Ammophila arenaria (marram grass) dispersal by marine transport in southern New Zealand

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Rhizome dispersal

Controls on dispersal distance:
- Ability to retain viability
- Buoyancy
- Nature of surface water drift

Previous estimates
- Buoyant up to 8 days (Knevel 2001)
- Loses viability between 7 and 70 days (Aptekar & Rejmanek 2000; Baye, 1990)

First systematic examination
Viability - methods

Aim – to determine the maximum time rhizome retains viability while in seawater

- 6 experiments (3 summer, 3 winter) over 3 years.
- Rhizome removed from eroding dune, immerse in seawater, planted in trays in glasshouse.
- Increasing duration of seawater immersion.
Viability - results

Rhizome viability lower during summer than winter
22 days in summer (excluding outliers)
44 days in winter

Abrupt decline in viability

Light treatment in experiment 5, rhizome retained viability after 60 days in seawater
Buoyancy - methods

Aim – to determine the maximum time rhizome remains buoyant in while in seawater

- 80 rhizome fragments – range of lengths and thicknesses.
- Still tank, no turbulence.
- Rhizome removed after ½ hr, 18 hrs, every second day for 25 days, then every 7 days.
No rhizome remained buoyant after 171 days in seawater
50% of all fragments had sunk by 11 days in seawater
Summary of results

Most fragments lost viability or sunk within 25 days.

But can remain viable for at least 60 days buoyant for 171 days
The potential exists for marram rhizome to float over a considerable distance.

- Drift speed of 0.01m/s
- 21km over 25 days
- 52km in 60 days

Successful long distance dispersal is more likely during winter and spring.
Marram is widespread

A few dune-systems of high conservation value remain

High potential for invasion

Implications for NZ dune management

Marram grass dominant
Marram & native species co-dominant
Spinifex or pingao dominant
Dune systems of national significance
Current control focused on dune-systems of high conservation value

Continuous surveillance is required

Greater consideration should be given to control of “source” populations

Requires integrated management
Conclusions

- Rhizome can be transported long distances and remain viable and buoyant
  - drift speed of 0.01m/s
  - 21km over 25 days
  - 52km in 60 days
- Can easily enter isolated dune systems of high conservation value
- Control techniques need to consider the dispersal of marram rhizome