



SEAGRASSES IN QUEENSLAND

Notes on their biology and ecology

Seagrass meadows are found in the shallow coastal waters of every sea in the world, and large areas of these important marine plants occur along Australia's coastline.

Seagrasses are angiosperms (flowering plants) which are related to the terrestrial flowering plants. Of approximately 58 known species of seagrass in the world, about 30 occur in Australian waters, including at least 15 in Queensland and the Great Barrier Reef Region.

Biology

The composite diagram below shows Typical leaf and rhizome morphologies (*characters*) from four different seagrass species.

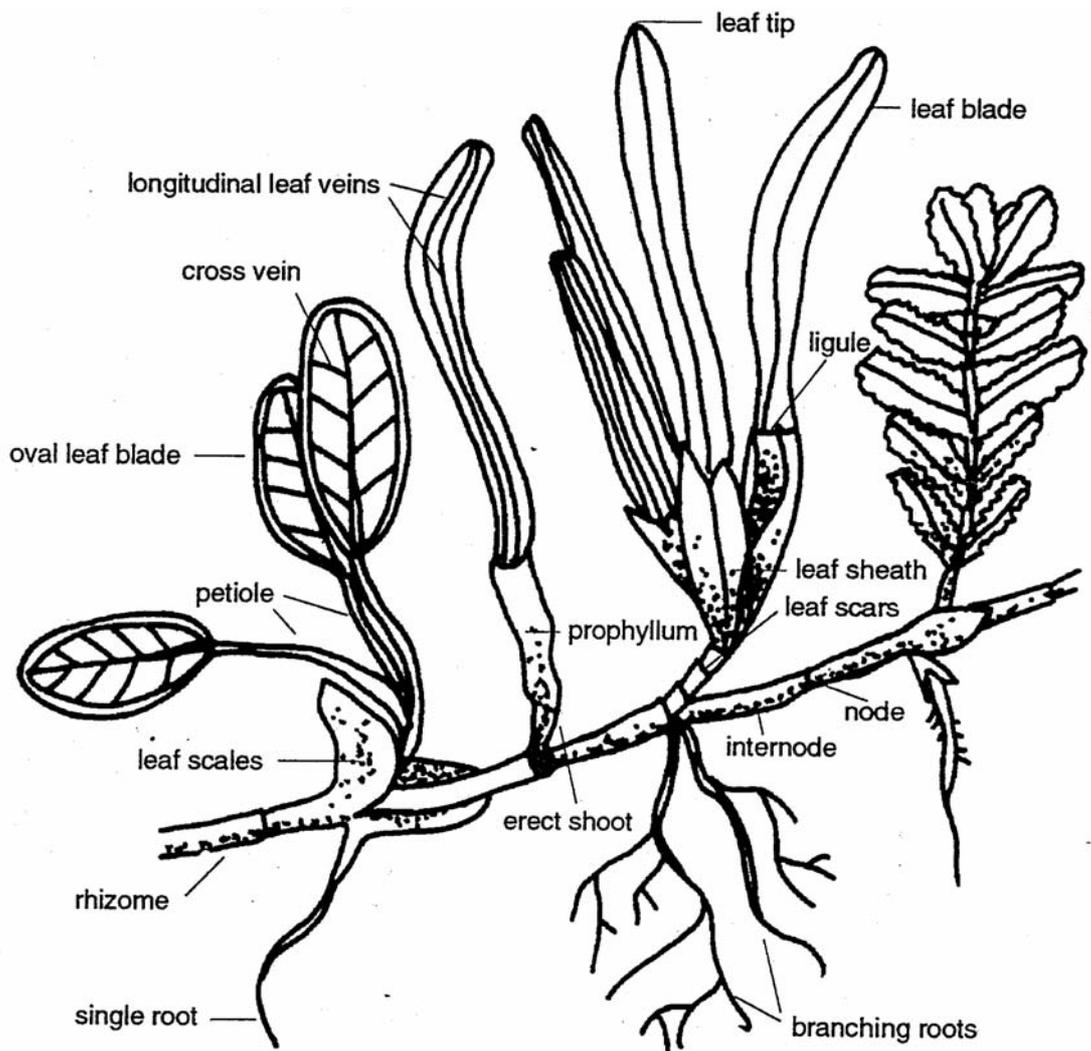


Figure 1. Morphological features of seagrasses

All seagrasses have horizontal underground stems called **rhizomes**, and it is through growth and branching of these that seagrasses vegetatively propagate. Seagrasses, which spend most, if not all, of their time submerged have developed methods of underwater pollination. Along the rhizome at intervals are **erect shoots** which bear the leaves and **leaf sheaths**. The leaves may vary in length from a few millimetres to over half a metre. Scars left from old leaves along the rhizome are **nodes** which divide the rhizome into sections called **internodes**.



Branching off from the rhizomes are roots which help to anchor the plants in the substrate and absorb nutrients. Living in an aquatic environment, the leaves can also absorb some nutrients directly from the water column. Seagrasses have developed air channels to overcome the problem of acquiring oxygen while submerged, and the aquatic medium has eliminated the need for a fibrous support system as found in terrestrial plants.

Seagrass ecosystems vary from a few plants or clumps of a single species to extensive single or multispecies meadows covering large areas of the bottom. Seagrasses are primary producers which use energy from the sun to drive photosynthetic processes in the leaves. They also help to stabilise fine sediments with their leaf and root systems and maintain water quality.

Factors which affect the distribution of seagrass beds are sunlight, available nutrients, water depth, turbidity, salinity, temperature, exposure at low-tide, current and wave action. Excessive pollution from sewage discharge, oil and runoff, and physical destruction from dredging, uncontrolled bait digging, boat propellers and anchors can damage or destroy seagrasses.

Ecology

