

# MSC IN HORTICULTURE – FINAL EXAM TOPICS

## 2017 SPRING SEMESTER

### KNOWLEDGE OF OBLIGATORY SUBJECTS

#### Plant geography and plant ecology

1. Plant populations and their main characteristics: architecture and grow forms, size and spatial structure. Life strategies and adaptation forms. The life cycle model.
2. Vegetation ecology in terrestrial ecosystems: adaptations and interactions in plant communities. How environmental factors affect the coexistence of species.
3. Vegetation dynamics: plant communities in space and time. Succession stages and their characterisation, succession series along the forest steppe zone.

#### Molecular genetics and gene technology of plants

4. Characterisation of basic molecules of life and their role in cell functions (DNA, RNA, proteins)
5. Organisation and distribution of DNA molecules in the organism (chromosomes, replication, cell division)
6. Constitution and functioning of eucariotic genes (central doctrine, mechanism of transcription, translation)

#### Propagation biology of plants

7. Dormancy and germination of seeds, germination biology.
8. Stability and changes in clonal propagating material. Maintenance of cultivars in clonal propagation.
9. Process of graft union formation, biological basis of scion-rootstock interaction

#### Plant ecosystems and their regulation

10. Ecological and production biological significance of C3 and C4 photosynthesis and CAM mechanism
11. What do the intraspecific and interspecific competition mean, how do they change and how can they be regulated in natural and agrarian systems, respectively?
12. How the plants defend themselves against consumer species including their morphological structures, physiological reactions and chemical compounds?

### KNOWLEDGE OF THE SPECIAL CLASSES

#### Special classes of floriculture

1. Natural spread, horticultural use, species and cultivars of conifers, the specialities of the growing.
2. Natural spread, horticultural use, species and cultivars of broad-leaved trees, the specialities of the growing.
3. Deciduous shrubs. Shrubs, trees and conifers of hedges.
4. Urban forestry – urban environmental harm, the potential benefits. Street trees, ground covers (species and cultivars).
5. Dendrological areas in Hungary.
6. Growing and commerce of woody plants in Hungary and in the European Union.
7. Growing of perennials in Hungary. The market and use of perennials.
8. Planting and maintenance of trees and shrubs. Diagnostics of trees, special tree care.
9. Growing and commerce of flowering and foliage pot plants in Hungary and in the European Union.
10. Growing and commerce of cut flowers in Hungary and in the European Union.
11. Anatomy, special life forms of tropical and subtropical orchids. The speciality of growing and care.
12. Anatomy, special life forms of bromelias. The speciality of growing and care.
13. The water as habitat. Growing, propagation and care of aquarium plants.
14. Growing, propagation and care of succulent plants. Types of succulence, the important families.
15. Propagation and growing of special ornamental bulbs. The possibility of use.

## Specialisation Medicinal and Aromatic Plants

Up to-date technologies of medicinal plant production course:

1. Propagation technologies in MAP production. Utilisation and breeding of cultivars.
2. Characteristics of plant care measures in cultivation of MAPs: nutrient supply, irrigation and plant protection
3. Harvesting and primary processing of MAP species
4. Specialities of secondary processing and extraction of MAP plants
5. Quality assurance systems in collection and production of MAPs.

Cultivation of special medicinal plants and spices course:

6. Characterisation of Asteraceae species cultivated as alternative crops: *Artemisia annua*, *Chamaemelum nobile*, *Chrysanthemum cinerariaefolium*, *Chrysanthemum parthenium*
7. Characterisation of Lamiaceae species cultivated as alternative crops: *Dracocephalum moldavica*, *Salvia sclarea*, *Hyssopus officinalis*, *Rosmarinus officinalis*
8. Characterisation of MAP species accumulating polysaccharides and saponins: Malvaceae, *Verbascum phlomoides*, *Saponaria officinalis*, *Glycyrrhiza glabra*
9. Characterisation of species providing pharmaceutical raw: *Cinchona spp.*, *Taxus spp.*, *Cathartus roseus*, *Datura* and relatives
10. Characterisation of other popular species as MAPs: *Olea europea*, *Cimicifuga racemosa*, *Vitex agnus-castus*, *Cynara scolymus*

Special plant compounds in nutrition and therapy course:

11. Grouping of most important biologically active substances used in phytotherapy and nutrition according to the biogenetic system
12. Description of active substances occurring in spices universally (e.g. essential oils) and specifically (e.g. azotoids).
13. Evaluation of *dietary supplements* with special respect to motivating and limiting factors in their consumption
14. Evaluation of *traditional herbal medicines* with special respect on the advantages and disadvantages of the establishment of this product category
15. Characterisation of active substances used by the pharmaceutical industry, examples for species and indications.

