

PLANTS

1. KINGDOM PLANTAE

multicellular plants - larger size

- possess cell wall & chloroplasts
- cells specialized for different functions

4 divisions - 3 groups of algae

- plus 1 group of flowering plants

accessory pigments - also 'masking' (cover up green)

- provide color of various algae
- enhance rate of photosynthesis (absorb blue light in deep water, transfers energy to chlorophyll)

2. SEAWEEDS

'seaweed' - general name for marine plants

- includes all 3 multicellular algae
- sheet, filament, branching, or encrusting

thallus - body of individual algae

- blade - leaf-like, photosynthetic
- stipe - stem-like, also photosynthetic
- holdfast - anchor, does not absorb
- bladder - gas-filled float

tissues - no vessels, so small or flat

- all physiological structures in blade
- match salinity of seawater

zonation - depth determine by amount light

- & accessory pigments
- green above brown above red

3. ALGAE

green algae - medium size

- close to surface (upper 10 m/33 ft)
- few accessory pigments (green chlorophyll uses red + yellow light)
- sea lettuce large-thin, others filamented or branched
- lead to evolution of land plants

brown algae - larger size (to 60 m/200 ft)

- surface to mid-depths (to 35 m)

- fucoxanthin (brown accessory pigment uses red + orange light)
- kelp very productive (stipe grows 50 cm/20 in daily)
- harvested for minerals & algin

red algae - smaller size, most complex & diverse algae

- surface to deep (to 270 m/880 ft)
- phycobilin (red accessory pigment uses blue + green)
- coralline algae with CaCO₃, encrust rocks, form reef
- harvested for agar & carrageenan (emulsifier to bind & thicken products)

4. FLOWERING PLANTS

'higher' plants - originally evolved on land

- less salty than ocean, excrete salt
- shallow depths (few accessory pigments)

tissues - leaves collect CO₂ + light

- roots absorb H₂O + nutrients
- vessels circulate, reproduce with flowers & seeds

sea grass - narrow, forms coastal marine meadows

- not true grass, tiny flowers pollinated by water

mangroves - woody tree or shrub

- along tropical/subtropical coasts
- mature 30 years, height 10 m/33 ft
- roots submerged in sediment
- prop/aerial roots & knobby knees
- no seeds, seedlings drop & float

5. PHOTOSYNTHESIS



I° productivity land plants

- cyanobacteria + uni/multicellular plants
- products leak out as sea foam

limiting factors - plenty of CO₂ + H₂O in oceans

- but light, nutrients, anchor in short supply

ecology - productivity is higher...

- if closer to shoreline (runoff, upwelling)
- if closer to surface (more light)
- in warmer water (faster metabolic reactions)

latitude - productivity is...

- very low at poles (cold, slow recycle, long dark winter)
- high in temperate (okay light, nutrients upwelled)
- generally low in tropics (thermocline limits nutrients)
- except very high in tropical coral reefs (warm & sunny, rapid recycling, zooxanthellae in coral tissue)