbergia sissoo*, *Tectona*, *Populus*, *Morus*, *Grewia*, *Eucalyptus*, *Quercus* spp. and bamboo, tamarind, neem etc.)

SOA/HE 108 P: Introductory Agroforestry (1)

Identification and seeds and seedlings of multipurpose tree species. Nursery practices for poplar, *Grewia optiva*, *Morus alba*, *Acacia catechu*, *Dalbergia sissoo*, robinia, leucaena etc. Visit to agro-forestry fields to study the compatibility of MPTS with agricultural crops: silvipastoral, alley cropping, horti-silviculture, agro-silvipasture, fuel and fodder blocks. Visit to social forestry plantations – railway line plantations, canal plantations, roadside plantations, industrial plantations and shelterbelts. Rapid assessment of farmers needs for green manure, fodder, fuel wood in selected villages. Economics and marketing of products raised in agro-forestry systems.

SOA/HAECC 102 T: Environmental Science (1)

Environment: introduction, definition and importance. Components of environment - interactions with organisms. Global and Indian environment - past and present status. Environmental pollution and pollutants. Air, water, food, soil, noise pollution - sources, causes and types. Smog, acid rain, global warming, ozone hole, eutrophication, sewage and hazardous waste management. Impact of different pollutions on humans, organisms and environment. Introduction to biological magnification of toxins. Deforestation - forms and causes, relation to environment. Prevention and control of pollution - technological and sociological measures and solutions - Indian and global efforts. India, international and voluntary agencies for environmental conservation - mandates and activities. International conferences, conventions and summits - major achievements. Environmental policy and legislation in India. Introduction to environmental impact assessment. Causes of environmental degradation - socio-economic factors. Human population growth and lifestyle.

SOA/HAECC 102 P: Environmental Science (1)

Visit to local areas - river/forest/ grassland/catchment etc. to document components of ecosystem. Study of common plants, insects, birds and animals. Visit to industries to study pollution abatement techniques.

Semester III**SOA/HC 110 T : Tropical and Sub-Tropical Fruits (2)**

Horticultural classification of fruits including genome classification. Horticultural zones of India, detailed study of area, production and export potential, varieties, climate and soil requirements, propagation techniques, planting density and systems, after care, training and pruning. Management of water, nutrient and weeds, special horticultural techniques including plant growth regulators, their solution preparation and use in commercial orchards. Physiological disorders. Post-harvest technology, harvest indices, harvesting methods, grading, packaging and storage of the following crops. Mango, banana, bael, banana, grapes, citrus, papaya, sapota, guava, pineapple, jackfruit, avocado, mangosteen, litchi, carambola, durian and passion fruit. Bearing in mango and citrus, causes and control measures of special production problems, alternate and irregular bearing overcome, control measures. Seediness and kokkan disease in banana, citrus decline and casual factors and their management. Bud forecasting in grapes, sex expression and seed production in papaya, latex extraction and crude papain production, economic of production. Rainfed horticulture, importance and scope of arid and semi-arid zones of India. Characters and special adaptation of crops: ber, aonla, annona, jamun, wood apple, bael, pomegranate, carissa, date palm, phalsa, fig, west Indian cherry and tamarind.

SOA/HC 110 P: Tropical and Sub-Tropical Fruits (1)

Description and identification of varieties based on flower and fruit morphology in above crops. Training and pruning of grapes, mango, guava and citrus. Selection of site and planting system, pre-treatment of banana suckers, desuckering in banana, sex forms in papaya. Use of plastics in fruit production. Visit to commercial orchards and diagnosis of maladies. Manure and fertilizer application including bio-fertilizer in fruit crops, preparation and application of growth regulators in banana, grapes and mango. Seed production in papaya, latex extraction and preparation of crude papain. Ripening of fruits, grading and packaging, production economics for tropical and sub-tropical fruits. Mapping of arid and semi-arid zones of India. Botanical description and identification of ber, fig, jamun, pomegranate, carissa, phalsa, wood apple, West Indian cherry, tamarind, aonla, bael and annona.

SOA/HC 111 T: Weed Management in Horticultural Crops (1)

Weeds: Introduction, harmful and beneficial effects, classification, propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy Concepts of weed prevention, control and eradication; Methods of weed control: physical, cultural, chemical and biological methods. Integrated weed management; Herbicides: advantages and limitation of herbicide usage in India, Herbicide classification, formulations, methods of application; Introduction to Adjuvants and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control.

SOA/HC 111 P: Weed Management in Horticultural Crops (1)

Identification of weeds; Survey of weeds in crop fields and other habitats; Preparation of herbarium of weeds; Calculations on weed control efficiency and weed index; Herbicide label information; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Preparation of list of commonly available herbicides; Study of phytotoxicity symptoms of herbicides in different crops; Biology of nut sedge, bermuda grass, parthenium and celosia; Economics of weed control practices; Tours and visits of problem areas.

SOA/HC 112 T: Tropical and Sub-Tropical Vegetables (2)

Area, production, economic importance and export potential of tropical and sub-tropical vegetable crops. Description of varieties and hybrid, climate and soil requirements, seed rate, preparation of field, nursery practices; transplanting of vegetable crops and planting for directly sown/transplanted vegetable crops. Spacing, planting systems, water and weed management; nutrient management and deficiencies, use of chemicals and growth regulators. Cropping systems, harvest, yield and seed production. Economic of cultivation of tropical and sub-tropical vegetable crops; post-harvest handling and storage. Marketing of tomato, brinjal, chillies, okra, amaranthus, cluster beans, cowpea, lab-lab, snap bean, cucurbits, moringa, curry leaf, portulaca and basella.

SOA/HC 112 P: Tropical and Sub-Tropical Vegetables (1)

Identification and description of tropical and sub-tropical vegetable crops; nursery practices and transplanting, preparation of field and sowing/planting for direct sown and planted vegetable crops. Herbicide use in vegetable culture; top dressing of fertilizers and intercultural; use of growth regulators; identification of nutrient deficiencies. Physiological disorder. Harvest indices and maturity standards, post-harvest handling and storage, marketing, seed extraction (cost of cultivation for tropical and sub-tropical vegetable crops), project preparation for commercial cultivation.

SOA/HC 113 T : Orchard Management (1)

Orchard management, importance, objectives, merits and demerits, clean cultivation, sod culture, Sod mulch, herbicides and inorganic and organic mulches. Tropical, sub-tropical and temperate horticultural systems, competitive and complimentary effect of root and shoot systems. Biological efficiency of cropping systems in horticulture, systems of irrigation. Soil management in relation to nutrient and water uptake and their effect on soil environment, moisture, organisms and soil properties. Integrated nutrient and pest management. Utilization of resources constraints in existing systems. Crop model and crop regulation in relation to cropping systems.

SOA/HC 113 P: Orchard Management (1)

Layout of different systems of orchard soil management, clean, inter, cover and mixed cropping, fillers. Use of mulch materials, organic and inorganic, moisture conservation, weed control. Layout of various irrigation systems.

SOA/HC 114 T: Principles of Plant Breeding (2)

Plant breeding as a dynamic science, genetic basis of Plant Breeding – classical, quantitative and molecular, Plant Breeding in India – limitations, major achievements, goal setting for future. Sexual reproduction (cross and self pollination), asexual reproduction, pollination control mechanism (incompatibility and sterility and implications of reproductive systems on population structure). Genetic components of polygenic variation and breeding strategies, selection as a basis of crop breeding. Hybridization and selection – goals of hybridization, selection of plants; population developed by hybridization – simple crosses, bulk crosses and complex crosses. General and special breeding techniques. Heterosis – concepts, estimation and its genetic basis.

SOA/HC 114 P: Principles of Plant Breeding (1)

Breeding objectives and techniques in major field crop plants. Floral biology – its measurement, emasculation, crossing and selfing techniques in major crops. Determination of mode of reproduction in crop plants, handling of breeding material and maintenance of experimental records in self and cross pollinated crops. Demonstration of hybrid variation and production techniques.

SOA/HE 109 T: Fundamentals of Entomology & Nematology (1)

Introduction to phylum arthropoda. Importance of class Insecta. Insect dominance. Definition, division and scope of entomology. Comparative account of external morphonology-types of mouth parts, antennae, legs, wings and genetallia. Anatomy of digestive, excretory, nervous and reproductive systems. Postembryonic developmenteclosion. Matamorphosis. Types of larvae and pupa. Classification of insects upto orders and families of economic importance and their distinguished characters.

History of development of nematology- definition, economic importance. General characters of plant parasitic nematodes, their morphology, taxonomy and classification, biology, symptomatology and control of important plant parasitic nematodes of fruits- tropical, subtropical and temperate fruits, vegetables, tubers, ornamental and plantation crops. Role of nematodes in plant disease complex.

SOA/HE 109 P: Fundamentals of Entomology & Nematology (1)

Identification and collection of insects, symptoms of damages, application of insecticides; methods of sampling and extraction of nematodes from soil and plant parts, killing, fixing and separation of temporary and permanent nematode mounts. Nematicides and their use, parts damaged by plant parasitic nematodes.

SOA/HE 110 T: Introduction to Major Field Crops (1)

Classification and distribution of field crops, definitions and concept of multiple cropping, mixed cropping, intercropping, relay and alley cropping, cultural practices for raising major cereals, pulses, oil seeds and fodder crops, green manuring, crop rotation.

SOA/HE 110 P: Introduction to Major Field Crops (1)

Identification of crop plants, seeds and weeds. Preparation of cropping scheme. Application of herbicides in field crops

SOA/HE 111 T : Fundamentals of Plant Pathology (1)

Introduction to the science of phytopathology, its objectives, scope and historical background. Classification of plant diseases, symptoms, signs, and related terminology. Parasitic causes of plant diseases (fungi, bacteria, viruses, phytoplasma, protozoa, algae and flowering parasitic plants), their characteristics and classification. Non-parasitic causes of plant diseases. Infection process. Survival and dispersal of plant pathogens. Plant disease epidemiology, forecasting and disease assessment. Principles and methods of plant disease management. Integrated plant disease management.

SOA/HE 111 P: Fundamentals of Plant Pathology (1)

Familiarity with general plant pathological laboratory and field equipments. Study of disease symptoms and signs and host parasite relationship. Identification and isolation of plant pathogens. Koch's postulates. Preparation of fungicidal solutions, slurries, pastes and their applications.

SOA/HSEC 101 T : Plant Propagation and Nursery Management (1)

Propagation: Need and potentialities for plant multiplication, sexual and asexual methods of propagation, advantages and disadvantages. Seed dormancy (scarification & stratification) internal and external factors, nursery techniques, apomixes – mono-embryony, polyembryony, chimera & bud sport. Propagation Structures: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, nursery (tools and implements), use of growth regulators in seed and vegetative propagation, methods and techniques of cutting, layering, grafting and budding physiological & bio chemical basis of rooting, factors influencing rooting of cuttings and layering, graft incompatibility. Anatomical studies of bud union, selection and maintenance of mother trees, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification, techniques of propagation through specialized organs, corm, runners, suckers. Micrografting, hardening of plants in nurseries. Nursery registration act. Insect/pest/disease control in nursery.

SOA/HSEC 101 P : Plant Propagation and Nursery Management (1)

Media for propagation of plants in nursery beds, pot and mist chamber. Preparation of nursery beds and sowing of seeds. Raising of rootstock. Seed treatments for breaking dormancy and inducing vigorous seedling growth. Preparation of plant material for potting. Hardening plants in the nursery. Practicing different types of cuttings, layering, graftings and buddings including opacity and grafting, etc. Use of mist chamber in propagation and hardening of plants. Preparation of plant growth regulators for seed germination and vegetative propagation. Visit to a tissue culture laboratory. Digging, labelling and packing of fruit plants. Maintenance of nursery records. Use of different types of nursery tools and implements for general nursery and virus tested plant material in the nursery. Cost of establishment of a mist chamber, greenhouse, glasshouse, polyhouse and their maintenance. Top grafting, bridge grafting and nursery management. Nutrient and plant protection applications during nursery.

Semester IV

SOA/HC 115 T: Spices and Condiments (1)

History, scope and importance, area and production, uses, export potential and role in national economy. Classification, soil and climate, propagation-seed, vegetative and micro propagation systems and methods of planting. Nutritional management, irrigation practices, weed control, mulching and cover cropping. Training and pruning practices, role of growth regulators, shade crops and shade regulation. Harvesting, post-harvest technology, packaging, storage, value added products, methods of extraction of essential oil and oleoresins. Economics of cultivation, role of Spice Board and Pepper Export Promotion Council, institutions and research centers in R&D. Crops: Cardamom, pepper, ginger, turmeric, clove, nutmeg, cinnamon, all spice, curry leaf, coriander, fenugreek, fennel, cumin, dill, celery, bishops weed, saffron, vanilla, thyme and rosemary.

SOA/HC 115 P: Spices and Condiments (1)

Identification of varieties: propagation, seed treatment – sowing; layout, planting; hoeing and earthing up; manuring and use of weedicides, training and pruning; fixing maturity standards, harvesting, curing, processing, grading and extraction of essential oils and oleoresins. Visit to commercial plantations.

SOA/HC 116 T: Temperate Fruits (2)

Classification of temperate fruits, detailed study of areas, production, varieties, climate and soil requirements, propagation, planting density, cropping systems, after care training and pruning, self incompatibility and pollinisers, use of growth regulators, nutrient and weed management, harvesting, post-harvest handling and storage of apple, pear, peach, apricot, cherry, persimmon, strawberry, kiwi, Queens land nut (Mecademia nut), almond, walnut, pecan nut, hazel nut and chest nut. Re- plant problem, rejuvenation and special production problems like pre-mature leaf fall, physiological disorders, important insect – pests and diseases and their control measures.

SOA/HC 116 P: Temperate Fruits (1)

Nursery management practices, description and identification of varieties of above crops, manuring and fertilization, planting systems, preparation and use of growth regulators, training and pruning in apple, pear, plum, peach and nut crops. Visit to private orchards to diagnose maladies. Working out economics for apple, pear, plum and peach.

SOA/HC 117 T: Ornamental Horticulture (2)

History, scope of gardening, aesthetic values. Gardens in India, types of gardens. Landscaping, historical background, definition. Floriculture industry: importance, area and production, industrial importance in India. Landscaping, basic principles and basic components. Principles of gardening, garden components, adornments, lawn making, methods of designing rockery, water garden, etc. Special types of gardens, their walk-paths, bridges, constructed features. Greenhouse. Special types of gardens, trees, their design, values in landscaping, propagation, planting shrubs and herbaceous perennials. Importance, design values, propagation, plating, climbers and creepers, palms, ferns, grasses and cacti succulents. Flower arrangement: importance, production details and cultural operations, constraints, post-harvest practices. Bio-aesthetic planning, definition, need, round country planning, urban planning and planting avenues, schools, villages, beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, planting material for play grounds. Vertical gardens, roof gardens. Culture of bonsai, art of making bonsai. Parks and public gardens.

SOA/HC 117 P: Ornamental Horticulture (1)

Identification and description of annuals, herbaceous, perennials, climbers, creepers, foliage flowering shrubs, trees, palms, ferns, ornamental grasses; cacti succulents. Planning and designing gardens, layout of location of components of garden study, functional uses of plants in the landscape. Planning design of house garden, roadside planting, avenues for new colonies, traffic islands, preparation of land for lawn and planting. Description and design of garden structures, layout of rockery, water garden, terrace garden, and Japanese gardens, recreational and children's corner. Layout of terrarium, traffic islands, bottle garden, dish garden. Flower arrangement, bonsai practicing and training. Visit to nearby gardens. Identification and description of species/varieties of jasmine, chrysanthemum, marigold, dahlia, gladiolus, carnation, aster and their important inter-culture practices

SOA/HC 118 T: Water Management in Horticultural Crops (1)

Importance of water, water resources in India. Area of different crops under irrigation, function of water for plant growth, effect of moisture stress on crop growth. Available and unavailable soil moisture – distribution of soil moisture – water budgeting – rooting characteristics – moisture extraction pattern. Water requirement of horticultural crops – lysimeter studies – Plant water potential climatological approach – use of pan evaporimeter – factor for crop growth stages – critical stages of crop growth for irrigation. Irrigation scheduling – different approaches – methods of irrigation – surface and sub-surface pressurized methods viz., sprinkler and drip irrigation, their suitability, merits and limitations, fertigation, economic use of irrigation water. Water management problem, soils quality of irrigation water, irrigation management practices for different soils and crops. Layout of different irrigation systems, drip, sprinkler. Layout of underground pipeline system.

SOA/HC 118 P: Water Management in Horticultural Crops (1)

Measurements of irrigation water by using water measuring devices, use of common formula in irrigation practices, practicing of land leveling and land shaping implements, layout for different methods of irrigation. Estimation of soil moisture constants and soil moisture by using different methods and instruments, scheduling of irrigation, different approaches, practicing use of instruments, estimation of irrigation efficiency and water requirements of horticultural crops, irrigation planning and scheduling, soil moisture conservation practices.

SOA/HC 119 T: Plantation Crops (2)

History and development, scope and importance, area and production, export and import potential, role in national and state economy, uses, industrial importance, by products utilization, soil and climate, varieties, propagation: principles and practices of seed, vegetative and micro-propagation, planting systems and method, gap filling, systems of cultivation, mulching, shade regulation, weed and water management, training, pruning and handling, nutrition, foliar feeding, role of growth regulators, soil management, liming practices, tipping practices, top working, physiological disorders, harvesting, post-harvest handling and processing, packaging and marketing, yield and economics of coconut, arecanut, oil palm, palmyrah palm, cacao, cashew nut, coffee, tea and rubber.

SOA/HC 119 P: Plantation Crops (1)

Description and identification of coconut varieties, selection of coconut and arecanut mother palm and seed nut, planting of seed nuts in nursery, layout and planting of coconut, arecanut, oil palm, cashew nut, cacao gardens, manuring, irrigation; mulching, raising masonry nursery for palm, nursery management in cacao. Description and identification of species and varieties in coffee, harvesting, grading, pulping, fermenting, washing, drying and packing of coffee, seed berry collection, seed extraction, treatment and sowing of coffee, epicotyl, softwood, grafting and top working in cashew, working out the economics and project preparation for coconut,

arecanut, oil palm, cashew nut, cacao, etc. Mother plant selection, preparation of cuttings and rooting of tea under specialized structure, training, centering, pruning, tipping and harvesting of tea.

SOA/HE 112 T: Breeding of Fruit and Plantation Crops (1)

Fruit breeding - History, importance in fruit production, distribution, domestication and adaptation of commercially important fruits, variability for economic traits, breeding strategies, clonal selection, bud mutations, mutagenesis and its application in crop improvement – policy manipulations – *in vitro* breeding tools (important fruit and plantation crops).

SOA/HE 112 P: Breeding of Fruit and Plantation Crops (1)

Exercises on floral biology, pollen viability; emasculation and pollination procedures; hybrid seed germination; raising and evaluation of segregating populations; use of mutagens to induce mutations and polyploidy.

SOA/HE 113 T: Growth and Development of Horticultural Crops (1)

Growth and development-definitions, components, photosynthetic productivity, leaf area index (LAI) - optimum LAI in horticultural crops, canopy development; different stages of growth, growth curves, growth analysis in horticultural crops. Plant bioregulators- auxin, gibberellin, cytokinin, ethylene inhibitors and retardants, basic functions, biosynthesis, role in crop growth and development, propagation, flowering, fruit setting, fruit thinning, fruit development, fruit drop, and fruit ripening. Flowering-factors affecting flowering, physiology of flowering, photoperiodism-long day, short day and day neutral plants, vernalisation and its application in horticulture, pruning and training physiological basis of training and pruning-source and sink relationship, translocation of assimilates. Physiology of seed development and maturation, seed dormancy and bud dormancy, causes and breaking methods in horticultural crops. Physiology of fruit growth and development, fruit setting, factors affecting fruit set and development, physiology of ripening of fruits-climatic and nonclimacteric fruits.

SOA/HE 113 P: Growth and Development of Horticultural Crops (1)

Estimation of photosynthetic potential of horticultural crops, leaf area index, growth analysis parameters including harvest index, bioassay of plant hormones, identification of synthetic plant hormones and growth retardants, preparations of hormonal solution and induction of rooting in cuttings, ripening of fruits and control of flower and fruit drop. Important physiological disorders and their remedial measures in fruits and vegetables, rapid tissue test, seed dormancy, seed viability by tetrazolium test, seed germination and breaking seed dormancy with chemicals and growth regulators.

SOA/HE 114 T: Genetic Resources of Horticultural Crops (1)

Role of genetic resources- centres of origin and diversity of crops plants- law of homologous series-plant introduction and exchange of genetic resources- principles and concepts of plant quarantine- plant introduction in horticultural crops-germplasm collection and centres- gene bank- gene sanctuary- need for conservation- genetic erosion- germplasm exploration-germplasm conservation- in vitro conservation cryopreservation- DNA finger printing. Wild relatives and sources of resistance to biotic, abiotic stresses and quality characters for fruit, vegetable, flower and plantation crops, spices, medicinal plants. International institutes and organizations for germplasm- Trade Related Intellectual Property Rights (TRIPPS) and IPR for Indian cultivars.

SOA/HE 114 P : Genetic Resources of Horticultural Crops (1)

Morphological evaluation of germplasm, collections and identification of wild relatives for fruit crops, vegetable crops, flower crops; spices, plantation crops, medicinal and aromatic plants. One or two visits to the nearest germplasm centres.

SOA/HSEC 102 T: Organic Farming (1)

Introduction, concept, relevance in present context; Organic production requirements; Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil improvement and amendments; Integrated diseases and pest management – use of biocontrol agents, biopesticides pheromones, trap crops, bird perches; Weed management; Quality considerations, certification, labeling and accreditation processors, marketing, exports.

SOA/HSEC 102 P: Organic Farming (1) Raising of vegetable crops organically through nutrient, diseases and pest management; vermicomposting; vegetable and ornamental nursery raising; macro quality analysis, grading, packaging, post harvest management.

Semester V

SOA/HC 120 T: Temperate Vegetables (2)

Importance of cool season vegetable crops in nutrition and national economy. Area, production, export potential, description of varieties and hybrids, origin, climate and soil, production technologies, seed production, post-harvest technology. Marketing of cabbage, cauliflower, knol-khol, sprouting broccoli, Brussels' sprout, lettuce, palak, Chinese cabbage, spinach, garlic, onion, leek, radish, carrot, turnip, beet root, peas, broad beans, rhubarb, asparagus, globe artichoke.

SOA/HC 120 P: Temperate Vegetables (1)

Identification and description of varieties/hybrids; propagation methods, nursery management; preparation of field, sowing/transplanting; identification of physiological and nutritional disorders and their corrections; post-harvest handling; cost of cultivation and field visits to commercial farms.

SOA/HC 121 T: Principles of Landscape Gardening (1)

Landscaping: historical background, basic principles and components, landscape composition of hills and plains, identification and use of landscape drafting equipments, drawing and designing of home gardens, public parks, avenues, farm complexes and institutions. Layout of formal garden, informal garden, terrace garden, rock garden, bog garden, sunken garden, designing of conservatory and lathe house. Landscape design for specific areas.

SOA/HC 121 P: Principles of Landscape Gardening (1)

Principles and elements of landscape design, plant material for landscaping, symbols, tools and implements used in landscape design, layout of formal gardens, informal gardens, special type of gardens (bog garden, sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Landscape design for specific areas.

SOA/HC 122 T: Farm Power and Machinery (1)

Basic concepts of various forms of energy, unit and dimensions of force, energy and power, calculations with realistic examples. IC Engines: Basic principles of operation of compression, ignition and spark ignition engines, two stroke and four stroke engines, cooling and lubrication system, power transmission system, broad understanding of performance and efficiency,

tractors, power tillers and their types and uses. Electric motors: types, construction and performance comparison. Tillage: objectives, method of ploughing. Primary tillage implements: construction and function of indigenous ploughs, improved indigenous ploughs, mould board ploughs, disc and rotary ploughs. Secondary tillage implements: construction and function of tillers, harrows, levelers, ridgers and bund formers. Sowing and transplanting equipment: seed drills, potato planters, seedling transplanter. Grafting, pruning and training tools and equipment. Inter-culture equipment: sweep. Junior hoe, weeders, long handle weeders. Crop harvesting equipments: potato diggers, fruit pluckers, tapioca puller and hoists.

SOA/HC 122 P: Farm Power and Machinery (1)

Calculation on force, power and energy. IC engines – showing the components of dismantled engines and motors. Primary and secondary tillage implements, hitching, adjustments and operations. Spraying equipment, calibration and operation. Plant protection equipment, calculation of dilution ratio and operation.

SOA/HC 123 T: Diseases of Fruits, Plantation and Medicinal and Aromatic Crops (2)

Etiology, symptoms, mode of spread, epidemiology and integrated management of the diseases of fruits, plantation, medicinal and aromatic crops viz mango, banana, grape, citrus, guava, sapota, papaya, jack fruit, pineapple, pomegranate, ber, apple, pear, peach, plum, almond, walnut, strawberry, areca nut, coconut, oil palm, coffee, tea, cocoa, cashew, rubber, betel vine senna, neem, hemp, belladonna, pyrethrum, camphor, costus, crotalaria, datura, dioscorea, mint, opium, *Solanum khasianum* and Tephrosia. Important post-harvest diseases of fruit, plantation and medicinal and aromatic crops and their management.

SOA/HC 123 P: Diseases of Fruits, Plantation and Medicinal and Aromatic Crops (1)

Observations of disease symptoms, identification of casual organisms and host parasite relationship of important diseases. Examination of scrapings and cultures of important pathogens of fruits, plantation, medicinal and aromatic crops.

SOA/HC 124 T: Insect Pests of Fruit, Plantation, Medicinal and Aromatic Crops (2)

General–economic classification of insects; ecology and insect-pest management with reference to fruit, plantation, medicinal and aromatic crops; pest surveillance. Distribution, host range, bio-ecology, injury, integrated management of important insect pests affecting tropical, sub-tropical and temperate fruits, plantation, medicinal and aromatic crops like coconut, areca nut, oil palm, cashew, cacao, tea, coffee, cinchona, rubber, betel vine senna, neem, hemp, belladonna, pyrethrum, camphor, costus, crotalaria, datura, dioscorea, mint, opium, *Solanum khasianum* and Tephrosia.. Storage insects – distribution, host range, bioecology injury, integrated management of important insect pests attacking stored fruits, plantation, medicinal and aromatic crops and their processed products. Toxicology – insecticide residue problems in fruit, plantation, medicinal and aromatic crops and their tolerance limits.

SOA/HC 124 P: Insect Pests of Fruit, Plantation, Medicinal and Aromatic Crops (1)

Study of symptoms of damage, collection, identification, preservation, assessment of damage and population of important insect – pests affecting fruits, plantation, medicinal and aromatic crops in field and storage

SOA/HE 115 T : Soil and Plant Analysis (1)

Methods of soil and plant sampling and processing for analysis. Quantification of minerals and their abundance. Soil structure and aggregate analysis. Theories and concepts of soil moisture estimation – gravimetric, tensiometric, gypsum block, neutron probe and pressure methods. Characterization of hydraulic mobility – diffusion and mass flow. Renewal of gases in soil and their abundance. Methods of estimation of oxygen diffusion rate and redox potential. Soil fertility evaluation methods. Use of radio tracer techniques in soil fertility evaluation. Soil

micro-organisms and their importance. Saline, alkali, acid, waterlogged and sandy soils, their appraisal and management. Chemical and mineral composition of horticultural crops. Leaf analysis standards, index tissue, interpretation of leaf analysis values. Principles of working of pH meter, electrical conductivity meter, spectrophotometer, flame photometer and atomic absorption spectrophotometer. Quality of irrigation water.

SOA/HE 115 P: Soil and Plant Analysis (1)

Collection and preparation of soil and plant samples for analysis. Determination of water holding capacity and hydraulic conductivity of soil. Estimation of moisture content in soils and plants. Determination of pH, electrical conductivity, sodium adsorption ratio and exchangeable sodium percentage of soils. Enumeration of soil microbes. Estimation of available macro and micronutrient elements in soils and their contents in plants. Irrigation water quality analysis.

SOA/HE 116 T: Mushroom Culture (1)

Introduction to mushrooms fungi – nutritional value, edible and poisonous types, edible mushrooms, *Pleurotus*, *Volvariella* and *Agaricus*, medicinal value of mushrooms, genetic improvement of mushroom, preparation of culture, mother spawn production, multiplication of spawn, cultivation techniques, harvesting, packing and storage; problems in cultivation – diseases, pest and nematodes – weed moulds and their management strategies. Economics of cultivation, post harvest technologies.

SOA/HE 116 P: Mushroom Culture (1)

Equipment and sterilization techniques for culture media, isolation of mother culture, and spawn preparation and maintenance of mushroom beds of oyster mushroom, *Volvariella* and *Agaricus*. Processing and preservations of mushrooms, economics of spawn and mushroom production and mushroom recipes

SOA/HE 117 T: Fundamentals of Food Technology (1)

Food and its function, physico-chemical properties of foods, food preparation techniques, nutrition, relation of nutrition of good health. Characteristics of well and malnourished population. Energy, definition, determination of energy requirements, food energy, total energy needs of the body. Carbohydrates: classification, properties, functions, source, requirements, digestion, absorption and utilization. Protein, classification, properties, functions, sources, requirements, digestion, absorption, essential and non-essential amino acids, quality of proteins, PER/NPR/NPU, supplementary value of proteins and deficiency. Lipids – classification, properties, functions, sources, requirements, digestion, absorption and utilization, saturated and unsaturated fatty acids, deficiency, rancidity, refining of fats. Mineral nutrition: macro and micro-minerals (Ca, Fe and P), function, utilization, requirements, sources, effects of deficiency. Vitamins: functions, sources, effects of deficiency, requirements of water soluble and fat-soluble vitamins. Balanced diet: recommended dietary allowances for various age groups, assessment of nutritional status of the population.

SOA/HE 117 P: Fundamentals of Food Technology (1)

Methods of measuring food ingredients, effect of cooking on volume and weight, determination of percentage of edible portion. Browning reactions of fruits and vegetables. Microscopic examination of starches, estimation of energy, value proteins and fats of foods. Planning diet for various age groups.

SOA/HSEC 103 T: Communication Skills and Entrepreneurship Development (1)

Entrepreneurship Development: Assessing overall business environment in the Indian economy. Overview of Indian social, political and economic systems and their implications for decision making by individual entrepreneurs. Globalisation and the emerging business / entrepreneurial environment. Concept of entrepreneurship; entrepreneurial and managerial characteristics; managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up; managing competition; entrepreneurship development programs; SWOT analysis, Generation, incubation and commercialization of ideas and innovations. Government schemes and incentives for promotion of entrepreneurship. Government policy on Small and Medium Enterprises (SMEs) / SSIs. Export and Import Policies relevant to horticulture sector. Venture capital. Contract farming and joint ventures, public-private partnerships. Overview of horti inputs industry. Characteristics of Indian horticultural processing and export industry. Social Responsibility of Business. Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and non-verbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, précis writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

SOA/HSEC 103 P: Communication Skills and Entrepreneurship Development (1)

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, précis writing, summarizing, abstracting; individual and group presentations.

