

SEAGRASS

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SEAGRASS

Seagrasses are flowering plants (Division Angiospermae) belonging to four plant families (Posidoniaceae, Zosteraceae, Hydrocharitaceae, or Cymodoceaceae), all in the order Alismatales (in the class of monocotyledons), which grow in marine, fully saline environments.

There are 12 genera with some 60 species known.



SEAGRASS ECOLOGY

These unusual marine flowering plants are called *seagrasses* because in many species the leaves are long and narrow, grow by rhizome extension, and often grow in large “*meadows*”, which look like grassland: in other words, many of the species of seagrasses superficially resemble terrestrial grasses of the family Poaceae.

Like all autotrophic plants, *seagrasses* photosynthesize so are limited to growing in the submerged photic zone, and most occur in *shallow* and *sheltered* coastal waters anchored in *sand* or *mud* bottoms. Most species undergo submarine pollination and complete their entire life cycle underwater.

Seagrasses form extensive beds or meadows, which can be either monospecific (made up of a single species) or in mixed beds where more than one species coexist. In temperate areas, usually one or a few species dominate (like the eelgrass *Zostera marina* in the North Atlantic), whereas tropical beds usually are more diverse, with up to thirteen species recorded in the Philippines.

SEAGRASS ECOLOGY

Seagrass beds are highly diverse and productive ecosystems, and can harbor hundreds of associated species from all phyla, for example juvenile and adult fish, epiphytic and free-living macroalgae and microalgae, molluscs, brittle worms, and nematodes.

Few species were originally considered to feed directly on seagrass leaves (partly because of their low nutritional content), but scientific reviews and improved working methods have shown that seagrass herbivory is a highly important link in the food chain, with hundreds of species feeding on seagrasses worldwide, including green turtles, dugongs, manatees, fish, geese, swans, sea urchins and crabs.

Some fish species that visit/feed on the seagrass raise their young in adjacent mangroves or coral reefs. Also, seagrass traps sediment and slows water movement, causing suspended sediment to fall out. The trapping of sediment benefits coral by reducing sediment loads in the water.

SEAGRASS TAXONOMY

The family **Zosteraceae**, also known as the **seagrass family**, includes two genera containing 14 marine species. It is found in temperate and subtropical coastal waters, with the highest diversity located around Korea and Japan.



SEAGRASS TAXONOMY



Enhalus



Halophila



Thalassia

The family **Hydrocharitaceae**, also known as **tape-grasses**, include Canadian waterweed and frogbit. The family includes both fresh and marine aquatics, although of the seventeen species currently recognised only three are marine. They are found throughout the world in a wide variety of habitats, but are primarily tropical.

SEAGRASS TAXONOMY



Posidonia

The family **Posidoniaceae** contains a single genus with two to nine marine species found in the seas of the Mediterranean and around the south coast of Australia.

SEAGRASS TAXONOMY



Amphibolis



Cymodocea



Halodule



Syringodium



Thalassodendron

The family **Cymodoceaceae**, also known as **manatee-grass**, includes only marine species. Some taxonomists do not recognize this family.

SEAGRASS DISTRIBUTION & IMPORTANCE

Seagrasses are a type of submerged aquatic flowering plants.

Seagrasses have leaves, roots, conducting tissues, flowers and seeds.

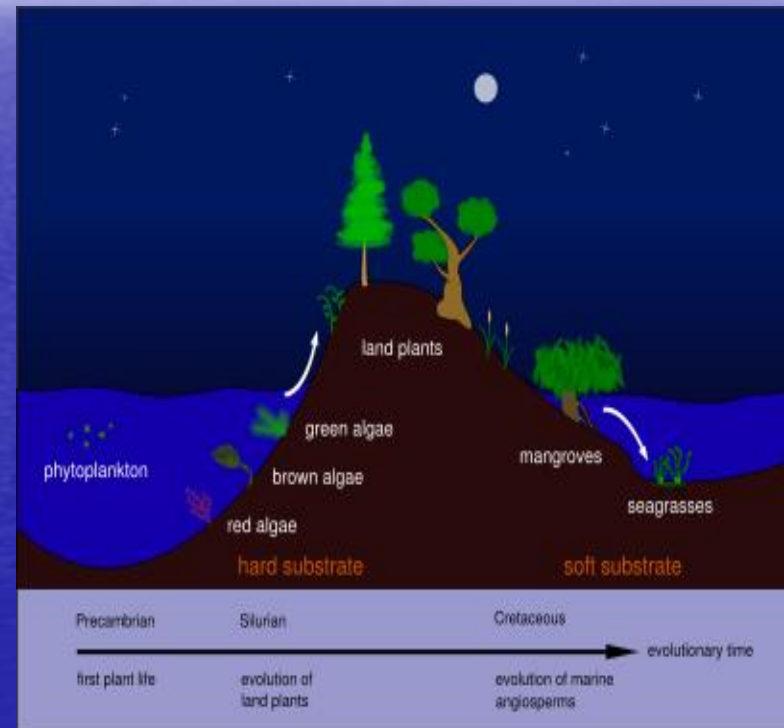
seagrass do not have strong, supportive stems and trunks to overcome the force of gravity on land.

