

Tier-II *precise subject specific syllabus in r/o Assistant Director (Horticulture)* in NDMC

1. FRUIT CROPS

Area, production, importance, uses, origin, distribution, use of rootstocks, high density planting, climate, soils, planting methods, training and pruning, nutrition, bahar treatment, irrigation scheduling, intercrops, weed control, problems in orchard management, flowering, fruit set, seedlessness irregular bearing, problems in fruit set, harvesting indices, harvesting, preharvest treatments, use of growth regulators, ripening methods and storage in respect of mango, banana, citrus, grape, pineapple, guava, papaya and sapota. Physiological disorders in fruit crops.

2. VEGETABLE CROPS

Importance of vegetables in human diet and national economy. Area and production, importance, nutritive value, 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 vegetable crops like tomato, brinjal, chillies, sweet pepper, potato, okra, cucurbitaceous crops like cucumber, pumpkin, ridge gourd, snake gourd, bitter melon, bottle gourd, 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 knobkhol, 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, coccinia and murraya.

3. FLORICULTURE AND LANDSCAPE

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 controlling growth and production of flowers, use of growth regulators, harvesting, postharvest handling, extension of shelf life of flowers of commercial

flower crops such as rose, chrysanthemum, jasmine, carnations, gladiolus, anthurium, tuberose, china aster, marigold, crossandra and gerbera.

Need for bioaesthetic planning, places suitable for bioaesthetic planning-towns, cities, villages, schools, temples, road side, parks, ghats of rivers and canals, platforms, railway lines, public and private buildings, institutes and places of worship. Ornamental trees, shrubs climbers, cacti, succulents used in bioaesthetic or landscape gardening.

ORNAMENTAL GARDENING

Candidates must have knowledge of – Horticulture, Styles of Gardening, Lawn Development, Roadside plantation of trees/shrubs. Flowering shrubs, Hedges, Bonsai and its maintenance, Annual flowers, Topiary, Indoor and outdoor potted plants, Propagation of roses, Chrysanthemum, Dahlia, Bougainvillea, Hanging Basket, Cultivation of Cut flowers i.e. Roses, Gladiolus, Orchids, Tuberose, Lillium and Anthurium, Ground Covers, Medicinal Plants, Scented Shrubs/Trees, Propagation, Plant Protection, Nursery management, Routine Garden operations, Features of the garden, Flower shows and Garden Competitions, Floral ornaments and Flower Arrangements.

4. MEDICINAL, AROMATIC, SPICES, CONDIMENT AND PLANTATION CROPS

Origin, importance, export potential, varieties, climate, soil requirements, propagation and planting and after care, mulching, 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, amla(aonla), stevia, ashwagandha, dioscorea, opium poppy, sarpagandha, steroids bearing *solanum*, *Phyllanthus amarus*, *chakramani*, *madhunasaini*, *sweet flag*, *Catharanthus roseus*, *isabgol*, *fox glove*, *belladonna*, *senna*, *tinospora*, *annatto*, *coleus*, *safed musli* and *asparagus*.

Aromatic Crops

Citronella, lemon grass, palmarosa, vetiliver, geranium, davana, mints, lavender and vanilla.

Spices and condiments

Turmeric, ginger, coriander, fenugreek, cardamom, pepper, cinnamon, clove, nutmeg and cumin.

Plantation Crops

Coconut, cashewnut, oil palm, betelvine, coffee, tea, cacao, arecanut and rubber.

5. Post Harvest Management of Horticultural Crops

Importance of post harvest technology in Horticultural crops. Maturity indices, harvesting, handling, grading of cut flowers, plantation crops, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and biochemical changes, hardening and delaying ripening process. Post harvest treatments of horticultural crops. Quality parameters and specifications. Methods of storage for local market and export, packaging methods and types of packages, recent advances in packaging. Types of containers and cushioning materials, vacuum packaging, cold storage, poly shrink packaging,

PRESERVATION OF ORNAMENTAL CROPS

Importance and scope of cut flowers, plantation crops, medicinal and aromatic plants preservation in India. Principles of preservation by heat, low temperature, chemicals and various methods of preservation. Selection of site for processing. Preservation of cut flowers, plantation crops, medicinal and aromatic plants through canning, bottling, freezing, dehydration, drying, sugar, chemicals, salts, vinegar, ultraviolet and ionizing radiations. Micro-organisms associated with spoilage of fruit and vegetable products. Spoilage of canned products-hydrogen swell, flipper, dent, leaker etc., Preservatives and colours permitted and prohibited in India.

6. PLANT PROPAGATION AND NURSERY MANAGEMENT:

Introduction, principles and classification of plant propagation methods. Selection of site for commercial nursery. Ecological and economic factors. Plant propagation structures, containers and media. Sexual propagation and its importance. Seed dormancy, Seed germination, process of seed germination, Factors affecting seed germination and pre-germination treatments and viability tests. Asexual (vegetative) propagation and its importance. Various methods of Asexual (vegetative) propagation like cuttage, layerage, budding, grafting and

factors responsible for their success. Different types among cuttage, layerage, budding, grafting methods followed in propagation of different horticultural crops. Role of root stocks, selection and maintenance of mother trees (scion bank), scion – stock relationships, bud wood certification, propagation through specialized structures. Importance of micro propagation of plants. Types of aseptic cultures. Types of media, preparation of media and inoculation of explants, establishment, sub culture and rooting of explants.

7. GREENHOUSE MANAGEMENT OF HORTICULTURAL CROPS

Importance, uses, scope and production of Ornamental crops in greenhouse. Status and development of greenhouse production of Ornamental as well as horticultural crops in the world and India. 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 ornamental crops. Preparation of growing media and its pasteurization. Management of nutrients through fertigation. Detailed production technology in respect of rose, carnation, gerbera, chrysanthemum and anthurium under greenhouse/polyhouse.

8. ORGANIC FARMING IN HORTICULTURAL CROPS :

Introduction, concept, relevance in present context, Organic production requirements, Biological intensive nutrient management-Organic manures, vermicomposting, green manuring, compost pits, recycling of organic residues, bio-fertilizers, soil improvement and amendments; Integrated diseases and pest management use of biocontrol agents, biopesticides, pheromones, trap crops bird perches, weed management.

9. PLANT PHYSIOLOGY :

Physiological changes during seed development, germination and seed dormancy. Seed viability and seed vigour. Photosynthesis – Importance, factors

affecting photosynthesis. Light and dark reactions – C₃, C₄ and CAM pathways. Significance and differences. Photo-respiration and its significance. Respiration and its significance. Nomenclature and classification of plant growth substances. History, occurrence, distribution, mode of action, movement, mechanism and function of auxins, gibberellins, cytokinins, ethylene, inhibitors, retardants, phenolic substances and morphactins. Role of plant growth regulators in plant propagation, seed and bud dormancy, juvenility, maturity and senescence, flowering, pollination, fruitset.