

Mangrove PowerPoint Notes



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- Complete fidelity to the mangrove environment – dominance doesn't extend to terrestrial communities – i.e. only exist in mangrove environment
- Major role in community structure – pure stands of mangrove
- Specialized form and structure that adapts them to their environment - Aerial roots for gas exchange and Vivipary is the condition whereby the embryo (the young plant within the seed) grows first to break through the seed coat then out of the fruit wall while still attached to the parent plant.
- No specific requirement for salt
- Taxonomic Isolation from terrestrial relatives. Strict Mangroves are separated from relatives at generic and often family and subfamily level - no close terrestrial relatives at least at the generic level

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- Determining factors for location of mangroves are warm currents – not latitudes

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- Red /white mangroves are north to Cedar Key on the west coast and north of the Ponce de Leon Inlet on the east coast.
- Dense amounts lie south of Cape Canaveral on the east coast and Tarpon Springs on the west coast.
- Black mangroves have been reported farther north on the east coast, with intermittent reports of single red or white mangroves in the St. Augustine area.
- Most in the Ten Thousands Islands and Florida Bay.
- 500,000 acres of mangroves

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- Glycophytes – plants that can't grow in saline environments
- Halophytes – plants that grow in saline environments
- Process that drives soil decomposition and remineralization
 - In freshwater methanogenesis - The biosynthesis of the hydrocarbon methane by microorganisms Aerobic environment
 - In saline env. – sulfur reducing organism
- Tidal control of nutrients and waste in mangrove wetlands
- Only the black mangrove is palatable

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Hydrological Regime

- Horizontal
 - Tide comes in bringing nutrient and dissolved oxygen
 - Tide goes out removes metabolic wastes (CO₂ and Toxic Sulfides) and excess salt
- Vertical
 - Incoming oxygenated, nutrient rich water wets surface and percolates downward into sediments and root zone
 - Sediment drainage on outgoing tide removes waste and excess salt
- Tidal pumping is needed but can carry in toxic substances
- Absence of tides has a deleterious effect, absence of DO sediment can become anoxic of anaerobic and metabolic wastes accumulate

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- Red and white internally adjust their osmolyte concentration
- Black Mangrove confines salt to the Xylem and releases it via transpiration

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- Red mangrove has prop roots and lenticels for gas exchange and a deep vertical rooting
- Black mangrove has pneumatophores and lenticels and extensive vertical rooting
- White mangrove has all three adaptations and the rooting varies by soil type

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- The existence of distinct zones, each dominated by different mangrove species is often evident in well developed mangals

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Mangrove zonation is more often manifested as a mosaic that varies with the complex of physical, chemical, and biological interactions occurring in a particular area.

Mangrove environments are so diverse it is usually difficult to determine the general ecological requirements of different species, as detailed studies in one area may be contradicted by equally precise studies of the same species in a different area.

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- Leaves drop from the mangrove trees and are quickly decomposed by fungi and bacteria
- Decomposed matter is referred to as detritus which is flushed into the estuary by the outgoing tides
- Food source for marine life including economically important shrimp, crabs, and fish
- Estimated 75% of the game fish and 90% of the commercial species in south Florida are dependent upon the mangrove system during at least part of their life cycles.

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- The role of mangroves as contributing to "land building" is doubtful
- Mangroves definitely serve as barriers to shoreline erosion, and help to stabilize sediments thus reducing the effects of storm surges and heavy surf

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- Mangroves are highly productive forests.
- Mangrove forests serve as nursery, feeding, and refuge areas for a wide variety of terrestrial and aquatic organisms including mammals, birds, reptiles, fish, and invertebrates
- Some of these species are threatened or endangered such as the brown pelican or the american crocodile
- 70 – 90 % of commercial or recreational important fish species spend part of their life cycles in estuaries, including mangrove forests

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- A paper published in the journal Science showed that areas protected by mangroves suffered significantly less destruction than coastlines that had lost their mangrove fringe.

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- Carbon budget of mangroves - the balance sheet that compares all the carbon inputs and outputs of the mangrove ecosystem
- These forests are highly effective carbon sinks
- Absorb carbon dioxide, taking carbon out of circulation and reducing the amount of greenhouse gas
- Disturbed mangrove soils release greater than an additional 11 million metric tons of carbon annually

National Geographic, February 2007

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- Mangroves also help improve water quality by extracting excess nutrients and by facilitating the detoxification and storage of pollutants in the sediments

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Direct loss of mangrove habitat by conversion to agricultural and/or urban lands; clear cutting for timber, fuel wood, wood chips, pulp, fodder, and charcoal; impounding for mosquito control; destruction for fish and shellfish culture operations; and conversion to salt ponds have resulted in the loss of over half of the area once occupied by mangroves