Seagrass blades are supported by natural buoyancy of water.



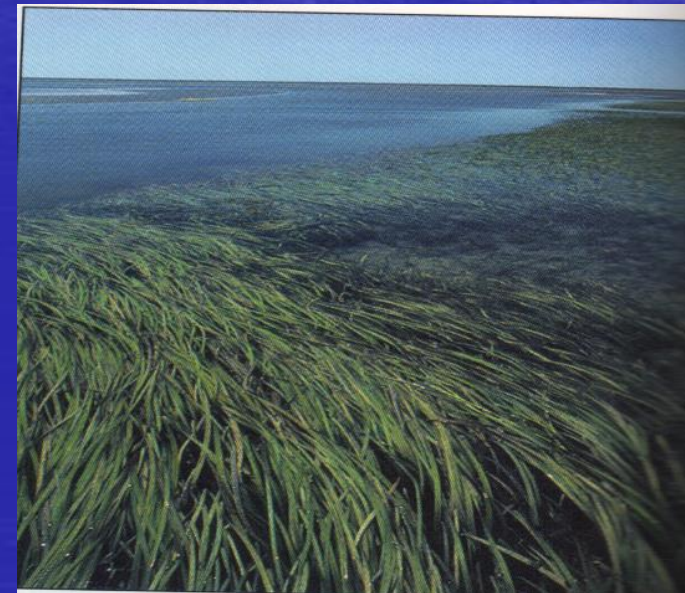
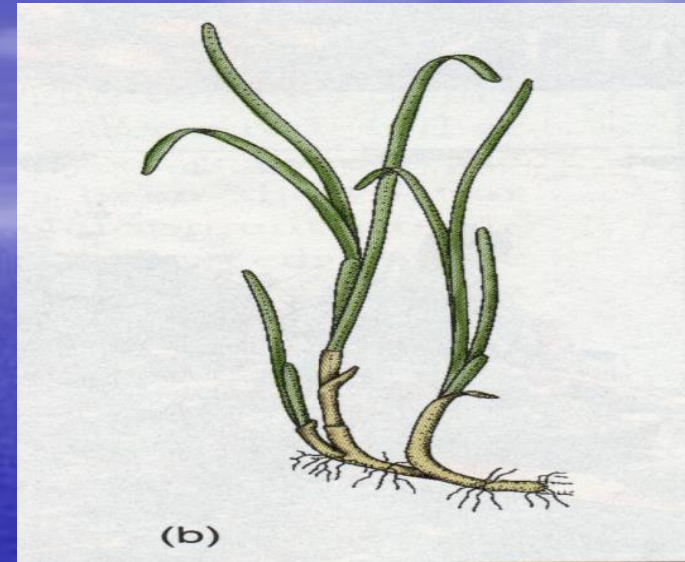
SEAGRASS DISTRIBUTION & IMPORTANCE

Sea grasses are evolved from terrestrial plants and have become specialized to live in the marine environment.



