

Overview of Horticulture

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Field of study that focuses on the cultivation, management, and improvement of plants for food, medicine, ornament, and environmental purposes.

1. Definition & Scope

Aspect	Description
Horticulture	The science and art of growing fruits, vegetables, herbs, ornamental plants, and turf. • Pomology (fruit) • Olericulture (vegetables)
Sub?disciplines	• Floriculture (flowers & ornamental plants) • Landscape horticulture (garden design, turf) • Post?harvest technology (storage, processing)
Relation to other fields	Overlaps with agronomy, botany, plant pathology, soil science, and environmental science.

2. Historical Perspective

Period	Key Developments
Ancient civilizations	Domestication of cereals, fruit trees, and garden plants in Mesopotamia, Egypt, China, and Mesoamerica.
Classical era	Roman and Greek texts (e.g., <i>De Re Rustica</i>) describe garden design and plant propagation.
Renaissance & Enlightenment	Botanical gardens and systematic classification (Linnaeus) expand scientific knowledge.
19th?20th?c.	Emergence of horticultural societies, hybridization of fruits and flowers, development of modern nurseries.
Late 20th?c. – present	Integration of biotechnology, precision agriculture, and sustainability concepts.

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3. Core Components of Horticultural Practice

3.1 Plant Propagation

Method	Typical Use	Advantages
Seeds	Annual crops, many ornamentals	Genetic diversity, low cost
Cuttings (stem, leaf, root)	Roses, many shrubs	True to type, rapid establishment
Layering	Raspberries, some woody perennials	Simple, high success rate
Grafting & Budding	Fruit trees, stone fruits	Combines desirable rootstock & scion traits
Tissue culture (micropropagation)	Mass production of disease-free plants	Uniformity, rapid scaling

3.2 Soil & Nutrient Management

- **Soil testing** : pH, EC, macro and micronutrients.
- **Amendments**: lime (pH adjustment), organic matter (compost, peat), gypsum (soil structure).
- **Fertilization**:
 - *Macronutrients*: N, P, K (primary); Ca, Mg, S (secondary).
 - *Micronutrients*: Fe, Mn, Zn, Cu, B, Mo.
 - *Application methods*: broadcast, banding, fertigation, foliar sprays.

3.3 Water Management

- **Irrigation systems**: drip, micro-sprinklers, flood, subirrigation.
- **Scheduling**: based on evapotranspiration, soil moisture sensors, plant growth stage.
- **Water quality**: salinity, pH, hardness affect plant health.

3.4 Pest & Disease Management (Integrated Pest Management – IPM)

1. **Monitoring** – scouting, traps, disease forecasting models.

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2. **Cultural controls** – crop rotation, sanitation, resistant varieties.
3. **Biological controls** – beneficial insects, microbial antagonists.
4. **Chemical controls** – selective pesticides applied as a