Seagrass beds are highly productive. They increase the available substrate up to 15 to 20 times that of the bottom area, due to combined area of leaf surfaces, which provides substrate and shelter for many species of epifauna and flora. The decaying leaves are broken down by fungi and bacteria which in turn provide food for other microorganisms such as foraminifera and plankton. Microorganisms provide food for the juveniles of many species of marine animals such as fish, crabs, prawns and molluscs. Seagrasses are directly consumed by herbivorous fish, dugong and turtles.

The importance of seagrasses to fisheries production has long been recognised. Food chains which begin with the primary production within seagrass meadows support populations of fish such as barramundi, mullet, whiting, tailor, luderick, bream and flathead. Commercial penaeid prawns such as brown tiger, grooved tiger and endeavour prawns also live in seagrass meadows as juveniles. Shellfish such as some oysters and pearl shell may be more likely to settle and survive where there is seagrass. Sandcrabs and flathead are just two species which spend much of their lives in and near seagrass beds, where there is not only food but also protection from strong tidal currents and predators.

Larger predatory animals such as herons, cormorants, sharks, barramundi, salmon, *etc*, are also attracted to the seagrass beds by the schools of forage fish which seek shelter there.

Seagrass beds, however, are fragile ecosystems and activities that damage them may also affect associated prawn and fish communities.

Research is continuing into seagrass biology and factors that influence the growth and distribution of these plants are still not fully understood.

All seagrasses and other marine plants are specifically protected under the *Fisheries Act 1994* in Queensland waters, as the proper management and maintenance of these areas is essential to both the commercial and recreational fishing industries. Seagrasses receive further protection under legislations such as the Environmental Protection Act and Marine Park Act.

Further Reading

Butler, A. and Jernakoff, P. (1999). *Seagrass in Australia: Strategic review and development of an R & D Plan*. 210 pp. (CSIRO Publ.: Collingwood).

Lanyon, J. (1986). *Seagrasses of the Great Barrier Reef*. Special Publication Series No. 3. 54pp. (Great Barrier Reef Marine Park Authority: Townsville, Qld.)

Larkum, A.W.D., McComb, A.J. and Shepherd, S.A. (1989). *Biology of Seagrasses. A Treatise on the biology of seagrasses with special reference to the Australian region*. 841 pp. (Elsevier Science Publ.: Amsterdam, New York.)

Zeller, B. (1998). *Queensland's fisheries habitats: current condition & recent trends*. Queensland Department of Primary Industries Information Series QI98025. 211 pp. (QDPI: Brisbane).

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