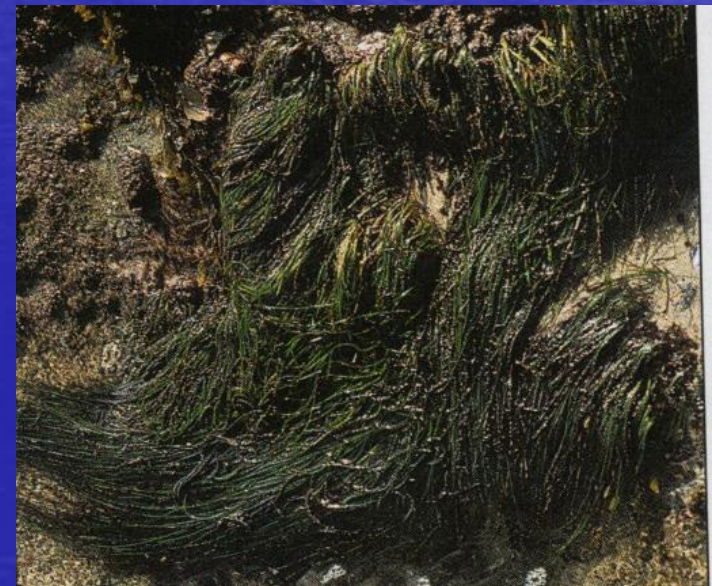
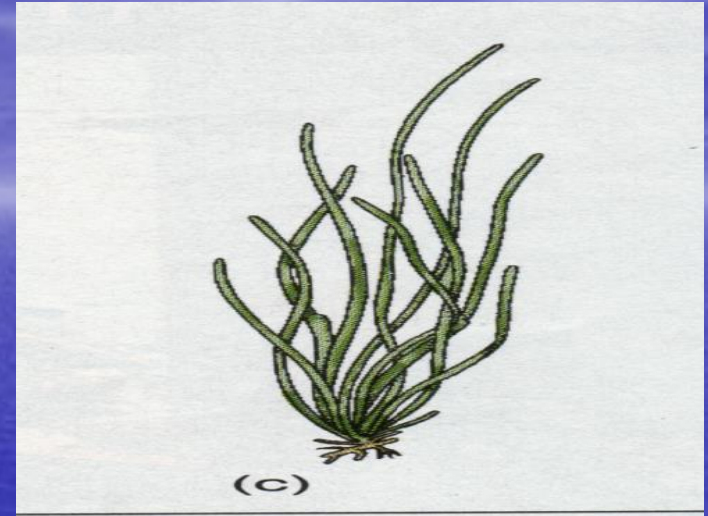
SEAGRASS DISTRIBUTION & IMPORTANCE

- Eelgrass, *Zostera*.
- It is distinctly flat, ribbon like leaves.
- It is common in oxygen-poor sediments.
- 50-60 species are known.
- It is found in North Atlantic and Pacific oceans, tropical south western Pacific.
- It also found in bays and estuaries.