Semester VI

SOA/HC 125 T: Potato and Tuber Crops (1)

Origin, area, production economic importance and export potential of potato and tropical, subtropical and temperate tuber crops; description of varieties and hybrids. Climate and soil requirements, season; seed rate; preparation of field; planting practices; spacing; water nutrient and weed management; nutrient deficiencies. Use of chemicals and growth regulators; cropping systems. Harvesting practices, yield; seed production, economics of cultivation. Post harvest handling and storage, field and seed standards, marketing of the following crops:

Crops: potato, tapioca, sweet potato, arrow root, cassava, colocasia, xanthosoma, amorphophallus, dioscorea, jerusalem artichoke, horse radish and other under- exploited tuber crops.

SOA/HC 125 P: Potato and Tuber Crops (1)

Identification and description of potato and tropical, subtropical and temperate tuber crops; planting systems and practices; field preparation and sowing/planting. Topdressing of fertilizers and inter culture and use of herbicides and growth regulators; identification of nutrient deficiencies, physiological disorders; harvest indices and maturity standards, post harvest handling and storage, marketing. Seed collection, working out cost of cultivation, project preparation of commercial cultivation.

SOA/HC 126 T: Breeding of Vegetable, Tuber and Spice Crops (2)

Centres of origin, plant bio-diversity and its conservation. Models of reproduction, pollination systems and genetics of important vegetable, tuber and spice crops. Self incompatibility and

male sterility, its classification and application in crop improvement. Principles of breeding self-pollinated crops, pure line selection, mass selection, heterosis breeding, hybridization, pedigree method, mass pedigree method, bulk method, modified bulk method, single seed descent method and back cross method. Polyploidy breeding.

Mutation breeding. Principles of breeding cross pollinated crops, mass selection, recurrent selection, heterosis breeding, synthetics and composites. Application of biotechnology in crop improvement. Crops: Solanaceous vegetables, cole crops, cucurbits, bulb crops, root crops, leafy vegetables, okra, leguminous crops.

SOA/HC 126 P: Breeding of Vegetable, Tuber and Spice Crops (1)

Floral biology and pollination mechanism in self and cross pollinated vegetables, tuber crops and spices. Working out phenotypic and genotypic heritability, genetic advance. Preparation and uses of chemical and physical mutagens. Polyploidy breeding and chromosomal studies. Techniques of F1 hybrid seed production. Maintenance of breeding records.

SOA/HC 127 T: Post Harvest Management of Horticultural Crops (2)

Importance of post-harvest technology in horticultural crops. Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process. Post-harvest treatments of horticultural crops. Quality parameters and specification. Structure of fruits, vegetables and cut flowers related to physiological changes after harvest. Methods of storage for local market and export. Pre-harvest treatment and precooling, pre-storage treatments. Different systems of storage, packaging methods and types of packages, recent advances in packaging. Types of containers and cushioning materials, vacuum packaging, cold storage, poly shrink packaging, grape guard packing treatments. Modes of transport.

SOA/HC 127 P: Post Harvest Management of Horticultural Crops (1)

Practice in judging the maturity of various horticultural produce, determination of physiological loss in weight and quality. Grading of horticultural produce, post-harvest treatment of horticultural crops, physical and chemical methods. Packaging studies in fruits, vegetables, plantation crops and cut flowers by using different packaging materials, methods of storage, post-harvest disorders in horticultural produce. Identification of storage pests and diseases in spices. Visit to markets, packaging houses and cold storage units.

SOA/HC 128 T: Seed Production of Vegetable, Tuber and Spice Crops (2)

Introduction and history of seed industry in India. Definition of seed. Differences between grain and seed. Importance and scope of vegetable seed production in India. Principles of vegetable seed production. Role of temperature, humidity and light in vegetable seed production. Methods of seed production of cole crops, root vegetables, solanaceous vegetables, cucurbits, leafy vegetables, bulb crops, leguminous vegetables and exotic vegetables. Seed germination and purity analysis. Field and seed standards. Seed drying and extraction. Seed legislation.

SOA/HC 128 P: Seed Production of Vegetable, Tuber and Spice Crops (1)

Study of seed structure, colour size, shape and texture. Field inspection of seed crops. Practices in rouging. Harvesting and seed extraction. Germination and purity analysis. Methods of seed production in cole crops, root vegetables, bulb crops, solanaceous vegetables, cucurbits, leafy vegetables, leguminous vegetables and exotic vegetables. Seed processing machines. Visit to seed production units.

SOA/HC 129 T: Insect Pests of Vegetable, Ornamental and Spice Crops (2)

Economic importance of insects in vegetable, ornamental and spice crops -ecology and pest management with reference to these crops. Pest surveillance in important vegetable, ornamental and spice crops. Distribution, host range, bio-ecology, injury, integrated management of important insect-pests affecting vegetable, ornamental and spice crops. Important storage insect-pests of vegetable, ornamental and spice crops, their host range, bioecology, injury and integrated management. Insect –pests of processed vegetables and ornamental crops, their host range, bio-ecology, injury and integrated management. Insecticidal residue problems in vegetables and ornamental crops, tolerance limits etc.

SOA/HC 129 P: Insect Pests of Vegetable, Ornamental and Spice Crops (1)

Study of symptoms, damage, collection, identification, preservation, assessment of damage/population of important insect-pests affecting vegetable, ornamental and spice crops in field and during storage.

SOA/HE 118 T: Breeding and Seed Production of Ornamental Plants (1)

History of improvements of ornamental plants, objectives and techniques in ornamental plant breeding. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of ornamental plants. Breeding for disease resistance. Development of promising cultivars of important ornamentals. Role of heterosis and its exploitation, production of F1 hybrids and utilization of male sterility, production of open pollinated seed. Harvesting processing and storage of seeds, seed certification.

SOA/HE 118 P: Breeding and Seed Production of Ornamental Plants (1)

Study of floral biology and pollination in important species and cultivars. Techniques of inducing polyploidy and mutation. Production of pure and hybrid seeds. Harvesting, conditioning and testing of seeds. Practice in seed production methods

SOA/HE 119 T: Diseases of Vegetable, Ornamental and Spice Crops (1)

Etiology, symptoms, mode of spread, epidemiology and integrated management of diseases of the following vegetables, ornamental and spice crops: tomato, brinjal, chilli, bhindi, cabbage, cauliflower, radish, knol-khol, pea, beans, beet root, onion, garlic, fenugreek, ginger, potato, turmeric, pepper, cumin, cardamom, nutmeg, coriander, clove, cinnamon, jasmine, rose, crossandra, tuberose, geranium. Important post-harvest diseases of vegetables and ornamental crops and their management.

SOA/HE 119 P: Diseases of Vegetable, Ornamental and Spice Crops (1)

Observations of symptoms, causal organisms and host parasitic relationship of important diseases, examination of cultures of important pathogens of vegetables, ornamental and spice crops.

SOA/HE 120 T: Protected Horticulture (1)

Importance and scope, basic principles of protected cultivation. Green and polyhouse designs, green house environment control, heating and cooling system- use of portable tunnel. Green house cultivation of important horticultural crops- rose, carnation, gerbera, orchids, anthurium, tomato, bell, pepper and strawberry. Insect pest and disease management under protected cultivation.

SOA/HE 120 P: Protected Horticulture (1)

Study of green house design. Practice of protected cultivation of horticultural crops- rose carnation, Gerbera and orchids, anthurium, tomato, bell, pepper and strawberry.

SOA/HSEC 104 T: Commercial Floriculture (1)

Scope and importance of commercial floriculture in India, production techniques of ornamental plants like rose, marigold, chrysanthemum, orchid, carnation, gladiolus, jasmine, dahlia, tuberose, bird of paradise, china aster and gerbera for domestic and export market, growing of flowers under protected environments such as glass house, plastic house etc., post harvest technology of cut flowers in respect of commercial flower crops, dehydration technique for drying of flowers, production techniques for bulbous.

SOA/HSEC 104 P: Commercial Floriculture (1)

Identification of commercially important floricultural crops. Propagation practices in chrysanthemum, sowing of seeds and raising of seedlings of annuals. Propagation by cutting, layering, budding and grafting. Training and pruning of roses. Use of chemicals and other compounds for prolonging the vase life of cut flowers. Drying and preservation of flowers. Flower arrangement practices

Semester VII

SOA/HC 130 T: Processing of Horticultural Crops (2)

Importance and scope of fruit and vegetable preservation industry in India, food pipe line, losses in post-harvest operations, unit operations in food processing. Principles and guidelines for the location of processing units. Principles and methods of preservation by heat pasteurization, canning, bottling. Methods of preparation of juices, squashes, syrups, cordials and fermented beverages. Jam, jelly and marmalade. Preservation by sugar and chemicals, candies, crystallized fruits, preserves chemical preservatives, preservation with salt and vinegar, pickling, chutneys and sauces, tomato and mushrooms, freezing preservation. Processing of plantation crops, products, spoilage in processed foods, quality control of processed products, Govt. policy on import and export of processed fruits. Food laws.

SOA/HC 130 P: Processing of Horticultural Crops (1)

Equipment used in food processing units. Physico-chemical analysis of fruits and vegetables. Canning of fruits and vegetables, preparation of squash, RTS, cordial, syrup, jam, jelly, marmalade, candies, preserves, chutneys, sauces, pickles (hot and sweet). Dehydration of fruits and vegetables – tomato product dehydration, refrigeration and freezing, cut out analysis of processed foods. Processing of plantation crops. Visit to processing units.

SOA/HC 131 T: Protected Cultivation of High Value Horticultural Crops (3)

Visit to commercial polyhouses, Project preparation and planning. Specialised lectures by commercial export house.

SOA/HC 132 T: Nursery Production and Management (3)

Project preparation

SOA/HE 121P: Protected Cultivation of High Value Horticultural Crops (6)

1. Study of designs of green- house structures for cultivation of crops
2. Land preparation and soil treatment
- 3.. Planting and production:
 - i. Cultural management including soil/media management in poly houses

- ii. Fertigation and irrigation management
- iii. Integrated Pest Management
- iv. Harvesting and post harvest management; certification and distribution
- v. Cost of production
- 4. Visit to export houses; Market intelligence; Marketing of produce; cost analysis; Institutional management
- 5. Report writing, presentation and discussion.

SOA/HE 122P: Nursery Production and Management (6)

- 1. .Nursery registration, methodology and certification
- 2. Establishment and management of plant propagating structures
- 3. Establishment of progeny blocks, identification of mother plants and maintenance of bud wood bank
- 4. Procurement of inputs (pots, polythene, FYM etc.)
- 5. Techniques and environ management for large scale production
- 6. Packaging and selling of plant material
- 7. Working out economics
- 8. Report writing, presentation and discussion

SOA/HSEC 105 T: Horti- Business Management (2)

Farm management - definition, nature, characteristics and scope. Farm management principles and decision making, production function, technical relationships, cost concepts, curves and functions – factors, product, relationship – factors relationship, product relationship, optimum conditions, principles of opportunity cost-equi-marginal returns and comparative advantages, time value of money, economic of scale, returns to scale, cost of cultivation and production, break even analysis, decision making under risk and uncertainty. Farming systems and types. Planning – meaning, steps and methods of planning, types of plan, characteristics of effective plans. Organizations – forms of business organizations, organizational principles, division of labour. Unity of command, scalar pattern, job design, span of control responsibility, power authority and accountability. Direction – guiding, leading, motivating, supervising, coordination – meaning, types and methods of controlling – evaluation, control systems and devices. Budgeting as a tool for planning and control. Record keeping as a tool of control. Functional areas of management – operations management – physical facilities, implementing the plan, scheduling the work, controlling production in terms of quantity and quality. Materials management – types of inventories, inventory costs, managing the inventories, economic order quantity (EOQ). Personnel management – recruitment, selection and training, job specialization. Marketing management – definitions, planning the marketing programmes, marketing mix and four P' s. Financial management – financial statements and ratios, capital budgeting. Project management – project preparation evaluation measures.

Semester VIII

Horticultural Work Experience 18 (6+6+6)

The students will spend one full semester working with State Department of Horticulture; Horticulture based industries, commercial horticulture farms, plantation industries etc. to gain **first hand information and hands-on-training** in the chosen area of interest.

Horticultural work experience will be evaluated by the department committee on the basis of

SOA/HC 132 T : Project report preparation (6)

SOA/HC 133 P : Field Work (6)

SOA/HC 134 T Project report writing, Presentation and Discussion (6)

DEPARTMENT OF HORTICULTURE

H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India-246 174

Course Curriculum for M. Sc. Horticulture/ M. Sc. (Ag.) Horticulture, 2011-12

Course offered

Core Courses

Course No.	Course Title	Credits
SOA/HC 501	Plant Propagation and Nursery Management	3 (2-0-1)
SOA/HC 502	Advances in Orchard Management	3 (2-0-1)
SOA/HC 503	Systematic Horticulture	3 (2-0-1)
SOA/HC 504	Advances in Pomology : Tropical and Subtropical Fruits	3 (2-0-1)
SOA/HC 505	Statistical Methods and Experimental Designs	4 (3-0-1)
SOA/HC 506	Advances in Temperate- Zone Pomology	3 (2-0-1)
SOA/HC 507	Advances in Olericulture	3 (2-0-1)
SOA/HC 508	Canopy Management in Fruits Crops	3 (2-0-1)
SOA/HC 509	Biotechnology of Horticultural Crops	3 (2-0-1)
SOA/HC 510	Advances in Breeding of Fruits and Plantation Crops	3 (2-0-1)
SOA/HC 511	Advances in Post- Harvest Technology and Management of Fruits and Vegetables	3 (2-0-1)
SOA/HC 512	Protected Cultivation of Horticultural Crops	3 (2-0-1)
SOA/HC 513	Advances in Floriculture and Landscaping	3 (2-0-1)
SOA/HC 514	Seminar	01 (0-0-1)
SOA/HC 515	Thesis Research	15(0-0-15)
	Total	56(27-0-29)

Elective Courses

Course No.	Course Title	Credits
SOA/HE 516	Growth and Development of Plants	3 (2-0-1)
SOA/HE 517	Advances in Breeding of Vegetable Crops	3(2-0-1)
SOA/HE 518	Dry Land Horticulture	3(2-0-1)
SOA/HE 519	Biotic and Abiotic Stress Management in Horticultural Crops	3 (2-0-1)
SOA/HE 520	Advances in Breeding of Ornamental Crops	3 (2-0-1)
SOA/HE 521	Organic Horticulture	3(2-0-1)
	Total	18(12-0-6)

Self Study Courses

Course No.	Course Title	Credits
SOA/HS 522	Self Study Courses	3
	Total	3

DEPARTMENT OF HORTICULTURE

H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India-246 174
Course Curriculum for M. Sc. Horticulture/M. Sc. (Ag.) Horticulture, 2011-12

Course offered

Course no.	Paper Title	Total marks	Theory marks			Practical marks	credits
			I		E		
Semester I							
SOA/HC 501	Plant Propagation and Nursery Management	100	80 (20	+	60)	20	2+1
SOA/HC 502	Advances in Orchard Management	100	80 (20	+	60)	20	2+1
SOA/HC 503	Systematic Horticulture	100	80 (20	+	60)	20	2+1
SOA/HC 504	Advances in Pomology : Tropical and Subtropical Fruits	100	80 (20	+	60)	20	2+1
SOA/HC 505	Statistical Methods and Experimental Designs	100	80 (20	+	60)	20	3+1
	Total	500	400(100	+	300)	100	16(11+5)
Semester II							
SOA/HC 506	Advances in Temperate- Zone Pomology	100	80 (20	+	60)	20	2+1
SOA/HC 507	Advances in Olericulture	100	80 (20	+	60)	20	2+1
SOA/HC 508	Canopy Management in Fruits Crops	100	80 (20	+	60)	20	2+1
SOA/HC 509	Biotechnology of Horticultural Crops	100	80 (20	+	60)	20	2+1
SOA/HC 510	Advances in Breeding of Fruits and Plantation Crops	100	80 (20	+	60)	20	2+1
	Total	500	400(100	+	300)	100	18(13+05)
Semester III							
SOA/HC 511	Advances in Post- Harvest Technology and Management of Fruits and Vegetables	100	80 (20	+	60)	20	2+1
SOA/HC 512	Protected Cultivation of Horticultural Crops	100	80 (20	+	60)	20	2+1
SOA/HC 513	Advances in Floriculture and Landscaping	100	80 (20	+	60)	20	2+1
SOA/HE 516	Growth and Development of Plants	100	80 (20	+	60)	20	2+1
SOA/HE 517	Advances in Breeding of Vegetable Crops	100	80 (20	+	60)	20	2+1
SOA/HE 518	Dry Land Horticulture	100	80 (20	+	60)	20	2+1
SOA/HS 522	Self Study Courses						3
	Total	500	400(100	+	300)	100	18(12+06)

Course no.	Paper Title	Total marks	Theory marks			Practical marks	credits
			I	E			
Semester IV							
SOA/HE 519	Biotic and Abiotic Stress Management in Horticultural Crops	100	80 (20	+	60)	20	2+1
SOA/HE 520	Advances in Breeding of Ornamental Crops	100	80 (20	+	60)	20	2+1
SOA/HE 521	Organic Horticulture	100	80 (20	+	60)	20	2+1
SOA/HC 514	Seminar	100					0+1
SOA/HC 515	Thesis	200					0+15
Total		600	240(60	+	180)	60	25(06+19)

I - Internal Assessment

E - External Assessment

Syllabus for M.Sc. Horticulture/ M.Sc.(Ag.) Horticulture 2011-

12

SOA/HC 501: Plant Propagation and Nursery Management

Introduction, life cycle in plants, cellular basis for propagation, apomixis, polyembryony, germination process and environmental factors affecting it, quality of seeds, seed dormancy, treatments to facilitate germination, seed testing, diseases control during germination.

Clone and phase variation, genetic variation in asexually propagated plants, production and maintenance of pathogen free clones, cutting- anatomical, physiological and biochemical aspects of root initiation in cuttings, types of cuttings, use of bioregulators, mist systems of rooting cuttings, planting and care, layering- principles and methods.

Reasons for grafting and budding, categories of root-stock, formation of graft and bud union, factors influencing the healing of graft union, limits of grafting, graft incompatibility, scion-stock relationship, techniques of grafting, budding and layering.

Micro propagation: Introduction, objectives, merits and demerits, facilities and equipments, aseptic techniques and use of antibiotics, media preparation, micro propagation techniques- clonal propagation, direct organogenesis, embryogenesis, meristem culture, micro grafting, hardening, packing and transport of micropropagules.

Nursery Management: types of nursery, location, components planning and layout of a commercial nursery, structures, media mixtures, nursery management practices

Practicals- Practice of grafting, budding, cutting and layering, anatomical studies of rooting of cuttings and grafting union, planning and layout for commercial nursery, sample seed testing, use of bioregulators in propagation, sterilization of equipments and laboratory, media preparation, selection and preparation of explants, meristem culture and micro grafting, planning and layout of experiments on various aspects of propagation. Visit to tissue culture labs and nurseries.

SOA/HC 502: Advances in Orchard Management

Importance and scope of orchard management, constraint in fruit production, concept of high density planting.

Orchard soil management systems, water requirement of fruit trees, factors affecting water requirement, classification of soil moisture, effect of soil moisture on fruit trees, disorders due to excess and deficient moisture, various factors affecting moisture supply to plants, drip and sprinkler irrigation, fertigation, multistory cropping, drainage systems, organic manures, fertilizers and bio fertilizers, role of elements in fruit production, disorders due to excess and deficiency of elements, evaluating need for nutrients/tissue analysis; integrated nutrient management (INM),

Recent techniques of training and pruning, fruit thinning, splitting of fruits, preharvest fruit drop, rejuvenation of old orchards. Internal and external factors of unfruitfulness, practices to induce flowering; irregular bearing of fruit trees.

Hardiness, winter killing, injuries and their protection, IPM, protection from important insects and diseases.

Practicals- Study of different systems of layout, planting, study of drip and sprinkler irrigation, identification and control of important diseases and insects, soil and foliar application of fertilizers, study of deficiency symptoms of elements, practice of pruning and training, rejuvenation of old orchards, tissue analysis, physical practices to induce flowering, use of bioregulators, cost of cultivation of an orchard, visit to important orchards and Fruit Research Stations.

SOA/HC 503: Systematic Horticulture

Introduction, importance and scope, botanical terminology. Plant classification history and systems- artificial, natural and modern systems. Nomenclature: importance, binomial classification and its salient features.

Morphological description of (vegetative, floral and fruit features) of the following important families of fruits, vegetables and ornamental crops:-

Anacardiaceae - Mango, Cashewnut; Rutaceae- Citrus, . Murrayas, Kamini; Musaceae- Banana; Myrtaceae- Guava, Bottle brush, Rosaceae- Apple, Pear, Plum, Peach, Apricot, Loquat, Rose; Apocyanaceae- Karonda, Kaner, Chandini; Vitaceae- Grapes; Sepindaceae- Litchi; Caricaceae- Papaya; Brassicaceae- cauliflower, cabbage, Radish, Turnip; Cucurbitaceae- Cucurbits; Solanaceae- Brinjal, Tomato, Chillies, Potato, Rat-ki-rani; Leguminaceae- Peas, Beans, Kachnar, Ashok, Cassia; Malvaceae- Bhindi, Hibiscus; Euphorbiaceae- Acalypha, Poinsettia, Croton; Nyctaginiaeeae-Bougainvillea; Rubiaceae- Hamelia, Mussanda, Ixoraparviflora; Ramnaceae- Ber; Amaryllidaceae- Onion, Garlic.

Practicals- Identification and botanical description (vegetative and floral features) of available fruits, vegetables and ornamental plants.

SOA/HC 504: Advances in Pomology: Tropical and Subtropical Fruits

Introduction, prospects and scope, constraints of fruit industry.

Origin and distribution, area and production, taxonomy, classification and description of important cultivars, nutrition, bearing habit, pollination and fruit set, use of bioregulators, special problems and physiological disorders in the production of the following fruits:

Tropical and subtropical fruits- Mango, Citrus fruits, Banana, Guava, Grape, Litchi, Papaya, Pine-apple, Jack-fruit.

Minor fruits- Ber, Aonla, Pomegranate, Loquat, Sapota, Phalsa, Bael, Karonda,

Practicals- Identification and morphological features of important cultivars of fruit, effect of bioregulators, practice of commercial propagation techniques, moisture conservation techniques, pollen germination, study of mango malformation, guava wilt, citrus decline, blossom biological studies, visit to Fruit Research Centres.

SOA/HC 505: Statistical Methods and Experimental Designs

Sampling theory- introduction, simple random sampling, estimates of sampling variance, stratified random sampling, two stage sampling, systematic sampling, estimate of proportions.

Test of hypothesis- introduction, one sample t-test and two sample t- test. Chisquare test- properties, testing significance of properties, testing independence of tributes Bartlett test, (F- Test).

Correlation- coefficient of correlation, test of significant, Fisher's Z- transformation, rank correlation, intraclass correlation. Regression- regression curve, fitting of line regression.

Need for an experiments, designing of an experiment, experimental error, principles of experimental design, analysis of designed experiments- analysis of variance, mathematical details, assumptions, transformation and anova table, pairwise comparisons and specific comparisons of treatments.

Completely randomized design- layout, application, merits and demerits, analysis of equal and unequal observations. Randomized block design- layout, application, merits and demerits, analysis, efficiency of blocking. Latin square design- layout, application, merits and demerits, analysis, change over design. Analysis of covariance for reduction of experimental error in CRD, RBD and L. S. designs. Split plot and related designs layout, application, merits and demerits, analysis, efficiency, variants of split plot design, strip plot design. Factorial experiments- concept of factorial treatments, definition of main effects and interrelations, analysis of series using Yates method.

Practicals- Practicals based on above topics.

SOA/HC 506: Advances in Temperate-Zone Pomology

Introduction, scope, area and production, temperate regions, contour planting, rest period and chilling requirement.

Origin and distribution, area and production, taxonomy, classification and description of important cultivars, clonal rootstocks, training techniques, bearing habit, pollination and fruit set, use of bioregulators, special problems and physiological disorders of the following fruits:

Pome Fruits- Apple and Pear

Stone Fruits- Peach, Plum, Apricot, Cherry and Almond

Nut Fruits- Walnut, Pecannut, Hazelnut and Pistachio etc.

Berries- Strawberry, Raspberry, Gooseberry

Kiwi fruit

Exposure to wild fruits of Uttarakhand hills.

Practicals- Identification and morphological features of temperate fruits, practice of contour planting, commercial propagation methods, pollen collection and germination, pruning and training, use of bioregulators, visit to Temperate Fruit Research Stations.

SOA/HC 507: Advances in Olericulture

Introduction, types of vegetable farming, vegetable forcing, bioregulators in vegetable production, principles of vegetable seed production.

Origin and distribution, area and production, taxonomy, classification and description of cultivars, use of bioregulators, seed production, specific problems and physiological disorders of the following vegetables:

Solanaceous Vegetables- Potato, Tomato, Brinjal, Chilli, Capsicum

Root Vegetables- Radish, Turnip, Carrot

Cole Vegetables- Cauliflower, Cabbage, Knol-khol

Legume Vegetables- Peas and French bean

Bulb Vegetables- Onion, Garlic

Cucurbits- Cucumber, Water melon, Bottle gourd, Sponge gourd, Musk melon, Pumpkin

Leafy Vegetables- Spinach, Amaranthus

Okra and Sweet Potato

Practicals- Identification and morphological features of vegetables, seed production techniques, study of disorders, use of bioregulators, basal and foliar application of nutrients, cost of vegetable cultivation, experimental trials, visit to vegetable seed production centres and processing units.

SOA/HC 508: Canopy Management in Fruits Crops

Canopy management - importance and advantages; factors affecting canopy development.

Canopy types and structures with special emphasis on geometry of planting, canopy manipulation for optimum utilization of light. Light interception and distribution in different types of tree canopies.

Spacing and utilization of land area - Canopy classification; Canopy management through rootstock and scion.

Canopy management through plant growth inhibitors, training and pruning and management practices.

Canopy development and management in relation to growth, flowering, fruiting and fruit quality in temperate fruits, grapes, passion fruits, mango, sapota, guava, citrus and ber.

Practicals- Study of different types of canopies, training of plants for different canopy types, canopy development through pruning, use of plant growth inhibitors, geometry of planting; study on effect of different canopy types on production and quality of fruits.

SOA/HC 509: Biotechnology of Horticultural Crops

Harnessing bio-technology in horticultural crops, influence of plant materials, physical, chemical factors and growth regulators on growth and development of plant cell, tissue and organ culture.

Callus culture – types, cell division, differentiation, morphogenesis, organogenesis, embryogenesis.

Use of bioreactors and in vitro methods for production of secondary metabolites, suspension culture, nutrition of tissues and cells, regeneration of tissues, ex vitro, establishment of tissue cultured plants.

Physiology of hardening - hardening and field transfer, organ culture – meristem, embryo, anther, ovule culture, embryo rescue, somaclonal variation, protoplast culture and fusion.

Construction and identification of somatic hybrids and cybrids, wide hybridization, in vitro pollination and fertilization, haploids, in vitro mutation, artificial seeds, cryopreservation, rapid clonal propagation, genetic engineering in horticulture crops, use of molecular markers. In vitro selection for biotic and abiotic stress, achievements of biotechnology in horticultural crops.

Practicals- An exposure to low cost, commercial and homestead tissue culture laboratories, media preparation, inoculation of explants for clonal propagation, callus induction and culture, regeneration of plantlets from callus, sub-culturing, techniques on anther, ovule, embryo culture, somaclonal variation, in vitro mutant selection against abiotic stress, protoplast culture, fusion technique, development of protocols for mass multiplication, project development for establishment of commercial tissue culture laboratory.

SOA/HC 510: Advances in Breeding of Fruits and Plantation Crops

Importance, objectives of fruit breeding; principles, prospects and problems, methods of improvement-introductions, clonal selection, hybridization, mutation, polyploidy, heterosis and back cross.

Centre of diversity, germplasm resource, breeding objectives, early development, inheritance of characters, problems and advances made in the following fruits and plantation crops:

Fruits- Mango, Citrus fruits, Jackfruit, Grape, Apricot, Apple, Cherry, Banana, Litchi, Peach, Almond, Papaya, Guava, Aonla, Pomegranate, Plum and Strawberry.

Plantation crops- Tea, Coffee, Coconut, Arecanut, Cocoa, Rubber and Cashewnut

Practicals- Studies on floral biology, practice of pollination procedures, hybridization, and use of mutagens.

SOA/HC 511: Advances in Post- Harvest Technology and Management of Fruits and Vegetables

Introduction, post harvest physio-biochemical changes; causes of post harvest losses, control of post harvest losses- proper cultural operations, pre-storage treatments, transportation, storage, environmental control, ionizing radiation, post harvest chemical treatments, storage of fresh fruits and vegetables, factor affecting storage quality, storage disorders, marketing of fruits and vegetables and their products.

History, objectives and scope of fruit and vegetable preservation, spoilage of fruits and vegetables, principles of preservation- temporary and permanent; vitamins and other nutrients in preserved products, food additives and their use in preservation. Principles and guidelines for establishing processing unit.

Containers: Types, merits and demerits, composition and manufacturing of tin and glass containers, failures in glass containers, general principles and procedures of canning and bottling, spoilage of canned products.

Principles and methods of jam, jelly and marmalade; theories of jelly formation, failures of jelly; unfermented fruit and vegetable beverages, juice extraction equipments, general methods of preparation and preservation, preservation of unfermented beverages.

General methods of making preserve and candy from some suitable fruits and vegetables, preparation of pickles, chutneys, sauces, ketchup, soup and cocktail from suitable fruits and vegetables, causes of spoilage.

Vinegar- quality standards, types, material processing and fermentation, methods of preparation, post-production processes, spoilage; pectin preparation.

Sun drying- merits and demerits, procedure; mechanical dehydration of fruits and vegetables, home and commercial dehydrators, packing and storage.

Preservation by freezing- objectives, freezing and growth of micro-organisms, freezing process, storage of frozen products; exposure on preservation by radiation.

Government policies, regulation and specifications for fresh and processed products.

Practicals- Identification of equipments used in preservation, canning of fruits and vegetables, cut out test for canned products, preparation of jam, jelly, squash, juice, preserve, chutney, ketchup, sauce, pickle; dehydration of potato, estimation of acidity, vitamin C, sugar, juice content and T.S.S., visit to processing factories.

SOA/HC 512: Protected Cultivation of Horticultural Crops

Introduction, history, present status, importance, problems and prospects of protected cultivation. Types and designs of protected structures and their management. Environment control in protected structures. Growing media and sterilization. Soilless cultivation, hydroponics and aeroponics. Irrigation and fertigation. Integrated insect pest and disease management

Vegetable seedlings production under protection. Protected cultivation of crops (media, bed preparation, varieties, planting, irrigation and fertigation, harvesting, specific operation for different crops and economics) rose, carnation, gerbera, orchids, anthurium, lily, chrysanthemum, capsicum, tomatoes, exotic vegetables, potted ornamental plants.

Post harvest management of flowers and vegetable (sorting, grading, packing, storage, transportation and marketing).

