

PLANT ANATOMY Lecture 25 - Secretory Structures

- I. **Function of secretory structures**
 - A. Accumulation or release of toxic (waste) substances
 - B. Deter herbivores
 - C. Guide pollinators
 - D. Accessory features of trichomes (secretory or non-secretory)
 - 1. Alter photosynthesis
 - 2. Regulate leaf temperature
 - 3. Regulate water loss
 - 4. Water absorption (trichoblast)
- II. **Types of secretory products - classification according to nature of the product**
 - A. Products necessary for the plant's own fundamental needs - removal of excess water or salts, or accumulation of waste products
 - 1. External
 - a) Hydathodes - secrete water
 - b) Salt glands - secrete inorganic (waste) salts
 - c) Digestive glands - help digest victims
 - 2. Internal
 - a) Resin ducts - accumulate resin (mostly terpenes)
 - b) Mucilages - slimy carbohydrate formed to the inside
 - c) Oils - accumulations within - can be waxy
 - d) Gums - result from modifications of the CW
 - e) Laticifers - secrete latex as a waste product
 - f) Gases - fill intercellular air spaces
 - B. Products that facilitate the plant's interaction with other organisms - scent producing structures that attract or discourage other organisms
 - 1. External
 - a) Nectaries - floral and extrafloral
 - b) Osmophores - odors or perfumes (terpenes) to attract bugs
 - c) Digestive glands - destroy victims
 - d) Adhesive cells - cover attachment organ of a parasite (mistletoe)
 - 2. Internal
 - a) Myrosin cells - accumulate the enzyme myrosinase that, when combined with thioglucosides in surrounding cells, make a toxic mustard oil
- III. **Structure and function of various secretory structures**
 - A. Secretory trichomes (common in dicots, rare in monocots, unknown in gymnosperms)
 - 1. Capitate
 - a) Secrete oil, mucilage, resin, salt
 - a) On leaves and stems of epidermal cells
 - b) Composed of cuticle, cap cells, and a barrier cell
 - 2. Colleter
 - a) Provide a protective coating for dormant buds
 - b) Occur on stipules or leaves
 - c) Permeates and covers entire bud
 - B. Gland - tissues including palisade, bundle, and others - still just under cuticle
 - C. Hydathode - enable guttation (dew) - can also release salt and cause leaf burn
 - 1. Passive - loose epithem (an epithem constitutes the loose cells of the hydathode)
 - 2. Active - compact epithem
 - D. Laticifer (latex - natural rubber; morphine; chewing gum - alkaloids)
 - 1. Articulated - develops one cells after another
 - 2. Non-articulated - one giant, branched cell with many nuclei