

Storm Impacts on Mangroves



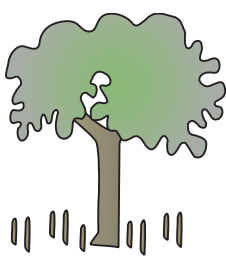
Physical factors affecting Moreton Bay mangroves

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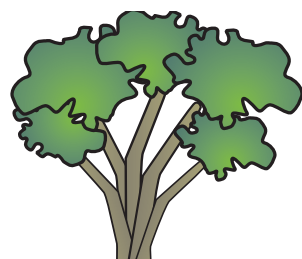


Moreton Bay is situated in an area of acute thunderstorm activity where the effects of hailstorm damage, have important implications for the status of forest structure, condition and composition. In September 1997, strong winds, storm surge and hail stones associated with a severe hailstorm caused large-scale defoliation, leaf and bark damage, removal of stems, branch abscission and plant death in mangrove communities in southern Moreton Bay. The hailstorm moved in a northeast direction from Cabbage Tree Point on the mainland to north Stradbroke Island, with a swath width of approximately 2.5 km. An estimated 200 hectares of mangrove and saltmarsh communities were affected, a substantial portion of the severely affected vegetation was on Cobby Cobby Island. The physical impacts of hailstorms were replicated in four species of mangrove seedlings using simulated tide tanks at the Moreton Bay Research Station mangrove planthouse. This study is the first to replicate these impacts experimentally, and provides an insight into one of the significant natural processes that may help to explain species diversity in Moreton Bay mangrove communities.

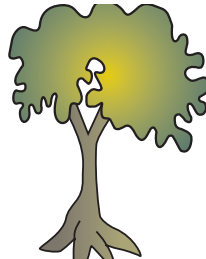
Mangrove Species Tested



Avicennia marina



Aegiceras corniculatum



Ceriops australis



Rhizophora stylosa



Hail damaged *Avicennia marina* tree on Cobby Cobby Island.

Methods

Hail damage treatments were based on observations of hail damage at Cobby Cobby Island, Southern Moreton Bay. Each of three tidal tanks contained a sub-treatment, which ranged in severity of physical damage (see below). Mangrove survival and any other visual observations of recovery were noted after one month.



Mangrove seedlings before and after simulated hail damage

Level of Physical Damage

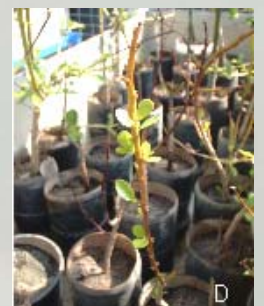
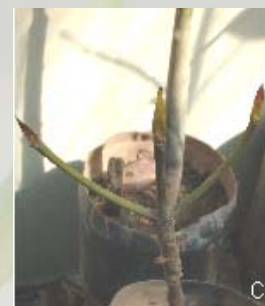
Moderate

Leaves were removed in all mangrove seedlings. Apical shoots in *R. stylosa* and *C. australis*, and reserve shoots in *A. corniculatum* were left untouched.

Severe

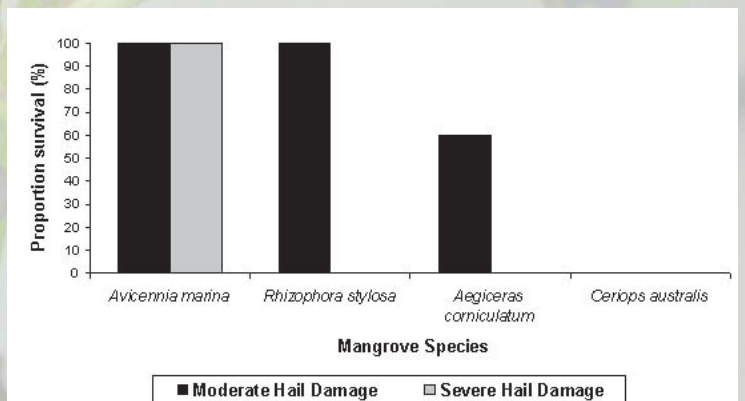
Leaves were removed in all mangrove seedlings. Apical and reserve shoots were removed in all mangrove seedlings. Bark scraped on one side of each seedling three times with a sharp knife.

Outcomes



- A. *A. marina* resprouting from epicormic buds after simulated hail damage
- B. *R. stylosa* leaves emerging from apical shoots after moderate hail damage simulation
- C. Dead *C. australis* after hail damage
- D. Emerging *A. corniculatum* reserve shoots after moderate hail damage simulation

Proportion of plant survival after moderate (leaf removal only) and severe (bark damage, defoliation and removal of apical/reserve shoots) hail damage simulation, for eight individuals each of four species of mangrove seedlings.



A. marina seedlings exhibited one hundred percent survival after both moderate (leaf removal only) and severe (leaves and apical/reserve shoots removed) hail damage simulations. Leaves emerged from intact apical shoots in *R. stylosa* and reserve shoots in *A. corniculatum* after moderate hail damage (75 & 60% survival respectively), but not after severe damage. *C. australis* was most susceptible of all species to the damage simulations, dying after both severe and moderate treatments. The post disturbance recovery (resilience) of *Avicennia marina* after natural disturbances such as hailstorms may partially explain its widespread distribution in Moreton Bay.