Practicals- Study of different protected structures, cladding materials used, installation and their management. Study of environment control devices used in protected structures and measurement of temperature, RH, light and CO₂. Study of growing media and sterilization. Study of irrigation and fertigation system and their management. Soilless cultivation. Hydroponics and aeroponics. Vegetable seedlings production under protection. Cultivation of Crops under protected environment: Rose, Carnation, Gerbera,

Orchid and Anthurium, Liliium and chrysanthemum, Capsicum, Tomatoes, Exotic vegetables. Post harvest management of flowers and vegetable. Study of insect pests and diseases and their control. Visit to commercial green house projects.

SOA/HC 513: Advances in Floriculture and Landscaping

History, importance and scope, problems and prospects, styles of gardening, formal garden and its important parts.

Landscaping- general principles, planning and designing, important elements, landscaping public buildings, educational institutions, factories, historical places.

Bio-aesthetic planning , bonsai culture, flower forcing, role of colour in floriculture, exhibition, post harvest management.

Origin and distribution, area and production, taxonomy and morphological features, classification and description of some important cultivars, propagation, special practices and problems, use of bioregulators:

Rose	Gladiolus	Carnation	Tuberose	Marigold
Gerbera	Chrysanthemum	Dahlia	Bougainvillea	Jasmines

Practicals- Identification of ornamental species, preparation of bonsai, use of bioregulators, judging, practice to conserve the life of cut flowers, morphological features of some ornamental plants, wintering in roses, preparation of shrubbery and herbaceous borders, propagation techniques, planning and layout for a garden, cost of cultivation of commercial flowers, visit to Ornamental Gardens.

SOA/HE 516: Growth and Development of Plants

Introduction- terminology, importance and scope, growth and its phases, growth curve, growth regions, environmental affecting growth, apical organization and meristems in growth, apical dominance. Seed germination, seed dormancy- types and causes, growth substances and seed dormancy, environmental controls, breaking dormancy; bud dormancy- hormonal control, morphological aspects; juvenility and vegetative growth

Study of Auxin, Gibberellins, Cytokinins, Ethylene, Inhibitors (ABA) under the following heads:

(i) Origin and history (ii) Natural and synthetic forms (iii) Biosynthesis and chemical nature (iv) Extraction and identification (v) Mode of action (vi) Transport of growth regulators (vii) Functions or effects on plants.

Flower initiation and development: photoperiodism and its effects, florigen concept; vernalization- kinetics, response, types, vernalization stimulus, devernization; physiology and chemical induction of flowering, sex expression and alteration; tuber, bulb and corm formation. Pollination and fruit-set, growth and development of fruits, parthenocarpy and seedlessness, maturity and ripening. Climacteric and non-climacteric fruits.

Senescence- chemical changes, causes, plant and organ senescence, regulating system in senescence; abscissions. Tropism: phototropism and geotropism.

Practicals- Study of growth and its measurements, preparation and mode of application of bioregulator solutions, effect of bioregulators on morphological and anatomical changes in plants, growth regulators in fruit set and development, bioregulators in breaking dormancy, induction of parthenocarpic fruits, fruit ripening, bioassays.

SOA/HE 517: Advances in Breeding of Vegetable Crops

History, principles, problems and prospects of vegetable improvement. Biodiversity and conservation. Introduction, selection including clonal selection and hybridization, mutation breeding, polyploidy and heterosis breeding for specific purposes like productivity, resistance to biotic and abiotic stresses and processing. Recent advances in breeding including biotechnological approaches. Cytogenetics, breeding objectives, inheritance, early achievement and advances made in the following vegetables:

Solanaceous, cole crops, legumes, bulb crops, root vegetables, tuber crops, leafy vegetables and cucurbits.

Practicals- Floral biology, pollination mechanism, selfing and crossing procedures, hybridization techniques working out phenotypic and genotypic variability, pcv, gcv heritability, genetic advance, preparation and use of chemicals and physical mutagens, polyploidy breeding, techniques of F₁ hybrid seed production, maintenance of breeding record.

SOA/HE 518: Dry Land Horticulture

Definition, importance and limitations of dry land horticulture, present status and future scope.

Constraints encountered in dry lands. Agro-climatic features in rain shadow areas, scarce water resources, high temperature, soil erosion, run-off losses etc.

Techniques of development and management of dry land horticulture. Watershed development. Soil and water conservation methods - terraces, contour bunds etc; methods of control and impounding of run off water - farm ponds, trenches, macro catch pits etc; in-situ water harvesting methods - microcatchments, different types of tree basins etc.

Methods of reducing evapo-transpiration - use of shelter belts, mulches, anti-transpirants, growth regulators etc. Water use efficiency - need-based, economic and conjunctive use of water, micro systems of irrigation etc.

Selection of plants/crops having drought resistance/ tolerance characteristics. Special techniques of planting and after care - use of seedling races, root stocks, in situ grafting, deep pitting/planting, canopy reduction etc.

Practicals- Study of rainfall patterns. Contour bunding/trenching, micro catchments, soil erosion and its control. Study of evapo-transpiration, mulches and micro irrigation systems. Special techniques of planting and after care in dry lands. Study of morphological and anatomical features of drought tolerant crops.

SOA/HE 519: Biotic and Abiotic Stress Management in Horticultural Crops

Stress – definition, classification, stresses due to water (high and low), temperature (high and low), radiation, wind, soil conditions (salinity, alkalinity, ion toxicity, fertilizer toxicity, etc.).

Pollution - increased level of CO₂, industrial wastes, impact of stress in horticultural crop production, stress indices, physiological and biochemical factors associated with stress, horticultural crops suitable for different stress situations.

Crop modeling for stress situations, cropping system, assessing the stress through remote sensing, understanding adaptive features of crops for survival under stress, interaction among different stress and their impact on crop growth and productivity.

Greenhouse effect and methane emission and its relevance to abiotic stresses, use of anti transpirants and PGRs in stress management, mode of action and practical use, HSP inducers in stress management techniques of soil moisture conservation, mulching, hydrophilic polymers.

Rain water harvesting, increasing water use efficiency, skimming technology, contingency planning to mitigate different stress situations, cropping systems, stability and sustainability indices.

Practicals- Seed treatment /hardening practices, container seedling production, analysis of soil moisture estimates (FC, ASM, PWP), analysis of plant stress factors, RWC, chlorophyll fluorescence, chlorophyll stability index, ABA content, plant waxes, stomatal diffusive resistance, transpiration, photosynthetic rate etc. under varied stress situations, influence of stress on growth and development of seedlings and roots, biological efficiencies, WUE, solar energy conversion and efficiency, crop growth sustainability indices, economics of stress management, visit to orchards and water shed locations.

SOA/HE 520: Advances in Breeding of Ornamental Crops

Principles-Evolution of varieties, origin, distribution, genetic resources, genetic divergence- Patents

Genetic inheritance of flower colour, doubleness, flower size, fragrance, post harvest life.

Breeding methods suitable for sexually and asexually propagated flower crops and ornamental plants-- introduction, selection, domestication, polyploid and mutation breeding for varietal development, Role of heterosis, Production of hybrids, Male sterility, incompatibility problems, seed production of flower crops.

Breeding constraints and achievements made in commercial flowers - rose, jasmine, chrysanthemum, marigold, tuberose, crossandra, carnation, dahlia, gerbera, gladioli, orchids, anthurium, aster, heliconia, lilliums, nerium.

Breeding constraints and achievements made in ornamental plants – petunia, hibiscus, bougainvillea, Flowering annuals (zinnia, cosmos, dianthus, snap dragon, pansy) and ornamental foliages– Introduction and selection of plants for waterscaping and xeriscaping.

Practicals- Description of botanical features– Cataloguing of cultivars, varieties and species in flowers, floral biology, selfing and crossing, evaluation of hybrid progenies, seed production-Induction of mutants through physical and chemical mutagens, induction of polyploidy, screening of plants for biotic, abiotic stresses and environmental pollution, *in vitro* breeding in flower crops and ornamental plants.

SOA/HE 521: Organic Horticulture

Organic horticulture – definition, synonyms and misnomers, principles, methods, merits and demerits.

Organic farming systems, components of organic horticultural systems, different organic inputs, their role in organic horticulture, role of biofertilizers, biodynamics and the recent developments.

EM technology and its impact in organic horticulture, indigenous practices of organic farming, sustainable soil fertility management, and weed management practices in organic farming, biological/natural control of pests and diseases, organic horticulture in quality improvement. GAP - Principles and management, HACCP exercise, certification of organic products and systems, agencies involved at national and international levels, standards evolved by different agencies.

Constraints in certification, organic horticulture and export, IFOAM and global scenario of organic movement, post-harvest management of organic produce.

Practicals- Features of organic orchards, working out conversion plan, Input analysis manures, nutrient status assessment of manures, biocomposting, biofertilizers and their application, pancha gavya preparation and other 20 organic nutrients application, methods of preparation of compost, vermicompost, green manuring, preparation of neem products and application, BD preparations and their role, EM technology and products, biological/natural control of pests and diseases, soil solarization, frame work for GAP, case studies, HACCP analysis, residue analysis in organic products, documentation for certification, visit to fields cultivated under organic practices.

Thesis: Objective and evaluation

Aim of introducing thesis in M. Sc.(Ag.) Horticulture is to give the students preliminary exposure for conducting the research and presenting its findings systematically and scientifically in a manuscript shape. To fulfill this goal, a specific topic for thesis research shall be assigned to each M. Sc. student by the teacher(s)/supervisor(s) of the department, in the first semester. The student will carry out the research for thesis under the respective supervisor(s) and finally present it in a book shape called thesis.

Each student will submit the thesis to the department/university towards the end of fourth semester of M. Sc. (Ag.) Horticulture degree.

Evaluation of Thesis:

The procedure will be as under:

- i. Critical examination of thesis by the external expert appointed by the university as per specialization of thesis work.
- ii. Each student shall give open presentation of thesis work before external/internal examiners, faculty members and students in the department.

List of B.Sc. VIII Sem students undertaking field projects, 2017-18

2. Chandni Negi



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that Miss Chandni Negi, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Plant Tissue Culture under Horticulture Work Experience W.e.f. 1st Feb. to May 18th, 2018 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.

Dated-22.05.2018

Prof.(A.R. Nautiyal)
Director

DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

3. Chera Mizu

Library
Dept. of Horticulture

प्रमाण पत्र

प्रमाणित किया जाता है कि श्री/कुमारी/श्रीमती चैरा मेजू पुत्र/पुत्री/पत्नी श्री चैरा तालाम निवासी ग्राम चुलियु डाकघर याजाती जिला लोअर सुवनसीरी अरुणाचल प्रदेश ने बागवानी फसल उत्पादन एवं नर्सरी प्रबन्धन के अन्तर्गत 01.02.2018 से 19.05.2018 तक PCDO फल सन्तति एवं प्रदर्शन उद्यान हराबाग में प्रशिक्षण प्राप्त किया तथा विषय पर आयोजित प्रशिक्षण में सफलतापूर्वक भाग लिया है।

प्रभारी *Kavita*
फल सन्तति एवं प्रदर्शन उद्यान
हराबाग तहसील सुंदरनगर
मण्डी जिला मण्डी हि०प्र०

S. N. Dutt
उपनिदेशक उद्यान
मण्डी जिला मण्डी हि०प्र०
Mandi Distt. Mandi (H.P.)

No. Udyan P.C.D.O. HaraBag 7/99 21 Date 19/05/2018.

Kavita
HARABAG

4. Diksha Bhatt

प्रमाण-पत्र

प्रमाणित किया जाता है कि कु0 दीक्षा भट्ट जो कि हेमवती नन्दन बहुगुणा गढ़वाल विश्वविद्यालय श्री नगर (गढ़वाल) की छात्रा है, द्वारा राजकीय पौधालय कालाढूंगी, रामगढ़, सतबूंगा एवं भीमताल में 1 फरवरी 2018 से 18 मई 2018 तक औद्यानिकी से सम्बंधित समस्त गतिविधियों की जानकारी एवं तकनीकी मार्ग दर्शन प्राप्त किया।


मुख्य उद्यमन अधिकारी
नैनीताल

5. E. Binakumari



INDIAN COUNCIL OF AGRICULTURAL RESEARCH
ICAR RESEARCH COMPLEX FOR NEH REGION
Manipur Centre, Lamphelpat, Imphal-795 004



Phone : 0385-2414654 (O), 9436891040 (M), 0385-2414260/749 (F), Email :
ssroy.icar@nic.in, subhrasaikat@gmail.com

Dr. S. S. Roy
Scientist (Horticulture)

F. No.
ARC/10/Misc./2010
Dated 8th May, 2018

Certificate of Course Coordinator

This is to certify that the work recorded in the report entitled "Production and Quality Analysis of Horticultural Crops" submitted by Miss E. Binakumari Devi, B.Sc. (Horticulture), VIII Semester, Hemwati Nandan Bahuguna Garhwal University, Srinagar, Garhwal, Uttarakhand in fulfilment of her Three Months Training Programme is a faithful research work accomplished under my personal supervision and guidance during 1 February, 2018 to 18th May, 2018 at ICAR Research Complex for NEH Region, Manipur Centre, Imphal.

The said work was carried out under the "Institute Flagship Programme on Medicinal Plants". Hence, this report, in part or whole, must not be published in any books, journals, websites and other public domain or otherwise publicized without prior permission of the Institute.

The assistance and help received from various sources during the course of investigation have been duly acknowledged.


(Subhrasaikat Roy)

Course Coordinator

Library
Dept. of Horticulture



INDIAN COUNCIL OF AGRICULTURAL RESEARCH
ICAR RESEARCH COMPLEX FOR NEH REGION

Manipur Centre, Lamphelpat, Imphal-795 004

Phone : 0385-2414654 (O), 9436891040 (M), 0385-2414260/749 (F), Email : ssroy.icar@nic.in, subhraisaiikat@gmail.com



Dr.S. S. Roy

Scientist (Horticulture)

F. No. ARC/10/Misc./2010

Dated 8th May, 2018

Certificate of Course Coordinator

This is to certify that the work recorded in the report entitled "**Production and Quality Analysis of Horticultural Crops**" submitted by **Miss G. Sushma Devi**, B.Sc. (Horticulture), VIII Semester, Hemwati Nandan Bahuguna Garhwal University, Srinagar, Garhwal, Uttarakhand in fulfilment of her Three Months Training Programme is a faithful research work accomplished under my personal supervision and guidance during 1 February, 2018 to 18 May, 2018 at ICAR Research Complex for NEH Region, Manipur Centre, Imphal.

The said work was carried out under the "Institute Flagship Programme on Medicinal Plants". Hence, this report, in part or whole, must not be published in any books, journals, websites and other public domain or otherwise publicized without prior permission of the Institute.

The assistance and help received from various sources during the course of investigation have been duly acknowledged.


(Subhra Saikat Roy)

Course Coordinator

7. Payal Bajaj



To whom so ever it may concern

This is to certify that Ms. Payal Bajaj D/o Mr. Pradeep Bajaj, a student of B.Sc. – Horticulture, VIIIth Semester, studying at H.N.B. Garhwal University, Sri Nagar, Uttarakhand, has successfully completed her industrial training, in the field of Mushroom Cultivation & Processing from 01.02.2018 to 20.05.2018. During this period, she displayed an excellent performance and behavior. We wish her bright future.

For Flex Foods Ltd.



P.K.Singh
Sr. Manager-HR&A

May 23, 2018

BRC CERTIFIED COMPANY

REGD. OFFICE : LALTAPPAR INDUSTRIAL AREA, HARIDWAR ROAD, DEHRADUN
TEL. : +91-135-2499262 FAX. : +91-135-2499235
E-mail : flexfoodsltd@sancharnet.in, Website : flexfoodsltd.com

8. Phairembam Raveena Devi

TO WHOM IT MAY CONCERN


It is certified that Ms. Phairembam Raveena Devi of Hemwati Nandan Bahuguna Garhwal University, Srinagar, has joined to the Experimental Learning Programme on Cultivation of Mushroom for four months in the Department of Plant Pathology College of Agriculture, Central Agricultural University, Imphal.

Ms. Phairembam Raveena Devi has been given satisfactory of Experiential Learning Programme on Cultivation of Mushroom

She is not related to me.

I wish her a prosperous bright future.

Date: 18-05-2018


18/5/2018
Dr. L. Nongdren Khomba Singh
Assoc. professor
Dept. of Plant Pathology
College of Agriculture
CAU, Imphal

9. Pooja Kumari

Society for Economic and Social Studies

R.O.: C-2/205, Geeta Complex, Indira Nagar, Dehradun - 248006

Contact : 7534006201-10

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Centre for Technology and Development

Main Activities :

- Promotion and Handholding of Micro and Small Enterprises
- Natural Resource Management
- Manufacturer of FRAMERS' FOOD PRODUCT
- Regd. with KVIB, UCOST - TRC
- Empaneled Udyami Mitra Under Ministry of MSME, Govt. of India

Secretary : D Raghunandan
Manager : P. Bhandari



Date: 19.05.2018

TO WHOMSOEVER IT MAY CONCERN

Certified that **Ms. Pooja Kumari** D/o Shri Ashok Kumar student of **B.Sc Horticulture VIII Semester**, Hemwati Nandan Bahuguna Garhwal (Central) University, Srinagar (Uttarakhand) has successfully completed her Industrial Training in our Co. in the field of **Fruit and Vegetable Processing and Production** from 1st February 2018 to 19 May 2018.

During this period her performance and behaviour has been found good.

We wish her bright future.

(Vinod Uniyal)
Manager Operation

10. Priyanka Chauhan

प्रमाण पत्र

प्रमाणित किया जाता है कि श्री/कुमारी/श्रीमती प्रियंका पुत्र/पुत्री/पत्नी श्री मोहन सिंह निवासी ग्राम जरल डाकघर जुगाहन तहसील सुंदरनगर जिला मण्डी हिमाचल प्रदेश ने बागवानी फसल उत्पादन एवं नर्सरी प्रबन्धन के अन्तर्गत 01.02.2018 से 19.05.2018 तक PCDO फल सन्तति एवं प्रदर्शन उद्यान हराबाग में प्रशिक्षण प्राप्त किया तथा विषय पर आयोजित प्रशिक्षण में सफलतापूर्वक भाग लिया है।

प्रभारी *Kavita*
फल सन्तति एवं प्रदर्शन उद्यान
हराबाग तहसील सुंदरनगर
मण्डी जिला मण्डी हि०प्र०

Sankar
उपनिदेशक उद्यान
Deputy Director Horticulture
मण्डी जिला मण्डी हि०प्र०
Mandi Dist. Mandi (H.P.)

No. *udyan* PC.O.O *7/99* 22 Dated 19/05/2018

Kavita
HARADAG

11. Priyanka Panwar

*Library
Dept. of Horticulture*

To Whom it may concern

Certified that Miss Priyanka Panwar, B.Sc (Horticulture), student of semester VIII School of Agriculture & Allied Science, H.N.B. Garhwal University, Srinagar (Garhwal) U.K. has attended this unit for practical training on Preservation of Fruits & Vegetables w.e.f Feb.02 2018 to May 15,2018 . Her performance and punctuality in the assigned job was satisfactory during the period.

(D.P.Singh)

Fruit Technologist,
Fruit Canning Unit Nagrota Bagwan
District Kangra H.P.
E.mail ID nagrota@gmail.com

13. Ruku Mena

Society for Economic and Social Studies

CTD Field Station, Sahaspur, Dehradun - 248 197

Phone : 2697556 Email: ctd.dehradun@gmail.com
Tel/Fax : 2751248 Website : www.ctd.in

Centre for Technology and Development

Main Activities

- Promotion and Handholding of Micro and Small Enterprises
- Natural Resource Management
- Manufacturer of FARMERS' FOOD PRODUCT
- Regd. with KVIB, UCOST -TRC
- Empaneled Udyami Mitra under Ministry of MSME, Govt. of India

Secretary : D Raghunandan
Manager : P. Bhundari



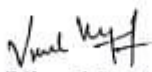
Date: 19.05.2018

TO WHOMSOEVER IT MAY CONCERN

Certified that **Ms. Ruku Mena** D/o Shri Angore Mena student of **B.Sc Horticulture VIII Semester**, Hemwati Nandan Bahuguna Garhwal (Central) University, Srinagar (Uttarakhand) has successfully completed her Industrial Training in our Co. in the field of **Fruit and Vegetable Processing and Production** from 1st February 2018 to 19 May 2018.

During this period her performance and behaviour has been found good.

We wish her bright future.


(Vinod Uniyal)
Manager Operation

14. Swati



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हे०न०ब० गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that Miss Swati student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Plant Tissue Culture under Horticulture Work Experience W.e.f. 1st Feb. to May 18th, 2018 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.

Dated-22.05.2018

Prof. (A.R. Nautiyal)

Director

DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

15. Thounaojam Kabita Devi

Library
Dept. of Horticulture

TO WHOM IT MAY CONCERN

It is certified that Ms. Thounaojam Kabita Devi of Hemwati Nandan Bahuguna Garhwal University, Srinagar, has joined to the Experimental Learning Programme on Cultivation of Mushroom for four months in the Department of Plant Pathology College of Agriculture, Central Agricultural University, Imphal.

Ms. Thounaojam Kabita Devi has been given satisfactory of Experiential Learning Programme on Cultivation of Mushroom

She is not related to me.

I wish her a prosperous bright future.

Date: 18-05-2018



18/5/2018

Dr. L. Nongdren Khomba Singh

Assoc. professor
Dept. of Plant Pathology
College of Agriculture
CAU, Imphal

Dr. L. Nongdren Khomba Singh
Associate Professor
Dept. of Plant Pathology
CAU, Imphal, Manipur

16. Yogita



गढ़-माटी संगठन

(गढ़माटी अतिथि गृह 21, 1891 & 1892 पट्टीका बजार)
(पट्टीका बजार, जिला गढ़माटी, उत्तराखण्ड-246419)
उत्तराखण्ड

साम-पत्रालय, भीरी, जिला रुद्रप्रयाग, उत्तराखण्ड-246419

मोबाइल नं: 9675732122, 7060326489

Ref. No.: GMS/OFF/013/2018

Date:

TO WHOMSOEVER IT MAY CONCERN

This is certify that **Miss. Yogita** studying B.Sc. Horticulture (VIII Semester) from Hemwati Nandan Bahuguna Garhwal University, Uttarakhand (A Central University) has successfully completed her training in our organization on "**Mushroom Production and Management**" from 01.02.18 to 19.05.18.

We have observed that the candidate is having hard working nature and sincere during the training period.

We wish her for better prospects in studies and career as well.

संस्थापक
गढ़-माटी संगठन
भीरी (उत्तराखण्ड)

17. Abimanyu



**CHARBHUJA
NURSERY**

Office : E-95, Shastri Nagar,
Opp. Rastrapati Maidan, Jaipur
Nursery : Bagwara, Teh. Amer,
Jaipur (Raj.)

No. 13/1578/2015

Dated : 20/05/2018

Dr. D.K. Rana
Assistant Professor
Deptt. of Horticulture
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.

Sub.:- Relieving & no dues of the HWE students

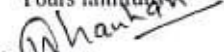
Ref. : No, dated 29.01.2018

Sir,

As per the subject & reference cited that **Mr. Abhimanyu**, students of B.Sc. Horticulture, 4th year were deployed here for HWE. These students have been relieved in 20.05.2018 after completion of first hand training on **Nursery Management and propagation Techniques in Horticultural Crops** from Feb., 2018 to May, 2018. All the students have been submitted NO DUES & PROJECT REPORT to this Office.



This is submitted for your kind information

For CHARBHUJA NURSERY
Yours faithfully


Vijay Singh Choudhary
M.Sc. Ag. (Hort., Ento)
For Charbhuj Nursery
Programme Coordinator

+91 9414381809, +91 9414224582
charbhujanursery@gmail.com
www.charbhujanursery.com

18. Hemant

	COLLEGE OF HORTICULTURE VCSG UTTARAKHAND UNIVERSITY OF HORTICULTURE & FORESTRY Bharsar, Pauri Garhwal, Uttarakhand - 246 123 Mob-9568846388, Email ID: sraviachieve@gmail.com
<i>Dr. Sanjeev Ravi</i> Assistant Professor, Plant Pathology VCSG UHF, Bharsar	
Ref. No. CH PAI/245	Date: 21-05-2018
<u>To Whomsoever It May Concern</u>	
<p>This is to certify that Mr. Hemant, B.Sc.Horticulture, 4th year H.N.B. Garhwal University, Srinagar (Garhwal) Uttarakhand, has successfully completed his internship programme, on Mushroom Production and Management, in Mushroom Research Unit, Department of Plant Pathology, Bharsar w.e.f. Feb. 01, 2018 to May 20, 2018. He is sincere, honest and committed throughout the training period. His performance over all was found satisfactory.</p> <p>I wish him success in all his endeavour.</p>	
 (Sanjeev Ravi) Assistant Professor Department of Plant Pathology VCSG UHF Bharsar	

19. Mahendra Kumar



**CHARBHUJA
NURSERY**

Office : E-95, Shastri Nagar,
Opp. Rastrapati Maidan, Jaipur
Nursery : Bagwara, Teh. Amer,
Jaipur (Raj.)

No. 13/1578/2015

Dated : 20/05/2018

Dr. D.K. Rana
Assistant Professor
Deptt. of Horticulture
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.

Sub:- Relieving & no dues of the HWE students

Ref. : No. dated 29.01.2018

Sir,

As per the subject & reference cited that **Mr. Mahendra Kumar**, students of B.Sc. Horticulture, 4th year were deployed here for HWE. These students have been relieved in 20.05.2018 after completion of first hand training on **Nursery Management and propagation Techniques in Horticultural Crops** from Feb., 2018 to May, 2018. All the students have been submitted NO DUES & PROJECT REPORT to this Office.

This is submitted for your kind information

Yours faithfully
(Signature)

Vijay Singh Choudhary
M.Sc. Ag. (Hort., Ento)
For Charbhuj Nursery
Programme Coordinator

+91 9414381809, +91 9414224582
charbhujanursery@gmail.com
www.charbhujanursery.com

20. Nitesh

HIMACHAL PRADESH HORTICULTURAL
PRODUCE MARKETING & PROCESSING
CORPORATION LTD.
(GOVERNMENT UNDERTAKING)



हिमाचल प्रदेश उद्यान उपज विपणन
एवम् निष्पादन सीमित
(एक सरकारी प्रतिष्ठान)

FRUIT PROCESSING PLANT, JAROL,
SUNDERNAGAR-174401, DISTT. MANDI H.P.
Ph. : 01907-275222, Telefax : 01907-275210

REF. NO. hpme/FPP/JR1./ Industrial Training /2018-19: 251

Dated 19.05.2018

TO WHOM IT MAY CONCERN

This is to certify that Mr. Nitesh Chauhan, En. No. 14930015 student of B. Sc. Horticulture, 8th Semester of Department of Horticulture, School of Agriculture & Allied Science, IINB Garhwal, University, Srinagar, Uttarakhand, has completed his training at hpme Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal Pradesh w.e.f. 01st Feb 2018 to 19th May 2018.

During training period his work and conduct has been found satisfactory.

I wish him all the success in his life.

Caush
19/5/2018

Addl. General Manager
hpme FPP Jarol
Sunder Nagar Distt. Mandi (H.P.)

Regd. Office : hpme Nigam Vihar,
Shimla - 171 002 H.P.

hpme
CST No. MND-1004
GST No. MND-1637
TIN No. : 02090300051

Ph. : 0177 - 2623832, 3623836
FAX : 0177 - 2623823, 2623834

21. Rahul

Library
Dept. of Horticulture

प्रमाण पत्र

प्रमाणित किया जाता है कि श्री/कुमारी/श्रीमती राहुल पुत्र/पुत्री/पत्नी श्री रमेश निवासी ग्राम कठियाल डाकघर कुम्भी तहसील बल्लू जिला मण्डी हिमाचल प्रदेश ने बागवानी फसल उत्पादन एवं नर्सरी प्रबन्धन के अन्तर्गत 01.02.2018 से 19.05.2018 तक PCDO फल सन्तति एवं प्रदर्शन उद्यान हराबाग में प्रशिक्षण प्राप्त किया तथा विषय पर आयोजित प्रशिक्षण में सफलतापूर्वक भाग लिया है।

प्रभारी *Kaul*
फल सन्तति एवं प्रदर्शन उद्यान
हराबाग तहसील सुंदरनगर
मण्डी जिला मण्डी हि०प्र०

Sharma
उपनिदेशक उद्यान
Deputy Director Horticulture
मण्डी जिला मण्डी हि०प्र० (H.P.)

No. 4499 P.C.O.O (JP) 7/99 23 Dated 19/05/2018

Kaul
Deputy Director Horticulture
हराबाग

22. Ramswaroop Choudhary



**CHARBHUJA
NURSERY**

Office : E-95, Shastri Nagar,
Opp. Rastrapati Maidan, Jaipur
Nursery : Bagwara, Teh. Amer,
Jaipur (Raj.)

No. 13/1578/2015

Dated : 20/05/2018

Dr. D.K. Rana
Assistant Professor
Deptt. of Horticulture
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.

Sub:- Relieving & no dues of the HWE students

Ref. : No. dated 29.01.2018

Sir,

As per the subject & reference cited that **Mr. Ramswaroop Choudhary**, students of B.Sc. Horticulture, 4th year were deployed here for HWE. These students have been relieved in 20.05.2018 after completion of first hand training on **Nursery Management and propagation Techniques in Horticultural Crops** from Feb., 2018 to May, 2018. All the students have been submitted NO DUES & PROJECT REPORT to this Office.

This is submitted for your kind information

CHARBHUJA NURSERY

Yours faithfully,

Vijay Singh Chouhan
M.Sc. Ag. (Hort., Ento)
For Charbhuj Nursery
Programme Coordinator

23. Sadananda Tourangbam



DEPARTMENT OF HORTICULTURE COLLEGE OF AGRICULTURE, CAU, IMPHAL

TO WHOM IT MAY CONCERN

This is to certify that **Mr. Sadananda Tourangbam**, Enrollment No. 1490025, B.Sc. Horticulture, VIII Semester, Hemvati Nandan Bahuguna Garhwal University, Srinagar Garhwal, Uttarakhand has successfully completed 90 days training on Experiential Learning on "Raising of Vegetables and Planting Material" for Course No. Hort 48H for the year 2018 and detail report has been submitted and found satisfactory.


19/5/2018

U. Chaoba Singh
Prof. and HOD
Department of Horticulture
Dr. U. CHAOBA SINGH
Professor & Head
Dept. of Horticulture
College of Agriculture
CAU, Imphal - 795 001

24. Subhajit Nandi



Govt. of West Bengal
District Horticulture Office
Department of F P I & Horticulture
Purulia

Library
Dept. of Horticulture

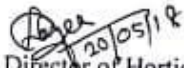
No. 66/DHO/PRL

Date 20/05/18


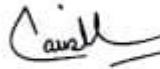
CERTIFICATE

This is to certify that the report entitled "**Study Modern Horticulture by Mulching & Drip irrigation**" at our campus in Purulia district of West Bengal is a faithful record of bona-fide research work carried out by **Mr. Subhajit Nandi** under our guidance & supervision.

