

A. Mangroves

- Or Mangal
- from mangue (tree) and grove (stand of trees)
 - a. Replace salt marsh as the dominant coastal ecosystem in subtropical and tropical regions
 - b. Facultative halophytes

c. Distribution

- i. 240,000 km² worldwide
- ii. 2,700 km² in Florida
- iii. 68 spp worldwide
- iv. 10 spp in the Americas

Distribution Continued

- v. Found on coastlines between 25° N and 25°S latitude, dependent on temperature
 - i. Rhizophora - survive 2-4° C for 24 hrs
 - ii. Avicennia – survives 2-4° C for several days

B. Three Main Genera

- a. Rhizophora (red mangrove)
 - a. *R. mangal* and *R. racemosa* most common
New World spp
 - b. High prop roots and dangling roots are
common (Figure 11-8)
 - c. More cold tolerant

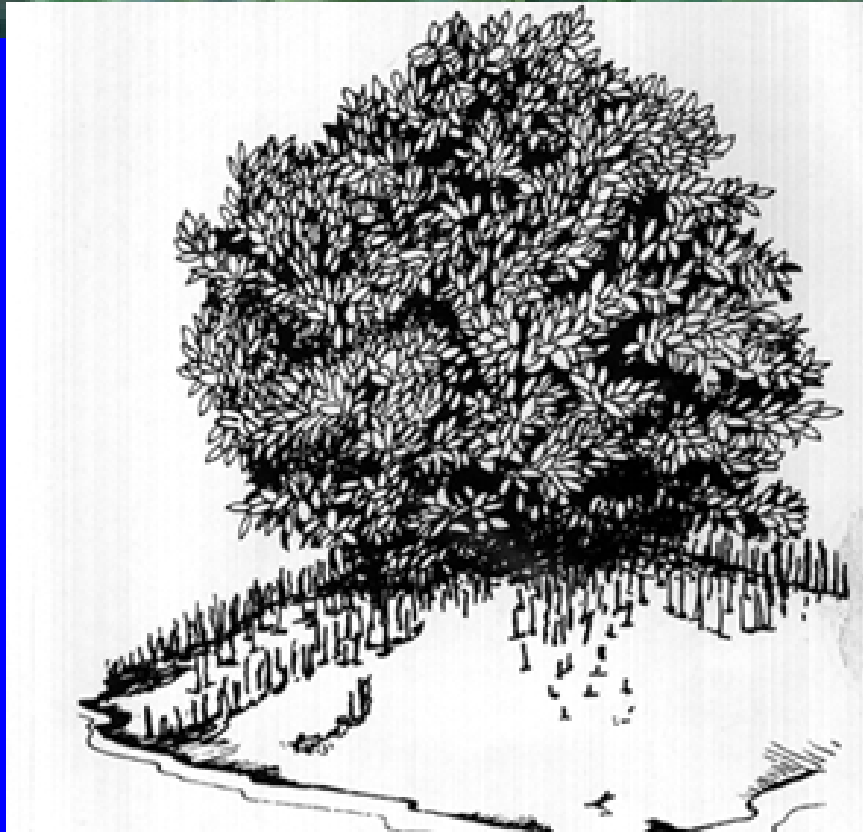


Red Mangrove (*Rhizophora mangle*)



b. Avicenna (black mangrove)

- i. *A. germanaus* most common in New World
- ii. Can tolerate very high salinity (60 ppt) and very anoxic conditions
- iii. Known for having pneumatophores



c. Laguncularia (white mangrove)

- i. *L. racemosa* most common in New World
- ii. Affinity for lower salinity areas



White Mangrove (*Laguncularia racemosa*)

