Assistant Director of Horticulture/ Senior Assistant Director of Horticulture

Eligibility M.Sc. (Hort.)

1. FUNDAMENTALS OF HORTICULTURE


Nutrition of Horticultural Crops – assessment of nutritional requirements based on soil, tissue analysis and field experiments. Identification of deficiency symptoms of various nutrients and methods of nutrient application. Assessment of irrigation requirements for different horticultural crops and different methods of irrigation. Pruning and training, their objectives and methods.

Pollination and fruit set, problems and requirements, flower and fruit drop, stages, causes and remedial measures. Fruit thinning, objectives, advantages and disadvantages. Unfruitfulness reasons and remedial measures.

2. PLANT PROPAGATION AND NURSERY MANAGEMENT


3. FRUIT CROPS
Area, production, importance, uses, origin, distribution, botany, classification of varieties, use of rootstocks, high density planting, climate, soils, planting methods, training and pruning, nutrition, irrigation scheduling, intercrops, weed control, problems in orchard management, flowering, fruit set, problems in fruit set, harvesting indices, harvesting, pre & postharvest treatments, use of growth regulators, yield, grading, packing for internal and export markets, ripening methods and storage in respect of mango, banana, citrus, grape, pineapple, guava, pomegranate, fig, sapota, Jack, Jamun, Aonla, custard apple, kokum, karonda, carambola and other fruit crops of Karnataka.

4. VEGETABLE CROPS
Importance of vegetables in human diet and National economy. Detailed study regarding origin and distribution, area and production, importance, nutritive value, botany, varieties, soil and climatic requirements, seed treatment, seed sowing/nursery raising, transplanting, nutrition, irrigation, intercultural operations, physiological disorders, harvest indices, harvesting, post harvest handling, curing, storage and usage of plant growth regulators in tomato, brinjal, chillies, sweet pepper, potato, okra, cucurbitaceous crops like cucumber, pumpkin, ridge gourd, snake gourd, bitter gourd, bottle gourd, chow-chow, melons like water melon and muskmelon, leguminous vegetables like cluster bean, French bean, dolichos bean, pea and broad bean, cole crops like cabbage, cauliflower and knol khol, root crops like radish, carrot, beetroot and turnip, bulb crops like onion and garlic, tuber crops like sweet potato, tapioca, amorphophallus, colocasia, dioscorea and yam, leafy vegetables like amaranthus, palak, Roselle, perennial vegetables like drumstick, cocinia and curry leaf and mushroom cultivation.

5. PRESERVATION OF FRUITS AND VEGETABLES
Importance and scope of fruit and vegetable preservation in India. Principles of preservation by heat, low temperature, fermentation, chemicals and various methods of preservation. Selection of site for processing, processing unit layout and precautions for hygienic conditions of the unit. Preservation of fruits and vegetables through canning, bottling, freezing, dehydration, drying, Irradiation and Food Standards, (HACCP, FSSA, Sanitary & Phytosanitary Measures)
Micro-organisms associated with spoilage of fruit and vegetable products. Spoilage of canned products -hydrogen swell, flipper, dent, leaker etc., Biochemical changes associated with spoilage of fruit and vegetable products. Preservatives and colours permitted and prohibited in India.
Different kinds of equipments used in processing. Preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits, preserves, chutneys, pickles, ketchup, sauce, purée, syrups, juices, squashes and cordials and alcoholic beverages.

6. PLANT PHYSIOLOGY (INCLUDING C3 & C4 PLANT) PHOTOSYTHESIS RESPIRATION Etc. GROWTH REGULATORS, HARMONES & MINERAL NUTRITION
of auxins, gibberellins, cytokinins, ethylene, inhibitors, retardants, phenolic substances and morphactins, BR's, ABA.

Role of plant growth regulators in seed and bud dormancy, juvenility, maturity and senescence, flowering, pollination, fruitset including parthenocarpy, fruit growth, fruit drop and fruit ripening (climacteric and non-climacteric) and fruit colour development, tuber and bulb formation and sex expression and extension of shelf life in fruits, vegetables and flowers. Role of growth regulators in plant propagation.

6(a) ENTOMOLOGY: Commonly occurring pests of horticultural crops, their life cycle, control measures including IPM and bee keeping.

6(b) PATHOLOGY:
Commonly occurring diseases of horticultural crops, life cycle of bacteria, fungi, viruses, phytoplasma, parasites, control measures including IDM.

7. COMMERCIAL FLORICULTURE
Area, production, importance, uses, origin, distribution, classification of varieties, propagation, environmental factors affecting growth and flowering, soils, nutrition, irrigation, weeding, special techniques of production such as growth regulation and enhancement of flowers, use of growth regulators, harvesting, postharvest handling of commercial flower crops such as Rose, Chrysanthemum, Jasmine, Carnation, Gladiolus, Anthurium, Tuberose, China aster, Marigold, Crossandra and Gerbera, Dahlia, Bird of paradise, Orchids, Heliconia, Lilies. Extension of vase life and Dry flower technology. Potted plants: Nerium, Petunia, Hibiscus, Bougainvillea. Flowering annuals (Zinnia, Cosmos, Dianthus, Snapdragon, Pansy Heliconia, alstroemeria, alpinia, ornamental ginger, bromeliads, Gypsophilla, Limonium, Statice) and Ornamental Foliages. Barleria, Celosia, Gomphrena and Non-traditional flowers.