All the assistance and help received during this investigation and sources of literature have been duly acknowledged. The duration of research work is 01/02/18 to 20/05/18.


Assistant Director of Horticulture
Purulia
Assistant Director of Horticulture
Dept. of FPI & H. Govt. of W.B.
Purulia

25. Vinay

HIMACHAL PRADESH HORTICULTURAL PRODUCE MARKETING & PROCESSING CORPORATION LTD. (A GOVERNMENT UNDERTAKING)		हिमाचल प्रदेश उद्यान उपज विपणन एवम् विद्यमान समित (एक सरकारी प्रतिष्ठान) FRUIT PROCESSING PLANT, JAROL, SUNDERNAGAR-174401, DISTT. MANDI H.P. Ph. : 01907-275222, Telefax : 01907-275210
REF. NO. hpmc/FPP/JRL./ Industrial Training /2018-19: <u>252</u>		Dated 19.05.2018
<u>TO WHOM IT MAY CONCERN</u>		
<p>This is to certify that Mr. Vinay, En. No. 14930031 student of B. Sc. Horticulture, 8th Semester of Department of Horticulture, School of Agriculture & Allied Science, HNB Garhwal, University, Srinagar, Uttarakhand, has completed his training at hpmc Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal Pradesh w.e.f. 01st Feb 2018 to 19th May 2018.</p> <p>During training period his work and conduct has been found satisfactory.</p> <p>I wish his all the success in his life.</p>		
<p> Addl. General Manager hpmc FPP Jarol Sunder Nagar Distt. Mandi (H.P.)</p>		
Regd. Office : hpmc Nigam Vihar, Shimla - 171 002 H.P.	hpmc CST No. MND-1004 GST No. MND-1637 TIN No. : 02090300051	Ph. : 0177 - 2623832, 3623836 FAX : 0177 - 2623823, 2623834

List of M.Sc. IV Sem undertaking research projects, 2017-18

1. Hema



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2018/364

Date: 14/10/2018

CERTIFICATE

This is to certify that the thesis entitled "**Evaluation of French Bean (*Phaseolus vulgaris* L.) Genotypes for Growth, Pod Yield and Quality under Subtropical Condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of the university by **Miss Hema, Roll No. 16134338001, Enrollment No. G12730003** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. D.K. Rana)


(Dr. Kh. Naseeruddin Shah)

2. Jenifer A Sangma



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

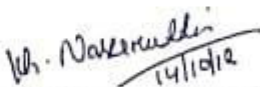
Ref: HNB44/Hort/2018/368

Date: 14/10/2018

CERTIFICATE

This is to certify that the thesis entitled “Effects of Integrated Nutrient Management on Growth, Yield and Quality of Cauliflower (*Brassica oleracea* L. var. *botrytis*) Cv. Pusa Kartiki under Garhwal Himalaya Region” being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Department of Horticulture of the university by **Ms. Jenifar A Sangma**, Roll No. **16134338002**, Enrollment No. **G12730004** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Kh. Naseeruddin Shah)

3. Manisha Deb Berma



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: H-1344/101/2018/27

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "Study of Genetic Variability, Correlation and Path Analysis in Bottle Gourd [*Lagenaria siceraria* (Mol.) Standl.] Genotypes under Garhwal Himalayan Region" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of the university by Miss Manisha Deb, Roll No. 16134338003, Enrollment No. G161341322 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. D.K. Rana)


(Dr. Kh. Naseeruddin Shah)

4. Rituparna Das



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2018/367

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "**Sex Modification in Cucumber (*Cucumis sativus* L.) Cv. Pusa Sanyog under Valley Conditions of Garhwal Hill**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Rituparna Das**, Roll No.16134338004, Enrollment No. **G.161341323** under the guidance of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. D.K. Rana


Dr. Vivek Singh

5. Sonali Mahajan



DEPARTMENT OF HORTICULTURE

School of Agriculture and Allied Science

H.N.B. Garhwal University, Srinagar (Garhwal), U.K.

(A Central University)

Dr. D.K. Rana

Assistant Professor & Head

☎ 01370267603(O)

+919412137680(M)

Email: drdkrana@gmail.com

Ref: HN BGU/Host/2018/365

Date: 14/Oct./2018

CERTIFICATE

This is to certify that the thesis entitled "Effect of Different Concentration of Nutrient and PGRs on Quality and Yield of Mango (*Mangifera indica* L.) cv. Amrapalli under Valley Conditions of Garhwal Hill" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Miss Sonali Mahajan, Roll No. 16134338006, Enrollment No. G161341325** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

6. Sangeeta Yadav



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2018/369

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled “Effect of Micronutrients on Growth, Yield and Quality of Brinjal (*Solanum melongena* L.) Cv. Pant Rituraj under Valley Conditions of Garhwal Hills” being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Department of Horticulture of the university by **Miss. Sangeeta Yadav**, Roll No. 16134338005, Enrollment No. G.161341324 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. D.K. Rana

Dr. Kh. Naseeruddin Shah

7. Amit Negi



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HN 244/Hort/2018/360

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "**Studies on Integrated Nutrient Management on Growth, Yield and Quality of Carrot (*Daucus carota* L.) Cv. Pusa Vasuda under Valley Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Amit Negi**, Roll No. **16114338007**, Enrollment No. **G12730015** under the joint supervision of Dr. D.K. Rana (Assistant Professor) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. D.K. Rana
(Asst. Professor)

Dr. Vivek Singh
Lecturer

8. Ashutosh Agnihotri



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Dr. D.K. Rana
(Assistant Professor & Head)

+919412137680

Email: drdkrana@gmail.com

Ref: HNBU/Hort/2018/361

Date: 14/10/2018

CERTIFICATE

This is to certify that the thesis entitled "**Assessment of Variability in Fruit Characteristics of Local Malta (*Citrus sinensis* L. Osbeck)**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Department of Horticulture of the university by **Mr. Ashutosh Agnihotri, Roll No. 16134338008, Enrollment No. G12730013** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(D.K. Rana)

9. Harendra Kumar



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Dr. D.K. Rana
Assistant Professor & Head


01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref: HNBGU/Hort/2018/373

Date: 14/10/2018

CERTIFICATE

This is to certify that the thesis entitled "Effect of Inorganic Fertilizers, Azotobacter and GA₃ on Growth, Yield and Quality of sprouting broccoli under Sub-Tropical Condition of Garhwal Himalaya" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Harendra Kumar**, Roll No. 16134338009, Enrollment No. G. 12730019 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. D.K. Rana


Dr. Vivek Singh

10. Kurumashetty Mahesh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGL/Hort/2018/363

Date: 14-10-2018

CERTIFICATE

This is to certify that the thesis entitled "Effect of Pre-emergence and Post-emergence Herbicides in Brinjal (*Solanum melongena* L.) Cv. Pant Rituraj under Subtropical Conditions of Garhwal Hills" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Department of Horticulture of the university by **Mr. Kurumashetty Mahesh**, Roll No. 16134338010, Enrollment No. G161341326 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Kh. Naseeruddin Shah)

11. Rohit Kumar Kharra



Dr. D.K. Rana
Assistant Professor & Head

DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref: HNBGU/Hort/2018/372

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "**Combined Effect of Spacing and Different Bio-fertilizer on Growth and Yield of Turnip (*Brassica rapa* L.) cv. Pusa Sweti under Valley Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Rohit Kumar Kharra**, Roll No. **16134338011**, Enrollment No. **G. 12730021** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Vivek Singh)



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2018/362

Date: 14-10-2018

CERTIFICATE

This is to certify that the thesis entitled "**Effect of Different Organic Manures and Their Combinations on Growth, Yield and Quality of Bitter Gourd (*Momordica charantia* L.) Cv. Pusa Do Mausami under Subtropical Condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Mr. Safal Rai, Roll No. 16134338012, Enrollment No. G11730081** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Kh. Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

Dr. (Kh. Naseeruddin Shah)

13. Samay Singh Meena



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HM244/ Hort/2018/266

Date: 14/10/2018

CERTIFICATE

This is to certify that the thesis entitled “Effect of Organic and Inorganic Fertilizers on Growth, Yield and Quality of Okra [*Abelmoschus esculentus* (L.) Moench] Cv. Arka Anamika Under Valley Condition of Garhwal Hills” being submitted in partial fulfilment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by Mr. Samay Singh Meena, Roll No. 16134338013, Enrolment No. G161341327 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

Dr. (Vivek Singh)

14. Sundeep Chauhan



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HR 1344/ Hort/ 2018/374

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "Effect of Bio-fertilizers on Growth, Yield and Quality of Pea (*Pisum sativum* L.) under Garhwal Himalaya" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of the university by **Ms. Sandeep Chouhan** Roll No. 16134338014, Enrollment No. G. 161341328 under the joint supervision of Dr. D.K. Rana (Assistant Professor) and Mr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

Mr. (Vivek Singh)



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBU/Hort/2018/370

Date: 14/10/18

CERTIFICATE

This is to certify that the thesis entitled "**Genetic Variability and Correlation Studies in Chilli (*Capsicum annum* var. *accuminatum* L.) Genotypes for Quantitative and Qualitative Traits under Subtropical Condition of Garhwal Himalaya**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Department of Horticulture of the university by **Mr. Yuvaraj Rathor**, Roll No. 16134338015, Enrollment No. G. 161341329 under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Vivek Singh)

List of B.Sc. VIII Sem students undertaking field projects 2018-19

1. Hansha



Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: info@fordindia.org, www.fordindia.org

Reg. No 558/2004-2005

Ref: 226/3 /FORD/2019

Dated: 20th May 2019

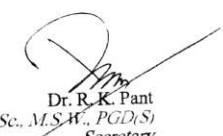
Certificate of Work Experience

This is to certify that **Ms. Hansha Bisht** D/O **Shri Laxman Singh Bisht** a student of **B.Sc (Hort.)**, 4th year of **Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK** attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.


To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. She also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training her behavior, conduct and performance remained satisfactory.

We wish her success in her future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

2. Suchita Uniyal




TO WHOMSOEVER IT MAY CONCERN

DATE: 18/05/2019

This is certified that **Ms. Suchita Uniyal**, En. No. C/151340144, (D/O) **Sh. Mahaveer Prasad Uniyal** student of B.Sc. Horticulture, 4th year, from School of Agriculture and Allied Science, HNB Garhwal University, Srinagar has undergone training from 01/02/2019 to 18/05/2019 on: **Maximum Cultivation and Management** at our unit at Pantnagar.

During this period she showed good character and discipline.

We wish her good luck for her future endeavors.

 HIMALAYA FOOD INTERNATIONAL LIMITED

Himalaya Food International Ltd.
CIN: 179102DL1969PLC047399 Formerly known as Himalaya International Ltd.

Contact@HimalayaFoodCompany.com www.HimalayaFoodCompany.com

Registered Office:
E-555, 1st floor, Sector - 7,
Dwarka, New Delhi - 110 075
Tel: +91-11-45108609

Shubhkhara, Pantnagar Sahib,
Himachal Pradesh - 173 225
Tel: +91-1754-223404, Fax 225178

Plants:
Vishnagar, Mehnana
Gujarat - 386 355
Telefax: +91-2761-309030

3. Akshita Bisht




भाकृअनुप-विवेकानन्द पर्वतीय कृषि अनुसंधान संस्थान
ICAR -Vivekananda Parvatiya Krishi Anusandhan Sansthan
अल्मोड़ा-263601, उत्तराखण्ड, भारत
Almora - 263601, Uttarakhand, India



CERTIFICATE

This is to certify that **Ms. Akshita Bisht**, B.Sc. (Horticulture), VIII Semester, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully completed first hand training on **"Mushroom Cultivation and Management"** in Mushroom Laboratory, Crop Protection Division, ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, Uttarakhand, India during February 01-May 20, 2019.


(Krishna Kant Mishra)
Supervisor


(A. Pattanayak)
Director

4. Alice Kaintura





High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बहगुना विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that Miss Alice Kaintura D/o Mr. Dharmendra Singh Kaintura, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.


Dr. (V.K. Purohit)
Supervisor
High Altitude Plant Physiology Research Centre
H.N.B. Garhwal University
Srinagar Garhwal - 246174


Prof. (P. Prasad)
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

counter-signed



DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

5. Annta Semwal



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हे०न०ब० गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that **Miss Ananta Semwal D/o Mr. Devendra Prasad Semwal**, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.

Dr. V.K. Purohit
Supervisor

HNBGU, Srinagar Garhwal
Uttarakhand - 246174

Prof. (P. Prasad)
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

countersigned

DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

6. Chanambam Aene Chanu

**COLLEGE OF AGRICULTURE, CENTRAL
AGRICULTURAL UNIVERSITY, IMPHAL**



CERTIFICATE

This is to certify that the Experimental Learning Report on entitled "Processing of Horticultural Crops" being submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Horticulture of the College of Agriculture, CAU, Imphal is record of bonafide experimental work carried out at Department of Agri-Engineering College of Agriculture, CAU, Imphal by Miss Chanambam Aene Chanu, Roll no. 15134105006, Enrolment no.G151340148 under the supervision of Dr. Ng Joykumar Singh (Assistant Professor) Agri-Engineering College of Agriculture, CAU, Imphal.



Supervisor

Dr. Ng Joykumar Singh
Asstt. Prof. (Agril. Engg.)
Central Agricultural University
Iroisemba, Imphal.



Dr. Y. Jekendra Singh,
Dean, College of
Agriculture, CAU, Imphal

Dean
College of Agriculture,
Central Agricultural University,
Imphal

7. Chanchal Tiwari



Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: organicfoundation@rediffmail.com, www.fordddn.org

Reg. No. 156/2014-2015

Ref: 22-7/3 /FORD-2019

Dated 20th May 2019

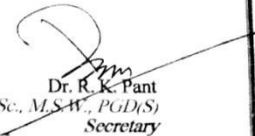
Certificate of Work Experience

This is to certify that Ms. *Chanchal Tiwari* D/O *Shri Rajneesh Kant Tiwari* a student of *B.Sc (Hort.)*, 4th year of *Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK* attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. She also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training her behavior, conduct and performance remained satisfactory.

We wish her success in her future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

8. Khushboo



qualityaustria

PATANJALI

PATANJALI AYURVED LIMITED

(CIN : U24237DL2006PLC144789)



An ISO 9001 : 2008, 14001 : 2004, 22000 : 2005, OHSAS 18001 : 2007 / HALAL/ GMP Certified Company

Date: 20th May 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Khushboo**, student of B.Sc.- Horticulture, Hemvati Nandan Bahuguna Garhwal University, Srinagar has undergone "**Industrial Training(preservation and processing of Fruits and vegetable Crops)**" in our organization, which was successfully imparted with effect from **1st Feb 2019 to 20th May 2019**.

During the tenure of her internship, we found her sincere, honest, hardworking, result oriented and striving for higher goals.

We wish her all success in her future career endeavours.

For Patanjali Ayurved Limited.

Authorized Signatory

Regd. Office: D-26, Pushpanjali Bijwasan, New Delhi - 110061

Corporate Office: Unit-III, Patanjali Food & Herbal Park, Vill.-Padartha, Haridwar-Laksar Road, Haridwar - 249404, Uttarakhand, (INDIA)

Contact : 01334-265370 E-mail : feedback@patanjaliayurved.org Web : www.patanjaliayurved.org

9. Linthiongambi Ningombam

Library
Branch of Horticulture

HORTICULTURE WORK EXPERIENCE (H.W.E). COLLEGE OF AGRICULTURE, CAU, IMPHAL



CERTIFICATE

This is to certify that Miss **Linthiongambi Ningombam**, student of B.Sc horticulture, final year, enrolment number G151340151 from **H.N.B Garhwal University, Srinagar, Uttarakhan**, has successfully completed his **Horticulture Work Experience (HWE)**, in our college, **Centre Agriculture University (CAU)**, **Iroisemba** in the field of "**Processing of Horticultural Crops**" From 01/02/2109 to 13/05/2019.

During this period her performance and behaviour have been found good.

I believe that the report fulfill part of the requirements for the subject.


Supervisor

Dr. Ng. Joykumar Singh
Asstt. Prof. (Agril. Engg.)
Central Agricultural University
Iroisemba, Imphal.



Dean (Dept. of Agricultural Engineering)

Dr. Y. Jekendra Singh
DEAN
College of Agriculture
Central Agricultural University
Imphal

10. Neetu Semwal



Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: foundation@fords.in, fords@gmail.com

Reg. No: 0563004/2008

Ref: 228/3 /FORD 2019

Dated: 20th May 2019


Certificate of Work Experience

This is to certify that Ms. *Neetu Semwal* D/O Late Shri Diwakar Prasad Semwal a student of B.Sc (Hort.), 4th year of Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. She also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training her behavior, conduct and performance remained satisfactory.

We wish her success in her future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

11. Pallavi

To Whom It May Concern

Certified that Miss. Pallavi, D/O Sh. Krishan Chand, student of B.Sc (Horticulture) semester -VIII has attended this unit for practical training on Preservation of Fruits & Vegetables w.e.f Feb. 01, 2019 to May 20,2019 . Her performance and punctuality in the assigned job was satisfactory during the period.

(D.P.Singh)

Fruit Technologist
H. P. Fruit Canning Unit
Negrota Bagwan (Kangra) H.P.

12. Priyanshu Sharma

Mushroom Development Project,
Palampur District Kangra HP 176062.

MDP 2/2/2018-19- 144

Dated

21 MAY 2019

'TO WHOM IT MAY CONCERN'

Certified that Miss Priyanshu Sharma D/o Sh Mahesh Sharam is a bonafide student of B. Sc. ~~Agriculture~~ ^{Horticulture} 4th year in 8th semester from HNB Garhwal University Srinagar U.K India. She was attached to this office under RAWE programme under intimation to Director of Horticulture HP. She was given training on Mushroom Cultivation and its Management and utilized the facilities w.e.f 05/02/2019 to 21/05/2019. During this period, she has acquired technical know how in respect of history and scope of mushroom cultivation, preparation of pasteurized compost and casing soil, spawn production and spawning technique, identification of edible & poisonous mushroom. Further training was imparted on infra structure required for seasonal and round the year cultivation of mushrooms, crop management in white button mushroom, oyster, milky mushroom, management of competitors moulds, diseases and insect- pest. Training continued on nutritional, medicinal properties of mushroom, post harvest technology of mushrooms, cultivation of speciality mushroom, shiitake and ganoderma etc. She also visited local mushroom growers cultivation units to see the practices adopted. A certificate of (RAWE) work experience for 3 months and sixteen days w.e.f. 05/02/2019 to 21/05/2019 is hereby issued in her favour.

(Susheel Awasthi)
Subject Matter Specialist Horticulture,
Mushroom Development Project,
Palampur, District Kangra (H.P.)

SV

13. Raksha Chauhan

To Whom It May Concern

Certified that Miss. Raksha Chauhan, D/O Sh. Bham Chand, student of B.Sc (Horticulture) semester -VIII has attended this unit for practical training on Preservation of Fruits & Vegetables w.e.f Feb. 01, 2019 to May 20, 2019. Her performance and punctuality in the assigned job was satisfactory during the period.

(D.P.Singh)

Fruit Technologist
H. P. Fruit Canning Unit
Nagrota Bagwan (Kangra) H.P.

14. S. Deepthi



SWASTIKA ENTERPRISE

To whom so ever it may concern

DATED:20-05-2019

This is to certify that Miss. S. Deepthi, En.No:G151340157 a student of 8th sem , DEPARTMENT OF HORTICULTURE, Hemawati Nandan Bahuguna Garhwal university,(A Central University), Srinagar (Garhwal), Uttarakhand, has successfully completed training in our company in the field of Production, Processing & Canning of mushroom from 01-02-2019 to 20-05-2019. During this period her performance and behaviour have been found good. We wish her bright future.



Regd.office : Plot No 1-36/12/1/27, Reddy colony, Chandanagar, Hyderabad , R.R. dist, (T.S) 500050.
RegNo:23619028000110.
Customer help line: 9705144900.

15. Sailina Singh




High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेनननबन गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that Miss Sailina Singh D/o Mr. Deviprasad, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.


Dr. (V.K.) Parohit
Supervisor
High Altitude Plant Physiology Research Centre
H.N.B. Garhwal University
Srinagar (Garhwal) Uttarakhand - 246174


Prof. (P.) Prasad
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

counter signed


DIRECTOR
HAPPRC. P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174




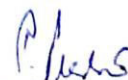
High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नंदन गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director


Certificate of Training

This is to certify that Miss Seeta D/o Mr. Kalam Singh, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.


Dr. (V.K. Purohit)
Supervisor
High Altitude Plant Physiology Research Centre
H.N.B. Garhwal University
Srinagar (Garhwal) Uttarakhand - 246174


Prof. (P. Prasad)
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

counter-signed


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

17. Shalini Butola




High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेनवती नंदन बाहुगुणा गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that Miss Shalini Butola D/o Mr. Chandra Singh Butola, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.


Dr. (V.K.) Purohit
Supervisor
High Altitude Plant Physiology Research Centre
H.N.B. Garhwal University
Srinagar (Garhwal) Uttarakhand - 246174


Prof. (P. Prasad)
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

counter signed


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

18. Sheetal Shah



Reg. No 559/2004/2005

Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: organicfoundation@rediffmail.com, www.fordddn.org

Ref: 225/3 /FORD/2019

Dated 20th May 2019

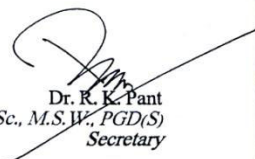
Certificate of Work Experience

This is to certify that Ms. **Sheetal Shah** D/O Shri Murli Shah a student of B.Sc (Hort.), 4th year of Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. She also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training her behavior, conduct and performance remained satisfactory.

We wish her success in her future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

**REPORT ON STUDENT'S EXPERIENTIAL
LEARNING PROGRAM-2019**
COLLEGE OF AGRICULTURE, CAU, IMPHAL



CERTIFICATE

This is to certify that *Miss Sororya Ningshen* student of *B.Sc Horticulture, Final year*, enrollment number **G15134105020** H.N.B Garhwal University, Srinagar, Uttarakhand has successfully completed his Horticulture Work Experience (HWE), in our College of Agriculture, Central Agriculture University (CAU), Iroisemba in the field of "**Processing of Horticultural Crops**" From 01/03/2109 to 13/04/2019.

During this period her performance and behavior have been found good.

I believe that the report fulfill part of the requirements for the subject.

Dr. Y. Jekendra Singh
Dean College of Agriculture

Dean
College of Agriculture,
Central Agricultural University,
Imphal.

Dr. Ng. Joykumar Singh
Supervisor
Asstt Prof (Agril Engg)
Central Agricultural University
Iroisemba, Imphal.




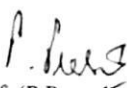
High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हे०न०ब० गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director


Certificate of Training

This is to certify that **Miss Sunita D/o Mr. Mahitab Singh**, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project Report on Propagation of Medicinal Plants under Horticultural Work Experience w.e.f. 1st Feb. to May 20th, 2019 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal under our supervision.


Dr. (V.K. Purohit)
Supervisor


Prof. (P. Prasad)
Supervisor
Prof. P. Prasad
High Altitude Plant Physiology
Research Centre
H.N.B. Garhwal University
(A Central University)
Srinagar Garhwal - 246174
Uttarakhand

countersigned


DIRECTOR
HAPPRC. P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

21. Ajad Jaguri



Reg. No 559/2004-2005

Ref: 224/3 /FORD/2019

Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: organicfoundation@rediffmail.com, www.fordddn.org

Dated 20th May 2019

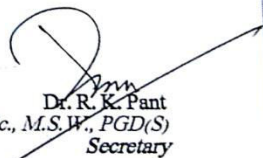
Certificate of Work Experience

This is to certify that *Shri Azad Jaguri S/O Shri Kushla Nand Jaguri* a student of *B.Sc (Hort.)*, 4th year of *Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK* attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. He also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training his behavior, conduct and performance remained satisfactory.

We wish him success in his future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

22. Anil Kumar



Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob. 9412075015, Email:

Ref: 224/3 /FORD/2019

Dated 20th May 2019

Certificate of Work Experience

This is to certify that *Shri Anil Kumar S/O Shri Sajjan Lal* a student of *B.Sc (Hort.)*, 4th year of Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. He also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training his behavior, conduct and performance remained satisfactory.

We wish him success in his future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

23. Mukesh Shivran

Telefax : 01423-235133

E-mail : kvkchomu@gmail.com

KVK KRISHI VIGYAN KENDRA



(Pragati Trust - Jaipur)

VPO-TANKARDA, CHOMU, DISTRICT-JAIPUR-303 702 (RAJASTHAN) INDIA

Ref. No. : F.1(29)RAWE/KVK/2018-19/ 70

Dated: 20/5/2019

CERTIFICATE

This is to certify that Mr. **MUKESH SHIVRAN** S/O Sh. **KISHANA RAM SHIVRAN** B.Sc.-Hort. IV Year student of **H. N. B. G. U. (A Central University)** Srinagar, Garhwal (Uttarakhand) has undergone **Horticulture Work Experience** on "Management practices of arid fruit crops" from 01/02/2019 to 20/05/2019 under our supervision and submitted his work report to this KVK. He was respectful to his senior and colleagues throughout the training period. The student has maintained 95 percent attendance during training. The overall work performance of the student was evaluated by our Institute/Organization as **Outstanding**.

We wish him all the best for his future academic endeavours.


Advisor

Dr. N.K. Gupta



(Dr. S. S. Rathore)

Programme Coordinator

24. Ningombam Lanchenba



DEPARTMENT OF HORTICULTURE

COLLEGE OF AGRICULTURE
CENTRAL AGRICULTURAL UNIVERSITY
Imphal - 795004, Manipur (India)


Dated:- Imphal 17th May, 2019

Certificate

This is to certify that Mr. Ningombam Lanthenba S/o Ningombam Sanajaoba of B.Sc.Horticulture H.N.B. Garhwal University (A Central University) Srinagar (Garhwal) Uttarakhand has completed the Horticultural Work Experience Programme entitled " Effect of different mulching systems on growth and development of strawberry under protected condition in Manipur" and "Protected Cultivation of King Chilli" during February – May of 2019 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand).

He took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.


17/5/19
(Prof. R.K Dilip Singh)
Major Adviser
Department of Horticulture, CAU

DR. R.K. DILIP SINGH
Professor
Department of Horticulture
College of Agriculture, CAU.

25. Oinam Krishnadas Singh

**COLLEGE OF AGRICULTURE, CENTRAL
AGRICULTURAL UNIVERSITY, IMPHAL**



CERTIFICATE

This is to certify that the Experimental Learning Report on entitled **"Processing of Horticultural Crops"** being submitted in partial fulfillment of the requirement for the degree of **Bachelor of Science in Horticulture** of the College of Agriculture, CAU, Imphal is record of bonafide experimental work carried out at Department of Agri-Engineering College of Agriculture, CAU, Imphal by **Mr. Oinam Krishnadas Singh**, Roll no. 15134105028, Enrolment no. G151340170 under the supervision of **Dr. Ng Joykumar Singh** (Assistant Professor) Agri-Engineering College of Agriculture, CAU, Imphal.



Supervisor

Dr. Ng Joykumar Singh
Asstt Prof (Agril. Engg.)
Central Agricultural University
Jaisemba, Imphal.



Dr. Y. Jekendra Singh,
Dean, College of Agriculture,
CAU, Imphal

Dean
College of Agriculture,
Central Agricultural University,
Imphal

26. Robin Singh



Foundation For Organic & Rural Development (FORD)

C-176, Nehru Colony, Dehradun

Mob.9412075015, Email: organicfoundation@rediffmail.com

Reg. No. 559/2004-2035

Ref: 230/2 /FORD/2019

Dated 20th May 2019


Certificate of Work Experience

This is to certify that *Shri Robin Singh S/O Shri Arjun Singh Rawat* a student of *B.Sc (Hort.)*, 4th year of *Department of Horticulture, School of Agriculture & Allied Science, HNB, Garhwal University, Srinagar (Garhwal), UK* attended a training programme on organic production process from 1st February 2019 to 20th May 2019 at this centre.

To train students on various aspects involved in organic production process a need based training module was developed that included International requirements for organic farming, IFOAM basic standards, organic certification, conversion to organic agriculture, pest and disease management in organic farm, livestock management, storage and transport of organic produce etc. with exposure to fields of organic producers, Centre of Excellence on Organic Farming, Dhakrani, KVK of GBPUA&T, Pantnagar, Dhakrani. He also remained associated in data collection from the villages that were required to prepare People's Biodiversity Registers the work entrusted to FORD by UK Biodiversity Board.

During training his behavior, conduct and performance remained satisfactory.

We wish him success in his future career.


Dr. R. K. Pant
Ph.D., M.Sc., M.S.W., PGD(S)
Secretary

27. Uttam Shivan

Telefax : 01423-235133

E-mail : kvkchomu@gmail.com

KVK · KRISHI VIGYAN KENDRA



(Pragati Trust - Jaipur)

VPO-TANKARDA, CHOMU, DISTRICT-JAIPUR-303 702 (RAJASTHAN) INDIA

Ref. No. : F.1(29)RAWE/KVK/2018-19/ 69

Dated: 20/5/2019

CERTIFICATE

This is to certify that Mr. **UTTAM SHIVRAN** S/O Sh. **DALLA RAM SHIVRAN** B.Sc. Hort. IV Year student of **H. N. B. G. U. (A Central University) Srinagar, Garhwal (Uttarakhand)** has undergone **Horticulture Work Experience** on "Management practices of arid fruit crops" from **01/02/2019 to 20/05/2019** under our supervision and submitted his work report to this KVK. **He was respectful to his senior and colleagues throughout the training period.** The student has **maintained 95 percent** attendance during training. The overall work performance of the student was evaluated by our Institute/Organization as **Outstanding.**

We wish him all the best for his future academic endeavours.

Advisor

Dr. N.K. Gupta


(Dr. S. S. Rathore)

Programme Coordinator

28. L. Abinash Kumar Singh

**COLLEGE OF AGRICULTURE,
CENTRAL AGRICULTURAL UNIVERSITY,
IMPHAL**



CERTIFICATE

This is to certify that the Experimental Learning Report on entitled **"Processing of Horticultural Crops"** being submitted in partial fulfillment of the requirement for the degree of **Bachelor of Science in Horticulture** of the College of Agriculture, CAU, Imphal is record of bonafide experimental work carried out at Department of Agri-Engineering College of Agriculture, CAU, Imphal by **Mr. Leichombam Abinashkumar Singh**, Roll no. **15134105032**, **Enrolment no. G14930013** under the supervision of **Dr. Ng Joykumar Singh** (Assistant Professor) Department of Agri-Engineering College of Agriculture, CAU, Imphal.


Supervisor

Dr. Ng Joykumar Singh
Asstt Prof (Agril. Engg.)
Central Agricultural University
Imphal, Imphal.



Dr. Y. Jekendra Singh,
Dean, College of Agriculture,
CAU, Imphal

Dean
College of Agriculture,
Central Agricultural University,
Imphal.