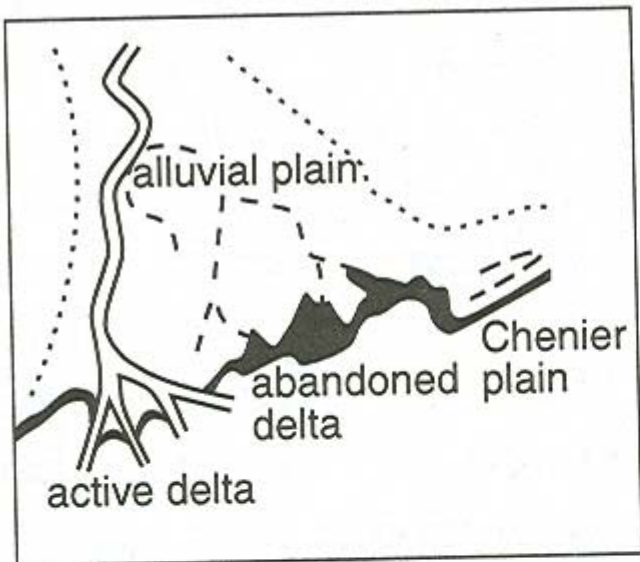


Artwork courtesy of U.S. Fish & Wildlife Service

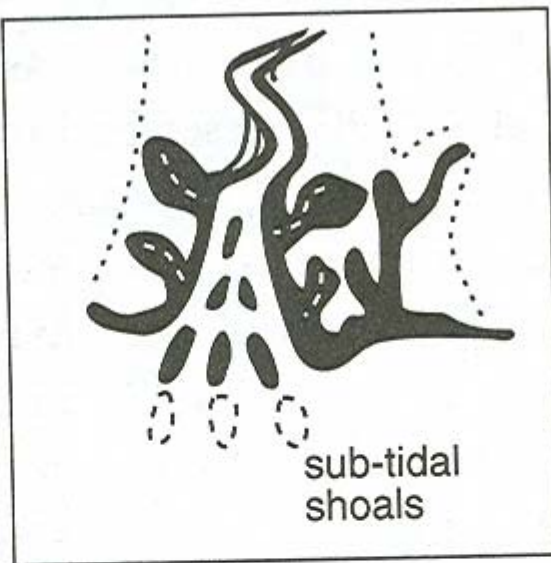
C. Geomorphological settings

- a. need gentle wave/tidal action to bring nutrients
- b. salinity allows them to out compete FW species

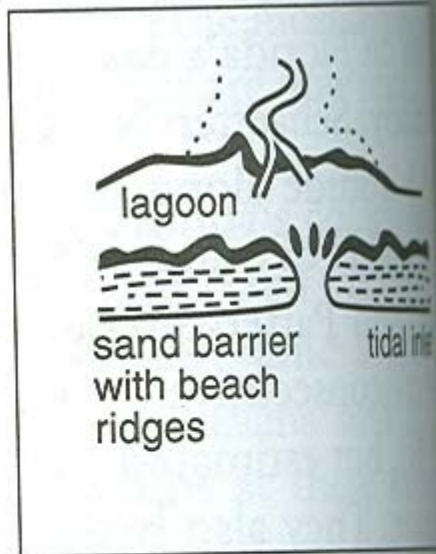
a.



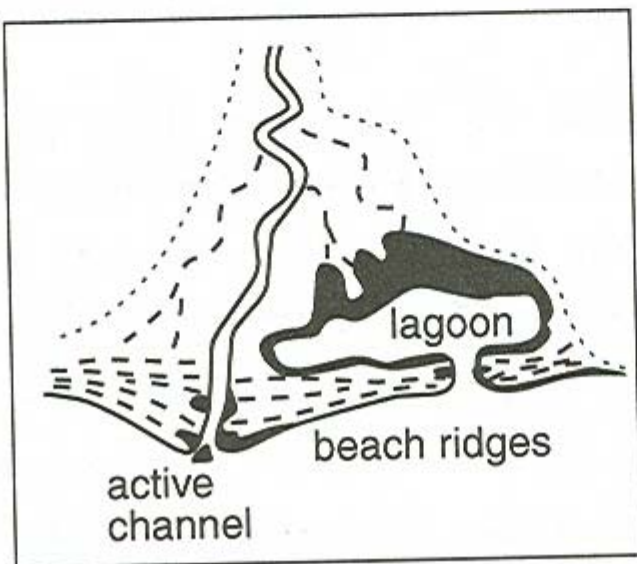
b.



