

**BIOL 221 – Concepts of Botany; Dr. Hardy; Spring 2013**  
**Exam 1 Guide**

**Topic 01 – Introduction to Botany**  
Reading: Evert & Eichhorn (2013) Chapter 1

- I. Plants are more important to you than you know
  - A. The naked truth (about plant fibers)
    - 1. Cotton is king  
Cotton facts and extraction process
    - 2. Flax was king  
Flax fiber facts and extraction process
    - 3. Pineapple fiber  
Pineapple fiber facts and extraction process
  - B. Biomass in the ecosystem
  - C. Your mass
  - D. Your caloric intake
  - E. Plants set the landscape, atmosphere
  - F. Medicines and recreational drugs
  - G. Forensics
  
- II. Cycad stories
  - A. Vegetative morphology
  - B. Reproductive morphology
  - C. Economic botany
  - D. Biogeography and conservation
  - E. Cycads and Guam dementia

**Topic 02 – Primary Body**

Reading: Evert & Eichhorn (2013) Chapter 23, 24, and 25 (pp 579-603; 607-612)

- I. Primary vs. secondary body
  - A. Parts derived from action of apical meristems
    - 1. Shoot apical meristem
    - 2. Root apical meristem
  - B. Parts derived from action of lateral meristems
    - 1. Vascular cambium
    - 2. Cork cambium
  
- II. Vegetative vs. reproductive organs
  - A. Organs for (vegetative) growth
    - 1. Leaf
    - 2. Stem
    - 3. Root
  - B. Organs for reproduction
    - 1. Sepals, petals, stamens, carpels (flower)
    - 2. Sporophylls, scales (strobilus, cone)

### 3. More types....

#### III. General functions of vegetative organs

- A. Leaf
- B. Stem
- C. Root

#### IV. Vegetative morphology of the shoot system

- A. Basic architecture
- B. Shoot apex
- C. Stem morphology
- D. Leaf morphology
  - 1. Structure
    - a. Adaxial vs. abaxial
    - b. Parts of a typical dicot leaf
    - c. Monocot leaves
    - d. Conifer leaves
  - 2. Leaf margins
  - 3. Phyllotaxy
  - 4. Complexity
  - 5. Venation
- E. Modifications of shoot architecture
  - 1. Of leaves
  - 2. Of stems
  - 3. Whole shoots
  - 4. Other

#### **V. Vegetative morphology of the root system**

- A. Basic architecture/morphology
- B. Modifications of root architecture/structure

#### **VI. Vegetative anatomy**

- A. Cells and tissues
  - 1. Plant cells are different
  - 2. Tissues and tissue systems
    - a. Dermal tissue system
    - b. Vascular tissue system
    - c. Ground tissue system
- B. Root anatomy
  - 1. In longitudinal section
  - 2. In transverse section
  - 3. Lateral roots
- C. Stem anatomy
  - 1. In transverse section
- D. Leaf anatomy
  - 1. In transverse section
- E. Shoots in longitudinal section

### **Topic 03 – Cereals and Legumes (Seeds and Seedlings)**

Reading: Evert & Eichhorn (2013) Chapter 22 (Fig. 22-1 and pp. 530-536, including “Wheat: Bread and Bran”)

#### I. Seeds and Embryos Introduction

- A. Systematics
  - 1. Spermatophytes or seed plants
  - 2. Before the spermatophytes
- B. Seed structure and adaptive value
- C. Dormancy and germination

#### II. Legumes

- A. Economic botany
  - 1. Some domesticated species
  - 2. Nutritional value of seeds
  - 3. Root nodules
- B. Fruit structure
- C. Seed and seedling structure

#### III. Cereals

- A. Economic botany
- B. Fruit, seed and seedling structure

### **Topic 04 – Secondary Body**

Reading: Evert & Eichhorn (2013) Chapter 26 and the Info Box on Bamboo on p. 603 of Chapter 25

#### I. Vascular cambium

- A. Formation
- B. Bifacial
- C. Annual rings
- D. Rays
- E. Fusiform and ray initials
- F. Vascular cambium in roots

#### II. Cork cambium

- A. Formation
- B. Properties of cork
- C. Lenticels
- D. Multiple cork cambia and layered periderms

#### III. Morphology of woody trunk

#### IV. Morphology of woody twig

## Topic 05 – Arborescent Monocots

Reading: none

I. Monocots are ancestrally herbaceous

II. Arborescent monocots

A. Banana “trees”

1. Primary thickening meristem
2. Formation of pseudostem

B. Most palm trees (e.g., a coconut palm)

1. Primary thickening meristem
2. Diffuse growth beneath for height

C. Pony-tail-palm, some palms and Joshua trees

1. Primary thickening meristem
2. Diffuse growth beneath for height
3. Secondary thickening meristem