List of M.Sc. IV Sem undertaking research projects, 2018-19

1. Deepali



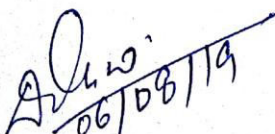
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)


Ref:

Date: 6 / 08 / 19

CERTIFICATE

This is to certify that the thesis entitled “Effect of Micronutrients and Their Combinations on Growth, Yield and Quality Parameters of Palak (*Beta vulgaris* L. var. *Bengalensis*) Cv. All Green” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Deepali**, Roll No. **17134338001**, Enrollment No. **G13660005** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Vivek Singh)

2. Priya Das



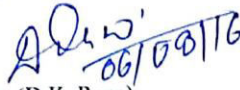
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India.
(A Central University)-246174


Ref: HNBGU/Hort/2019/384

Date: 06/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Combined Effect of NAA and Micronutrients on Growth, Yield and Quality of Capsicum (*Capsicum annum* L. var. Grossum Sendt.) Cv. Yolo Wonder under Subtropical Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Miss Priya Das**, Roll No. **17134338002**, Enrollment No. **G171340004** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. K.N. Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

3. Reshma Ramesh




DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India.
(A Central University)-246174


Ref: HNBGU/Hort/2019/385

Date: 06/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Assessment of Genetic Variability, Correlation, Path Coefficient and Divergence in Turmeric (*Curcuma longa* L.) under Subtropical Condition of Garhwal Himalaya**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Department of Horticulture, Chauras Campus of this university by **Miss Reshma Ramesh**, Roll No. **17134338003**, Enrollment No. **G171340005** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. K.N. Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

4. Sita Bisht



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India.
(A Central University)-246174


Ref: HNBU/Host/2019/383

Date: 06/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Estimation of Genetic Variability, Correlation, Path Analysis and Divergence in Tomato (*Solanum lycopersicum* L.) Genotypes under Subtropical Condition of Garhwal Himalaya**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Department of Horticulture, Chauras Campus of this university by **Miss. Sita Bisht**, Roll No. **17134338004**, Enrollment No. **G171340006** under the joint supervision of Dr. D.K. Rana (Assistant Professor and Head) and Dr. K.N. Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

5. Abhay Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal),
U.K.
(A Central University)

Ref: HNBGU/Hort/2019/382

Date: 06/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Screening of Brinjal Genotypes for Shoot and Fruit Borer (*Leucinodes orbonalis* G.) under Valley Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Abhay Singh**, Roll No. **17134338005**, Enrollment No. **G171340007** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


06/08/19
Dr. (D.K. Rana)


06/08/19
Dr. (Vivek Singh)

6. Ajay Pratap Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref HNB66/Hort/2017/334

Date: 09/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Effect of Pinching and Nitrogenous Fertilizer on Growth, Flowering and Yield of African Marigold (*Tagetes erecta* L.) Cv. Pusa Narangi Galinda Under Subtropical Conditions of Garhwal Hill**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Floriculture Section, Department of Horticulture, Chauras Campus of this university by **Mr. Ajay Pratap Singh, Roll No. 17134338006, Enrollment No. G171340008** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


09/08/19

Dr. (D.K. Rana)


08/08/19

Dr. (Vivek Singh)

7. Anil Yadav




DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal),
U.K.
(A Central University)

Ref: HNBGU/Hort/2019/392

Date: 9/08/2019

CERTIFICATE

This is to certify that the thesis entitled "**Combined Influence of PGRs and Urea on Growth, Yield and Quality Parameters of Radish (*Raphanus sativus* L.) Cv. Mino Early Long White under Subtropical Condition of Garhwal Valley**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Anil Yadav**, Roll No.17134338007, Enrollment No. **G171340009** under the joint supervision of Dr. D.K. Rana (Assistant Professor and Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr.(Vivek Singh)

8. Deepak Kumar Kharbas



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal),
U.K.
(A Central University)


Ref: HNBGU/Hort/2019/389

Date: 08/08/2019

CERTIFICATE

This is to certify that the thesis entitled “**Effect of Foliar Application of Various Micronutrients and Sulphur on Yield and Yield Attributing Parameters of Cabbage (*Brassica oleracea* var. *capitata* L.) Cv. Golden Acre under Valley Conditions of Garhwal Hill**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Deepak Kumar Kharbas**, Roll No. **17134338008**, Enrollment No. **G171340010** under the joint supervision of Dr. D.K. Rana (Assistant Professor and Head) and Dr. K.N. Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


08/08/19
Dr. (D.K. Rana)


08/08/2019
Dr. (K.N. Shah)

9. Mukesh Choudhary



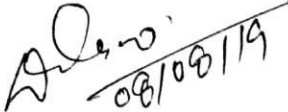
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal),
U.K.
(A Central University)

Ref: HNB/GU/Hort/2019/388

Date: 8/08/2019

CERTIFICATE

This is to certify that the thesis entitled “**Impact of PGRs, Boron and Their Combinations on Sex Expression of Bottle Gourd (*Lagenaria siceraria* Mol.) Cv. Pusa Naveen under Garhwal Hill**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Mr. Mukesh Choudhary**, Roll No. **17134338009**, Enrollment No. **G171340011** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


08/08/19
Dr. (D.K. Rana)


08/08/19
Dr. (Vivek Singh)

10. Pushpraj



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)-246174

Ref: HNBBGU/Hort/2019/387

Date: 08/08/19

CERTIFICATE

This is to certify that the thesis entitled **“Effect of Plant Growth Regulators and Their Combinations on Growth, Yield and Quality of Sprouting Broccoli (*Brassica oleracea* var. *italica*) Cv. Palam Samridhi Under Subtropical Conditions of Garhwal Hill”** being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Pushp Raj**, Roll No. **17134338010**, Enrollment No. **G171340012** under the joint supervision of Dr. D.K. Rana (Assistant Professor and HOD) and Dr. Khulakpam Naseeruddin Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

11. Sanjiv Kumar Yadav



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/HKT/2019/393

Date: 09.08.2019

CERTIFICATE

This is to certify that the thesis entitled "Effect of PGRs, Micronutrients and Their Combinations on Growth, Yield and Quality Parameters of Brinjal (*Solanum melongena* L.) Cv. Pant Samrat under Garhwal Hills" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Mr. Sanjiv Kumar Yadav, Roll No. 17134338011, Enrollment No. G171340013** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

Dr. (Vivek Singh)

12. Umesh Kumar



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU / Hort / 2019 / 331

Date: 09/08/2019

CERTIFICATE

This is to certify that the thesis entitled “**Effect of Different Rooting Media and Layering Time on Rooting Success of Jackfruit (*Artocarpus heterophyllus* Lam.) Air-Layers under Garhwal Valley Conditions**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Umesh Kumar, Roll No. 17134338013, Enrollment No. G13660028** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Amit Kotiyal (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)

13. Unique Mehla



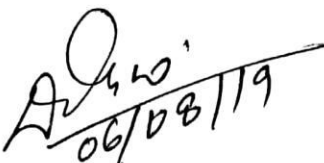
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)


Ref: HNBGU/Hort/2019/386

Date: 06/08/2019

CERTIFICATE

This is to certify that the thesis entitled “**Combined Effect of Mineral Elements and Humic Acid on Several Growth, Yield and Quality Parameters of Spinach (*Spinacia oleracea* L.) Cv. Virginia Savoy**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Unique Mehla**, Roll No. **17134338014**, Enrollment No. **G171340014** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. K.N. Shah (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

14. Uttam Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBU/Hort/2019/390

Date: 09/08/19

CERTIFICATE



This is to certify that the thesis entitled “**Influence of Biofertilizers with Their Combination on Yield and Yield Related Characters of Ridge Gourd [*Luffa acutangula* (Roxb.) L.] Cv. Jaipur Long under Garhwal Hills**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Uttam Singh**, Roll No. **17134338015**, Enrollment No. **G171340015** under the joint supervision of Dr. D.K. Rana (Assistant Professor and Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Vivek Singh)

List of B.Sc. students undertaking field projects during, 2019-20

1. Anita

<p>HIMACHAL PRADESH HORTICULTURAL PRODUCE MARKETING & PROCESSING CORPORATION LTD. [A GOVERNMENT UNDERTAKING]</p>		<p>हिमाचल प्रदेश उद्यान उपज विपणन प्रबन्ध विधायन सीमित (एक सरकारी प्रतिष्ठान)</p> <p>FRUIT PROCESSING PLANT, JAROL, SUNDERNAGAR-174401, DISTT. MANDI H.P. Ph. : 01907-275222, Telefax : 01907-275210</p>			
REF. NO. 214	Certificate	Dated 07-07-2020			
<p>This is to certify that Ms. Anita D/o Sh. Nand Lal, student of B.Sc. Horticulture 4th Year of Hemwati Nandan Bahuguna Garhwal University (A Central University), Srinagar UK, has completed her training at hpmc Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal Pradesh w.e.f. 1st February 2020 to 20th March 2020. However, the remaining period from 22nd March to 20th May, 2020 was utilized in report preparation of the said project due to COVID-19 Lockdown period.</p> <p>She has successfully completed her industrial training in Plant. Her work and conduct has been found satisfactory.</p> <p>I wish her all the success in her life.</p>					
 Plant Manager hpmc Ltd. FPP Jarol, Sunder Nagar, Distt. Mandi (H.P.) PIN-174401					
<table border="0" style="width: 100%;"><tr><td style="width: 33%;">Regd. Office : hpmc Nigam Vihar, Shimla - 171 002 H.P.</td><td style="width: 33%;">hpmc CST No. MND-1004 DL 11.11.77</td><td style="width: 33%;">Ph. : 0177 - 2623832, 3623836 FAX : 0177 - 2623823, 2623834</td></tr></table>			Regd. Office : hpmc Nigam Vihar, Shimla - 171 002 H.P.	hpmc CST No. MND-1004 DL 11.11.77	Ph. : 0177 - 2623832, 3623836 FAX : 0177 - 2623823, 2623834
Regd. Office : hpmc Nigam Vihar, Shimla - 171 002 H.P.	hpmc CST No. MND-1004 DL 11.11.77	Ph. : 0177 - 2623832, 3623836 FAX : 0177 - 2623823, 2623834			

2. Archita Thakur



Society for Farmer's Development

Village Talhar, P.O. Nagwain Tehsil Aut Distt. Mandi (H.P. - 175121)

Phone: 01905-209494, Mob. 94596-32014

Email: sfdnagwain@gmail.com Website: <http://www.stdruraltch.org> (parent organization)

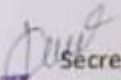
President: Dr. J.R. Thakur
Secretary: Karam Chand

Ref. No.:
Date:

To Whom It May Concern

This is to certify that **Miss Archita Thakur** (Enrollment/Roll No. G161341295/16134105002), student of **B.Sc (Horticulture)** 4th year of Department of Horticulture, School of Agriculture and allied science H.N.B. Garhwal University, Srinagar (Garhwal), U.K. has successfully undertaken **First Hand Training on Processing of Horticulture crops** at our processing unit w. e. f. 01.02.2020 to 20.05.2020 under **Horticulture work Experience (HWE)** programme.

I wish her a bright career in Horticulture and allied industries.


Secretary
(Karam Chand)
Society for Farmer's Development
Nagwain, Distt. Mandi (H.P.)

3. Arti Gairola

Society for Economic and Social Studies

Contact : 7534006201, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D.Raghumandan
Manager : P.Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



8th September 2020

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Arti Gairola** of Batch 2016-2020, 8 Semester- BSc. Horticulture, HN8G University, Srinagar Garhwal was associated with our organisation for undertaking training in Post Harvest Management for eight weeks i.e. from 1st February 2020 to 20th May 2020. Her main responsibility was to provide assistance for production of Squashes, Chutneys, Jams, etc in our FSSAI unit in Sahaspur Dehradun, besides learning the aspects of backward & forward linkages of Food Industries.

Due to the impact of COVID-19, the training could not be continued onwards 22nd March 2020.

We found her a hardworking, dedicated field worker during her tenure of learning. We wish her all the best for future endeavor.

For Society for Economic & Social Studies

Pradeep Bhandari
Manager
Farmer Field Station
Sahaspur, Dehradun



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197

Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

4. Debala Laishom



DEPARTMENT OF HORTICULTURE
COLLEGE OF AGRICULTURE
CENTRAL AGRICULTURAL UNIVERSITY

Imphal – 795004, Manipur (India)

Dated: - Imphal 20th May, 2020

CERTIFICATE

This is to certify that **Miss. Debala Laishom D/o L. Angouba Singh** of B.Sc. Horticulture H.N.B. Garhwal University (A Central University) Srinagar (Garhwal) Uttarakhand has completed the Horticultural Work Experience Programme entitled “**Propagation methods of Horticultural crops**” during 1st February – 16th March of 2020 under my guidance and supervision as a part of fulfilling her requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 17th March to 20th May were utilized in discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID 19.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

Prof. Usham Chaoba Singh

Head of Department

Department of Horticulture,

College of Agriculture, CAU

Dr. U. CHAOBA SINGH
Professor & Head
Dept. of Horticulture
College of Agriculture
C.A.U. Imphal - 795004

Major Advisor: -

Prof. R.K. Dilip Singh

Department of Horticulture, CAU,

DR. R.K. DILIP SINGH
Professor,
College of Agriculture,
Central Agricultural University,
Imphal - 795004

5. Ekta Sharma



HAMIRPUR SUPPLEMENT FOODS

V.P.O. KARER, Tehsil Barsar, Distt. Hamirpur (H.P.)

Mob.: 98161-26230

Ref. No.

Dated:-----

TO WHOM IT MAY CONCERN

It is to certify that **Miss. Ekta Sharma** D/O Sh. Davender Kumar student of HNB Garhwal University, A Central University Srinagar (Garhwal), UK, India has completed her industrial training on the Module Value Added, Vigour and Vital Supplement Food Products from locally grown Agri-produce w.e.f **01-02-2020 to 18-03-2020**. She has got training regarding Receipt and Inspection of Agro-Based Raw Produce for converting into semi-finished and finally packing of finished products, so prepared in accordance with the specifications laid down in the Food Safety and Standards Act (2006), Rules & Regulations, 2011 (FSSAI). Apart, she has also got Training in Marketing of Our Food Products at our focal centre and local areas. She is an industrious student and has taken pains and interest in the assigned work and acquired good knowledge in the subject.

During her stay in our factory, her work and conduct was found quite satisfactory.


(Dr. R.C. Sharma)

Ph.D Bulgaria

Hamirpur Supplement Foods



6. Laimayum Joymala Sharma



DEPARTMENT OF HORTICULTURE
COLLEGE OF AGRICULTURE
CENTRAL AGRICULTURAL UNIVERSITY
Imphal – 795004, Manipur (India)

Dated: - Imphal 20th May, 2020

CERTIFICATE

This is to certify that Miss LAIMAYUM JOYMALA SHARMA D/o L. JOYCHANDRA SHARMA of B.Sc. Horticulture H.N.B. Garhwal University (A Central University) Srinagar (Garhwal) Uttarakhand has completed the Horticultural Work Experience Programme entitled “**Propagation methods of Horticultural crops**” during 1st February – 16th March of 2020 under my guidance and supervision as a part of fulfilling her requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 17th March to 20th May were utilized in discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID 19.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

Prof. Usham Chaoba Singh

Head of Department

Department of Horticulture,

College of Agriculture, CAU

Dr. U. CHAOBA SINGH
Professor & Head
Dept. of Horticulture
College of Agriculture
Imphal - 795004

Major Advisor: -

Prof. R.K. Dilip Singh

Department of Horticulture, CAU.

DR. R.K. DILIP SINGH
Professor,
College of Agriculture,
Central Agricultural University,
Imphal - 795004

7. Manisha

HIMACHAL PRADESH HORTICULTURAL
PRODUCE MARKETING & PROCESSING
CORPORATION LTD.

[A GOVERNMENT UNDERTAKING]



हिमाचल प्रदेश उद्यान उपज विपणन
एवम् विधायन सीमित
(एक सरकारी प्रतिष्ठान)

FRUIT PROCESSING PLANT, JAROL,
SUNDERNAGAR-174401, DISTT. MANDI H.P.
Ph. : 01907-275222, Telefax : 01907-275210

REF. NO. 215

Dated 09-07-2020

Certificate

This is to certified that Ms. Manisha D/o Sh. Mahesh Chand, student of B.Sc. Horticulture 4th Year of Hemwati Nandan Bahuguna Garhwal University (A Central University), Srinagar UK, has completed her training at hpmc Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal Pradesh w.e.f. 1st February 2020 to 20th March 2020. However, the remaining period from 22nd March to 20th May, 2020 was utilized in report preparation of the said project due to COVID-19 Lockdown period.

She has successfully completed her industrial training in Plant. Her work and conduct has been found satisfactory.

I wish her all the success in her life.


Plant Manager
hpmc Ltd. FPP JAROL,
Sunder Nagar, Distt. Mandi (HP)
PIN-174401

Regd. Office : hpmc Nigam Vihar,
Shimla - 171 002 H.P.

hpmc
CST No. MND-1004 } Dt. 11.11.77
GST No. MND-1537
TIN No. : 02090300051

Ph. : 0177 - 2623832, 3623836
FAX : 0177 - 2623823, 2623834

8. Muskan Chaudhary



Society for Farmer's Development

Village Talhar, P.O. Nagwain Tehsil Aut Distt. Mandi (H.P. - 175121)

Phone: 01905-209494, Mob. 94596-32014

Email: sfdnagwain@gmail.com Website: <http://www.stdruraltech.org> (parent organization)

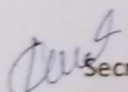
President: Dr. J.R. Thakur
Secretary: Karam Chand

Ref. No.:
Date:

To Whom It May Concern

This is to certify that Mrs Muskan Chaudhary (Enrollment/Roll No. G161341301/16134105008), student of B.Sc (Horticulture) 4th year of Department of Horticulture, School of Agriculture and allied science H.N.B. Garhwal University, Srinagar (Garhwal), U.K. has successfully undertaken First Hand Training on Processing of Horticulture crops at our processing unit w. e. f. 01.02.2020 to 20.05.2020 under Horticulture work Experience(HWE) programme.

I wish her a bright career in Horticulture and allied industries.


Secretary
(Karam Chand)
Secretary
Society for Farmer's Development
Nagwain, Distt. Mandi (H.P.)

9. Nitika Chauhan



Society for Farmer's Development

Village Talhar, P.O. Nagwain Tehsil Aut Distt. Mandi (H.P. - 175121

Phone: 01905-209494, Mob. 94596-32014

Email: sfdnagwain@gmail.com Website: <http://www.stdruraltech.org> (parent organization)

President: Dr. J.R. Thakur
Secretary: Karam Chand

Ref. No.:
Date:

To Whom It May Concern

This is to certify that **Miss Nitika Chauhan** (Enrollment/Roll No. **G161341303/16134105010**), student of **B.Sc (Horticulture)** 4th year of Department of Horticulture, School of Agriculture and allied science H.N.B. Garhwal University, Srinagar (Garhwal), U.K. has successfully undertaken **First Hand Training on Processing of Horticulture crops** at our processing unit w. e. f. **01.02.2020 to 20.03.2020** under **Horticulture work Experience (HWE)** programme.

I wish her a bright career in Horticulture and allied industries.

Secretary
(Karam Chand)

Secretary
Society for Farmer's Development
Nagwain, Distt. Mandi (H.P.)

10. Pooja



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बाहुगुणा गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Director

Certificate of Training

This is to certify that **Miss Pooja**, student of B.Sc. Horticulture Final year, at H.N.B. Garhwal University (A Central University), Srinagar (Uttarakhand) has successfully completed the Horticulture Work Experience Programme entitled "**Seed Germination and Tissue Culture Techniques**" during **1st Feb.2020 to 21st March 2020** under my guidance and supervision as a part of fulfilling the requirement for Bachelor of Science degree in the field of Horticulture under HNB Garhwal University (A Central University), Srinagar (Uttarakhand). However the remaining period from **22 March to 20 May of 2020** was utilized in discussion and report presentation of the said project due to lock down as a result of the pandemic COVID 19.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

Dr. (V.K. Purohit)
Supervisor

Countersigned

Prof. (A.R. Nautiyal)

Director

HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

Post Box No.14 Srinagar Garhwal 246174 –Uttarakhand India, Ph. 01346-253760, 252172. Fax: 252070
email:happrc@gmail.com website:http/hnbgau.ac.in

पोस्ट बॉक्स नं० 14 श्रीनगर गढ़वाल-246174 उत्तराखण्ड, दूरभाष 01346-252172, 253760 फैक्स 252070

HSF HAMIRPUR SUPPLEMENT FOODS

V.P.O. KARER, Tehsil Barsar, Distt. Hamirpur (H.P.)

Mob.: 98161-26230

Ref. No.

Dated:-----

TO WHOM IT MAY CONCERN

It is to certify that **Miss. Priti Thakur** D/O Sh. Parvinder Thakur student of HNB Garhwal University, A Central University Srinagar (Garhwal), UK, India has completed her industrial training on the Module Value Added, Vigour and Vital Supplement Food Products from locally grown Agri-produce w.e.f 01-02-2020 to 18-03-2020. She has got training regarding Receipt and Inspection of Agro-Based Raw Produce for converting into semi-finished and finally packing of finished products, so prepared in accordance with the specifications laid down in the Food Safety and Standards Act (2006), Rules & Regulations, 2011 (FSSA). Apart, she has also got Training in Marketing of Our Food Products at our focal centre and local areas. She is an indutrious student and has taken pains and interest in the assigned work and acquired good knowledge in the subject.

During her stay in our factory, her work and conduct was found quite satisfactory.


(Dr. R.C. Sharma)
Ph.D Bulegaria
Hamirpur Supplement Foods


12. Priyanka Mandoli

Society for Economic and Social Studies

Contact : 7534006201, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D. Raghumandan
Manager : P. Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



8th September 2020

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Priyanka** of Batch 2016-2020, 8 Semester- BSc. Horticulture, HNBG University, Srinagar Garhwal was associated with our organisation for undertaking training in Post Harvest Management for eight weeks i.e. from 1st February 2020 to 20th May 2020. Her main responsibility was to provide assistance for production of Squashes, Chutneys, Jams, etc in our FSSAI unit in Sahaspur Dehradun, besides learning the aspects of backward & forward linkages of Food Industries.

Due to the impact of COVID-19, the training could not be continued onwards 22nd March 2020.

We found her a hardworking, dedicated field worker during her tenure of learning. We wish her all the best for future endeavor.

For Society for Economic & Social Studies


Pradeep Bhandari
Manager
Farmer Field Station
Sahaspur, Dehradun



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197

Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

13. Sanjana Singh

HSF HAMIRPUR SUPPLEMENT FOODS

V.P.O. KARER, Tehsil Barsar, Distt. Hamirpur (H.P.)

Mob.: 98161-26230

Ref. No.

Dated:-----

TO WHOM IT MAY CONCERN

It is to certify that **Miss. Sanjana Singh** D/O Sh. Vijay Thakur student of HNB Garhwal University, A Central University Srinagar (Garhwal), UK, India has completed her industrial training on the Module Value Added, Vigour and Vital Supplement Food Products from locally grown Agri-produce w.e.f 01-02-2020 to 18-03-2020. She has got training regarding Receipt and Inspection of Agro-Based Raw Produce for converting into semi-finished and finally packing of finished products, so prepared in accordance with the specifications laid down in the Food Safety and Standards Act (2006), Rules & Regulations, 2011 (FSSA). Apart, she has also got Training in Marketing of Our Food Products at our focal centre and local areas. She is an industrious student and has taken pains and interest in the assigned work and acquired good knowledge in the subject.

During her stay in our factory, her work and conduct was found quite satisfactory.


(Dr. R.C. Sharma)
Ph.D Bulgaria
Hamirpur Supplement Foods


14. Vaishnavi Sharma

HIMACHAL PRADESH HORTICULTURAL
PRODUCE MARKETING & PROCESSING
CORPORATION LTD.
[A GOVERNMENT UNDERTAKING]



हिमाचल प्रदेश उद्यान उपज विपणन
एवम् विपणन सीमित
(एक सरकारी प्रतिष्ठान)

FRUIT PROCESSING PLANT, JAROL,
SUNDERNAGAR-174401, DISTT. MANDI H.P.
Ph. : 01907-275222, Telefax : 01907-275210

REF. NO. 213

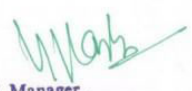
Dated 09-07-2020

Certificate

This is to certified that Ms. Vaishnavi Sharma D/o Sh. Arun Kumar Sharma, student of B.Sc. Horticulture 4th Year of Hemwati Nandan Bahuguna Garhwal University (A Central University), Srinagar UK, has completed her training at hpmc Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal Pradesh w.e.f. 1st February 2020 to 20th March 2020. However, the remaining period from 22nd March to 20th May, 2020 was utilized in report preparation of the said project due to COVID-19 Lockdown period.

She has successfully completed her industrial training in Plant. Her work and conduct has been found satisfactory.

I wish her all the success in her life.


Plant Manager,
hpmc Ltd. FPP-JAROL,
Sunder Nagar, Distt. Mandi (H.P.)
PIN - Sunder Nagar Distt. Mandi (H.P.)

Regd. Office : hpmc Nigam Vihar,
Shimla - 171 002 H.P.

hpmc
CST No. MND-1004 } Dt. 11.11.77
GST No. MND-1537 }

Ph. : 0177 - 2623832, 3623836
FAX : 0177 - 2623823, 2623834

15. Zelina Taga



16. Babulal Choudhary

Telefax : 01423-235133
E-mail:kvkchomu@gmail.com

KRISHI VIGYAN KENDRA

(Pragati Trust - Jaipur)

VPO-TANKARDA, CHOMU, DISTRICT - JAIPUR-303 702 (RAJASTHAN) INDIA

REF.NO. : F.1(29)RAW/KVK/2020-21/66

DATED: 09-06-2020

Certificate

This is to certify that **Mr. Babulal Choudhary** (Roll No./Enrollment **16134105017 /G161341310**) student of **B.Sc. Horticulture 4th year of Department** of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken **first hand training on Hi tech Horticulture** at our farmers' Hi-tech Unit **w.e.f 01.02.2020 to 20.05.2020** under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries



(Dr. S. S. Rathore)
Sr. Scientist and Head
Senior Scientist and Head
Krishi Vigyan Kendra, Chomu
Distt. Jaipur (Raj.)

17. Madhav Badoni



KRISHI VIGYAN KENDRA
(ICAR- Vivekanand Parvatiya Krishi Anusandhan Sansthan,
Department of Agricultural Research and Education,
Ministry of Agriculture and Farmers Welfare, Govt. of India)
CHINYALISUR, UTTARKASHI-249 196 (UTTARAKHAND)
Email: kvkchinyalisur@gmail.com, Tele-Fax-01371-237198



ISO 9001:2015

F No. 115-1/19-KVK/

Date: July 2nd, 2020


CERTIFICATE

This is to certify that **Mr. Madhav Badoni** son of **Mr. Surat Ram Badoni**, student of B.Sc. Horticulture 8th semester of Department of Horticulture, H. N. B. Garhwal University, Srinagar, Uttarakhand has enrolled in Horticulture Work Experience at **Krishi Vigyan Kendra, Uttarkashi**, (ICAR-VPKAS, Almora). The training was conducted with the following module:

1. Mushroom Cultivation and Management

During the training period, **Mr. Madhav Badoni** actively participated and performed all activities by himself. We found him sincere and hardworking.

I wish him a great success in his future endeavours.

 02/07/2020

Dr. Pankaj Nautiyal

Officer-in-charge
KVK Uttarkashi
Krishi Vigyan Kendra (ICAR-VPKAS)
Chinyalisur, Uttarkashi

18. Nikhil Thakur



Society for Farmer's Development

Village Talhar, P.O. Nagwain Tehsil Aut Distt. Mandi (H.P. - 175121)

Phone: 01905-209494, Mob. 94596-32014

Email: sfdnagwain@gmail.com Website: <http://www.stdruraltech.org> (parent organization)

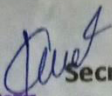
President: Dr. J.R. Thakur
Secretary: Karam Chand

Ref. No.:
Date:

To Whom It May Concern

This is to certify that **Mr Nikhil Thakur (Enrollment/Roll No. G161341312/16134105019)**, student of **B.Sc (Horticulture) 4th year** of Department of Horticulture, School of Agriculture and allied science H.N.B. Garhwal University, Srinagar (Garhwal), U.K. has successfully undertaken **First Hand Training on Processing of Horticulture crops** at our processing unit **w. e. f. 01.02.2020 to 20.05.2020** under **Horticulture work Experience (HWE) programme.**

I wish him a bright career in Horticulture and allied industries.


Secretary
(Karam Chand)
Secretary
Society for Farmer's Development
Nagwain, Distt. Mandi (H.P.)

19. Nyaken Kamsi



KRISHI VIGYAN KENDRA

PAPUM-PARE



DIRECTORATE OF ANIMAL HUSBANDRY, VETERINARY & DAIRY DEVELOPMENT
GOVERNMENT OF ARUNACHAL PRADESH,
NIRJULI

CERTIFICATE

This is to certify that Mr/Miss: NYAKEN KAMSI Enrollment No. 9261341313 School of Agriculture and Allied Science, H.N.B Garhwal University, U.K. has successfully completed the Training on "Propagation Techniques and Nursery Management of Horticultural Crops" under Krishi Vigyan Kendra Papum-Pare, Karsingsa, Arunachal Pradesh, as a part of Horticulture Work Experience (HWE) Programme from 1st February to 21st March, 2020. The remaining period from 22nd March to 20th May, 2020 were utilized for discussion and report preparation due to lockdown as result of Covid 19 pandemic.

His/her discipline and performance has been satisfactory during the training period. I wish him/her all the success in life.

Sr. Scientist & Head
KVK, Papum-Pare
Karsingsa

Senior Scientist & Head
Krishi Vigyan Kendra
Papum - Pare
Karsingsa (A.P.)

20. Oinam Tennyson Singh



DEPARTMENT OF HORTICULTURE
COLLEGE OF AGRICULTURE, IROISEMBA
CENTRAL AGRICULTURAL UNIVERSITY
Imphal – 795004, Manipur (India)

Dr. Ng Piloo
Associate Professor

Dated: Imphal, the 20th May, 2020

CERTIFICATE

This is to certify that *Mr. Oinam Tennyson Singh* (Enrollment No.: G161341314, Roll No.: 16134105021), *S/o Oinam Tombi Singh*, of B.Sc. (Horticulture) 8th Semester at H.N.B. Garhwal University (A Central University) Srinagar (Garhwal), Uttarakhand has completed the Horticultural Work Experience Programme entitled "Processing of Horticultural Crops" during 01st February – 21st March of 2020 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 22nd March to 20th May, 2020 were utilized in online discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID-19.

He took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.

Major Advisor: 

Dr. Ng Piloo
Associate Professor
Department of Horticulture
College of Agriculture, Iroisemba
Central Agricultural University, Imphal

21. Pabitra Das



**DHANSIMLA SOCIO-ECONOMIC
RESEARCH & DEVELOPMENT ORGANISATION**

Regn. No.- S/1L/6791 of 2001-2002

P.O.- DHANSIMLA ♦ Dist.- BANKURA ♦ WEST BENGAL ♦ PIN.- 722207
e-mail : dserdo_debasis@yahoo.co.in, website : www.dsrdo.in

Mobile :- 9474045923, 9734209215

Ref. No.

