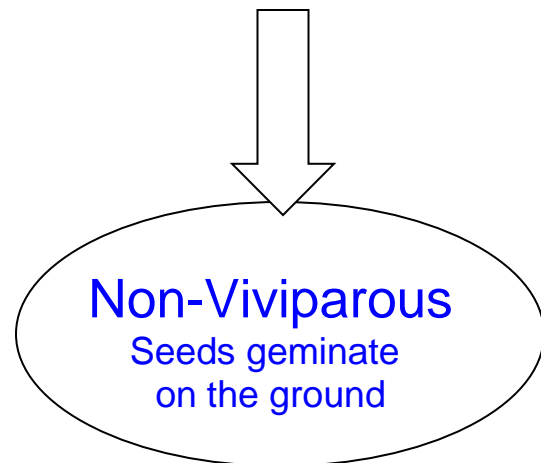
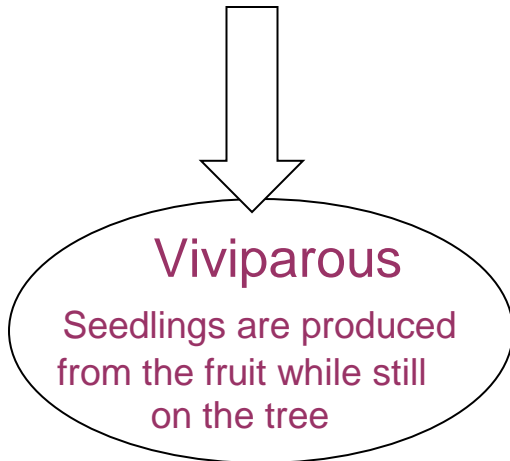


Germination of Mangroves

The seeds once formed can be dispersed in two ways:



VIVIPAROUS PRODUCTION



Propagule Formation

The fruits or seedlings of all mangrove plants can float. This is an excellent dispersal mechanism for plants that live in water.

Unlike most plants, whose seeds germinate in soil, many mangrove plants are viviparous. i.e. their seeds germinate while still attached to the parent tree.

Once germinated the seedlings grow either

(a) within the fruit

Aegialitis, Acanthus, Avicennia & Aegiceras

(b) or out through the fruit

Rhizophora, Ceriops, Bruguiera & Nypa

to form a **propagule** (a seedling ready to go)



The production of live seedling (known as **vivipary**) is very rare in plants other than mangroves and a few seagrass species.

It is possible that the well developed seedling has a greater chance of surviving, once it has taken root, in a situation where it will be battered by water –borne objects.

It also allows the seedling to establish its salt secreting or salt excluding tissues before being exposed to salt water.

Photo: Ceriops australis

Seedlings that grow within the fruit

Avicennia, Aegialitis, Acanthus and Aegiceras



These species also produce live seedlings but these are still contained within the seed coat when it drops from the plant.

For example, the seed of *Avicennia* floats until its coat drops away. The speed in which this happens depends on the temperature and the salinity of the water. In water of high or low salinity the seed coat is slow to drop off but in brackish water the coat is shed quickly.

This allows the seedling to lodge in the favoured habitat of their species. Higher temperatures also favour faster action. *Avicennia* seeds can only last up to four days in water.



Seedlings that grow through the fruit

Rhizophora, Bruguiera, Nypa and Ceriops



The seedling grows in place attached to the parent tree for one to three years, reaching lengths of up to one metre. This allows the seedling to establish its salt secreting or salt excluding tissues before being exposed to salt water.

When the propagule is mature it drops into the water and remains dormant while it travels in an intriguing way in the sea water. The seedlings lie horizontally and move quickly. On reaching brackish water they turn vertically, roots down and leaf buds up, making it easier for them to lodge in the mud at a suitable, less salty site.

Some species of the floating seedlings (*Rhizophora*) can survive, in a state of suspended animation for up to a year in the water.

Some require several weeks immersion in saltwater for successful growth.

Numerous quantities of seedlings are washed up as debris along tropical beaches. Only a small number of the prolific crop find a place to put roots down.

Almost all mangroves require full sunlight for growth so it is an advantage for the young plant to drift away from the shade of the parent tree, but it must root quickly to avoid being washed away.



Above:
Rhizophora stylosa
Below & Left:
Bruguiera
gymnorhiza



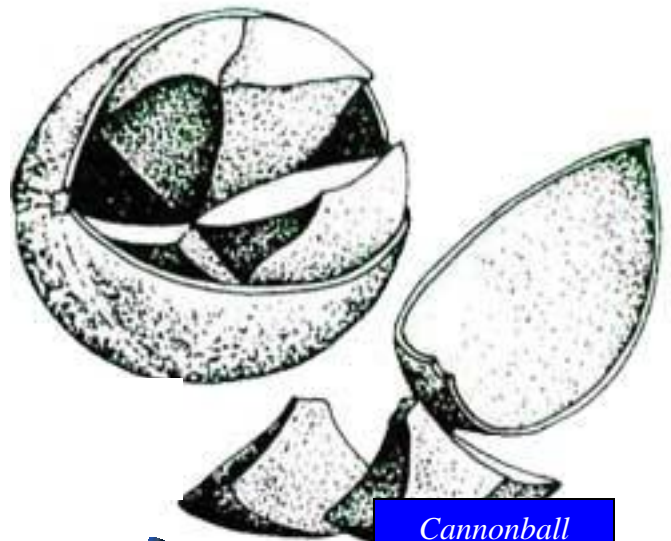
The presence of these species shows that viviparous seedlings are not strictly necessary for successful mangrove reproduction.

Seeds numbering anything from one in the Looking Glass mangrove (*Heritiera littoralis*) to about 16 in the Cannonball mangrove (*Xylocarpus granatum*) are encased generally in seed capsules that fall to the ground, some breaking open on impact (Cannonball) others remain intact and float away with the tides.

All mangrove seeds and fruit are large. This gives them a bigger storage capacity and a better chance of survival.

The **Cannonball mangrove** (*Xylocarpus granatum*) produces a large fruit 20cm in diameter, containing up to 18 tightly packed seeds. On ripening it explodes, scattering the seeds which float away with the tide. They are often found on local beaches.

The seed of the **Looking-glass mangrove** (*Heritiera littoralis*) has a prominent ridge on one side. This may act as a sail when the seed is in the water.



*Cannonball
Mangrove
Seed*



*Looking-glass
Mangrove
Seed*