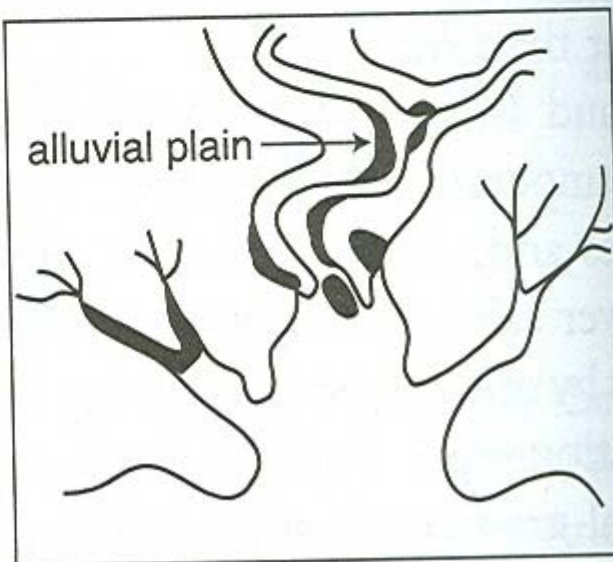
c.



d.



e.



D. Hydrodynamic settings

- a. Fringe – protected shorelines, some canals, rivers and lagoons
 - i. Grow to 13 m tall
 - ii. Accumulate organic matter
 - iii. Found in S. Fla, Puerto Rico, Mexico, Texas
 - iv. Avicennia found in salinity to 59 ppt, Rhizophora to 39 ppt
 - v. Overwash islands – one type of fringe mangrove
 - i. Rhizophora dominated
 - ii. sensitive to ocean pollution

b. Riverine – along tidal affected rivers

- i. Grow to 21 m tall
- ii. Rhizophora dominated, but with few prop roots
- iii. Avicennia and Laguncularia also present
- iv. Salinity 10-20 ppt