## Specialisation in Fruit Growing

From "Physiological questions of fruit bearing trees" subject

1. Describe the factors determining the shape and size of fruit trees. How can we manipulate the physiological processes with technological tools?
2. Describe the process of flower bud development of fruit trees, and the changing of their frost hardiness during dormancy.
3. Describe the process of fruit development, maturity and ripening of after ripening type fruits. Explain the hormonal background of fruit drops.
4. What is the reason of biennial bearing (alternate bearing) in orchards? What kind of technology can we eliminate it with?
5. List the internal and external factors determining the root development of fruit trees.

From „Modern fruit growing" subject

6. Conditions and factors of modern fruit orchard establishment.
7. Training systems and orchard management technology of modern apple orchards.
8. Modern training systems and new elements of the orchard management technologies for stone fruits (cherries, peaches, apricots).
9. Training systems and orchard management technology of modern walnut orchards.
10. Possibilities for the modernization of berry production (strawberries and raspberries).

From „Evaluation of fruit species and –varieties" subject

11. More important tendencies of apple breeding. Description of apple assortment having competitiveness on international market. Evaluation of role of historical apple cultivars in the current growing and breeding.
12. Tendencies and methods of pear breeding in the world. Important results of pear breeding. Characterisation of important characteristics of Japanese pear, Evaluation of cultivars suitable for growing in Hungary

13. More important tendencies and results of peach and apricot breeding in the world. Evaluation of new Hungarian cultivars and novelties suitable for adaptation
14. More important tendencies and the newest international results of European and Japanese plum cultivars
15. Main aspects and results of sweet and sour cherry in Hungary and abroad, Hungarian and foreign bred novelties.

### **Specialisation in Viticulture and Enology**

#### *Biological and phytotechnical resources of viticulture*

1. Botany of the grapevine. Grape species, their roles in cultivation and breeding.
2. Life cycle of vineyard. Phenology and growth cycle of the grapevine.
3. Photosynthesis and respiration of the grapevine. Factors affecting photosynthesis.
4. Water- and heat stress of grapevines.
5. Role of light, temperature and humidity in grape production. Effects of climate change on viticulture.
6. The role of biotic factors in grape production. Grapevine resistance breeding.
7. Concepts and roles of phytotechniques in grape production practices. Historical evolution of pruning systems.
8. Classification and description of phytotechnical practices.
9. Classification and description of grape pruning and training systems.
10. Biological resources of phytotechniques.

#### *Quality oriented viticulture*

11. Trends of the grape and wine industry based on worldwide statistics. Development of the concept of quality in viticulture.
12. Roles of the vineyard and cultivation system in grape quality.
13. Possibilities of different cultivation systems (ecological, biological and biodynamic) in quality oriented viticulture.
14. Modern techniques in viticulture. Climate adaptation, precision viticulture.
15. Technologies and current topics of the production of pathogen-free propagation materials.

### **Specialisation in Vegetable Growing**

#### *Soilless forcing*

1. Concept of soilless vegetable production, its partition, economic significance and technical basis
2. Different growing media in use, forcing technologies in container and in rockwool production
3. Pepper (*Capsicum annum*) forcing with soilless technology
4. Tomato forcing with soilless technology
5. Soilless technology in forcing of pumpkin ones (*Cucurbitacea*)

#### *Mushroom Growing*

6. The economical and environmental impacts of mushroom cultivation
7. Requirements of mushroom production (spawn, substrate, technology, growing unit)
8. Comparison of the different button mushroom (*Agaricus bisporus*) cultivation technologies
9. The intensive cultivation technology of oyster mushrooms (*Pleurotus sp.*)
10. Cultivation and economical potential of exotic mushroom species

#### *Vegetable seed production*

11. Requirements of vegetable variety registration on EU level
12. Processing and treatments of vegetable seeds
13. Seed production of tomato and pepper
14. Seed production of melons and cucumber
15. Seed production of sweet corn, bean and pea