Date...26.08.2020

CERTIFICATE

This is to certify that Mr. Pabitra Das S/o Mr. Asoke Das, a Student of B.Sc (Horticulture), Semester VIII Department of Horticulture, School of Agriculture & Allied Science, H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand observed and took part in first hand training on Processing of Horticultural Crops in different places of our area of work for his field experience from 1st February'2020 to 21st March'2020. But due to lockdown for pandemic COVID 19, no fieldwork was possible and the remaining period from 22nd March'2020 to 20th May'2020 was utilized in discussion and preparation of report of the said project.

His whole hearted involvement, endearing behavior, punctuality and sincerity charmed us. I wish his every success in life.


(Debasis Barat)

Secretary
Dhansimla Socio-Economic Research
& Development Organization

22. Pravinkumar Yumkhaibam



DEPARTMENT OF HORTICULTURE
COLLEGE OF AGRICULTURE, IROISEMBA
CENTRAL AGRICULTURAL UNIVERSITY
Imphal – 795004, Manipur (India)

Dr. Ng. Piloo
Associate Professor

Dated: Imphal, the 20th May, 2020

CERTIFICATE

This is to certify that *Mr. Pravinkumar Yumkhaibam* (Enrollment No.: G161341316, Roll No.: 16134105023), s/o Yumkhaibam Ibungcha Singh, of B.Sc. (Horticulture) 8th Semester at H.N.B. Garhwal University (A Central University) Srinagar (Garhwal), Uttarakhand has completed the Horticultural Work Experience Programme entitled “Processing of Horticultural Crops” during 01st February – 21st March of 2020 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 22nd March to 20th May, 2020 were utilized in online discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID-19.


He took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.

Major Advisor:- 
Dr. Ng. Piloo
Associate Professor
Department of Horticulture
College of Agriculture, Iroiseimba
Central Agricultural University, Imphal.

23. Ritesh Rana

24. Sandeep Kumar Bairwan



गढ़-माटी संगठन
(सोमाहटी बंजिनिगम संख्या 21, 1860 के आधीन पंजीकृत संस्था)
(पंजीकरण संख्या: GRP
1903/1323/19-05-2017)
ग्राम-पञ्चालय: भीरी, जिला रुद्रप्रयाग, उत्तराखण्ड-246419
मोबाइल नं०: 9675732122, 7060326489

Ref. No.: GMS/OFF/013/2020

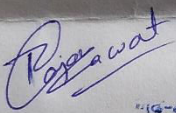
Date: 25/04/2020

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Sandeep Kumar** student of **B. Sc. (Horticulture) Semester VIII** from **H.N.B. Garhwal University, Srinagar (Garhwal)** has successfully completed his 45 days training from 1st February to 20th March. in our organization on **"Mushroom Production and Management"**. His Further training could not continue due to COVID-19 Pandemic.

We have observed that the candidate is having hard working nature and sincere during the training period.

We wish him all the best for future.


गढ़-माटी संगठन
Mrs. Ranjana Rawat,
Director & President, Gadh – Maati Sangathan
village Bhiri, Rudraprayag.

25. Sanjay Yadav

Telefax : 01423-235133
E-mail:kvkchomu@gmail.com

KRISHI VIGYAN KENDRA

(Pragati Trust - Jaipur)

VPO-TANKARDA, CHOMU, DISTRICT- JAIPUR-303 702 (RAJASTHAN) INDIA

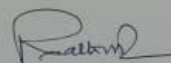
REF.NO. : F.1(29)RAWE/KVK/2020-21/67

DATED: 09-06-2020

Certificate

This is to certify that **Mr. Sanjay Kumar Yadav** (Roll No./Enrollment 16134105026/G161341319) student of **B.Sc. Horticulture 4th year** of Department of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken **first hand training on Hi tech Horticulture** at our farmers' Hi-tech Unit **w.e.f 01.02.2020 to 20.05.2020** under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries



(Dr. S. S. Rathore)
Sr. Scientist and Head
Senior Scientist and Head
Krishi Vigyan Kendra, Chomu
Distt. Jaipur (Raj.)

26. U. Bharath Joshi



DECCAN DEVELOPMENT SOCIETY
KRISHI VIGYAN KENDRA



Didig Village, Zahirabad Mandal-502220, Sangareddy District (Telangana state)

CERTIFICATE

This is to certify that **Mr. Udurupati Bharath Joshi s/o Udurupati Srinivasa Rao**, of B.Sc (Horticulture) at H.N.B Garhwal University (A Central University) Srinagar (Garhwal), Uttarakhand has completed the Horticulture Work Experience Programme entitled "**Organic Farming On Horticultural Crops**" during 01st February- 20th March of 2020 under my guidance and supervision as a part fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 21st March to 20th May were utilized in discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID 19.

He took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish him a grand success and luck in his future life.

Bharat

Senior Scientist and Head
(DDS – KVK)

Programme Coordinator
DDS-KVK

27. Vikas Choudhary

Telefax : 01423-235133
E-mail:kvkchomu@gmail.com

KRISHI VIGYAN KENDRA

(Pragati Trust - Jaipur)

VPO-TANKARDA, CHOMU, DISTRICT- JAIPUR-303 702 (RAJASTHAN) INDIA

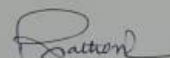
REF.NO. : F.1(29)RAWE/KVK/2020-21/68

DATED: 09-06-2020

Certificate

This is to certify that **Mr. Vikas Choudhary** (Roll No./Enrollment **16134105028/G161341321**) student of **B.Sc. Horticulture 4th year** of Department of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken **first hand training on Hi tech Horticulture** at our farmers' Hi-tech Unit **w.e.f 01.02.2020 to 20.05.2020** under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries



(Dr. S. S. Rathore)
Sr. Scientist and Head
Senior Scientist and Head
Krishi Vigyan Kendra, Chomu
Distt. Jaipur (Raj.)

28. Dhanakumar Thongam



DEPARTMENT OF PLANT PATHOLOGY
COLLEGE OF AGRICULTURE
CENTRAL AGRICULTURAL UNIVERSITY, IMPHAL

CERTIFICATE

This is to certify that Mr. DHANAKUMAR THONGAM, S/O TH. DINESHWAR SINGH of B.Sc. (Horticulture) at H.N.B. Garhwal University (A Central University) Srinagar (Garhwal), Uttarakhand has completed the Horticultural Work Experience Programme entitled "Mushroom Cultivation" during 01st February-21st March of 2020 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand). However, the remaining period from 22nd March to 20th May were utilized in discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID 19.

He took keen interest in all the stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.

Major Advisor,

Dr. L. Nongdren Khomba Singh

Assoc. Prof.

Dr. L. Nongdren Khomba Singh
Associate Professor
Dept. of Plant Pathology
CAU, Imphal, Manipur

29. Konjengbam Probind Singh



**DEPARTMENT OF PLANT PATHOLOGY
COLLEGE OF AGRICULTURE
CENTRAL AGRICULTURAL UNIVERSITY, IMPHAL**

CERTIFICATE

This is to certify that Mr. KONJENGBAM PROBIND SINGH, S/O K. ROBICHAND SINGH of B.Sc. (Horticulture) at H.N.B. Garhwal University (A Central University) Srinagar (Garhwal), Uttarkhand has completed the Horticultural Work Experience Programme entitled "Mushroom Cultivation" during 01st February-21st March of 2020 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University(Uttarkhand). However, the remaining period from 22nd March to 20th May were utilized in discussions and report preparation of the said project due to lockdown as a result of the pandemic COVID 19.

He took keen interest in all the stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.

Major Advisor,

Dr. L. Nongdren Khomba Singh

Assoc. Prof.

Dr. L. Nongdren Khomba Singh
Associate Professor
Dept. of Plant Pathology
CAU, Imphal, Manipur

List of M.Sc. IV Sem undertaking research projects, 2019-20

1. Anita Panwar



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar
(Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2020/432

Date: 4/12/2020

CERTIFICATE

This is to certify that the thesis entitled "**Effect of Preharvest Application of Naphthalene Acetic Acid, Gibberlic Acid and Ethrel on the Fruit Growth, Quality and Yield of Plum (*Prunus salicina*) Cv. Santa Rosa Under Valley Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Miss. Anita Panwar, Roll No.18134338001, Enrollment No. G181342627** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

(Dr. Vivek Singh)
Assistant Professor

2. Bharti



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort./2020/430

Date: 28/11/2020

CERTIFICATE

This is to certify that the thesis entitled "**Effect of Integrated Nutrient Management on Growth, Yield and Quality of French bean (*Phaseolus vulgaris* L.)**" Cv. Contender under Subtropical Condition of Garhwal Hills" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of the university by **Miss Bharti, Roll No. 18134338002, Enrollment No. G14930004** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. K.N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


28/11/2020
Dr. (D.K. Rana)


28/11/2020
Dr. (K.N. Shah)

3. Chandni Negi



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)-246174

Ref: HM/344/Hort/2020/474

Date: 26/11/2020

CERTIFICATE

This is to certify that the thesis entitled “**Estimation of Various Genetic Variability Component, Correlation, Path Coefficient and Divergence in Diverse Pumpkin (*Cucurbita moschata* Duch Ex Poir) Lines under Subtropical Condition of Garhwal Himalaya**” being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Miss. Chandni Negi, Roll No. 18134338003 , Enrollment No. G. 14930005** under the joint supervision of Dr. D. K. Rana (Assistant Professor & Head) and Dr. K. N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


26/11/2020
Dr. (D.K. Rana)


26/11/2020
Dr. (K.N. Shah)

4. Pooja Kumari

5. Rajani Chaudhary




DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref:

Date: / /

CERTIFICATE

This is to certify that the thesis entitled "Effect of different Auxin concentration on rooting success and survivability of guava (*Psidium guajava*) cultivar Pant prabhat) Air-layering under Garhwal Hills" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Miss. Rajani Chaudhary, Roll No. 18134338005, Enrollment No. G. 13660012** under the supervision of Dr. Vivek Singh (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. Vivek Singh
(Asst. Professor)

6. Toki Siram



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBU/Hort/2020/447

Date: 21/11/2020

CERTIFICATE

This is to certify that the thesis entitled “Effect of Various Concentrations of Plant Growth Regulators (GA_3 and NAA) on Different Growth, Yield and Quality Parameters of King Chilli (*Capsicum chinense* jacq.) under Subtropical Condition of Garhwal Hills” being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by Miss. Toki Siram, Roll No. 18134338006, Enrollment No. G. G181342628 under the joint supervision of Dr. D. K. Rana (Assistant Professor & Head) and Dr. K. N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


28/11/2020
Dr. (D.K. Rana)


21/11/2020
Dr. (K.N. Shah)

7. Abhimanyu
8. Anil Kumar Yadav
9. Dharmendra Kumar Ram




DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)


Ref: HNB/GU/Horti/2020/428

Date: 21/11/2020

CERTIFICATE

This is to certify that the thesis entitled “Interactive Effect of Inorganic and Bio-fertilizers on Various Yield and Yield Related Parameters of Cowpea [*Vigna unguiculata* (L.) Wilczek] Cv. Pant Lobia-1 under Valley Condition of Garhwal Hills” being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Dharmendra Kumar Ram**, Roll No. 18134338009, Enrollment No. G. 181342630 under the joint supervision of Dr. D. K. Rana (Assistant Professor & Head) and Dr. K. N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


21/11/2020
Dr. (D.K. Rana)


21/11/2020
Dr. (K.N. Shah)

10. Etalesh Gautam



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University Srinagar (Garhwal), UK, India
(A CENTRAL UNIVERSITY)-246174

Ref: HNIBGU/Hort./2020/429

Date: 26/11/2020

CERTIFICATE

This is to certify that the thesis entitled "**Impact of Foliar Application of Plant Bio-Regulators on Vegetative, Floral and Yield Traits in Bottle Gourd [*Lagenaria siceraria* (Molina) Standl.] Cv. Gutka Long Under Valley Condition of Garhwal Hills**" being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India is a record of *bonafide* research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Etalesh Goutam**, Roll No. **18134338010**, Enrollment No. **G181342631** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. K.N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand and no part of the thesis has been submitted for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

11. Ramswaroop Choudhary



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)


Ref: HNBGU/Hovki/2020/438

Date: 01/10/2020

CERTIFICATE

This is to certify that the thesis entitled “**Interaction Between Different Doses of Inorganic Fertilizers and Bio-inoculants (*Rhizobium*, *Azotobacter*, *Bacillus* and *Pseudomonas*) on Growth, Yield and Quality of Okra [*Abelmoschus esculentus* (L.) Moench] Cv. Parbhani Kranti Under Valley Conditions of Garhwal Hills**” being submitted in partial fulfilment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Ramswaroop Choudhary**, Roll No. **18134338013**, Enrollment No. **G14930022** under the joint supervision of **Dr. D.K. Rana** (Assistant Professor & Head) and **Dr. K.N. Shah** (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (K.N. Shah)

12. Udit Joshi



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2020/425

Date: 26 / 10 / 2020

CERTIFICATE

This is to certify that the thesis entitled "**Morphological Characterization, Genetic Variability and Divergence studies in Okra [*Abelmoschus esculentus* (L.) Moench] Under Valley Conditions of Garhwal**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Udit Joshi, Roll No. 18134338014, Enrollment No. G181342633** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


26/10/2020
Dr. (D.K. Rana)


26/10/2020
Dr. (Vivek Singh)

13. Vikram Kulhary

List of B.Sc. students undertaking field projects during 2020-21

1. Aastha Thakur



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Aastha Thakur** (Enrollment No. G171340016, Roll No. 17134105001), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled **"Modern Concept of Muskmelon Cultivation and Processing of Horticultural Crops"** from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

(D. K. Rana)

2. Ankita Kumari



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Ankita Kumari** (Enrollment No. G171340017, Roll No. 17134105002), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled **"Modern Concept of Muskmelon Cultivation and Processing of Horticultural Crops"** from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

(D. K. Rana)

3. Bharti



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Bharti** (Enrollment No. G171340016, Roll No. 17134105003), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Muskmelon Cultivation and Processing of Horticultural Crops**" from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

4. Diksha Saini



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
-919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HM B44 / Hort / 2021 / 457

Date: July 31, 2021

CERTIFICATE

This is to certify that Miss Diksha Saini (Enrollment No.G1713-40019, Roll No.17134105004), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "Modern Concept of Vegetable Cultivation and Processing of Horticultural Crops" from 16th April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

5. Diksha Sharma



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Diksha Sharma** (Enrollment No. G171340020, Roll No. 17134105005), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Muskmelon Cultivation and Processing of Horticultural Crops**" from **21st April, 2021 to 31st July, 2021** at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

6. Jyoti Soni



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: H-1344 / Hort / 2021 / 4-18

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss JYOTI SONI** (Enrollment No. G171340021, Roll No. 17134105006), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Okra Cultivation and Processing of Horticultural Crops**" from **21st April, 2021 to 31st July, 2021** at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

(D. K. Rana)

7. Kshetrimayum Sonia Devi



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Hort/2021/453

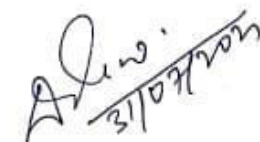
Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Kshetrimayum Sonia Devi** (Enrollment No.G171340022, Roll No.17134105007), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Tomato and Brinjal Cultivation and Processing of Horticultural Crops**" from 19th April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

8. Lily Chinneihoi



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
-919412137680(M)
Email: drdcrana@gmail.com

Ref. No.: HNBGU/Hort/2021/458

Date: July 31, 2021

CERTIFICATE

This is to certify that Miss Lily Chinneihoi (Enrollment No.G1713-40023, Roll No.17134105008), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "Modern Concept of Vegetable Cultivation and Processing of Horticultural Crops" from 16th April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

9. Manisha



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Manisha** (Enrollment No. G171340024, Roll No. 17134105009), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Musk Melon Cultivation and Processing of Horticultural Crops**" from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science

H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HH/364/Hort/2021/456

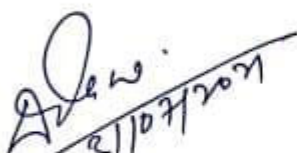
Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Poonam** (Enrollment No.G171340025, Roll No.17134105010), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "Modern Concept of Vegetable Cultivation and Processing of Horticultural Crops" from 16th April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Preeti** (Enrollment No. G171340026, Roll No. 17134105011), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Musk Melon Cultivation and Processing of Horticultural Crops**" from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

12. Priyanka



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Hort/2021/452

Date: July 31, 2021

CERTIFICATE

This is to certify that Miss **Priyanka** (Enrollment No.G171340027, Roll No.17134105012), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Tomato & Brinjal Cultivation and Processing of Horticultural Crops**" from **19th April, 2021 to 31st July, 2021** at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

13. Rinki Bisht



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBU/Hort/2021/949

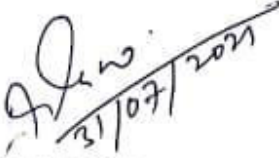
Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Rinki Bisht** (Enrollment No. G171340028, Roll No. 17134105013), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Okra Cultivation and Processing of Horticultural Crops**" from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

14. Riya Gautam



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Host/2021/954

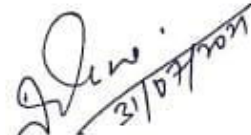
Date: July 31, 2021

CERTIFICATE

This is to certify that Miss Riya gautam (Enrollment No.G171340029, Roll No.17134105014), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "Modern Concept of Tomato and brinjal cultivation and Processing of Horticultural Crops" from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

15. Shalini Bisht



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Hort/2021/750

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Shalini Bisht** (Enrollment No. G171340030, Roll No. 17134105015), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled **"Modern Concept of Okra Cultivation and Processing of Horticultural Crops"** from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

16. Shalvi



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNB/GU/Hort/2021/451

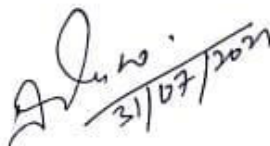
Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Shalvi** (Enrollment No.G171340031, Roll No.17134105016), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Okra Cultivation and Processing of Horticultural Crops**" from **21st April, 2021 to 31st July, 2021** at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

17. Yogita Bhandari



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science

H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: 17 H1344 / Hort / 2021 / 455

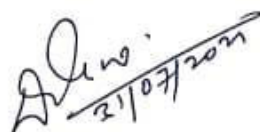
Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Yogita** (Enrollment No.G1713-40033, Roll No.17134105018), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled "**Modern Concept of Vegetable Cultivation and Processing of Horticultural Crops**" from 16th April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.


(D. K. Rana)

18. Zoya Ali



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Assistant Professor

☎ 01370267603(O)
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.:

Date: July 31, 2021

CERTIFICATE

This is to certify that **Miss Zoya Ali** (Enrollment No. G171340034, Roll No. 17134105019), student of B.Sc. Horticulture Semester VIII, 2020-21 has successfully completed the Horticultural Work Experience (HWE) entitled **"Modern Concept of Musk Melon Cultivation and Processing of Horticultural Crops"** from 21st April, 2021 to 31st July, 2021 at Horticultural Research Centre under my supervision and guidance as a part of fulfilling the requirement for Degree of Bachelor of Science in Horticulture of H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand.

She took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish her a grand success and good luck in her future life.

(D. K. Rana)

19. Amit Choudhary

CHARBHUJA NURSERY *Library*
Dept. of Horticulture
Village Bagwara, Teh. Amer 9414381809, 9414224582
Jaipur-303805 E-95, Shastrinagar,
Jaipur- 302016

Ref No., CN / ho / 21 / 43 / 01

Date: 21.07.21

CERTIFICATE

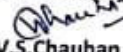
This is certified that

Mr. AmitChoudhary,
student of B.Sc.(Hort.)Semester VIII

from H.N.B. Garhwal University, Srinagar (Garhwal) has successfully
completed his Horticulture work experience(H.W.E.) programme at our nursery
for 45 days during 21 April to 31 July 2021

I wishhim all the best for future endeavor.

For Charbhuj Nursery


V.S. Chauhan
M.Sc. Ento.

Cc . Dr. D.K.Rana (Asstt. Prof.)
Department of Horticulture,
School of agriculture & allied sciences,
HNB Garhwal University, Srinagar (Garhwal)

20. Balwant Gurjar



KRISHI VIGYAN KENDRA-KOTPUTLI, JAIPUR
DIRECTORATE OF EXTENSION EDUCATION
SRI KARAN NARENDRA AGRICULTURE UNIVERSITY
JOBNER



Lt Col (Dr.) Supern Singh Shekhawat
Senior Scientist & Head

Email pc.kvk.gonera@sknau.ac.in
Mobile No. 9408660365

No. KVK/KTP/2021-77

Date: 27.08.2021

CERTIFICATE OF APPRECIATION

Mr. Balwant Gurjar S/o Shri Kanhiyalal Gurjar, student of Hemavati Nandan Bahuguna, Garhwal (A Central University) under gone through rigorous training at KVK, Kotputli from April 21,2021 to July 31,2021 in different fields of nursery raising of flowers and vegetable, plantation of orchards, training and pruning of lime plants, vermin compost making. He shown great interest in learning all the aspect of Propagation and Cultivation of Horticultural Crops at KVK. He will be the asset to any organization. Best wishes for his future endeavors.

Supern Singh
(S.S.Shekhawat)

21. Gaurav Badoni

Herbal Research & Development Institute (HRDI)

जड़ी-बूटी शोध एवं विकास संस्थान (एचआरडीआई)

Mandal-Gopeshwar - 246 401, Distt. Chamoli, Uttarakhand

मण्डल-गोपेश्वर - 246 401, जिला-चमोली, उत्तराखण्ड

Phone: 01372-254210, Fax: 254273, Website: www.hrdu.org, Email: director@hrdu.org, director_hrdu@yahoo.in

Ref. No. *HRDI/21-5/2021-22*

Gopeshwar, Dated, 31 July, 2021

CERTIFICATE

This is to certify that Mr. Gaurav Badoni, B. Sc. Horticulture (8th Semester), Department of Horticulture, HNB Garhwal University, Srinagar Garhwal, Uttarakhand, India has completed industrial training in this Institute. His industrial training was focused on cultivation, collection and quality control of medicinal plants and aromatic plants. This training was carried out at Herbal Analytical Laboratory of this institute from 21 April, 2021 to 31 July, 2021.

We wish him all the best and success in his future endeavor.



Dr. Arvind Kumar Bhandari
Scientist

Arvind Kumar Bhandari
(M.Tech., Ph.D)
Scientist-B
Herbal Research & Development Institute
Mandal, Gopeshwar (Chamoli) U.K.

22. Piyush Dyal



DEPARTMENT OF HORTICULTURE
Progeny-cum-Demonstration Orchard,
Harabag, Tehsil Sunder Nagar, Distt. Mandi HP
175 018

No. Udyann PCDO Harabag 09/2020-320

Dated: 02/08/2021

To Whom it May Concern

This is to certify that **Mr. Piyush Dyal** s/o Sh. Prabh Dyal, Vill. Dhanotu P.O. Mahadev, Tehsil Sundernagar, Distt. Mandi (H.P.) 175 018 has completed his training programme on "Nursery Management of Horticultural Crops" at Progeny-cum-Demonstration Orchard (PCDO), Harabag, Tehsil Sundernagar, Distt Mandi (H.P.) w.e.f. 07/06/2021 to 31/ 07/2021.

During this period his performance, character and conduct was found satisfactory.

I wish him good luck for his bright future.


02/08/2021
Hort. Dev. Officer I/o
PCDO, HARABAGH
Sunder Nagar (HP)

23. Rahul Dudhwal

CHARBHUJA NURSERY

Village Bagwara, Teh. Amer
Jaipur-303805

9414381809, 9414224582

E-95, Shastrinagar,
Jaipur- 302016

Ref No., CN / ho / 07/02/ 021

Date: 31/07/ 021

CERTIFICATE

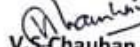
This is certified that

Mr. Rahul Dudhwal,
student of B.Sc.(Hort.)Semester VIII

from H.N.B. Garhwal University, Srinagar (Garhwal) has successfully
completed his Horticulture work experience(H.W.E.) programme at our nursery
for 45 days during 21 April to 31 July 2021

I wish him all the best for future endeavor.

For Charbhuja Nursery


V.S. Chauhan
M.Sc. Ento.

Cc. Dr. D.K. Rana (Asstt. Prof.)
Department of Horticulture,
School of agriculture & allied sciences,
HNB Garhwal University, Srinagar (Garhwal)

24. Rajat Prashar



DEPARTMENT OF HORTICULTURE
Progeny-cum-Demonstration Orchard,
Harabag, Tehsil Sunder Nagar, Distt. Mandi HP
175 018

No. Udyan PDCO Harabag 09/2020-219

Dated: 02/08/2021

To Whom it May Concern

This is to certify that **Mr. Rajat Prashar** s/o Sh. Hukam Chand, Vill. Pargi P.O. Galma, Tehsil Balh, Distt. Mandi (H.P.) 175 008 has completed his training programme on "Nursery Management of Horticultural Crops" at Progeny-cum-Demonstration Orchard (PCDO), Harabag, Tehsil Sundernagar, Distt Mandi (H.P.) w.e.f. 07/06/2021 to 31/07/2021.

During this period his performance, character and conduct was found satisfactory.

I wish him good luck for his bright future.


Hort. Dev. Officer I/c
PCDO, HARABAGH,
Sunder Nagar (HP)
02/08/2021

25. Rayala Gopi



P. Mahesh Kumar
CEO

SWASTIKA ENTERPRISE

DATE : 31AUGUST2021

HORTICULTURE WORK EXPERIENCE TRAINING CERTIFICATE

This is to certify that Mr. **Rayala Gopi** of B.Sc Horticulture from H.N.B.G.U
Has completed his Horticulture Work Experience training On **MUSHROOM
CULTIVATION** during the period of 01-may-2021 to 31-august -2021
(123 days).

His attendance during the training was 92/123 days.(Due to lockdown in state)

He was found punctual,hard working and sincere during the training period.

We wish him all the best for his future endeavor.

For **SWASTIKA ENTERPRISE**

P. MAHESH KUMAR
CEO



Add: Plot No. 1-36/12/1/27, Reddy Colony, Chandanagar, Hyderabad-500 050.
Mob: +91 7842911964 email: swastikamushrooms@gmail.com

26. Sanwar Mal Choudhary

CHARBHUJA NURSERY Library
Dept. of Horticulture
Village Bagwara, Teh. Amer 9414381809, 9414224582
Jaipur-303805 E-95, Shastrinagar,
Jaipur- 302016

Ref No., CN /ho/770/ 021

Date: 31.07.21

CERTIFICATE

This is certified that

Mr. Sanwar Mal Choudhary,
student of B.Sc.(Hort.)Semester VIII

from H.N.B. Garhwal University, Srinagar (Garhwal) has successfully
completed his Horticulture work experience(H.W.E.) programme at our nursery
for 45 days during 21 April to 31 July 2021

I wish him all the best for future endeavor.

For Charbhuj Nursery

V.S. Chauhan
V.S. Chauhan
M.Sc. Ento.

Cc . Dr. D.K.Rana (Asstt. Prof.)
Department of Horticulture,
School of agriculture & allied sciences,
HNB Garhwal University, Srinagar (Garhwal)

27. Shoyab Kalal

CHARBHUJA NURSERY
Village Bagwara, Teh. Amer
Jaipur-303805

9414381808, 9414224302
E-95, Shastri nagar,
Jaipur-302016

Ref No., CN / ho / Fr / Ent / 2021

Date: 31.07.2021

CERTIFICATE

This is certified that

Mr. Shoyab Kalal,
student of B.Sc.(Hort.)Semester VIII

from H.N.B. Garhwal University, Srinagar (Garhwal) has successfully
completed his Horticulture work experience(H.W.E.) programme at our nursery
for 45 days during 21 April to 31 July 2021

Approximately 45 days of training are wasted due to COVID infestation.

I wish him all the best for future endeavor.