c. **Basin-** inland depressions, behind fringe, in stagnant water

i. Grow to 9m tall

ii. Soil conditions: highly anoxic, saline

iii. Avicennia and Laguncularia with many pneumatophores

iv. If salinity >50 ppt: Avicennia, if low: laguncularia, 30-40ppt mixed forest

d. Dwarf — isolated, low productivity, low FW, low nutrients

i. Grow to 2-5m shrubs

ii. Fringe of everglades, Florida Keys

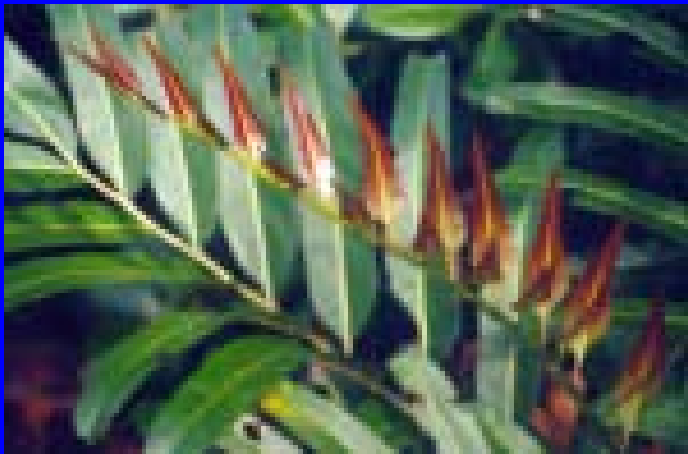
iii. Hammock — one type

i. buildup of peat

ii. Rhizophora dominated

E. Understory – lacking due to variety of stressors

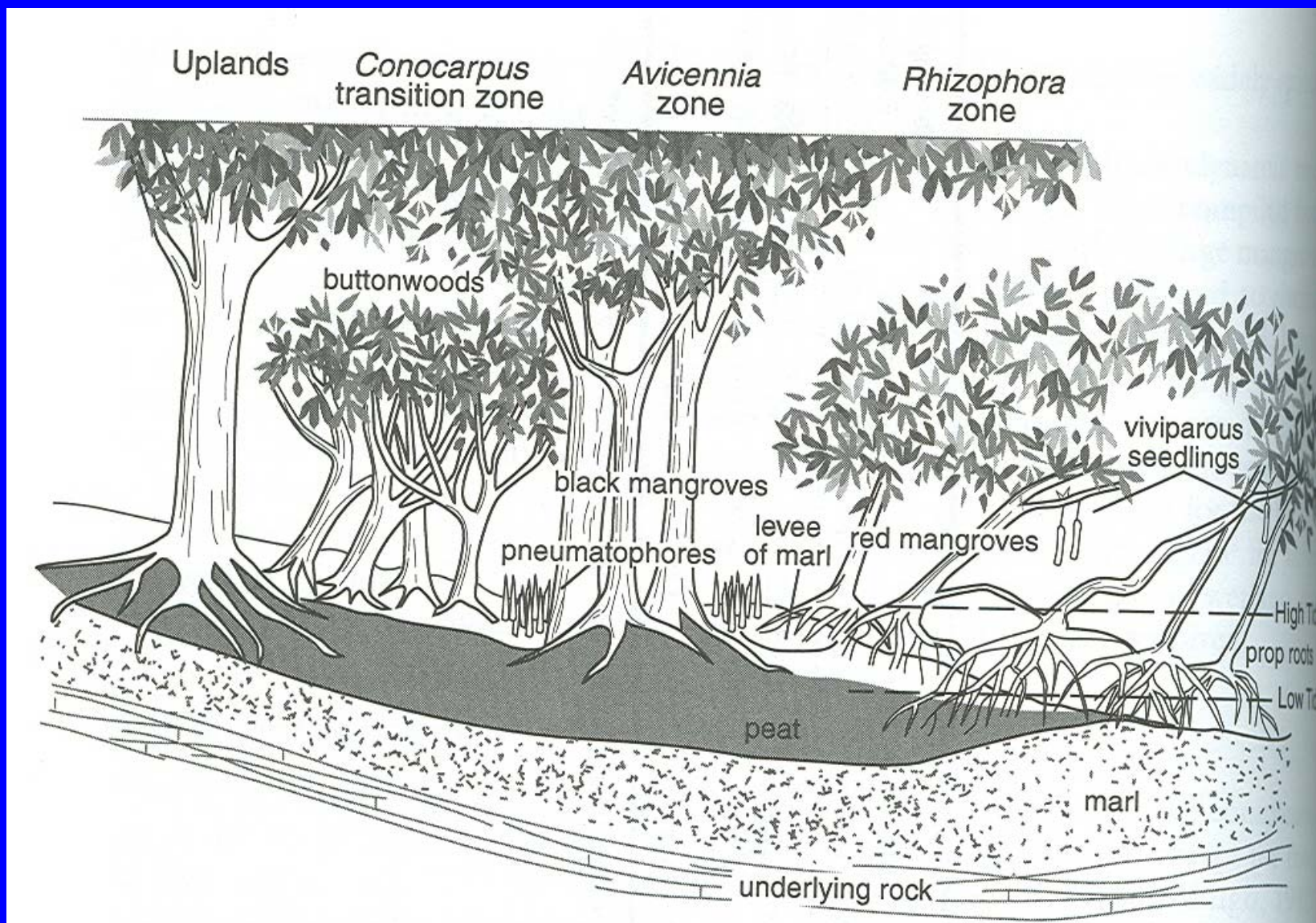
- a. Mangrove ferns (*Acrostichum spp*) are common, 3 spp worldwide

