Water movement of prickly acacia seed & implications for management

Prickly acacia spread

Prickly acacia (*Vachellia nilotica*) is a major weed in Queensland with serious impacts on pasture production and the environment. Large parts of the state are currently free of prickly acacia, but are potentially at risk of invasion.

While livestock are known to be the primary means of dispersal for prickly acacia seed, the role of flowing water as a secondary vector has until recently received little attention.

Research into water movement of seeds

To help gain a better understanding of water-related seed movement, research was undertaken by the Department of Agriculture and Fisheries into prickly acacia seed and pod buoyancy with subsequent field studies with Southern Gulf NRM support to quantify downstream establishment of immature plants from upstream seed sources.

Seed and pod buoyancy

Buoyancy trials were conducted for both seeds and seed pods. Seeds demonstrated no buoyancy, sinking immediately when placed in water. However, prickly acacia pods did demonstrate buoyancy with all pods sunk after 12 days in agitated water (average of 5 days) and up to 18 days in still water. Related research into germination after immersion found the germination rate largely unaffected by immersion.

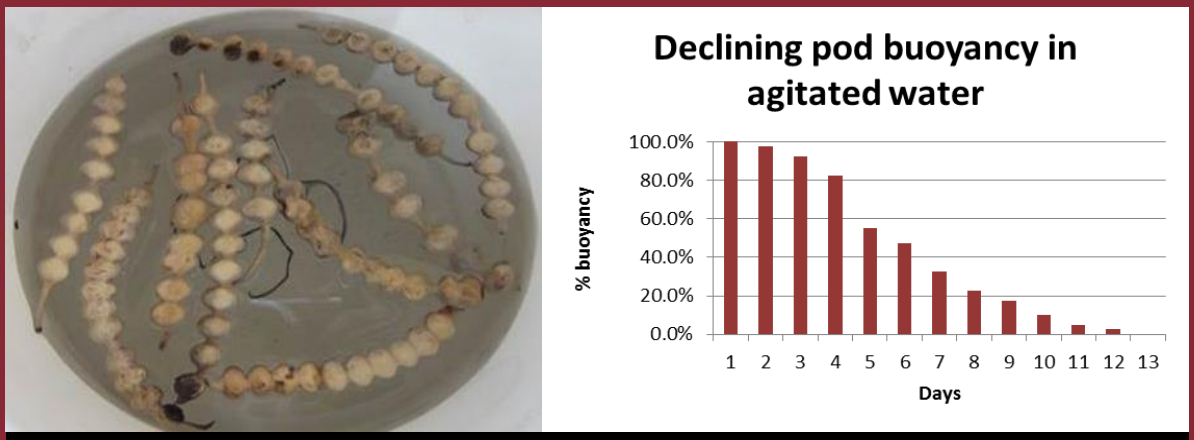

Figure 1: Prickly acacia seed pods in buoyancy trials (left) and trial results (right) showing buoyancy of pods in agitated water for up to 12 days

This factsheet was co-developed by Southern Gulf NRM and the Department of Agriculture and Fisheries through the Queensland Government funded War on Western Weeds initiative.

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Field observations

Three creeks in the Hughenden area of north west Queensland were surveyed for immature prickly acacia plants. Sites were selected on the basis of there being a known prickly acacia source infestation upstream and high confidence that all immature plants found along the creeks during the surveys were due to water movement of seed pods from the upstream source infestation.

The key findings were:

- Most seeds were deposited in first 250 to 500 m
- Nearly all seed was deposited within 7 km
- Maximum recorded water-borne seed spread was 15.2 km

Potential for long distance dispersal

While long distance water dispersal is theoretically possible, it has not been recorded and may rarely occur in field conditions. The reasons for this may include: many pods are consumed by livestock; pods are readily settling on watercourse margins, depressions or caught in vegetation; disintegration of the pods before or during flooding; and, flood times may not coincide with pod drop.

Implications

The buoyancy and field research results have implications for three key areas: riverine surveys, catchment buffer zones and Good Neighbour Policy (GNP) initiatives.

- **Riverine surveys** – it is important for baseline surveys of prickly acacia distribution to be undertaken on priority watercourses and to re-survey from 1 to 2 years following flooding events (timed to help detectability of plants).
- **Catchment buffer zones** - strategically located riverine buffer zones may protect downstream catchment areas. The control focus would need to be at least 15km upstream from the last known seed source plus an additional buffer length of to minimise risks. Conversely, control of infestations more than 15 km upstream of the last known seed source may provide negligible catchment protection.
- **GNP initiatives** – the establishment of weed-free boundary buffer zones on property boundaries as part of GNP initiatives provides a significant benefit. The watercourse buffer width of 250 m in the Flinders Shire Council GNP will not eliminate all seed movement but a moderate proportion up to 61%.

Figure 2. High seedling numbers close to an upstream seed source (left) and an isolated plant further down the same watercourse (right)

Further information

Further information is available by contacting **SG NRM** (call **1800 676 242**) or **Biosecurity Queensland** (call **13 25 23** or visit **www.biosecurity.qld.gov.au**)

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