

# **SHRI GURU RAM RAI UNIVERSITY**

Pathribagh, Dehradun-248001, Uttarakhand, India

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s 2(f) of UGC Act 1956]

## **Syllabus**

### **Pre-Ph.D. Course Work (Horticulture)**



**Effective from Academic Session  
(2020-2021)**

**&**

**Revised in (2021-2022)**

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Pathribagh, Dehradun-248001, Uttarakhand

## PRE-Ph.D. COURSE (HORTICULTURE)

**Table: The course structure and Assessment scheme:**

S. No.	Course code	Subject	Credits (L:T:P)	Total credit	Total marks	Minimum marks for completion
<b>Core Courses</b>						
1.	PRMC-601	Paper I: Research Methodology	4 (2:1:1)	4	80	40
2.	PREC-602	Paper II: Research & Publication Ethics	2 (1:1:0)	2	40	20
3.	PPHC-603	Advances in Production of Fruit Crops	4 (2:1:1)	4	80	40
4.	PPAC-604	Doctoral Seminar- I	2 (0:0:2)	4	80	40
		Doctoral Seminar- II Field work/workshop	2(0:2:0)			
<b>Elective Courses*</b>						
5.	PPAE-605	Advances in Growth Regulation of Fruit Crops	4 (2:1:1)	4	80	40
	PPAE-606	Advances in Vegetable Production	4 (2:1:1)			
	PPAE-607	Post Harvest Technology for Fruit Crops	4 (2:1:1)			
	PPAE-608	Advances in Production Technology of Flower crops	4 (2:1:1)			
<b>Total</b>				18	360	-
<b>Ph. D. Thesis Research**</b>						
6.	Ph. D. Thesis Research			NA	Non gradial	

\*Elective courses (Students have to select any *one* course from above elective courses)

\*\*After completion of pre-Ph.D. course work, student has to register for Ph.D. Horticulture. He/she will have to fill up a prescribed admission form of university and submit along with the synopsis on a proposed research work under the designated supervisor of the university.

**Programme Outcome:**

- P.O. 1: Develop deeper understanding of a subject for its application in addressing social and scientific issues.
- P.O. 2: To understand the critical aspects of conducting ethical research for sustainable development.
- P.O. 3: To develop the reasoning-based solution to the scientific problem.
- P.O.4: To understand the impact of research & development on environment safety and sustenance.
- P.O.5: Inculcate the leadership skills required to identify the problem and finding the solution in coherence with the teamwork.
- P.O.6: To develop the skill set of designing and executing experiments pertaining to a targeted scientific problem.
- P.O.7: Develop the analytical skills prerequisite for analyzing the research findings and correlating with the set objectives.
- P.O.8: To develop meticulous scientific writing skills for presenting the research outcomes.

**Programme Specific Outcomes:**

- P.S.O. 1: To develop the skills in advances in Horticulture.
- P.S.O. 2: To educate the various management strategies for growth regulation of fruit crops.
- P.S.O. 3: To disseminate principles, planning, layout and analysis of vegetable production.
- P.S.O. 4: Develop skills in ethical dimensions of research work in Post Harvest Technology for Fruit Crops

**Paper-I: Research Methodology** (Compulsory)

**Course Code:** PRMC-601

**Credit: 4 (2:1:1)**

**Objective:**

To apprise students with the knowledge of statistical methods and techniques, and their application in seed science and technology.

**UNIT -I : Concept & Types of Research**

Meaning and importance of Research – Types of Research – Selection and formulation of Research Problem – Research Design, Classification of Research, Pure and Applied Research, Exploring or Formulative Research, Descriptive Research, Diagnostic Research/Study, Evaluation research/Studies, Action Research, Experimental Research, Analytical Study of Statistical Method, Historical Research,

**UNIT-II :Methods Research**

Surveys, Case Study, Field Studies General Survey of various Methods including Survey Method, Interdisciplinary Method, Cash Study Method, Sampling Method, Statistical Method, Observation Method, Interview Method, Schedule Method, Questionnaire Method, Documentary Method, Library Method, Historical Method and Scientific Method. Characteristic Features of Scientific Method; Empirical Verifiable, Cumulative, Self - Correcting, Deterministic, Ethical & Ideological neutrality (Value Free).