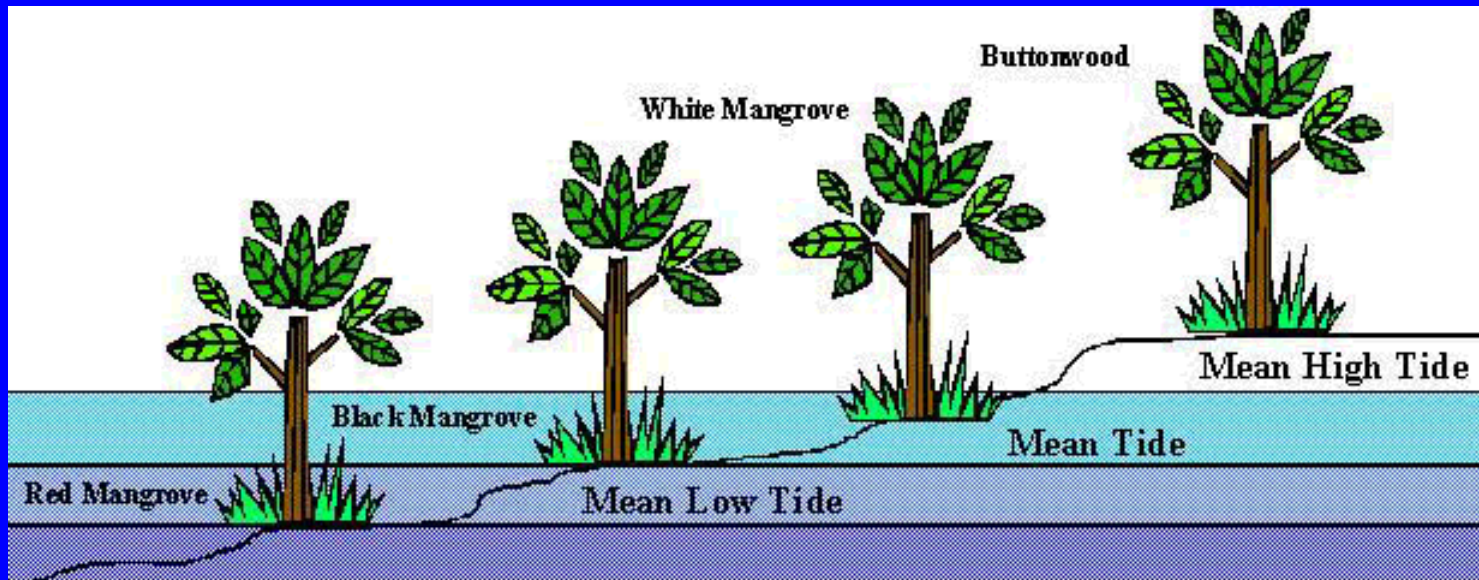


F. Salinity

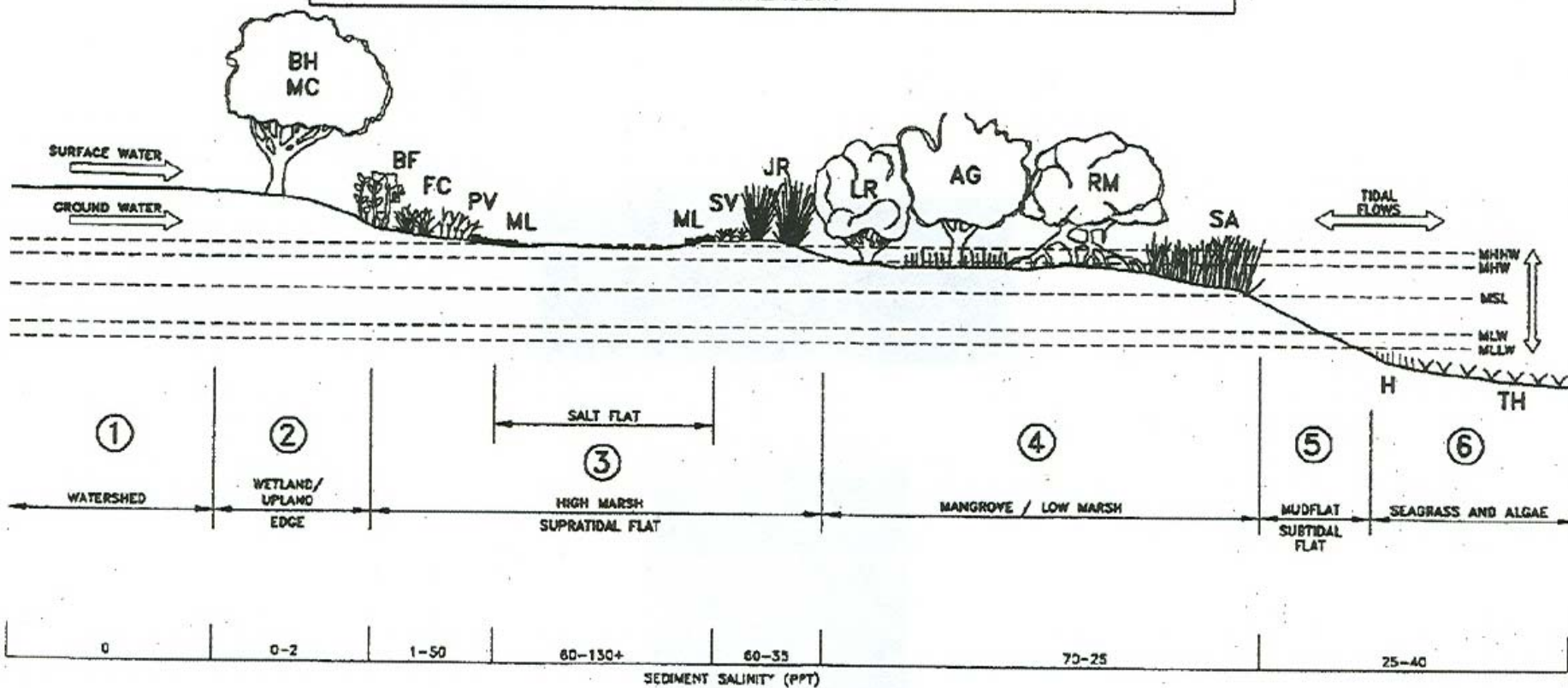
- a. Not required for mangroves
- b. Much higher in soil than in water