For Charbhuj Nursery
For Charbhuj Nursery
V.S.Chauhan
M.Sc.Ento.  Auth. Sign

Cc. Dr. D.K.Rana (Asstt. Prof.)
Department of Horticulture,
School of agriculture & allied sciences,
HNB Garhwal University, Srinagar (Garhwal)

List of M.Sc. Students undertaking Research projects during 2020-21

1. Dujum Poyom



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalsisht23@gmail.com

Ref. No-

Date:

CERTIFICATE-I

This is to certify that the thesis entitled “**Standardization of protocol for improving germination efficiency in Seabuckthorn (*Hippophae salicifolia* D. Don) seed through stratification and priming**” being submitted in partial fulfilment of the requirements for the degree of **Master of Science in Horticulture**, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Miss. Dujum Poyom, Enrolment No. G 191341966 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T. S. Bisht)
Supervisor

2. Gunjan Panwar



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com

Ref. No- DOH/TS-P/05/2021

Date: 10/09/2021

CERTIFICATE-I

This is to certify that the thesis entitled “Standardization of protocol for improving the performance of rooting in dormant cuttings of kiwifruit (*Actinidia deliciosa* Planch) by using hormones under mist chamber” being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Gunjan Panwar, Enrolment No. G191341967 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T.S. Bisht)
Supervisor

3. Rishibala Bist



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBGU/Hort/2021/470

Date: 07/09/2021

CERTIFICATE

This is to certify that the thesis entitled "**Studies on Morphological Characterization, Variability, Trait Association and Divergence of French Bean (*Phaseolus vulgaris* L.) Genotypes under Sub-Tropical Condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by Miss. Rishibala Bist, Roll No. **19134338003**, Enrollment No. **G191341968** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D.K. Rana)


Dr. (Vivek Singh)

4. Shalini Butola



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com

Ref. No- DOI/TS-P/09/2021

Date: 10/09/2021

CERTIFICATE-I

This is to certify that the thesis entitled “Standardization of protocol for improving germination efficiency in Apple (*Malus domestica* Borkh) cv. Golden Delicious seed through stratification and priming” being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Center, Department of Horticulture of this university by Miss. Shalini Butola, Enrolment No. G151340160 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T. S. Bisht)
Supervisor

5. Shilpi Rana



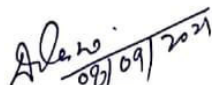
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K. India
(A Central University)- 246174

Ref: HNBGU/Hort/2021/473

Date: 8/09/2021

CERTIFICATE

This is to certify that the thesis entitled "Effect of Humic Acid and Salicylic Acid on Growth, Yield and Quality of Long Melon (*Cucumis melo* var. *utilissimus*) Cv. Punjab Selection-8 under Valley Condition of Garhwal" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Ms. Shilpi Rana, Roll No. 19134338005, Enrollment No. G191341969** under the joint supervision of Dr. D.K. Rana (Assistant Professor & Head) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. D.K. Rana


Dr. Vivek Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNB/364/Hort/2021/471

Date: 10/09/2021

CERTIFICATE

This is to certify that the thesis entitled "**Genetic Variability, Character Association and Divergence Analysis of Fenugreek Genotypes (*Trigonella foenum-graecum* L.) Under Valley Condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Anil Choudhary, Roll No. 19134338007, Enrollment No. G191341971** under the supervision of Dr. K.N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (K.N. Shah)

7. Hanuta Ram Jat



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: H/1344/Hort/2021/459

Date: 10/09/2021

CERTIFICATE

This is to certify that the thesis entitled "Effect of PGRs and Vermiwash on Growth, Yield and Quality in Coriander (*Coriandrum sativum* L.) Cv. ACR-2 under Valley Condition of Garhwal Himalaya" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by Mr. Hanuta Ram Jat, Roll No. 19134338010, Enrollment No. G191341974 under the supervision of Dr. K.N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (K.N. Shah)



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNBU/Hort/2021/475

Date: 7/09/2021

CERTIFICATE

This is to certify that the thesis entitled “Effect of PGRs on Growth, Yield and Quality of Knol-Khol (*Brassica oleracea* var. *gongylodes*) Cv. White Vienna under Valley Condition of Garhwal Hills” being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Mr. Hemant Kumar Gurjar**, Roll No. 19134338011, Enrolment No. G191341975 under the supervision of **Dr. K.N. Shah** (Assistant Professor) Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (K.N. Shah)



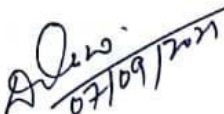
DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: HNB/4/Hort/2021/472

Date: 07/09/2021

CERTIFICATE

This is to certify that the thesis entitled "Effect of Pinching, GA₃ and NAA on Growth, Yield and Quality Parameters of Fenugreek (*Trigonella foenum-graecum* L.) Cv. Pant Ragini under Garhwal Hills" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Kamlesh Kumar Yadav**, Roll No. 19134338012, Enrollment No. G191341976 under the joint supervision of Dr. D. K. Rana (Assistant Professor) and Dr. Vivek Singh (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


Dr. (D. K. Rana)


Dr. (Vivek Singh)

10. Maliram Yadav



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com


Ref. No.- D011/TS-P/03/2021

Date: 10/09/2021

CERTIFICATE-I

This is to certify that the thesis entitled "**Improvement in the performance of rooting in kiwifruit (*Actinidia deliciosa* Planch) cutting by using different types and hormones under mist chamber**" being submitted in partial fulfilment of the requirements for the degree of **Master of Science in Horticulture**, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Center, Department of Horticulture of this university by **Mr. Maliram Yadav**, Enrolment No. **G191341976** under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T. S. Bisht)
Supervisor

11. Pramod Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) – 246174, Uttarakhand, INDIA

Ref: HNBU/Hort/2021/465

Date: 08/09/2021

CERTIFICATE

This is to certify that the thesis entitled "Effect of Different Irrigation Regimes on Different Phenological Stages of Muskmelon (*Cucumis Melo* L.) Cv. Kājri under Garhwal Hills" being submitted in partial fulfillment of the requirement for the degree of Master of Science in 'Horticulture' of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by Mr. Pramod Singh, Enrollment No. G191341978 under the supervision of Dr. K. N. Shah (Assistant Professor), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(Dr. K. N. Shah)
Supervisor

12. Rupam Sarkar



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

☎ +919412932995(M)
Email: tejpalsisht23@gmail.com

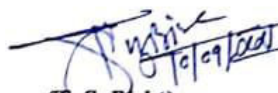
Ref. No- D011/TSP/06/2021

Date: 10/09/2021

CERTIFICATE-I

This is to certify that the thesis entitled “**Effect of seed biopriming with bioinoculants on growth, yield and yield contributing traits of Cowpea (*Vigna unguiculata* L) cv. Kashi Kanchan grown under Aonla orchard**” being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Mr. Rupam Sarkar, Enrolment No. G152040128 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T.S. Bisht)
Supervisor

13. Sourabh Sukla Das



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com

Ref. No- D01/TS-P/07/2021

Date: 10/09/2021

CERTIFICATE-I

This is to certify that the thesis entitled "Effect of seed biopriming with bioinoculants on growth, yield and yield contributing traits of French Bean (*Phaseolus Vulgaris* L.) cv. Pant Anupama grown under Aonla orchard" being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Mr Sourabh Sukla Das, Enrolment No. G152040130 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2021


(T. S. Bisht)
Supervisor

14. Sumit Chauhan



DEPARTMENT OF HORTICULTURE
School of Agriculture and Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
(A Central University)

Ref: 1-1 N/264 / H/04/2021 / 460

Date: 08/09/2021

CERTIFICATE


This is to certify that the thesis entitled "**Response of OP and Hybrid Pea for Integrated Nutrient Management under Sub-tropical Conditions of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by **Mr. Sumit Chauhan**, Roll No. **19134338017**, Enrollment No. **G191341979** under the joint supervision of **Dr. D.K. Rana** (Assistant Professor) and **Dr. Vivek Singh** (Lecturer), Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

Dr. (D.K. Rana)

Dr. (Vivek Singh)

List of B.Sc. students undertaking field projects during 2021-22

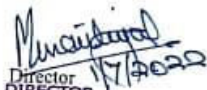
1. Ambika



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेनवत नंदन बाहुगुणा विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)
Prof. M.C. Nautiyal
HOD/Director

Certificate of Training

This is to certify that Miss Ambika D/o Mr. Lalit Chaudhary, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project in Propagation and Multiplication of Medicinal and Aromatic Plants under Horticultural Work Experience w.e.f. 10th March 2022 to 30th June 2022 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.


Director
DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

Post Box No.14 Srinagar Garhwal 246174 -Uttarakhand India, Ph. 01346- 252172, Fax- 25207
email:happre@gmail.com website:http://hnbgu.ac.in
पोस्ट बॉक्स नं० 14 श्रीनगर गढ़वाल-246174 उत्तराखण्ड, दूरभाष 01346-252172.

2. Anshika Singh

<p>उद्यान एवं खाद्य प्रसंस्करण विभाग उत्तराखंड</p> <p>कार्यालय उप निदेशक उद्यान औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र</p> <p>श्रीनगर गढ़वाल उत्तराखंड</p> <p>Horticulture Training and Testing Centre Srinagar</p> <p>Garhwal</p> <p> उत्तराखण्ड साक्षरता मिशन</p> <p>Certificate</p> <p>In the reference of course coordinator Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand, This is to certify that Anshika Singh D/o Mr. Sushil Kumar Singh, a final year student of B.Sc. Horticulture (8th Sem.) studying from H.N.B. Garhwal University Srinagar Garhwal has undergone 110 days Training programme from 10th March 2022 to 30th June 2022 in Food Preservation (50 days) to manage post-harvest losses and Nursery Management (60 days) for the production of quality planting material. She has made various value added products in Food Preservation (Pickle, Jam, Jelly, Chutney, Juices) and has done various operations in Nursery (Cutting, Budding, Grafting, Layering, Training, etc.)</p> <p>During the above period she has been quite sincere and hard working through this training programme.</p> <p>I wish her a bright future.</p> <p>Date: 30.06.2022</p> <p> Dr. D.K. Tiwari Deputy Director Horticulture Srinagar Garhwal उपनिदेशक (उद्यान) औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र श्रीनगर गढ़वाल</p>	
--	--

3. Arushi Sharma

Society for Economic and Social Studies

R.O.: C-2/205, Geeta Complex, Indira Nagar, Dehradun - 248006

Contact : 7534006201-02, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D.Raghumandan
Manager : P.Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



30th June 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Arushi Sharma** (Aadhaar # 3393 2288 8268) of Batch 2018-2022, 8 Semester- BSc. Horticulture, HNB University, Srinagar Garhwal Uttarakhand was associated with our Fruit & Vegetable processing unit located in Sahaspur, Dehradun from 10th March 2018 to 30th June 2022. Her main responsibility was to undertake training in Post Harvest Management and to provide assistance in ongoing operations of unit viz. production of Squashes, Chutneys, Jams, etc.

During this period, we found her a hardworking and satisfactory in carrying out the job duties during her tenure of learning.

We wish her all the best for future endeavor.

For Society for Economic & Social Studies

Vinod Uniyal
Manager
9456502185



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197

Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

4. Bidyaluxmi Huirem




BAGWAN GRAMODHYOG SAMITI

Vill- Shyampur, P.O- Ambiwala, via- Premnagar
Dehradun (Uttarakhand)

Certificate

This is certified that Mr./Ms. Bidyaluxmi Huirem S/o, D/o
Mr. Huirem Indra Singh student of H.N.B. Garhwal University
has successfully completed training program on Mushroom Cultivation & Management
Under RAWA/HWE/FWE from 10/03/2022 to 30/06/2022
Conducted by Bagwan Gramodhyog Samiti, Dehradun.
During the training period his/her performance was found satisfactory.
We wish his/her success for future.


Secretary


President

5. Ishita Bisht

उद्यान एवं खाद्य प्रसंस्करण विभाग उत्तराखंड
कार्यालय उप निदेशक उद्यान औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल उत्तराखंड
Horticulture Training and Testing Centre Srinagar
Garhwal
(Ph: 01346-252269)


उत्तराखण्ड शासन

Certificate

In the reference of course coordinator Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand, This is to certify that Ishita Bisht D/o Mr. Girveer Singh Bisht, a final year student of B.Sc. Horticulture (8th Sem.) studying from H.N.B. Garhwal University Srinagar Garhwal has undergone 110 days Training programme from 10th March 2022 to 30th June 2022 in Food Preservation (50 days) to manage post-harvest losses and Nursery Management (60 days) for the production of quality planting material. She has made various value added products in Food Preservation (Pickle, Jam, Jelly, Chutney, Juices) and has done various operations in Nursery (Cutting, Budding, Grafting, Layering, Training, etc.)

During the above period she has been quite sincere and hard working through this training programme.

I wish her a bright future.

Date: 30.06.2022


Dr. D.K. Tiwari
Deputy Director Horticulture
Srinagar Garhwal

उपनिदेशक (उद्यान)
औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल

उद्यान एवं खाद्य प्रसंस्करण विभाग उत्तराखंड

**कार्यालय उप निदेशक उद्यान औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल उत्तराखंड**

**Horticulture Training and Testing Centre Srinagar
Garhwal**



(Ph: 01346-252269)

Certificate

In the reference of course coordinator Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand, This is to certify Khushpreet D/o Diwan Chand a final year student of B.Sc. Horticulture (8th Sem.) studying from H.N.B. Garhwal University Srinagar Garhwal has undergone 110 days Training programme from 10th March 2022 to 30th June 2022 in Food Preservation (50 days) to manage post-harvest losses and Nursery Management (60 days) for the production of quality planting material. She has made various value added products in Food Preservation (Pickle, Jam, Jelly, Chutney, Juices) and has done various operations in Nursery (Cutting, Budding, Grafting, Layering, Training, etc.)

During the above period she has been quite sincere and hard working through this training programme.

I wish her a bright future.

Date: 30.06.2022

Dr. D.K. Tiwari

**Deputy Director Horticulture
Srinagar Garhwal**

उपनिदेशक (उद्यान)
औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल

7. Muskan Sharma

Society for Economic and Social Studies

R.O.: C-2/205, Geeta Complex, Indira Nagar, Dehradun - 248006

Contact : 7534006201-02, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D.Raghumandan
Manager : P.Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



30th June 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Muskan Sharma (Aadhaar # 3576 1946 6196) of Batch 2018-2022, 8 Semester- BSc. Horticulture, HNB University, Srinagar Garhwal Uttarakhand was associated with our Fruit & Vegetable processing unit located in Sahaspur, Dehradun from 10th March 2018 to 30th June 2022. Her main responsibility was to undertake training in Post Harvest Management and to provide assistance in ongoing operations of unit viz. production of Squashes, Chutneys, Jams, etc.

During this period, we found her a hardworking and satisfactory in carrying out the job duties during her tenure of learning.

We wish her all the best for future endeavor.

For Society for Economic & Social Studies

Vinod Uniyal
Manager
9456502185



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197

Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

8. Neha Rana



9. Nusrat Jahan



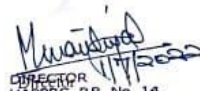
High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र

Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बहुगुणा गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Prof. M.C. Nautiyal
HOD/Director

Certificate of Training

This is to certify that Miss Nusrat Jahn D/o Mr. Mohd. Ali, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project in Propagation and Multiplication of Medicinal and Aromatic Plants under Horticultural Work Experience w.e.f. 10th March 2022 to 30th June 2022 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

10. Priyanka Sharma



Training Certificate

This is to certify that Miss Priyanka Sharma D/o Mr. Kishori Lal Sharma, student of B.Sc. Horticulture year 2022 at 8th semester has undertaken Training for 110 days from 10-03-2022 to 30-06-2022 excluding Sundays.

During the course of her trainings, she had an opportunity to work in various departments in our factory including the beverage division, pickle division and the wine division. During the course of her training, the conduct of the student was good and we wish the student all the very Best in the future.

Authorised Signatory


Signature
MINOCHA INDUSTRIES

OUR BRANDS:

Minchy's
FOOD PRODUCTS



MINOCHA INDUSTRIES: NH-05 Shoghi, Distt. Shimla - 171219 (H.P)

+91 177 2928067 ☎ +91 177 2860203 📠 +91 98162 10012

info@minchys.com

www.minchys.com

@minchysindia

11. Priyanka Thakur



Prof. M.C. Nautiyal
HOD/Director


High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बाहुगुणा गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Certificate of Training

This is to certify that Miss Priyanka Thakur D/o Mr. Girdhari Lal, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project in Propagation and Multiplication of Medicinal and Aromatic Plants under Horticultural Work Experience w.e.f. 10th March 2022 to 30th June 2022 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

12. Rashmi Kannojiya





BAGWAN GRAMODHYOG SAMITI

Vill- Shyampur, P.O- Ambiwala, via- Premnagar
Dehradun (Uttarakhand)

Certificate

This is certified that Mr./Ms. Rashmi Kannojiya S/o, D/o
Mr. Vinod Baku student of HNB Garhwal University
has successfully completed training program on Mushrooms Cultivation
Under RAW/ HWE/ FWE from 10/05/2022 to 30/06/2022
Conducted by Bagwan Gramodhyog Samiti, Dehradun.
During the training period his/her performance was found satisfactory.
We wish his/her success for future.


Secretary


President

13. Riya

Society for Economic and Social Studies

R.O.: C-2/205, Geeta Complex, Indira Nagar, Dehradun - 248006

Contact : 7534006201-02, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D. Raghumandan
Manager : P. Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



30th June 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Riya (Aadhaar # 2797 5463 7369) of Batch 2018-2022, 8 Semester-BSc. Horticulture, HNB University, Srinagar Garhwal Uttarakhand was associated with our Fruit & Vegetable processing unit located in Sahaspur, Dehradun from 10th March 2018 to 30th June 2022. Her main responsibility was to undertake training in Post Harvest Management and to provide assistance in ongoing operations of unit viz. production of Squashes, Chutneys, Jams, etc.

During this period, we found her a hardworking and satisfactory in carrying out the job duties during her tenure of learning.

We wish her all the best for future endeavor.

For Society for Economic & Social Studies

Vinod Uniyal
Manager
9456502185



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197
Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

14. Santoshi Jaiswal



BAGWAN GRAMODHYOG SAMITI

Vill- Shyampur, P.O- Ambiwala, via- Premnagar
Dehradun (Uttarakhand)

Certificate

This is certified that Mr./Ms. Santoshi Jaiswal S/o, D/o
Mr. Tai Prakash Jaiswal student of H.N.B. Garhwal University
has successfully completed training program on Mushroom Cultivation & Management
Under RAWE/HWE/FWE from 10/03/2022 to 30/06/2022
Conducted by Bagwan Gramodhyog Samiti, Dehradun.
During the training period his/her performance was found satisfactory.
We wish his/her success for future.


Secretary


President

15. Ankesh Verma



कृषि विज्ञान केन्द्र, जयपुर-1
(प्रगति ट्रस्ट-जयपुर)
Chomu (Tankarda), Dist. Jaipur-303 702 (Raj.)
Krishi Vigyan Kendra, Jaipur-I
(Pragati Trust-Jaipur)

Ph. 0141231122
Email: kvkchomu@gmail.com
Website: Jaipur1.kvk2.in

REF.NO. : F.1(29)RAW/KVK/2022-23/ 111

DATED: 30-06-2022

Certificate

This is to certify that Mr. Ankesh Verma (Roll No./Enrollment 18134105018/G181342605) student of B.Sc. Horticulture Semester VIII of Department of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken first hand training on Hi tech Horticulture at our farmers' Hi-tech Unit w.e.f 14.03.2022 to 30.06.2022 under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries

(N. K. Gupta)
Subject Matter Specialist
(Horticulture)
Naval Kishor Gupta
SMS (Horticulture)
Krishi Vigyan Kendra Chomu

16. Ashish Kumar



कृषि विज्ञान केन्द्र, जयपुर-I
(प्रगति ट्रस्ट-जयपुर)
श्रीमं. (तंकारदा), जिला-जयपुर-303702 (राजस्थान)
Krishi Vigyan Kendra, Jaipur-I
(Pragati Trust-Jaipur)
Chomu (Tankarda), Dist. Jaipur-303 702 (Ra.)
Ph. (0141)231123
Email: kvkchomu@gmail.com
Website: jaipur1.kvk2.in

REF.NO. : F.1(29)RAW/KVK/2022-23/ 114

DATED: 30-06-2022


Certificate

This is to certify that **Mr. Ashish Kumar** (Roll No./Enrollment **18134105019/G181342606**) student of **B.Sc. Horticulture Semester VIII** of Department of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken **first hand training on Hi tech Horticulture** at our farmers' Hi-tech Unit w.e.f **04.04.2022 to 30.06.2022** under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries

(N. K. Gupta)
Subject Matter Specialist
(Horticulture)
SMS (Horticulture)
Krishi Vigyan Kendra Chomu

उद्यान एवं खाद्य प्रसंस्करण विभाग
कार्यालय उप निदेशक उद्यान औद्यानिक प्रशिक्षण
परीक्षण केन्द्र श्रीनगर गढ़वाल उत्तराखंड
Horticulture Training and Testing Centre Srinagar
Garhwal
(Ph: 01346-252269)


उत्तराखण्ड शासन


Certificate

In the reference of course coordinator Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand, This is to certify that Banwari Lal Dantel S/o Mr. Ganesh Ram Dantel, a final year student of B.Sc. Horticulture (8th Sem.) studying from H.N.B. Garhwal University Srinagar Garhwal has undergone 110 days Training programme from 10th March 2022 to 30th June 2022 in Food Preservation (50 days) to manage post-harvest losses and Nursery Management (60 days) for the production of quality planting material. He has made various value added products in Food Preservation (Pickle, Jam, Jelly, Chutney, Juices) and has done various operations in Nursery (Cutting, Budding, Grafting, Layering, Training, etc.)

During the above period He has been quite sincere and hard working through this training programme.

I wish him a bright future.

Date: 30.06.2022


Dr. D.K. Tiwari
Deputy Director Horticulture
Srinagar Garhwal
उपनिदेशक (उद्यान)

18. Bhagwan Sahay Jat



ICAR
(A Project of ICAR
New Delhi, Govt. of
India)

कृषि विज्ञान केन्द्र, जयपुर-1

(प्रगति ट्रस्ट-जयपुर)

चोमू (टंकड़ा), जिला-जयपुर-303702 (राजस्थान)

Krishi Vigyan Kendra, Jaipur-1

(Pragati Trust-Jaipur)

Chomu (Tankarda), Dist. Jaipur-303 702 (Raj.)

Ph. (0141)231113

Email: kvkchomu@gmail.com

Website: Jaipur1.kv12.in

REF.NO. : F.1(29)RAWE/KVK/2022-23/ 112

DATED: 30-06-2022

Certificate

This is to certify that **Mr. Bhagwan Sahay Jat** (Roll No./Enrollment 18134105021/G181342608) student of **B.Sc. Horticulture Semester VIII** of Department of Horticulture, School of Agriculture and Allied Science from **H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand** has successfully undertaken **First hand training on Hi tech Horticulture** at our farmers' Hi-tech Unit **w.e.f. 10.03.2022 to 30.06.2022** under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries

(N. K. Gupta)
Subject Matter Specialist
(Horticulture)

(Signature)
30/6/22
N. K. Gupta
Subject Matter Specialist
(Horticulture)
Chomu, Dist. Jaipur-303702
Rajasthan

19. Farhan Ahmed

Mob No.: 80917-65403, 76500-58883
THAKUR COMPOST & MUSHROOM FARM
VILLAGE SONAGHAT PO CHAIL TEHSIL KANDAGHAT DISTT SOLAN HP 173217

TO WHOM IT MAY CONCERN

It is certified that Mr Farhan Ahmed S/O Shri Riyaz Ahmed , 308, Kotwal Alampur haridwar , Uttarakhand - 247665 has worked in Thakur Compost & Mushroom farm Village Sonaghat ,PO Chail Teh kandaghat, DISTT. Solan (HP) 173217, From 10 March 2022 till 10 June 2022 During his working period we found him Sincere, honest, hardworking, dedicated employee with great knowledge.

He is amiable in nature and character is well.

We wish him every success in life.

For Thakur Compost & Mushroom farm

Thakur Compost & Mushroom Farm

Authorized Signature

Authorized signature

20. Kapil Kumar



BAGWAN GRAMODHYOG SAMITI

Vill- Shyampur, P.O- Ambiwala, via- Premnagar
Dehradun (Uttarakhand)

Certificate

This is certified that Mr./Ms. Kapil Kumar S/o, D/o
Mr. Kamal Kumar student of H.N.B. Garhwal University
has successfully completed training program on Mushroom Cultivation
Under RAWF/HWF/FWF from 10/03/2022 to 30/06/2022
Conducted by Bagwan Gramodhyog Samiti, Dehradun.
During the training period his/her performance was found satisfactory.
We wish his/her success for future.


Secretary


President

21. Nandeibam Prakash Singh



DEPARTMENT OF HORTICULTURE
COLLEGE OF AGRICULTURE, IROISEMBA
CENTRAL AGRICULTURAL UNIVERSITY

Imphal – 795004, Manipur (India)

Dr.Ng.Piloo
Associate Professor

Dated: Imphal, the 30th June, 2022

CERTIFICATE

This is to certify that *Mr.Nandeibam Prakash Singh* (Enrollment No.: G181342611, Roll No.: 18134105024), s/o Nandeibam Paoma Singh, of B.Sc. (Horticulture) 8th Semester at H.N.B. Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand has completed the Horticultural Work Experience Programme entitled "Processing of Horticultural Crops" during 10 March – 30 June of 2022 under my guidance and supervision as a part of fulfilling his requirement in Bachelor of Science in the field of Horticulture under HNB Garhwal University (Uttarakhand)..

He took keen interest in all stages of the project and has gained good knowledge of various activities.

I wish him a grand success and good luck in his future life.

Major Advisor:- Dr. Ng. Piloo

Dr. Nangbam Piloo
Associate Professor
Department of Horticulture
College of Agriculture, Iroisemba
Central Agricultural University, Imphal

उद्यान एवं खाद्य प्रसंस्करण विभाग उत्तराखंड

**कार्यालय उप निदेशक उद्यान औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल उत्तराखंड**

**Horticulture Training and Testing Centre Srinagar
Garhwal**



(Ph: 01346-252269)

Certificate

In the reference of course coordinator Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar Garhwal, Uttarakhand, This is to certify that RODDA SAMPREETH KUAMR S/o Mr. RODDA SAMUEL, a final year student of B.Sc. Horticulture (8th Sem.) studying from H.N.B. Garhwal University Srinagar Garhwal has undergone 110 days Training programme from 10th March 2022 to 30th June 2022 in Food Preservation (50 days) to manage post-harvest losses and Nursery Management (60 days) for the production of quality planting material. He has made various value added products in Food Preservation (Pickle, Jam, Jelly, Chutney, Juices) and has done various operations in Nursery (Cutting, Budding, Grafting, Layering, Training, etc.)

During the above period He has been quite sincere and hard working through this training programme.

I wish Him a bright future.

Dr. D.K. Tiwari

Deputy Director Horticulture

Srinagar Garhwal

उपनिदेशक (उद्यान)
औद्यानिक प्रशिक्षण एवं परीक्षण केन्द्र
श्रीनगर गढ़वाल

Date: 30.06.2022

23. Rohit Sharma

Society for Economic and Social Studies

R.O.: C-2/205, Geeta Complex, Indira Nagar, Dehradun - 248006

Contact : 7534006201-02, 9412382568

E-mail : ctd.dehradun@gmail.com Website : <http://ctdsess.in>

Secretary : D.Raghumandan
Manager : P.Bhandari



Centre for Technology and Development

Main Activities :

Promotion and Handholding of Micro and Small Enterprises

Natural Resource Management

Manufacturer of FRAMERS' FOOD PRODUCT

Regd. with KVIB, UCOST - TRC

Empaneled Udyami Mitra under Ministry of MSME, Govt. of India



30th June 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. Rohit Sharma (Aadhaar # 7350 6310 6116) of Batch 2018-2022, 8 Semester- BSc. Horticulture, HNB University, Srinagar Garhwal Uttarakhand was associated with our Fruit & Vegetable processing unit located in Sahaspur, Dehradun from 10th March 2018 to 30th June 2022. His main responsibility was to undertake training in Post Harvest Management and to provide assistance in ongoing operations of unit viz. production of Squashes, Chutneys, Jams, etc.

During this period, we found him a hardworking and satisfactory in carrying out the job duties during her tenure of learning.

We wish him all the best for future endeavor.

For Society for Economic & Social Studies

Vinod Uniyal
Manager
9456502185



Unit Address : CTD Field Station, Sahaspur, Dehradun - 248 197

Regd. Office : Khasra 275, West End Marg, Said-ul-Ajaib, New Delhi - 110030

24. Sachin Arya



High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र

Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बहुगुणा गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)

Prof. M.C. Nautiyal
HOD/Director

Certificate of Training

This is to certify that Mr. Sachin Arya S/o Mr. Magan Lal, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project in Propagation and Multiplication of Medicinal and Aromatic Plants under Horticultural Work Experience w.e.f. 10th March 2022 to 30th June 2022 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

Post Box No.14 Srinagar Garhwal 246174 -Uttarakhand India, Ph. 01346- 252172. Fax: 25207
email:happrc@gmail.com website:http://hnbgu.ac.in
पोस्ट बॉक्स नं० 14 श्रीनगर गढ़वाल-246174 उत्तराखण्ड, दूरभाष 01346-252172.



भारतीय
ICAR
(A Project of ICAR
New Delhi, Govt. of
India)

कृषि विज्ञान केन्द्र, जयपुर-I
(प्रगति ट्रस्ट-जयपुर)
चोमू (टांकड़ा), जिला-जयपुर-303702 (राजस्थान)

Krishi Vigyan Kendra, Jaipur-I

(Pragati Trust-Jaipur)
Chomu (Tankarda), Dist. Jaipur-303 702 (Raj.)
Ph. (0141)231123
Email: kvkjaipur@gmail.com
Website: jaipur1.kvk2.in

REF.NO. : F.1(29)RAW/KVK/2022-23/ 113

DATED: 30-06-2022

Certificate

This is to certify that Mr. Sanjeev Verma (Roll No./Enrollment 18134105028/G181342615) student of B.Sc. Horticulture Semester VIII of Department of Horticulture School of Agriculture and Allied Science from H.N.B Garhwal University, Srinagar (Garhwal), Uttarakhand has successfully undertaken first hand training on Hi tech Horticulture at our farmers' Hi-tech Unit w.e.f 14.03.2022 to 30.06.2022 under Horticulture Work Experience (HWE) Programme.

I wish a bright career in horticulture and allied industries

(N. K. Gupta)
Subject Matter Specialist
(Horticulture)
SMS (Horticulture)
Krishi Vigyan Kendra Chomu

26. Vivek Kumar

HIMACHAL PRADESH HORTICULTURAL
PRODUCE MARKETING & PROCESSING
CORPORATION LTD.
(A HP GOVERNMENT UNDERTAKING)



हिमाचल प्रदेश उद्यान उपज विपणन
उद्यम लिमिटेड
(हिमाचल प्रदेश सरकार प्रतिष्ठान)

HPMC FRUIT PROCESSING PLANT

Jarol, Sundernagar - 175018, Distt. Mandi (Himachal Pradesh)
Ph. : 01907-275222, Fax : 01907-275210, E-mail : hpmcjr@gmail.com
GSTIN : 02AAACH6129G2Z0

Ref. No. 303


Date 27/06/22

TO WHOM IT MAY CONCERN

This is to certify that Mr. Vivek Kumar, S/O Sh.,
Rajneet Kumar student of B.Sc. Horticulture 4th Year of Department of
Horticulture School of Agriculture & Allied Science H.N.B. Garhwal
University, Srinagar (Garhwal), U.K. has completed his training at
HPMC Fruit Processing Plant, Jarol Sunder Nagar, Distt. Mandi, Himachal
Pradesh w.e.f. 10.03.2022 to 27.06.2022.

He has successfully completed his industrial training in
Plant. His work and conduct has been found satisfactory.

I wish him all the success in his life.



Dy. General Manager
hpmc FPP Jarol
Sunder Nagar Distt. Mandi (H.P.)

**Dy. General Manager
HPMC, FPP, Jarol,
Sunder Nagar (H.P.)**

Regd. Office : hpmc Nigam Vihar,
Shimla - 171 002 H.P.
E-mail : hpscshimla@gmail.com


Ph. : 0177 - 2623832, 2623836
FAX : 0177 - 2623834

27. Vivek Saklani

 High Altitude Plant Physiology Research Centre
उच्च शिखरीय पादप कार्यिकी शोध केन्द्र
Hemvati Nandan Bahuguna Garhwal University (A Central University)
हेमवती नन्दन बहगुना गढ़वाल विश्वविद्यालय (केन्द्रीय विश्वविद्यालय)
Prof. M.C. Nautiyal
HOD/Director

Certificate of Training

This is to certify that Mr. Vivek Saklani S/o Mr. Shailendra Shuklani, student of B.Sc. Horticulture Final year, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Uttarakhand) has successfully completed practical training Course on Project in Propagation and Multiplication of Medicinal and Aromatic Plants under Horticultural Work Experience w.e.f. 10th March 2022 to 30th June 2022 at High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal.