**UNIT- III: Data Collection and Data Analysis**

Collection, Objectives and Classification of Data, Aims, Methods and Objects of Tabulation of Data, Forms and Processes of Interpretation and Presentation of Data.

Primary, Secondary and Tertiary Data. Construction and adaptation of instruments, administration of questions and tests, Tabulation of data. Data organization in SPSS & Excel, Graphical representation of data.

Definition and Aims of Content Analysis, Problems of Content Analysis, Computer and Content Analysis Discussion and Interpretation of results, Testing of Hypothesis: Logical and Statistical Techniques.

**UNIT –IV: Report Writing**

Locating Information on a Topic of Interest, Acquiring Copies of Articles of Interest, The Nature of Scientific Variables, Conceptual Versus Operational Definitions of Variables, Levels of Measurement, Various Paradigms including Formism, Mechanism, Organicism, Pragmatism, The Basic Format for a Research Report, Identification of the Parts of a Research Report, Citation and Referencing Styles, Essentials of Report Writing, Aids for Writing Good Research Report.

**Course Outcome (COs):**

- CO 1. To develop understanding of the basic framework of research process.
- CO 2. To develop an understanding of various research designs and techniques.
- CO 3. To identify various sources of information for literature review and data collection.
- CO 4. To develop an understanding of the ethical dimensions of conducting applied research
- CO 5. Appreciate the components of scholarly writing and evaluate its quality.

**Suggested Readings:**

- Bagchi, Kanak Kanti (2007) Research Methodology in Social Sciences: A Practical Guide, Delhi, Abijeet Publications.
- Sharma, B.A.V., et al., (2000) Research Methods in Social Sciences, New Delhi, Sterling Publishers
- B.A.V. Busha, C. H and Harter, S. D (1980) Research Methods in Librarianship, New Academic Press.
- Cooper, R. Donald and Pamela S. Schindler (2003) Business Research Methods, Delhi, Tata McGraw-Hill.
- Flyvbjerg, Bent (2001) Making Social Science Matter: Why Social Inquiry Fails and How It can Succeed Again, United Kingdom, Cambridge University Press.
- Goodde and Hatte (1952) Methods in Social Research, New York, McGraw – Hill.
- Gopal, M.H (1970) An Introduction to Research Procedures in Social Sciences, Bombay, Asia Publishing House.
- Hunt, Morton (1989) Profiles of Social Research: The Scientific Study of Human Interactions, Bombay, Popular Prakashan.
- Kothari, C.R (2004) Research Methodology: An Introduction, Delhi, New Age.

**Paper-II: Research & Publication Ethics (Compulsory)**

**Code: RPEC-602**

**Credit: 2(1:1:0)**

**OBJECTIVE**

To provide ethical knowledge and values related to agricultural research

**UNIT- I**

**Philosophy and Ethics**

Introduction to Philosophy: definition, nature and scope, concept, branches Ethics: definition, moral philosophy, nature of moral judgments and reactions

**UNIT- II**

**Scientific Conduct**

Ethics with respect to science and research, Intellectual honesty and research integrity, Scientific is

conducts: Falsification, Fabrication and Plagiarism (FFP)

- Redundant publications: duplicate and overlapping publications, salami slicing
- Selective reporting and misrepresentation of data

### **UNIT- III**

#### **Publication Ethics**

- Publication ethics: definition, introduction and importance
- Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
- Conflicts of interest
- Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice-versa, types
- Violation of publication ethics, authorship and contributorship
- Identification of publication misconduct, complaints and appeals
- Predatory publishers and journals

#### **Practical**

##### **Open Access Publishing**

- Open access publications and initiatives
- SHERPA/ RoMEO online resource to check publisher copyright & self- archiving policies
- Software tool to identify predatory publications developed by SPPU
- Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

##### **Publication Misconduct**

##### **Group Discussions**

Subject specific ethical issues, FFP, authorship

Conflict of interest, Complaints and appeals: examples and fraud from India and abroad

##### **Software tools**

Use of plagiarism software like Turnitin, Urkund and other open source software tools

##### **Databases and Research Metrics**

##### **Databases**

- Indexing databases
- Citation databases: Web of Science, Scopus, etc.