G. Zonation





AG = AVICENNIA	JR = JUNCUS	PV = PASPALUM
BF = BORRICHIA	LR = LAGUNCULARIA	RM = RHIZOPHORA
BH = BACCHARIS	MC = MYRICA	SV = SALICORNIA
FC = FIMBRISTYLIS	ML = MONANTHOCHLOE	SA = SPARTINA
H = HALODULE	TH = THALASSIA	



H. Adaptations

- a. Salinity – exclusion and excretion
- b. Prop roots and drop roots – Rhizophora
- c. Pneumatophores – Avicennia – 20-30 cm above sediment
- d. Lenticels found on a & b, let oxygen into plant, moves through aerenchyma to root rhizosphere
- e. Viviporous seedlings – Rhizophora – seeds germinate on tree
 - i. Hypocotyls (seedling) drops, floats till touches sediment, roots

I. Crabs – mangrove maintenance

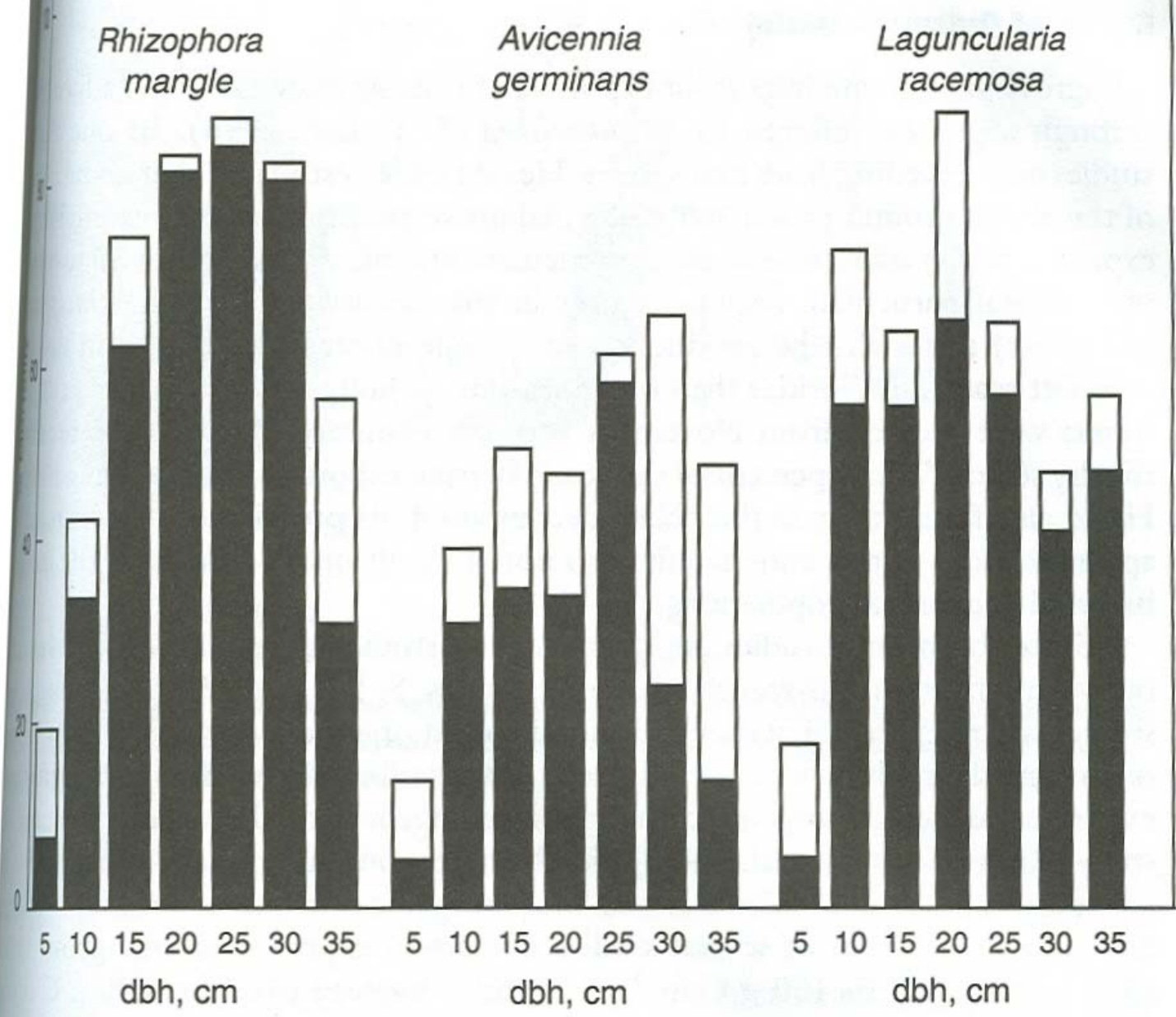
- a. Burrow, oxygenate soil, drag leaves into soil, aid in decomposition
- b. Selectively eat dropped hypocotyls

