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Roly poly and its management

DPIRD-124

Roly poly, also known as prickly saltwort or tumbleweed (*Salsola australis*), is a native species found throughout Australia. The dead plants can break off at ground level, forming the 'tumbleweeds' seen in movies.

Like most summer weeds, roly poly uses soil moisture and nutrients that would otherwise be available to the following crop. The time taken to clear uncontrolled plants can delay seeding.

Livestock will graze the young plants; however, they will not eat the mature plants and are injured by the prickly leaves.

Identification and attributes

Salsola australis is the species of roly poly that is most found in agricultural regions. It is a native species and there is a lot of genetic diversity between populations. Many different forms of this species have been recorded, including variants that are perennial (live for several years) rather than annual (live for one year or less).

This species is commonly confused with black roly poly (*Sclerolaena muricata*), which has spiny burrs and is generally hairier. It may also be confused with kochia (*Kochia scoparia*) and tumbleweed (*Amaranthus albus*).

Plant

- Roly poly seedlings have two cotyledons (first leaves) that are about 1 cm long and round in cross-section. They look more like the seedling of a grass species than a broadleaf species.
- The juvenile (young) plant has round, succulent leaves that can be 0.5 cm to over 5 cm long.
- The leaves on the adult plants are different to those on young plants, with the result that the young plants are often mistaken for a separate species.
- The adult plants have leaves that are short (usually less than 1 cm), flat, and taper to a spine.
- The adult plants are branched from the main stem and grow in a round shape.
- Plants are occasionally prostrate (low growth along the ground), particularly in a saline soil type.
- Once the adult plant is dead, it may break free from the root system to form the iconic 'tumbleweed', and wind-dispersed plants frequently travel over 1 km (while shedding more seed), before becoming entangled in fence lines, vegetation, or piles of other dead roly poly plants.

Refer to our website at dpird.wa.gov.au, download our MyPestGuide app and make a report. Include a photo and, in the 'Send report' field, click on 'MyPestGuide' and change it to 'MyWeedWatcher'. Alternatively, send a photo to the author of this page.

Image 1: Young roly poly plant. Photo – Abul Hashem, Department of Primary Industries and Regional Development

Seeds

- Single seeds form at the base of leaves.
- Each seed is found inside a fruit with five 'wings', although wingless fruit are also found on each plant.
- The fruit look a bit like small, dry flowers.
- Seeds shed before and after the plants die.

Image 2: Roly poly seeds with dry papery seed coverings, Photo – Catherine Borger, Department of Primary Industries and Regional Development

Biology

When they emerge

- Roly poly seeds have variable dormancy.
- There are short term after-ripening requirements as the seed finishes maturing, and then seedlings germinate following exposure to sufficient moisture.
- Seeds will germinate over a wide temperature range, although 11 to 20°C is the optimal temperature.
- No germination occurs over 40°C and germination is reduced at and below 5°C.
- Burial is not necessary for germination but increases the likelihood that a seedling will successfully establish.
- As seeds have little dormancy and can germinate over a broad temperature range, emergence can occur throughout the year.
- Peak establishment is variable between populations.
- Roly poly seed collected from plants at Lake Grace had peak establishment in summer, while seed collected from Morawa had peak emergence in winter, and seed from Merredin emerged in small cohorts throughout the year. All 3 populations had the same temperature range for optimal germination and yet all populations had different optimal germination times when grown at Perth. Clearly these populations have evolved differences in dormancy/after-ripening requirements in response to different environmental conditions or agronomic management regimes in different regions.

Where they grow

Roly poly is most abundant in disturbed habitats. The weed prefers alkaline or saline soils, but it can tolerate a very wide range of soil types and climates. If habitats remain undisturbed for over 3 years (that is, a long-term pasture), the roly poly population quickly declines.

Image 3: Dead roly poly on a fence line. Photo – Dave Nicholson, Department of Primary Industries and Regional Development

Seed production

Roly poly seed production in Lake Grace and Morawa ranged from less than 100 to approximately 20,000 seeds per plant and was directly related to plant size. Between different populations, seed viability can range from less than 10% to over 90%.

The seedbank

In the event of rainfall during seed production (direct water contact with the seeds), some seeds will sprout prior to shedding.

Seeds shed when the mature plant is still actively growing and then more rapidly after the senesced plant breaks off to form a tumbleweed and starts moving (not all plants break free to form a tumbleweed).