##### **Research Metrics**

- Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
- Metrics: h- index, g index, i10 index, altmetrics

#### **Course Outcome:**

CO 1: To develop an understanding of research ethics, publications misconduct and plagiarism.

CO 2: To develop Intellectual honesty and research integrity.

CO3. To identify various sources of information for data bases and research matrices.

CO4. To develop an understanding of Open access publications and initiatives.

CO5. Appreciate the components of scholarly writing and evaluate its quality

**Paper-III: Advances in Fruit Crops (Core Course)****Course Code: PPHC-603****Credit: 4 (2:1:1)****OBJECTIVE**

To keep abreast with latest developments and trends in production technology of fruit crops.

**UNIT-I**

National and International scenario in fruit production, Recent advances in propagation - root stock influence, planting systems, High density planting, crop modelling , Precision farming, decision support systems - aspects of crop regulation- physical and chemical regulation effects on physiology and development, influence of stress factors, strategies to overcome stress effects, integrated and modern approaches in water and nutrient management, Total quality management (TQM) – Current topics.

Mango and Banana

**UNIT -II**

Papaya, Grapes and Citrus

**UNIT- III**

Guava, Litchi, Sapota, Pomegranate, Custard apple, Phalsa, Loquat and Aonla

**UNIT- IV**

Pineapple, Avocado, Jack fruit, Jamun, Ber, Bael, Datepalm and Fig

**UNIT- V**

Apple, Pear, Plums, Strawberry, Peach, Apricot, Almond, Cherries, Kiwi, Persimmon and Nut crops

**PRACTICAL**

- Survey of existing fruit cropping systems and development of a model cropping system
- Estimating nutrient deficiency
- Estimation of water use efficiency
- Soil test-crop response correlations
- Practices in plant growth regulation
- Studying physiological and biochemical responses, quality analysis.

**Course Outcome (COs):**

CO1. Define latest developments and trends in production technology of fruit crops.

CO2. Summarise recent advances in propagation and fruit production.

CO3. Categorize biological stress factors, strategies to overcome stress effects.

CO4. Estimate nutrient and water deficiency.

### Suggested Readings

- Bose, T.K., Mitra S.K. and Sanyal, D. 2001. Fruits- Tropical and Subtropical. Naya Udyog.
- Bose, T.K., Mitra, S.K. and Sanyol, D. 2002. Fruits of India-Tropical and sub-Tropical. Naya Udyog.
- Chadha, K.L. and Pareek, O.P., 1996. Advance in Horticulture (Vol. II & VIII) Malhotra Publ. House.
- Chadha, K.L. and Pareek, O.P. 1996. Advances in Horticulture (Vols. III). Malhotra Publ. House.
- Misra, K.K. 2014. Textbook of Advance Pomology. Biotech
- Nakasone, H.Y. and Puul, R.E. 1998. Tropical Fruits. CABI.
- Peter, K.V. 2008. Basic of Horticulture. New India Publ. Agency.
- Pradeep K.T., Suma B. J. and Satheesan, K.N. 2008. Management of Horticultural Crops (Parts I & II). New India Publ. Agency.
- Radha, T. and Mathew, L. 2007. Fruit Crops. New India Publ. Agency.
- Singh, H.P., Negi, J.P. and Samuel, J.C. 2002. Approaches for Sustainable Development of Horticulture. National Horticultural Board.
- Singh, H.P., Singh, G., Samuel, J.C. and Pathak, R.K. 2003. Precision Farming in Horticulture NCPAH, DAC/ PFDC, CISH, Lucknow.
- Westwood, M. N. 1988. Temperate-zone Pomology. Timber Press.
- Westwood, M.N. 2009. Temperate-Zone Pomology: Physiology and Culture, Third Edition. Timber Press.

### ELECTIVE COURSE

The Candidates are required to opt any one course from the following elective courses:

#### ELECTIVE COURSE-I

#### Advances in Growth Regulation of Fruit Crops

Course Code: PPHE-605

Credit: 4 (2:1:1)

#### OBJECTIVE

Appraisal on the advances in growth regulation of fruit crops.

