AMMOPHILA ARENARIA DISPERSAL AND INVASION IN NEW ZEALAND

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Ammophila arenaria (Marram grass) is a major threat to the geomorphology and ecology of temperate dune systems in Australia and New Zealand. It was planted widely during the late1800s to stabilise mobile dunes, but became naturalised and spread to otherwise pristine dunes, primarily by marine transportation of rhizome. The marine dispersal of *Ammophila* poses a significant conservation threat to New Zealand's remaining dune systems which retain conservation values.

This dispersal process can be divided into three phases: (1) the entry of rhizome into the marine environment, during episodic dune erosion; (2) transportation of rhizome by surface drift; and (3) the deposition of rhizome and establishment of new plants on beaches. This paper presents the first systematic examination of phase two of this sequence.

The marine transport of *Ammophila* depends on the ability of rhizome to retain viability and buoyancy while immersed in seawater. The tolerance of rhizome to salt water was established by excavating rhizome from a foredune in summer and winter; immersing the rhizome for periods of between 1 and 60 days in both seawater and in freshwater; then growing rhizome in trays of beach sand in the glasshouse. Buoyancy was assessed by floating rhizome of various morphologies in seawater.

The tolerance of *Ammophila* rhizome to seawater immersion differed seasonally. During summer months rhizome remained viable up to 22 days in seawater. During winter experiments rhizome remained viable up to 60 days immersion. There was some decline in viability as the length of immersion increased. Rhizome exhibited considerably higher viability when immersed in freshwater than in seawater. *Ammophila* dispersal is not limited by rhizome buoyancy – most rhizome floated in seawater for longer than 60 days.

The potential exists for long distance alongshore dispersal of *Ammophila* rhizome, especially if dispersal occurs during winter. The exact distance will depend on the speed, direction and consistency of wind-forced surface drift. A persistent surface current of $0.1ms^{-1}$, for example, would be capable of transporting rhizome 518 km over 60 days.