**PLSC 210: Horticulture Science**

Fall Semester, 2009

**GUIDELINES FOR EXAMINATION I**

**Exam Date: Wednesday, September 23, 2009**

I. **COMPOSITION**

The first exam will be composed of short answers, matching, multiple choice, and true-and-false questions. Questions will be asked from materials that have been covered up to Monday, September 21, 2009.

II. **SUGGESTED AREAS OF STUDY**

1. **Introduction** (Lectures)

a. Definition of “horticulture.”

b. Importance of horticulture in enhancing human health and emotional well-being.

c. What is the difference between agronomy and horticulture?

d. Know what are involved in each of the disciplinary fields of horticulture: olericulture, pomology, arboriculture, floriculture, landscape horticulture, nursery.

e. Know some examples of professional careers for horticulturists.

2. **Classification** (Chapter 2, Lectures)

a. Know how to classify plants by growth habits (succulents, vines, ground covers, trees, shrubs).

b. Difference between deciduous and evergreen trees.

c. Distinguish annuals, biennials, perennials with examples.

d. Classification of plants by temperature tolerance.

e. Difference between cool-season crop and warm-season crop.

f. Meaning of xerophyte, shade plant, halophyte, glycophyte, acid-loving plants.

g. Kinds of vegetables grown for aerial portions.

h. Kinds of vegetables grown for underground portions (roots, tubers, bulbs, corms).

i. Classification of temperate fruits (berries, brambles, vines, pome, stone fruits).

j. Classification of florist crops (cut flowers, potted flowering plants, foliage plants, bedding plants, cut greens).

k. Classification of landscape plants (trees, shrubs, vines, etc. with examples).

l. The system of scientific plant classification (family, genus, species, variety or cultivar).

m. Name the Swedish botanist who modernized plant classification.

n. Show the family names and scientific nomenclature for ‘Russet Burbank’ potato, ‘Red Cascade’ petunia, and ‘Delicious’ apple (correct spelling of genus, species and cultivars).

o. List names of five plant families that are important in horticulture.

p. What is difference between a variety and a cultivar? What is a sport?

q. What is meant by clone, pure-line cultivar, hybrid cultivar, open-pollinated cultivar?

r. What is an ecospecies and how does it occur?

3. **Plant Structure** (Chapter 3, Lectures)

a. Know various components of the plant cell: nucleus, nucleolus, mitochondria, chloroplast, vacuole, cell wall.

b. Know three different types of meristems (apical, intercalary, cambium).

c. The locations and functions of xylem, phloem and cambium tissues.

d. Composition of phloem tissues: sieve tube member, sieve tube plate, companion cell, phloem parenchyma cell; composition of xylem tissues.

e. The functions of root cap and root hair.

f. Various stem modifications that are horticulturally important: crown, runner (stolon), spur, rhizome, tuber, corm, bulb.

g. Know the anatomy of leaf tissues: upper and lower epidermis, stomata (stoma), palisade and mesophyll parenchyma cells).

h. Know the structural parts of the flower: sepal, calyx, corolla, perianth (sepal, petal, receptacle), pistil (ovary, style, stigma), stamen (anther, filament).

i. Know various inflorescence types with examples: head, spike, raceme, corymb, panicle, cyme, umbel.

j. Difference between ray florets and disc florets.

k. Difference between pedicel and peduncle.

l. Examples of aggregate fruit (i.e. strawberry) and multiple fruit (i.e. pineapple).

m. Identify the types of fruits (dry and fleshy) from pictures provided.

n. Identify the external and internal components of a bean seed (raphe, hilum, micropyle, cotyledon, radicle, embryo, seed coat).

o. What is meant by a dioecious species?

p. Know various flower sex expressions of plants: monoecious, androecious, gynoecious, andromonoecious, gynomonoecious, trimonoecious.

4. **Growth and Metabolism** (Chapter 4, Lectures)

a. What is meant by plant “growth”?

b. Definition of plant morphogenesis, differentiation, anabolism, catabolism.

c.. Know 3 major chemical processes of plants: photosynthesis, metabolism, respiration.

d. What are produced from photolysis and photophosphorylation in the light phase of photosynthesis?

e. Difference between the C3 pathway (Calvin cycle) and the C4 pathway of photosynthesis; give examples of plants having two different pathways.

f. Receptor carbon compounds (RuBP or PEP) for carbon dioxide (CO2) fixation during Calvin cycle and C4 pathway.

g. What is meant by photorespiration? Does it operate in C3 or in C4 plants? Why is it important in relation to photosynthetic efficiency?

h. What is meant by a CO2 compensation point? How does it differ between the C3 and C4 plants?

i. Name six macronutrient and seven micronutrient elements.

j. Contrast autotrophic and heterotrophic plants.

k. Definition of diffusion, osmosis, translocation, transpiration.

l. Chemical equation for respiration.

m. What does the Q10 value imply?

n. Suggest ways to reduce respiration from stored plant parts.

o. What is meant by ‘hypobaric’ storage and why is it used?

p. Difference between anabolism and catabolism.

q. Name 3 major groups of plant constituents (carbohydrate, protein, fatty acids).

r. Know what is meant by: monosaccharides, disaccharides, oligosaccharides, polysaccharides, starch.

5. **Differentiation and Development** (Chapter 5, Lectures)

a. What is meant by differentiation?

b. Difference between phyto-hormones and plant growth regulators.

c. What is meant by phototropism and how does it occur?

d. Know the plant growth hormone that is responsible for phototropism.

e. Know three different types of auxins (natural, synthetic).

f. What is meant by apical dominance how does it occur?

b. Know about the functions, occurrence and practical use of the following growth regulators: auxins, gibberellins (GA), cytokinins, ethylene, abscisic acid.

c. What is phototropism and what growth hormone is involved in it?

d. What is apical dominance and what plant growth hormone is involved in it? What horticultural practice requires the removal of apical dominance?

e. Know about the kinds of auxins and cytokinins used in plant tissue culture (auxins: IAA (natural), NAA (synthetic); cytokinins: zeatin (natural), kinetin (synthetic), benzyl adenine (BA, synthetic), 2-iP (synthetic).

f. What growth regulator is used to induce parthenocarpy (seedless fruit) in grapes?

g. Name growth regulators used to convert flower sexes: 1) from male to female, 2) female to male in cucurbits.

h. A growth regulator used in the enhancement of fruit ripening and flower induction in bromeliads (including pineapple).

i. Growth regulators used in plant tissue culture for induction of: 1) shoot differentiation, 2) callus and root differentiation.

j. Three steps of seed germination.

k. Difference between physical (seed coat) dormancy and physiological (inhibitor induced) dormancy of seeds and suggest how these dormancies can be eliminated.

l. What is meant by ‘double dormancy’?

m. Difference between scarification and stratification in breaking seed dormancy.

n. Why is the phase change from juvenility and maturity important in tree fruit production?

o. Why is chilling requirement important in fruit growing? Why is apple industry absent in Florida or other warm regions, although the plants grow well?

p. Influence of C:N ratios on vegetative and reproductive growth.

q. Examples (2 species) of short-day, long-day and day-neutral plants.

r. Name of the receptor (pigment compound) responsible for photoperiodism.

s. What is meant by ‘critical dark period’ and ‘night break’?

t. Why long-day plants do not bloom in the tropical regions of the equator?

u. What is meant by vernalization? Give examples of plants that require vernalization for flowering.