#### UNIT- I

Eco-physiological influences on growth and development of fruit crops flowering, fruit set- Crop load and assimilate partitioning and distribution.

#### UNIT -II

Root and canopy regulation, study of plant growth regulators in fruit culture- structure, biosynthesis, metabolic and morphogenetic effects of different plant growth promoters and growth retardants.

#### UNIT- III

Crop residue management in multiple cropping systems; latest developments in plant Absorption, translocation and degradation of phytohormones – internal and external factors influencing hormonal synthesis, biochemical action, growth promotion and inhibition, canopy management for fertigated orchards.



**UNIT- IV**

Growth regulation aspects of propagation, embryogenesis, seed and bud dormancy, fruit bud initiation, regulation of flowering, off season production.

**UNIT -V**

Flower drop and thinning, fruit set and development, fruit drop, parthenocarpy, fruit maturity and ripening and storage, molecular approaches in crop growth regulation- current topics.

**Practical**

- Root- shoot studies, quantifying the physiological and biochemical effects of physical and chemical growth regulation,
- Bioassay and isolation through chromatographic analysis for auxins, gibberellins,
- Experiments on growth regulation during propagation, dormancy, flowering, fruit set and fruit development stages.

**Course Outcome (COs):**

CO 1. Define advances in growth regulation of fruit crops.

CO 2. Summarize Eco-physiological influences on growth and development of fruit crops.

CO 3. Choose plant growth regulators in fruit culture.

CO4. Explain Growth regulation aspects of propagation.

**Suggested Readings**

- Buchanan B., Gruessam W. & Jones R. 2002. *Biochemistry & Molecular Biology of Plants*. John Wiley & Sons.
- Epstein E. 1972. *Mineral Nutrition of Plants: Principles and Perspectives*. Wiley.
- Fosket D.E. 1994. *Plant Growth and Development: A Molecular Approach*. Academic Press.
- Leopold A.C. & Kriedermann P.E. 1985. *Plant Growth and Development*. 3rd Ed. McGraw-Hill.
- Radha T. & Mathew L. 2007. *Fruit Crops*. New India Publ. Agency.
- Roberts J., Downs S. & Parker P. 2002. Plant Growth Development. In: *Plants* (I. Ridge, Ed.), pp. 221-274, Oxford University Press.
- Salisbury F.B. & Ross C.W. 1992. *Plant Physiology*. 4th Ed. Wadsworth Publ.

**ELECTIVE COURSE-II**

**Advances in Vegetable Production**

**Course Code: PPHE-606**

**Credit: 4 (2:1:1)**

**OBJECTIVE**

To keep abreast with latest developments and trends in production technology of vegetable crops.

**UNIT- I**

Present status and prospects of vegetable cultivation; nutritional and medicinal values; climate and soil as critical factors in vegetable production; choice of varieties; nursery management; modern concepts in water and weed management; physiological basis of growth, yield and quality as influenced by chemicals and growth regulators; role of organic manures, inorganic fertilizers, micronutrients and biofertilizers; response of genotypes to low and high nutrient management, nutritional deficiencies, disorders and correction methods; different cropping systems; mulching; containerized culture for year round vegetable production; low cost polyhouse; net house production; crop modeling, organic gardening; vegetable production for pigments, export and processing of:

Tomato, Brinjal, chilli, Sweet pepper and Potato

**UNIT –II**

Cucurbits, Cabbage, Cauliflower, Sprouting broccoli, Brussels sprout and Knol-khol

**UNIT- III**

Okra, Onion, Garlic, Leek, Peas and beans, Salad crops, Amaranthus and Drumstick

**UNIT- IV**

Carrot, Turnip, Beet root and Radish

**UNIT -V**

Sweet potato, Tapioca, Yam, Elephant foot yam and Taro

**Practical**

- Seed hardening treatments;
- Practices in indeterminate and determinate vegetable growing and organic gardening;
- Portraits and ball culture;
- Diagnosis of nutritional and physiological disorders;
- Analysis of physiological factors like anatomy; photosynthesis; light intensity in different cropping situation;
- Assessing nutrient status, use of plant growth regulators;
- Practices in herbicide application;
- Estimating water requirements in relation to crop growth stages, maturity indices;
- Dry land techniques for rainfed vegetable production; production constraints;
- Analysis of different cropping system in various situation like cold and hot set;
- Vegetable waste recycling management; quality analysis ;
- Marketing survey of the above crops;
- Visit to vegetable and fruit malls and packing houses.