■ immediately after hurricane
 □ 8-10 months after hurricane

Rhizophora mangle

Avicennia germinans

Laguncularia racemosa

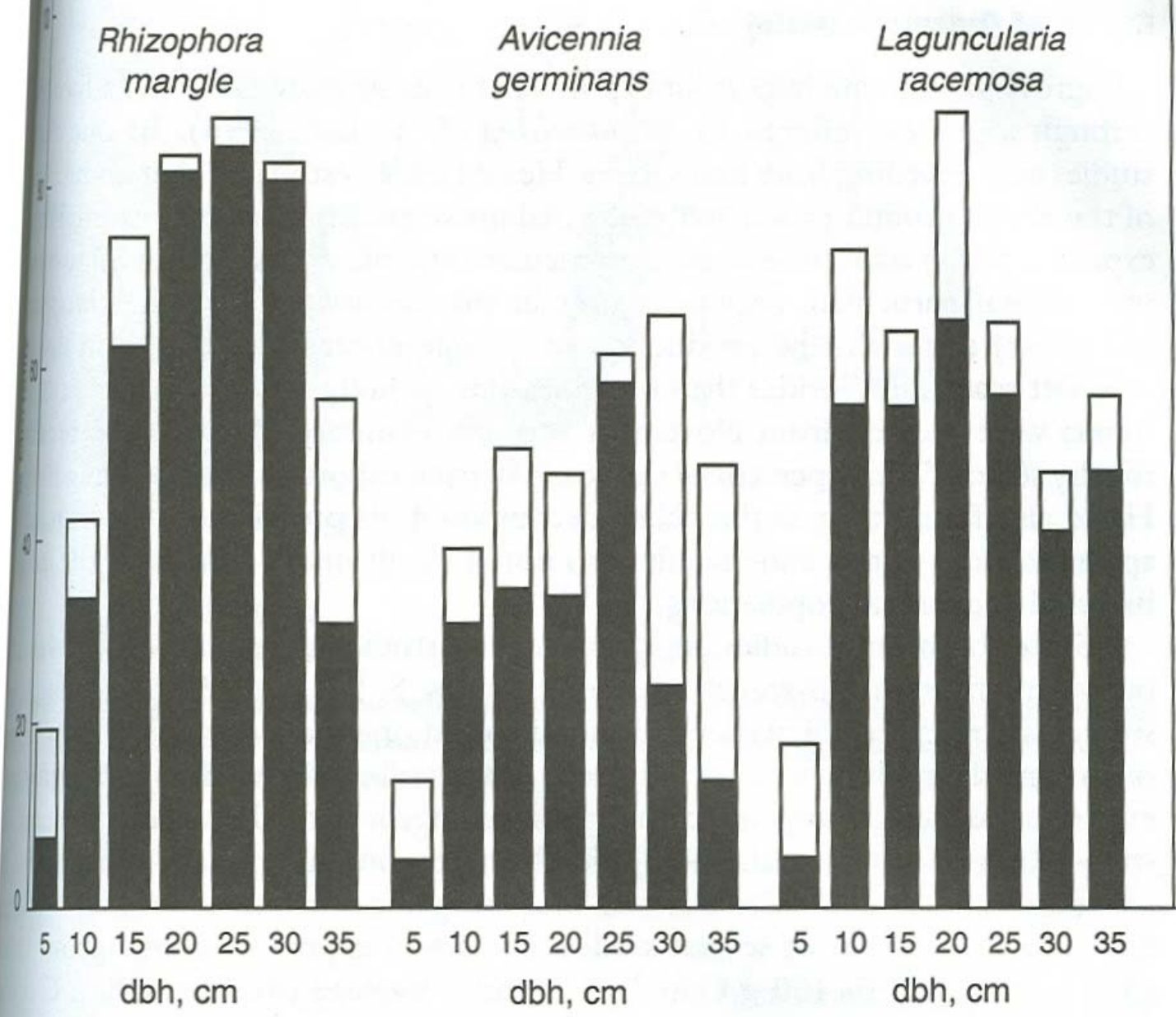


immediately after hurricane
 8-10 months after hurricane

Rhizophora mangle

Avicennia germinans

Laguncularia racemosa



Hurricanes Continued

- a. mangrove succession to stable community in average time between major hurricanes
- b. Wipe out larger mangroves, small trees in gaps survive and act as a seed bank

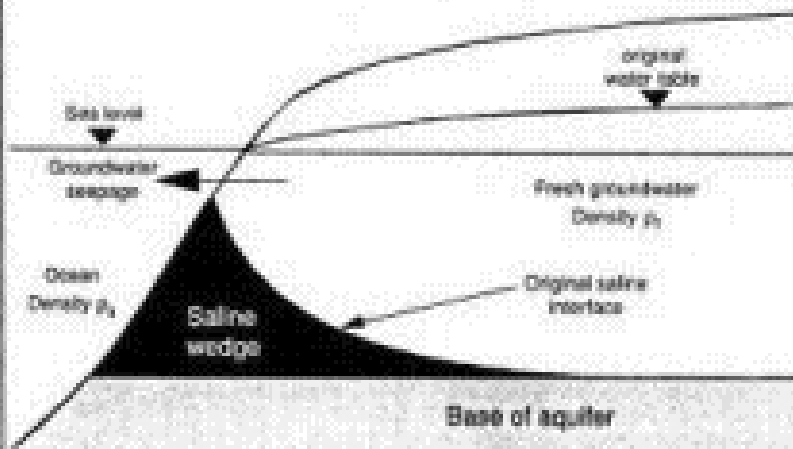
K. Mangrove effects on estuaries

- a. Net export of organic matter and nutrients
- b. Provides nursery areas and food sources for fisheries





1: Before pumping



2: After pumping