A mature, senesced plant also contains younger seeds that will not initially shed (even in a thresher). These retained seeds have similar viability to the shed seeds but have greater dormancy (due to lack of maturity). The retained seeds shed over time due to natural aging and weathering, regardless of whether the senesced tumbleweed is mobile or stationary. However, viability of the retained seed dropped to less than 2%, 2 months after the plant reached senescence (a decline of 79%). Since these retained seeds have such low viability, they will have little impact on the population growth rate. However, the retained seeds maintain a capacity for dispersal, as the mature tumbleweed may continue to move.

Dead tumbleweed plants have been recorded moving anywhere from 1 metre to over 1 km at Morawa. Over 10% of the Morawa population of plants blew over the 1 m high fence to move into neighbouring fields. In a dense stand of roly poly, about half of the plants become entangled with other roly poly plants before they can travel far.

An average of 19% of seed from field plants and 68% of seed from plants grown in controlled conditions germinated in the year following seed production. However, it is not known if the ungerminated seeds were dormant or had degraded and lost viability. The very thin seed coat indicates the seed is unlikely to last long in the soil seed bank.

Why is it roly poly a weed?

Roly poly, along with a range of other species in the *Salsola* genus, is a prominent weed of agricultural systems, internationally.

Like most summer weed species, roly poly utilises soil moisture and nutrients that would otherwise be available to the following crop.

The time taken to clear uncontrolled plants may delay seeding.

Livestock will graze the young plants, but they will not eat the mature plants, and are injured by the prickly leaves.

This species has tentatively been linked to oxalate poisoning, but most tests indicate that oxalate levels are too low to poison sheep. Levels of oxalates and nitrates in roly poly may increase in the presence of nitrogen fertiliser or legume species.

The dead, mobile tumbleweeds can become a significant fire hazard, particularly when too many plants pile up against fences or buildings.

As a native species, this species of roly poly is not a problem in areas of native vegetation and plays a valuable role in revegetation of disturbed sites.

Herbicide resistance

Herbicide resistance in roly poly populations has not been recorded in Australia, but it is a common problem in the United State and Canada. Mature roly poly plants can travel outside their field of origin and disperse seeds over a wide area. Therefore, if resistance is suspected, it is important to crush or burn the mature plants before they have a chance to roll away.

Tactics for integrated weed management

Knockdown herbicide options

A knockdown of paraquat or paraquat+diquat may be more effective than glyphosate. However, mature plants can re-sprout after paraquat or paraquat+diquat application, with sufficient rainfall. High rates are required to kill the mature plants growing over summer, but young plants in the juvenile vegetative stage are relatively easy to kill.

In-crop

There are no herbicides registered for roly poly control in crops. However, roly poly plants are generally shorter than crop, and highly susceptible to crop competition. Therefore, narrow row spacing, or high seeding rates can reduce roly poly growth in crop.

Pasture

The only registered herbicide product for pasture is 2,4-D. Heavy grazing will remove young plants, but plants may re-sprout. A Lake Grace population in a volunteer, grazed pasture did not have significantly reduced seed production compared to ungrazed pasture (28,000 seeds/m2 compared to 40,000 seeds/m2).

Rolling or crushing can be used to remove mature plants. Roly poly prefers disturbed soil and is unlikely to remain in a long-term pasture of more than 3 years.

Non-agricultural areas

Products registered for non-agricultural areas include 2,4-D, imazapyr or imazapyr+glyphosate, and paraquat or paraquat+diquat.

Residue burning

The small seeds have a thin seed coat and papery wings, making them very easy to destroy through burning, if sufficient residue is available. Note that the mature plants may be a fire hazard if they roll around while burning.

Table 1 Tactics to consider when developing an integrated weed management plan for roly poly

Tactic	Likely % of control (range)	Comments on use
Knockdown (non-selective) herbicides for fallow and pre-sowing control	80 (30 to 99)	If possible, delay spraying until full emergence and youngest plants have two leaves.
Improving crop competition	-	Optimum sowing rates essential. Row spacing >250 mm will reduce crop competitiveness. Early sowing where possible, especially for populations that emerge in May.
Grazing — actively managing weeds in pastures	25 (20 to 80)	Graze infested areas heavily and continuously during winter and spring.
Burning residue	80 (60 to 80)	Sufficient crop residues are needed. If the plants have already become mobile, it may be necessary to crush/roll them prior to burning to ensure adequate fire safety.

Contact us

Catherine Borger, Grains Principal Research Scientist
+61 8 9690 2220 | Email Catherine Borger

Related content

Summer fallow weed management | Grains Research and Development Corporation (grdc.com.au)

Integrated Weed Management Hub | Grains Research and Development Corporation (grdc.com.au)

Refer to the department website at dpird.wa.gov.au for more information about the following:

- Crop weeds
- Integrated weed management tactics to manage crop weeds
- Summer weeds
- MyPestGuide

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