**Course Outcome (COs):**

CO 1. Memorize Present status and prospects of vegetable cultivation.

CO 2. Outline and summarize climate and soil as critical factors in vegetable production.

CO 3. Prepare nursery and its management.

CO4. Analyze different cropping system in various situations.

**Suggested Readings**

- Bose T.K. & Som N.G. 1986. *Vegetable Crops of India*. Naya Prokash.
- Bose T.K., Kabir J., Maity T.K., Parthasarathy V.A. & Som M.G. 2003. *Vegetable Crops*. Vols. I-III. Naya Udyog.
- Brewster J.L. 1994. *Onions and other Vegetable Alliums*. CABI. FFTC. *Improved Vegetable Production in Asia*. Book Series No. 36.
- Ghosh SP, Ramanujam T, Jos JS, Moorthy SN & Nair RG. 1988. *Tuber Crops*. Oxford & IBH.
- Gopala krishnan T. R. 2007. *Vegetable Crops*. New India Publishing Agency.
- Kallo G. & Singh K. (Ed.). 2001. *Emerging Scenario in Vegetable Research and Development*. Research Periodicals & Book Publ. House.
- Kurup G.T., Palanisami M.S., Potty V.P., Padmaja G., Kabeerathuma S. & Pallai S.V. 1996. *Tropical Tuber Crops, Problems, Prospects and Future Strategies*. Oxford & IBH.
- Sin M.T. & Onwueme IC. 1978. *The Tropical Tuber Crops*. John Wiley & Sons.

- Singh N.P., Bhardwaj A.K., Kumar A. & Singh K.M. 2004. *Modern Technology on Vegetable Production*. International Book Distr. Co.
- Singh P. K., Dasgupta S.K. & Tripathi S.K. 2006. *Hybrid Vegetable Development*. International Book Distr. Co

### **ELECTIVE COURSE-III**

#### **Post Harvest Technology for Fruit Crops**

**Course Code: PPHE-607**

**Credit: 4 (2:1:1)**

#### **OBJECTIVE**

To facilitate deeper understanding on principles and practices of postharvest management of fruit crops.

#### **UNIT- I**

Maturity indices, harvesting practices for specific market requirements, influence of pre-harvest practices, enzymatic and textural changes, respiration and transpiration.

#### **UNIT –II**

Physiology and biochemistry of fruit ripening, ethylene evolution and ethylene management, factors leading to post-harvest loss, pre-cooling.

#### **UNIT- III**

Treatments prior to shipment, viz., chlorination, waxing, chemicals, biocontrol agents and natural plant products. Methods of storage ventilated, refrigerated, MAS, CA storage, physical injuries and disorders.

#### **UNIT- IV**

Packing methods and transport, principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jellies, candies.

#### **UNIT -V**

Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management, food safety standards.

#### **Practical**

- Analyzing maturity stages of commercially important horticultural crops,
- Improved packing and storage of important horticultural commodities,
- Physiological loss in weight of fruits and vegetables,
- Estimation of transpiration, respiration rate, ethylene release and study of vase life extension in cut flower using chemicals,
- Estimation of quality characteristics in stored fruits and vegetables, cold chain management
- Visit to cold storage and CA storage units, visit to fruit and vegetable processing units,
- Project preparation, evaluation of processed horticultural products.

#### **Course Outcome (COs):**

CO 1. . Define Principles and practices of postharvest management of fruit crops.

CO2.Outline and summarize maturity indices, harvesting practices for specific market requirements.

CO3. Choose methods of Packing, preservation, food processing, canning.

CO4. Categorize factors leading to post-harvest loss.