8. GREENHOUSE MANAGEMENT OF HORTICULTURAL CROPS
Importance, uses, scope and production of horticultural crops in greenhouse. Status and development of greenhouse production of horticultural crops in the world and India. Development, constraints, research needs and future of protected culture of horticultural crops in India and Karnataka. Points to be considered before establishing a greenhouse. Types of greenhouses, classification of greenhouses based on the shapes, material used, utility and cladding material used. Size and arrangement of greenhouses and characteristics of various greenhouse cladding materials, greenhouse benches etc.,
Management of light, temperature (greenhouse heating and cooling), CO₂ and relative humidity inside the greenhouse.
Various types of growing media used and their suitability for different horticultural crops. Preparation of growing media and its pasteurization. Management of nutrients through fertigation.
Detailed production technology in respect of tomato, capsicum, cucumber, rose, carnation, gerbera, chrysanthemum, orchids and anthurium under greenhouse/polyhouse.
9. MEDICINAL, AROMATIC, SPICES AND PLANTATION CROPS
Origin, Importance, export potential, varieties, climate, soil requirements, propagation, planting and after care, manuring, irrigation, training, pruning, harvesting, yield and post harvest handling, curing and processing practices, storage methods and distillation of essential oils of the following crops.

Medicinal Plants
Aloe vera, Amla (aonla), Stevia, Ashwagandha, Dioscorea, Opium poppy, gloriosa, Sarpagandha, Steroids bearing Solanum, Chakramuni, Madhumasini, Sweet flag, Catharanthus roseus, Isabgol, Fox glove, Belladona, Senna, Tinospora, Annatto, Coleus, noni, Safed musli and Asparagus and other important crops grown in Karnataka.

Aromatic Crops
Citronella, Lemon grass, Palmrosa, Vetiver, Geranium, Davana, Mint and lavender.
Spice crops: Turmeric, Ginger, Coriander, Fenugreek, Cardamom, Black Pepper, Cinnamon, Clove, Nutmeg and Cumin and other important crops grown in Karnataka
Plantation Crops: Coconut, Cashewnut, Areca nut, Oil palm, Betelvime, Coffee, Tea, Cocoa, vanilla and Rubber.

10. ORNAMENTAL GARDENING AND LANDSCAPE ARCHITECTURE

Flower arrangement – Principles, Styles, Containers and Holding solutions.

11. DRY LAND HORTICULTURE AND WATERSHED MANAGEMENT
Watershed management, objectives, approaches, steps in watershed development planning, land use capability, classification, soil and rain water conservation, water harvesting measures in watershed area. Problems and prospects under water shed. Alternate water use system. Choice of crops. Cultural practices like planting, training, pruning, nutrition and water management and
harvesting of important dry land fruits viz., ber, pomegranate, custard apple, phalsa, fig, aonla, jamun and tamarind.

12. SOCIAL AND FARM FORESTRY

Introduction – forests in India, forest policy and law, gap between demand and supply of forest products. Principles of general silviculture and tree species under silviculture.

Social forestry – need, objectives and scope, choice of species for fuelwood, fodder, smaller timber and timber, their culture, propagation, application of agro-techniques and economic benefits, management of social forestry plantations nurseries and their practices.

Afforestation on different problematic sites. Voluntary organizations, Joint farm management (JFM) and their role in promoting afforestation programmes. Maintenance and conservation of village woodlots. Energy plantations. Social forestry for watershed management.

Farm forestry – objectives and role, need for shelter belts and wind breaks, types of farm forestry. Agro/ Horti. forestry – need, objectives, scope, principles and practices of agro/horti. forestry systems, choice of the tree species, and management implications. Forest products, their processing and use including minor forest products.

Irrigation – Water requirement of different Horticultural Crops – various irrigation methods including Drip, Sprinkler, Fogging, Misting and Water Stress on Horticultural Crops-Plasticulture- Mulching types.

13. SPECIAL TOPICS

13.1 Organic farming


Precision farming: Definition and implementation in Horticulture crops. Definition of IFS, its principles and practices.

13.2 Seed Science and Technology

Types of seeds, concept of seed quality and factors affecting it. Role and Goal of seed Technology. Generation system of seed multiplication, classes of seed. Principles of seed production, seed certification, and processing. Seed testing methods (Germination, physical
purity, moisture and TZ test). Principles and methods of seed storage, IPR and its utilization, PPVR & FR. Techniques of seed production in important vegetables (tomato, brinjal, onion, cucurbits, root vegetables etc.)

13.3 Soil Science And Agricultural Chemistry


Recent Advances in Horticulture, Soilless Culture- Hydroponics, Aeroponics, Urban & Peri-urban Horticulture, GPS & GSM, Agri-Export Zones & industrial support.

Chairman,
Competitive Examination Syllabus Committee

DIRECTOR OF HORTICULTURE

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