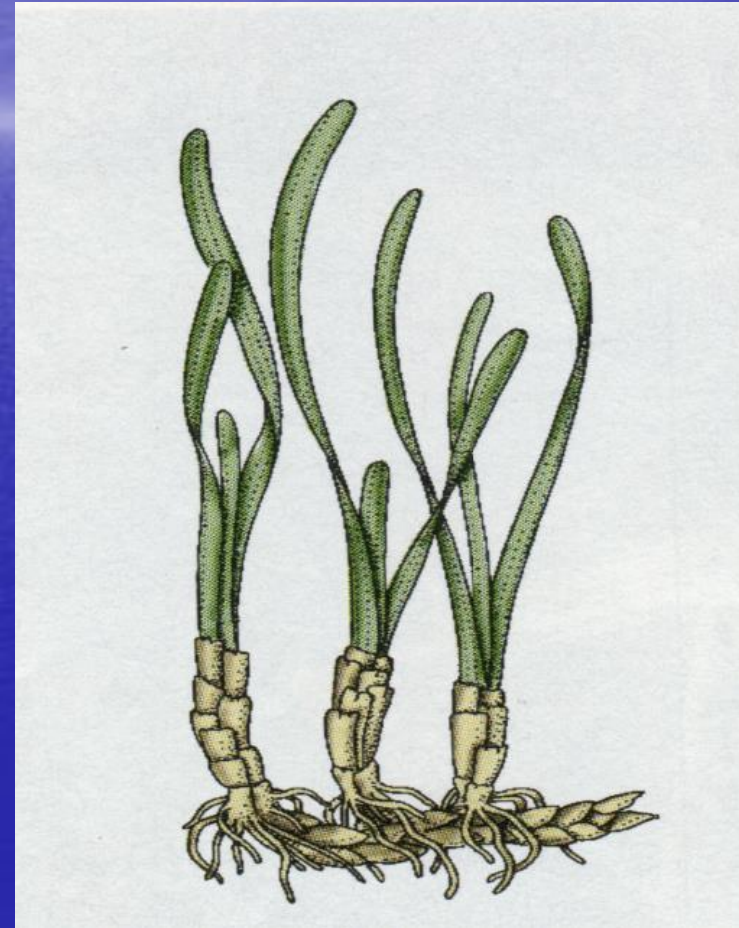
SEAGRASS DISTRIBUTION & IMPORTANCE

- Surf grass, *Phyllospadix* is usually found in rocky shore.
- It is found on the pacific coast of North America



SEAGRASS DISTRIBUTION & IMPORTANCE

- Turtle grass, *Thalassia*. It look like eel grass.
- The leaves are broader and more strap-like.
- Highly productive turtle grass found in muddy and sandy bottoms.
- More species found in Indian and western Pacific ocean.
- Found more in Caribbean Sea and Gulf of Mexico.



SEAGRASS DISTRIBUTION & IMPORTANCE

- Manatee grass, *Syringodium* found in tropical waters.
- Found in Indian ocean.



Enhalus acoroides

- *Enhalus* is a monotypic genus of marine flowering plants.
- *Enhalus* is large seagrass native to coastal waters of the tropical Indian and Western Pacific Oceans.
- The strap-shaped leaves arise directly from the rhizomes and can reach 1 m in length.
- *Enhalus* is surface pollinated with male flowers that detach from the plant to float on the surface until they reach a female flower where pollination can occur.



Halophila beccarii

- Erect plants arise from branching slender rhizomes.
- Each shoot carries 4-8 leaves with elliptic blades reaching 2.5 cm long.
- Leaf has three longitudinal veins without cross veins.



Cymodocea rotundata

- A relatively less common species with a cluster of **2-3 dark green leaves** attached by a well developed long leaf sheath.
- Leaf sheath scars form continuous ring around the shoot-annular appearance.
- The **leaf tip is bluntly rounded** and sometimes appears slightly heart-shaped to the naked eye.
- The rhizomes are smooth and clean, devoid of leaf scars between successive shoots.



Halodule wrightii

- Leaves 5-12 cm long.
- Lamina linear, narrowed at base, covered; leaf margin entire.
- Nerves ending in lateral teeth at the leaf tip.
- Teeth bidentate



ENVIRONMENTAL SERVICES

Seagrasses are sometimes labeled **ecosystem engineer**, because they partly create their own **habitat**: the leaves slow down water-currents increasing **sedimentation**, and the seagrass **roots** and **rhizomes** stabilize the seabed.

Their importance for associated species is mainly due to provision of shelter (through their three-dimensional structure in the water column), and for their extraordinarily high rate of **primary production**. As a result, seagrasses provide **coastal** zones with a number of **ecosystem goods** and **ecosystem services**, for instance habitat for commercially and recreationally valued fishery species, **fishing grounds**, **wave protection**, **oxygen production** and protection against **coastal erosion**.

Seagrass meadows account for more than **10% of the ocean's total carbon storage**. Per hectare, it holds twice as much carbon dioxide as rain forests. Yearly, seagrasses sequester about **27.4 million tons of CO₂**.

IMPORTANCE OF SEAGRASS

- Provides food, habitat and nursery areas for adult and juvenile vertebrate and invertebrate.
- Served as indicator species.
- Provide attachment sites to smaller macroalgae and epiphytic organisms such as sponges, bryozoans etc.
- Single acre of seagrass can produce over 10 tonnes of leaves per year.
- A single acre of seagrass support as many as 4000 fish and 50 million small invertebrates.

IMPORTANCE OF SEAGRASS

- Seagrass enhance the economic of country through productivity of associated fauna and flora.
- Florida's 2.7 million acres of seagrass supported commercial harvest of fish and shell fish valued at over 124 billion dollars.

THREATS TO SEAGRASS COMMUNITY

- Excessive grazing
- Diseases
- Pollution
- Sedimentation
- Decreasing water clarity
- Storms
- Currents
- Global warming