DIRECTOR
HAPPRC, P.B. No. 14
H.N.B. Garhwal University
(A Central University)
Srinagar (Garhwal) U.K.
PIN - 246174

Post Box No.14 Srinagar Garhwal 246174 -Uttarakhand India, Ph. 01346- 252172. Fax: 25207
email:happre@gmail.com website:http/ hnbgu.ac.in
पोस्ट बॉक्स नं० 14 श्रीनगर गढ़वाल-246174 उत्तराखण्ड, दूरभाष 01346-252172,

List of M.Sc. Students undertaking Research projects during 2021-22

1. Anjali Kuriyal



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com


Ref. No-1 DCH/TS-P/10/2022

Date: 25/09/2022

CERTIFICATE-I

This is to certify that the thesis entitled "Standardization of protocol for improving runner production efficiency in different strawberry (*Fragaria x ananassa* duch.) cultivars by using various growing media and hormonal combinations" being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Miss. Anjali Kuriyal, Enrolment No. G201342082 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2022


(T. S. Bisht)
Supervisor

2. Ankita Dadarwal



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalsisht23@gmail.com

Ref. No-1 DOH/TS-P/08/2022

Date: 25/09/2022

CERTIFICATE-I

This is to certify that the thesis entitled "Improving germination efficiency in aonla (*Emblica officinalis* Gaertn.) through seed grading and priming with various concentrations of gibberellic acid" being submitted in partial fulfilment of the requirements for the degree of Master of Science in Horticulture, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by Ankita Dadarwal, Enrolment No. G201342083 under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2022


(T. S. Bisht)
Supervisor

3. Astha Chauhan



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Head

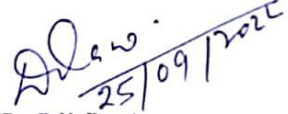
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBU Hort/2022/32

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled "**Effect of Micronutrients on Different Horticultural Traits of Capsicum (*Capsicum annum* L. var. *grossum* Sendt.) Cv. California Wonder under Subtropical Condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus and Department of Horticulture of this university by Miss Astha Chauhan, Roll No. 20134338004 and Enrollment No. G201342084 under my supervision, and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. D.K. Rana)

4. Kanishka



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com

Ref. No-Don/TS-P/09/2022

Date: 25/09/2022

CERTIFICATE-I

This is to certify that the thesis entitled “Standardization of protocol for improving germination efficiency in Aonla (*Emblica officinalis* Gaertn.) by using various size seed grades collected at different maturity stages” being submitted in partial fulfilment of the requirements for the degree of **Master of Science in Horticulture**, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by **Kanishka**, Enrolment No. **G153220004** under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2022


(T. S. Bisht)
Supervisor

5. Payel Das



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Head

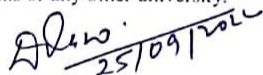
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Hort/2022/22

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled "**Impact of Various Type of Mulch Material on Growth, Yield and Quality of Summer Squash (*Cucurbita pepo* L.) Cv. Pusa Alankar under Valley Condition of Srinagar Garhwal**" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal (Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Center, Chauras Campus and Department of Horticulture of this university by Miss Payel Das, RollNo. 20134338006 and EnrollmentNo. G162040934 under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. D. K. Rana)

6. Rupam Bharti



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. K.N. Shah
Assistant Professor

+917895953707(M)
Email: naseer.ahmed56@gmail.com

Ref. No.: HNBGU/Hort/2022/24

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled **"Influence of Various Concentrations of Commercial and Nano Urea on Growth, Yield and Quality of Beet Leaf (*Beta vulgaris* var. *bengalensis*) Cv. All Green under Subtropical Condition of Srinagar Garhwal"** being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Miss Rupam Bharti, Roll No:- 20134338007** and **Enrollment No:- G201342085** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.

(Dr. K.N. Shah)

7. Sonal



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Head

+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HN/344/Hort/2022/28

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled "**Influence of Plant Growth Regulators on Tomato (*Solanum lycopersicum* L.) Growth, Yield and Quality Parameters under Subtropical condition of Garhwal Hills**" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Miss Sonal, Roll No. 20134338008 and Enrollment No. G201342086** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. D.K. Rana)



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalbisht23@gmail.com


Ref. No- D011/TS-P/07/2022

Date: 25/09/2022

CERTIFICATE-I

This is to certify that the thesis entitled "Studies on the performance of different guava (*Psidium guajava* L.) cultivars for growth, yield and quality attributes under ultra-high-density plantation in valley condition of Srinagar Garhwal" being submitted in partial fulfilment of the requirements for the degree of **Master of Science in Horticulture**, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by **Sonu Shekhawat**, Enrolment No. **G201342087** under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2022


(T. S. Bisht)
Supervisor



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. K.N. Shah
Assistant Professor

+917895953707(M)
Email: nascer.ahmed56@gmail.com

Ref. No.: HNUGU/Hort/2022/23

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled "Efficacy of Integrated Nutrient Management on *Amaranthus* (*Amaranthus tricolor* L.) Cv. Pusa Kirti for Different Economically Important Traits under Valley Condition of Srinagar Garhwal" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Miss Sushma Suman**, Roll No. 20134338010 and Enrollment No. G201342088 under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


25/09/2022
(Dr. K.N. Shah)

10. Bhupendra Singh



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science,
Hemvati Nandan Bahuguna Garhwal University
(A Central University),
Srinagar (Garhwal) -246174, Uttarakhand, INDIA

DR. T. S. BISHT
Assistant Professor

+919412938995(M)
Email: tejpalsisht23@gmail.com


Ref. No-104/TSP/11/2022

Date: 25/09/2022

CERTIFICATE-I

This is to certify that the thesis entitled "Effect of seedling treatment with various bio-inoculants on growth, yield and yield contributing traits of *Capsicum* (*Capsicum annum L.*) grown under zero till Aonla orchard" being submitted in partial fulfilment of the requirements for the degree of **Master of Science in Horticulture**, of the Department of Horticulture, HNB Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of *bona fide* research carried out at Horticulture Research Centre, Department of Horticulture of this university by **Mr. Bhupendra Singh, Enrolment No. G163010025** under my supervision and no part of the thesis has been submitted for any other degree or diploma to this or any other university.

Srinagar
September, 2022


(T. S. Bisht)
Supervisor

11. Biswajit Das



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. D.K. Rana
Head

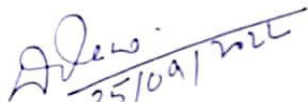
+919412137680(M)
Email: drdkrana@gmail.com

Ref. No.: HNBGU/Hort/2022/29

Date: -25/09/22

CERTIFICATE

This is to certify that the thesis entitled **"Influence Of Different Organic Manures On Growth, Yield And Quality Parameters of Amaranthus (*Amaranthus tricolor* L.) Cv. Pusa Kirti Under Subtropical Condition of Srinagar Garhwal"** being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal (Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Center, Chauras Campus and Department of Horticulture of this university by **Mr. Biswajit Das, Roll No. 20134338012 and Enrollment No. G201342089** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


25/09/22
(Dr. D. K. Rana)

12. Suraj Malakar



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H. N. B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. K.N. Shah
Assistant Professor

+917895953707(M)
Email: naseer.ahmed56@gmail.com

Ref. No.: H-1364/Hort/2022/30

Date: 25/09/2022

CERTIFICATE

This is to certify that the thesis entitled "Effect of Different Plant Growth Regulators on Vegetative Development, Sex Expression and Fruit Production of Summer Squash (*Cucurbita pepo* L.) under Subtropical Conditions of Srinagar Garhwal" being submitted in partial fulfillment of the requirement for the degree of **Master of Science in Horticulture** of the H.N.B. Garhwal University (A Central University), Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by **Mr. Suraj Malakar, Roll No. 20134338014 and Enrollment No. G162041131** under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


(Dr. K.N. Shah)

13. Mahendra Kumar



DEPARTMENT OF HORTICULTURE
School of Agriculture & Allied Science
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India
(A Central University)-246174

Dr. K.N. Shah
Assistant Professor

+917895953707(M)
Email: naseer.ahmed56@gmail.com

Ref. No.: HN/344/Hort/2022/21

Date: 25/9/2022

CERTIFICATE

This is to certify that the thesis entitled "Studies on Performance of Public and Private Sector Radish (*Raphanus sativus* L.) Varieties under Valley Condition of Srinagar Garhwal" being submitted in partial fulfillment of the requirement for the degree of Master of Science in Horticulture of the H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India, is a record of bonafide research work carried out at Horticultural Research Centre, Chauras Campus, Department of Horticulture of this university by Mr. Mahendra Kumar, Roll No. 18134338011, Enrollment No. G14930014 under my supervision and no part of the thesis has been utilized for any other degree or diploma to this or any other university.


25/9/2022
Dr. (K.N. Shah)



उत्तराखण्ड जैवप्रौद्योगिकी परिषद्

UTTARAKHAND COUNCIL FOR BIOTECHNOLOGY

Department of Agriculture, Govt. of Uttarakhand



उत्तराखण्ड सरकार

Ref: UCB/Hld/ 184

Date: 22/12/2020

To,


Dr. Deepti Prabha,
Assistant Professor
Deptt. of Seed Science & Tech.
H.N.B. Garhwal University
Srinagar, Garhwal

Dear Dr. Prabha,

This is regarding the project entitled "Germplasm collection of French Bean from Garhwal Hills and its screening for anthracnose resistance using Morphological and Molecular Markers" sanctioned vide order no. UCB/R&D Project/2016/02/377 dated 31.03.2016. The duration of the above project completed on September, 2018 and all the sanctioned objectives have been achieved. We have received all the needed documents viz, final statement of expenditure, utilization certificate and project completion report from your side on completion of the project and there is nothing pending.

We wish you all the success in your future endeavors.

With Regards,


(Dr. Kanchan Karki)
In-charge Project Cell


(Dr. D.K. Singh)
Director

Copy to:

1. PA to Director for kind information.
2. Project Cell, UCB, Haldi.
3. Account Department, UCB, Haldi
4. Registrar, H.N.B. Garhwal University, Srinagar, Garhwal.
5. Finance Officer, H.N.B. Garhwal University, Srinagar, Garhwal.

Trade of medicinal and Aromatic plants in Uttarakhand, India

Dissertation

Submitted to the

Hemwati Nandan Bahuguna Garhwal University,

Srinagar Garhwal

For the degree of M.Sc

In

Medicinal and Aromatic plants



**Supervisor
Dr. Harish
Chandra**

**Submitted by
Saloni Negi**

**High Altitude Plant Physiology Research Centre
(HAPPRC) H.N.B Garhwal University (A Central
University), Srinagar Garhwal-246174, Uttarakhand
(India)**

**Invitro cultutre of *Centella asiatica* under different
hormonal concentrations**

Dissertation

Submitted to the

Hemwati Nandan Bahuguna Garhwal University,

Srinagar Garhwal

For the degree of M.Sc

In

Medicinal and Aromatic plants



**Supervisor
Dr. A R Nautiyal**

**Submitted by
Bamang Raju**

**High Altitude Plant Physiology Research Centre
(HAPPRC) H.N.B Garhwal University (A Central
University), Srinagar Garhwal-246174, Uttarakhand
(India)**

Allelopathic effect of *Cymbopogon nardus* on *Eupatorium adenophorum*

Dissertation

Submitted to the

Hemwati Nandan Bahuguna Garhwal University,

Srinagar Garhwal

For the degree of M.Sc

In

Medicinal and Aromatic plants



Supervisor
Prof. M C Nautiyal

Submitted by
Sonam Rawat

**High Altitude Plant Physiology Research Centre
(HAPPRC) H.N.B Garhwal University (A Central
University), Srinagar Garhwal-246174, Uttarakhand
(India)**

Effect of foliar application of salicylic acid and zinc sulphate on Morphological and Biochemical Attributes of *Rosmarinus officinalis* L.

Dissertation

Submitted to the

Hemwati Nandan Bahuguna Garhwal University,

Srinagar Garhwal

For the degree of M.Sc

In

Medicinal and Aromatic plants



Supervisor
Dr. Babita Patni

Submitted by
Bhumika Bhardwaj

**High Altitude Plant Physiology Research Centre
(HAPPRC) H.N.B Garhwal University (A Central
University), Srinagar Garhwal-246174, Uttarakhand
(India)**

Investigation of allelopathic potential of *Parthenium hysterophorus* and *Pinus roxburghii* on growth and biochemical parameters of *Ocimum tenuiflorum*

Dissertation

Submitted to the

Hemwati Nandan Bahuguna Garhwal University,

Srinagar Garhwal

For the degree of M.Sc

In

Medicinal and Aromatic plants



Supervisor

Prof. M. C Nautiyal

Submitted by

Monali Chauhan

**High Altitude Plant Physiology Research Centre
(HAPPRC) H.N.B Garhwal University (A Central
University), Srinagar Garhwal-246174, Uttarakhand
(India)**

**SURVEY ANALYSIS IN RURAL GARHWAL HIMALAYA ABOUT THE
MEDICINAL IMPORTANCE OF FOUR CANDIDATE PLANTS NAMED
TULSI, ALOEVERA, GILOY AND MARIGOLD.**



**DISSERTATION
SUBMITTED TO THE
H.N.B. GARHWAL UNIVERSITY (A CENTRAL UNIVERSITY),
SRINAGAR (GARHWAL), UTTARAKHAND, INDIA
FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS
SESSION 2019-2021**

**BY
KRISHNENDU DEBNATH
Enrolment No: - G152040111
ROLL NO: - 19134340008**

**SUPERVISOR
PROFESSOR M. C. NAUTIYAL
DEPARTMENT OF HIGH ALTITUDE PLANT PHYSIOLOGY RESEARCH CENTER**

**SCHOOL OF AGRICULTURE & ALLIED SCIENCE
H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL)-246174, UTTARAKHAND, INDIA**

**Essential oil extraction of *Juniperus communis* L.
and its Bioactivities**



**DISSERTATION
SUBMITTED
TO**

**H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR GARHWAL, UTTARAKHAND
FOR THE DEGREE OF
MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS**

**Supervisor
Dr. Vijay Laxmi**

**Name of Student
Piyush Kumar Chaubey
Enrollment No.: G201340005**

**High Altitude Plant Physiology Research Centre (HAPPRC)
H.N.B. Garhwal University (A Central University)
Srinagar Garhwal-246174, Uttarakhand (India)
Academic Session 2020-2022**

**Antioxidant Properties of the Herbal Tea Prepared from some
Himalayan Medicinal and Aromatic Plants**



**DISSERTATION
SUBMITTED
TO**

**SUBMITTED FOR FULFILLMENT OF THE
REQUIREMENTS FOR AWARD OF THE DEGREE
OF
MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS
(ACADEMIC SESSION 2020-2022)**

**Supervisor
Dr. VIJAY LAXMI**

**Name of Student
ANKIT SEN KOHLI**

**High Altitude Plant Physiology Research Centre (HAPPRC)
H.N.B. Garhwal University (A Central University)
Srinagar Garhwal-246174, Uttarakhand (India)**

**IN-VITRO PROPAGATION STUDIES USING MICRO-PROPAGATION
IN *ZANTHOXYLUM ARMATUM* DC. AN IMPORTANT MEDICINAL
PLANT**

**DESSERTATION
SUBMITTED
TO
H.N.B.GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)**



**BY
LALIT KUMAR
FOR THE DEGREE OF
MASTER OF SCIENCE**

**HIGH ALTITUDE PLANT PHYSIOLOGY RESEARCH CENTRE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
SRINAGAR (GARHWAL), UTTARAKHAND
SEPTEMBER 2022**

**STUDY ON EFFECT OF SALINITY ON MEDICINAL PLANTS AND
ITS MECHANISM**



**DISSERTATION
SUBMITTED TO THE
H.N.B. GARHWAL UNIVERSITY (A CENTRAL UNIVERSITY),
SRINAGAR (GARHWAL), UTTARAKHAND, INDIA
FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS
SESSION 2019-2021**

**BY
HEMLATA KABADWAL
Enrolment No: - G191340055
ROLL NO: - 19134340003**

**SUPERVISOR
Dr. BABITA PATNI
DEPARTMENT OF HIGH-ALTITUDE PLANT PHYSIOLOGY RESEARCH CENTER**

**SCHOOL OF AGRICULTURE & ALLIED SCIENCE
H.N.B. GARHWAL UNIVERSITY
A CENTRAL UNIVERSITY SRINAGAR (GARHWAL)-246174, UTTARAKHAND, INDIA**

**AVAILABILITY OF MEDICINAL PLANTS AND
MACRONUTRIENT PROFILE OF SOME SELECTED
SPECIES ALONG WITH ALTITUDINAL GRADIENTS IN
TUNGNATH REGION OF GARHWAL HIMALAYA**



DISSERTATION
SUBMITTED TO
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY,
SRINAGAR, UTTARAKHAND
FOR THE DEGREE OF MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS

SUPERVISOR:
Dr. M. C. NAUTIYAL

SUBMITTED BY
CHAITI TRIPURA

HIGH ALTITUDE PLANT PHYSIOLOGY AND RESEARCH CENTRE,
H.N.B. GARHWAL UNIVERSITY, SRINAGAR (GARHWAL)
ACADEMIC SESSION 2020-2022

**ALLELOPATHIC EFFECT OF *Ageratina adenophora* (synonym
Eupatorium adenophorum) ON GERMINATION AND SEEDLING
GROWTH OF Ashwagandha (*Withania somnifera*)**

DISSERTATION

SUBMITTED TO THE

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY



FOR THE DEGREE

OF

MASTER OF SCIENCE

IN

MEDICINAL AND AROMATIC PLANTS

BY

ANJU

ENROLLMENT NUMBER- G162040889

High Altitude Plant Physiology Research Centre

School of Agriculture and Allied Sciences

Hemvati Nandan Bahuguna Garhwal University Srinagar,

Uttarakhand, (246174)

Academic session: 2020 - 2022

**Nutritional and Medicinal Attributes of Flowers of
Three *Rhododendron* species along the Altitudinal
Gradients**



**DISSERTATION
SUBMITTED
TO**

**H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR GARHWAL, UTTARAKHAND
FOR THE DEGREE OF
MASTER OF SCIENCE
IN
MEDICINAL AND AROMATIC PLANTS**

**NAME SUPERVISOR:
Dr. VIJAY LAXMI**

**NAME OF STUDENT:
SUMAN ACHARYA**

**High Altitude Plant Physiology Research Centre (HAPPRC)
H.N.B. Garhwal University (A Central University)
Srinagar Garhwal-246174, Uttarakhand (India)
Academic Session 2020-2022**

M.Sc. RURAL TECHNOLOGY
(Revised Syllabus w.e.f. the Academic Session 2020-2021)

(Revised Syllabus w.e.f. the Academic Session 2020-2021)							
		Credits (Marks)					
Course Code	Course Title	Total	Theory	Tutorial	Practical	Credits	Sessional
Semester I							
SOA/RT/C001	Watershed Management	100	3(60)	-	1(20)	04	20 (10+10)
SOA/RT/C002	Nursery Techniques and Management	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/C003	Concepts of Statistics	100	3(60)	-	1(20)	04	20 (10+10)
SOA/RT/C004	Environment and Biodiversity Conservation	100	3(60)	1(20)	-	04	20 (10+10)
SOA/RT/C005	Rural Sociology and Social Welfare	100	2(60)	1(20)		03	20 (10+10)
		500	13	2	3	18	
Semester II							
SOA/RT/C006	Soil Science & Agricultural Chemistry	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/C007	Mushroom Cultivation Technique	100	3(60)	-	1(20)	04	20 (10+10)
SOA/RT/C008	Rural Project Planning and Management	100	3(60)	1(20)		04	20 (10+10)
SOA/RT/C009	Extension Strategies for Rural Development	100	3(60)	1(20)	-	04	20 (10+10)
SOA/RT/C010	Protected Cultivation	100	2(60)	-	1(20)	03	20(10+10)
		500	13	2	3	18	
Semester III							
SOA/RT/C011	Medicinal and Aromatic Plants (MAPs)	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/C012	Disaster Mitigation and Management	100	2(60)	1(20)		03	20 (10+10)
SOA/RT/C013	Information and communication Technology	100	2(60)	1(20)		03	20 (10+10)
SOA/RT/E001	Elective Course: Any three of the following a. Innovative Technologies for Rural Development	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/E002	b. Rural Marketing and Management	100	2(60)	1(20)	-	03	20(10+10)
SOA/RT/E003	c. Fundamentals of Remote Sensing and GIS	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/E004	d. Introductory Agro-meteorology & Climate Change	100	2(60)	1(20)	-	03	20 (10+10)
SOA/RT/SS001	Self Study: Any One of the following • Rural Tourism	100	3(60)	1(20)	-	03	40(20+20)
SOA/RT/SS002	• Rural Health, Sanitation and Water	100	3(60)	1(20)	-	03	40(20+20)
		600	12	3	3	18	
Semester IV							
SOA/RT/C014	Post harvest Techniques of Fruit and Vegetable	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/C015	Master Thesis / Dissertation	100			06	06	
SOA/RT/E005	Elective Course: Any three of the following a. Entrepreneurship Development	100	2(60)	1(20)	-	03	20 (10+10)
SOA/RT/E006	b. Introduction to Apiculture	100	2(60)	-	1(20)	03	20 (10+10)
SOA/RT/E007	c. Rural Energy Resources Management	100	2(60)	1(20)	-	03	20 (10+10)
SOA/RT/E008	d. Environmental Impact Assessment	100	2(60)	1(20)	-	03	20(10+10)
SOA/RT/SS003	Self Study: • Technology Alternative for Rural Housing	100	3(60)	1(20)	-	03	40(20+20)
		500	8	3	7	18	
Total		2100	46	10	16	72	
Grand Total Semester I to IV		Core=54+ Elective 18 = 72Credits					

Grant
2.9.19

Prasad
02/09/2019

15 P
02/9/2019

Summary of Credit

Semester	Core Credit	Elective Credit	Self Study	Total Credit
I	18(500)			18(500)
II	18(500)			18(500)
III	9(300)	9(300)	3(100)	18(600)
IV	9(200)	9(300)	3(100)	18(500)
I-IV	54(1500)	18(600)	3(100)	72(2100)

#There will be 02 internal assessments consisting of 10 marks each for each theory paper/ course. However, it can be internal assessment depending on course teacher.

- In some paper, Instead of practical there will be Term paper/ Seminar in which students will be asked to prepare a paper on a particular topic and present the same in seminar.
- Maximum marks for each course: 100 [40 (20 sessional + 20 Practical/Term paper) + 60 End Term Test]

Important Point from Academic Ordinances

- In order to qualify for a Two-Year Master's degree a student must acquire a minimum of 72 credits including a minimum of 54 credits in Core and 18 credits in Electives course.
- Maximum 9 credits self study course (one minimum 3 Credits course shall be mandatory but not to be included while calculating the grades).

The Distribution of marks for Dissertation/ Project report & Viva-voce will be as below

Master Thesis / Dissertation	60 Marks
Periodical Presentation	20 Marks
Viva-voce	20 Marks
Total	100 Marks

Master Thesis / Dissertation shall be evaluated jointly by Internal and the External Examiner.

Ghawal
29.19

P. Khosla
02/09/2019

25/8
02/9/2019

**PROBLEMS FACED BY THE FARMERS IN AGRICULTURE
PRACTICES IN KHANDA GAD WATERSHED, DISTRICT
PAURI GARHWAL, UTTARAKHAND**



MASTER THESIS /DISSERTATION

SUBMITTED TO THE H.N.B. GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SCIENCE IN RURAL TECHNOLOGY

SESSION 2020-2022

SUBMITTED BY

Anjali Mishra

M.Sc. (Rural Technology)

Roll No. 20134345002

Enrollment No. G162430061

SUPERVISOR

Dr.R.S. Negi

Professor & Head

DEPARTMENT OF RURAL TECHNOLOGY

SCHOOL OF AGRICULTURE AND ALLIED SCIENCE

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

SRINAGAR (GARHWAL), UTTARAKHAND – 246174, INDIA

SEPTEMBER, 2022

**TECHNOLOGICAL ADOPTION FOR LIVELIHOOD SECURITY
OF APPLE GROWERS: A CASE STUDY OF NAUGAON BLOCK,
DISTRICT UTTARKASHI, UTTARAKHAND**



MASTER THESIS/DISSERTATION

SUBMITTED TO

**HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR GARHWAL, UTTARAKHAND**

**FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
DEGREE
MASTER OF SCIENCE
IN
RURAL TECHNOLOGY
(Session- 2020-22)**

**SUBMITTED BY
DEEPIKA**

Roll No.20134345003

Enrollment No.G201340082

SUPERVISOR

Dr. R. S. Negi

Professor & Head

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY,
(A CENTRAL UNIVERSITY),
SRINAGAR, GARHWAL, UTTARAKHAND– 246174, INDIA
SEPTEMBER, 2022**

**“EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON
GROWTH, YIELD AND SHELF LIFE OF *Beta vulgaris* var.
bengalensis UNDER THE VALLEY CONDITION OF GARHWAL
HILL”**



MASTER THESIS/DISSERTATION

**SUBMITTED TO
H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF
MASTER OF SCIENCE
IN
RURAL TECHNOLOGY
SESSION 2020-2022**

**By
Heisnam Bipna
M.Sc. Rural Technology
Roll No-20134345004
Enrollment No-G201340083**

**Supervised By
Dr. R.S. Negi
Professor and Head**

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL), UTTARAKHAND- 246174, INDIA**

SEPTEMBER, 2022

**Assessment of Fuel Consumption Pattern in Rural
Community: A Case Study of Parbuk Block, District Lower
Dibang Valley, Arunachal Pradesh**



MASTER THESIS /DISSERTATION

Submitted to

**H.N.B Garhwal University, Srinagar, Garhwal, Uttarakhand
(A Central University)**

For the partial fulfillment of the requirement for Degree of

MASTER OF SCIENCE

IN

RURAL TECHNOLOGY

(SESSION- 2020-2022)

By

OBIINAM RATAN

Roll No-20134345005

Enrollment No- G162430094

M.Sc. Rural Technology

Supervisor

Dr. R.S Negi

Professor & Head

Department of Rural Technology

School of Agriculture and Allied Science

HEMVATI NANDAN BAHUGUNA GARHWAL

(A CENTRAL UNIVERSITY)

UNIVERSITY, SRINAGAR, GARHWAL, UTTARAKHAND

SEPTEMBER, 2022

**IMPACT OF COVID- 19 PANDEMIC ON MIGRATION: A CASE
STUDY OF KHANDAGAD WATERSHED, DISTRICT PAURI
GARHWAL, UTTARAKHAND.**



MASTER THESIS/DISSERTATION

SUBMITTED TO

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

SRINAGAR GARHWAL, UTTARAKHAND

**IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR DEGREE
OF**

MASTER OF SCIENCE

IN

RURAL TECHNOLOGY

SESSION 2020-22

SUBMITTED BY

RUCHI RANA

ROLL NO. 20134345006

ENROLLMENT NO. G162340382

SUPERVISOR

Dr. R.S. NEGI

PROFESSOR & HEAD

DEPARTMENT OF RURAL TECHNOLOGY

(SCHOOL OF AGRICULTURE AND ALLIED SCIENCE)

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

SRINAGAR (GARHWAL) – 246174, UTTARAKHAND, INDIA

SEPTEMBER, 2022

**"EFFECT OF ORGANIC MANURE ON THE GROWTH AND YIELD
RELATED PARAMETERS OF BROAD BEAN [*Vicia faba* (L.)] cv. BR 2
IN THE VALLEY CONDITION OF GARHWAL HILLS"**



**MASTER THESIS/DISSERTATION
SUBMITTED TO
H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF
MASTER OF SCIENCE
IN
RURAL TECHNOLOGY
SESSION 2020-2022**

**By
YADHU SANGDO
M.Sc. Rural Technology
Roll No-2013-4345007
Enrolment No-G162090468**

**Supervisor
Dr. R.S. Negi
Professor and Head**

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL), UTTARAKHAND- 246174, INDIA
SEPTEMBER, 2022**

**ASSESSMENT OF SOCIO ECONOMIC STATUS AND POVERTY
INDEX OF RURAL HOUSEHOLDS OF JAUNSARI TRIBE : A CASE
STUDY OF BLOCK KALSI DISTRICT DEHRADUN,
UTTARAKHAND**



**MASTER DISSERTATION
SUBMITTED TO H.N.B GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF
MASTER OF SCIENCE IN RURAL TECHNOLOGY
SESSION 2020-2022**

SUBMITTED BY

KULDEEP RATHORE

M.Sc Rural Technology

Roll No. 20134345009

Enrollment No. G162340407

Under the Supervision of

Dr. R. S. NEGI

Professor and Head of Department

DEPARTMENT OF RURAL TECHNOLOGY

(School of Agriculture and Allied Science)

**HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
SRINAGAR (GARHWAL), UTTARAKHAND-246174, INDIA**

SEPTEMBER, 2022

**ASSESSMENT OF INNOVATIVE TECHNOLOGY
INTERVENTIONS FOR SUSTAINABLE RURAL LIVELIHOOD:
A CASE STUDY OF GOSTU GAD WATERSHED, BLOCK-
KHIRSU, DISTRICT-PAURI GARHWAL, UTTARAKHAND**



MASTERS THESIS/DISSERTATION

**SUBMITTED TO
H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF
MASTER OF SCIENCE
IN
RURAL TECHNOLOGY
SESSION 2020-2022**

**SUBMITTED BY
MAYANK RAWAT
M.Sc. Rural Technology
Roll No-20134345010
Enrolment No-G162340410**

**Under the Supervision of
Prof. R.S Negi
Professor & Head**

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL), UTTARAKHAND- 246174, INDIA**

SEPTEMBER, 2022

**ASSESSMENT OF RURAL OUT MIGRATION FACTORS: A CASE
STUDY OF BLOCK KOT, PAURI GARHWAL UTTARAKHAND**



**MASTER THESIS /DISSERTATION
SUBMITTED TO THE H.N.B. GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE IN RURAL TECHNOLOGY
SESSION 2020-2022**

SUBMITTED BY

Mukesh Singh

M.Sc. (Rural Technology)

Roll No. 20134345011

Enrollment No.G201340084

SUPERVISOR

Dr.R.S. Negi

Professor & Head

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)**

SRINAGAR (GARHWAL), UTTARAKHAND – 246174, INDIA

SEPTEMBER, 2022

**EFFECT OF FOLIAR APPLICATION OF MICRO-
NUTRIENTS ON GROWTH AND YIELD OF CABBAGE
(*Brassica oleracea* var. *capitata* L.)”, VARIETY Namdhari
183 UNDER THE VALLEY CONDITION OF GARHWAL
HILLS, UTTRAKHAND**



**MASTER THESIS/DISSERTATION
SUBMITTED TO
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR GARHWAL, UTTARAKHAND
IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR
DEGREE OF
MASTER OF SCIENCE
IN
RURAL TECHNOLOGY
SESSION 2020-2022
SUBMITTED BY
PRAKASH CHAND BAIRWA
ROLL NO. 20134345012
ENROLLMENT NO. G20134345012**

**SUPERVISOR
Dr. R.S. NEGI
PROFESSOR AND HEAD**

**DEPARTMENT OF RURAL TECHNOLOGY
SCHOOL OF AGRICULTURE AND ALLIED SCIENCE
HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY
(A CENTRAL UNIVERSITY)
SRINAGAR (GARHWAL) – 246174, UTTARAKHAND, INDIA
SEPTEMBER, 2022**

**IMPACT ASSESSMENT OF INNOVATIVE TECHNOLOGY
ADOPTION IN AGRICULTURE AND ALLIED SECTORS: A CASE
STUDY OF BLOCK LALGANJ, DISTRICT VAISHALI, BIHAR**



DISSERTATION

SUBMITTED TO

H.N.B. GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE

OF

MASTER OF SCIENCE

IN

RURAL TECHNOLOGY

SESSION 2020-2022

By

Vishal Kumar

M.Sc. Rural Technology

Roll No-2013445014

Enrolment No-G201340087

Supervisor

Dr. R.S. Negi

Professor & Head

DEPARTMENT OF RURAL TECHNOLOGY

SCHOOL OF AGRICULTURE AND ALLIED SCIENCE

HEMVATI NANDAN BAHUGUNA GARHWAL UNIVERSITY

(A CENTRAL UNIVERSITY)

SRINAGAR (GARHWAL), UTTARAKHAND- 246174, INDIA

SEPTEMBER, 2022