**Suggested Readings**

- Bhutani R.C. 2003. *Fruit and Vegetable Preservation*. Biotech Books.
- Chadha K.L. & Pareek O.P. (Eds.). 1996. *Advances in Horticulture*. Vol. IV. Malhotra Publ. House.
- Haid N.F. & Salunkhe S.K. 1997. *Post Harvest Physiology and Handling of Fruits and Vegetables*. Grenada Publ.
- Mitra S.K. 1997. *Post Harvest Physiology and Storage of Tropical and Sub-tropical Fruits*. CABI.
- Ranganna S. 1997. *Hand Book of Analysis and Quality Control for Fruit and Vegetable Products*. Tata McGraw-Hill.
- Sudheer K.P. & Indira V. 2007. *Post Harvest Technology of Horticultural Crops*. New India Publ. Agency.
- Willis R., Mc Glassen W.B., Graham D. & Joyce D. 1998. *Post Harvest. An Introduction to the Physiology and Handling of Fruits, Vegetables and Ornamentals*. CABI.

**ELECTIVE COURSE-IV**

**Advances in Production Technology of Flower crops**

**Course Code: PPHE-608**

**Credit: 4 (2:1:1)**

**OBJECTIVE**

This course is designed to provide students with an in-depth understanding of the principles and practices of sustainable flower crops production and physiology. Students will learn about soil fertility management, stand establishment, environmental modification pest management, greenhouse production, and the production practices and physiological aspects of specific flower crops.

**UNIT- I**

Scope and importance of commercial flower production- global scenario in cut flower production and trade- varietal wealth and diversity- special characters and requirements for cut flowers, loose flowers, dry flowers and floral oil trade- flower production problems in India.

**UNIT -II**

Propagation and multiplication, nursery management- media for nursery- special nursery practices- IPR issues related to propagation materials- growing environment- open cultivation, protected cultivation- soil requirement- artificial growing media- soil and media decontamination.

**UNIT- III**

Greenhouse management- planting methods- systems of planting- influence of environmental parameters- light, temperature, moisture, humidity and CO<sub>2</sub> on growth and flowering- regulation for quality flowers- water and nutrient management- microirrigation and fertigation- slow release fertilizers, bio fertilizers and water soluble fertilizers- flower forcing, special horticultural practices- physiological disorders- IPM- IDM.

**UNIT- IV**

Crop specific practices of loose flower production- jasmine, scented rose, chrysanthemum, tuberose, marigold, crossandra, nerium, gomphrena and non-traditional flowers.

**UNIT -V**

Crop specific practices of cut flower production- cut rose, cut chrysanthemum, carnation, gerbera, gladiolus, cut tuberose, orchids, anthurium, aster, lillium, bird of paradise, limonium and

cut foliages.

**Practical**

- Botanical description of species and varieties of commercial flowers
- Propagation techniques of commercial flowers
- Mist chamber operation
- Soil decontamination techniques
- Practices in manuring
- Practices in drip irrigation and fertigation
- Practices in foliar nutrition
- Practices in growth regulator application
- Special practices- pinching, netting, disbudding, staking, defoliation
- Training and pruning techniques
- Photoperiodic and chemical regulation of flowering
- Assessing harvest indices
- Post harvest handling
- Crop specific practices for loose and non traditional flowers
- Crop specific practices for cut flowers
- Case studies and project preparation for regionally important cut flowers
- Visit to commercial cut flower units

**Course Outcome (COs):**

CO 1. Define Principles and practices of nursery management of flower crops.

CO2. Outline and summarize greenhouse management.

CO3. Choose methods of cut flower production.

CO4. Categorize production practices and physiological aspects of specific flower crops.

**Suggested Readings**

- Arora, J.S. 2006. Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana
- Bhattacharjee. S. K. 2006. Advances in Ornamental Horticulture. Vol. I-VI. Pointer publ.
- George. S and Peter K.V. 2008. Plants in a garden. New India Publ. Agency.
- Randhawa and Assitabha Mukhopadhyay.1989. Floriculture in India. Allied publishers Ltd., New Delhi.
- Reddy, S., Janakiram, B., Balaji Kulkarni. S and Mishra R. L. 2007. High-tech Floriculture. Indian Society of Ornamental Horticulture. New Delhi.
- Sheela V. L. 2007. Flowers in trade. New India Publ. Agency. New Delhi
- Valsalakumari P. K., Rajeevan P.K., Sudhadevi. P.K. and Geetha. C.K. 2008. Flowering Trees.