



Irrigated Winter Forages in Northern Victoria

Managing Persian Clover

Irrigated Winter Forages: Managing Persian Clover

Persian clover is used in irrigated annual pastures in northern Victoria. It may be grown alone or in combination with short-lived ryegrass.

The key principles for the management of Persian clover based pastures relate to:

- achieving a high plant density at establishment
- optimising management of grazing, water, and soils and fertilisers.

Two different types of Persian clover exist which differ in their suitability for irrigated annual pastures.

- subspecies *majus*, is most suited to irrigated annual pastures. It is characterised by “soft seeds”, an erect growth habit, thick hollow stems and large leaflets. “Maral” is the most commonly used cultivar.

Subspecies *majus* is often, incorrectly, called shaftal or giant shaftal clover. Shaftal clover (*Trifolium clusii*) is a relatively unproductive clover species which grows in high rainfall pastures as a volunteer species.

- subspecies *resupinatum* is not commonly used in irrigated annual pastures. It is characterised by a prostrate growth habit, thin stems and small leaflets. “Hard seed” content is higher and maturity times generally earlier than for *majus*.

Persian clover cultivars vary in their ability to regenerate each autumn. This ability is closely related to the hardness (permeability) of their seed coats.

“Hard” and “soft” seeds

- “Hard seeds” are seeds with an impermeable seed coat which prevents water uptake and hence germination.
- “Soft seeds” are seeds with a permeable seed coat that allows water uptake and germination if moisture and temperature conditions are suitable.
- The progressive breakdown of the “hard seed” coat over summer results in an increasing proportion of seeds with a “soft seed” coat. This soft seed is then capable of germinating when temperature and moisture conditions are suitable.
- The establishment of “hard seeded” Persian clover cultivars is not covered in this brochure as they are not commonly used in irrigated annual pastures. Details on the establishment of hard seeded cultivars (which are capable of reliably regenerating each autumn) are covered in the subterranean clover brochure.
- Cultivars which produce a high proportion of “soft seeds” in spring are not capable of reliably regenerating each autumn and so usually need to be sown each year. The management of these cultivars is covered in this brochure.

1. Establishment

1.1. Time of establishment

Persian clover can be started anytime from early February onwards, with start-ups from mid February onwards most reliable.

When short-lived ryegrass is included in the mix, start-ups may need to be delayed as high temperatures limit the germination of ryegrass and the likelihood of achieving a high ryegrass content.

1.2. Seedbed conditions

Persian clover can be sown into a cultivated, weed-free seedbed by either broadcasting onto the surface and lightly covering with a roller (the preferred option), or sown at no more than 5 mm depth, and irrigated up.

Persian clover seed should always be inoculated prior to sowing, using an appropriate inoculum, to ensure that the appropriate rhizobium are present for nitrogen fixation.

If the initial irrigation is in February or March, the second irrigation should be 3–5 days after the first in order to avoid a surface crust. (A close second irrigation requires good surface drainage and slope in order to avoid scalding). Subsequent irrigations should be at the same interval as for perennial pasture, i.e. a cumulative evaporation less rainfall interval (E-R) of 50 mm.

1.3. Sowing rates

Sowing Persian clover alone:

- Persian clover seed @ 8–10 kg/ha

Sowing Persian clover with short-lived ryegrass:

- Persian clover seed @ 6–8 kg/ha
- short-lived ryegrass seed @ 10–15 kg/ha

1.4. Early season growth

The keys to early season growth of Persian clover pastures are:

- high establishment density. This can have large impacts on autumn-winter production.
- use of best management practices (BMPs) for grazing, water, and soils and fertilisers (see sections 2, 3 and 4).
- control of pests and diseases (see section 8).

2. BMPs - grazing

The first grazing of a Persian clover pasture is often associated with controlling summer weeds.

When ryegrass is included in the mix, subsequent grazings should be:

- when the ryegrass is at the 2½–3 leaf stage.
- to a residual height of 4–5 cm. Grazing to a lower residual height will reduce regrowth rates and annual production.

When there is no short-lived ryegrass in the mix, subsequent grazings should be:

- when there is sufficient pasture present to graze (this corresponds to minimum rotation lengths of 30–40 days in late autumn and early spring, and up to 50–60 days in winter).
- to a residual pasture height of 2–3 cm during autumn and winter. This will optimise pasture removal and quality at this time of the year.
- to a residual pasture height of 4–5 cm during spring. This will optimise pasture removal and pasture regrowth rates at this time of the year.

Do not graze new regrowth (i.e. a maximum of 3 days on the one area) as this will reduce regrowth rates.

Note that bloat can potentially be a problem when stock are grazing pastures with a high clover content.

3. BMPs - water

The keys to good water management are to irrigate the pasture before it is moisture stressed, and to minimise waterlogging. This is particularly important for areas established early and involves attention to:

- **irrigation frequency.** For early start-ups the second irrigation should be 3–5 days after the first, provided surface drainage is good, in order to avoid a surface crust. Subsequent irrigations should be at the same interval as for perennial pasture, i.e. a cumulative evaporation less rainfall interval (E-R) of 50 mm.
- **speed of irrigation.** Water should flow onto bays for a maximum of 4 to 6 hours. This requires good channel structure, good flow rates and well laid out bays. (The first irrigation in autumn is usually slower than this due to the large volume of water required).
- **quick drainage.** Surface water needs to drain off the bays quickly to minimise the period of water logging (i.e. no standing water 18 hours after starting to irrigate). This requires well laid out bays with good slope for water flow over the pasture, well sealed channel plugs to avoid seepage, the use of spinner cuts (except on very short bays) to enhance surface drainage, clean drains so that water is able to drain off the end of the bays, and drains that run into a reuse system.
- **water quality.**
 - ◆ Persian clover is *moderately sensitive* to salt. This means that there will be little or no decline in its growth through the use of irrigation water with a salinity content of up to 1,500 $\mu\text{S}/\text{cm}$ (1,000 ppm). This is provided there is deep drainage of approximately 10% of applied water (irrigation plus rainfall) and no saline water table.
 - ◆ The quality of the water can be tested with an EC meter. Water from alternative water sources such as a drain, bore or spear should also be tested regularly.

4. BMPs - soils and fertilisers

A program to ensure adequate soil fertility includes:

- soil testing representative areas.
- setting nutrient targets.
- developing a fertiliser plan. This needs to take into account nutrient imports and exports, so that the required nutrients are applied in the most economical way.
- implementing BMPs for fertiliser applications.
- planning a nitrogen use approach (if appropriate).

Phosphorus (P) targets for perennial pastures used for dairy production are in the range of 18–22 ppm of Olsen P. However, P targets for irrigated annual pastures are not known, but are likely to be marginally lower than that for perennial pastures. Typically, maintenance applications of P for Persian clover pastures are in the order of 20–30 kg P/ha.year.

Nitrogen fertilisers can be used to increase pasture growth when short-lived ryegrasses are included in the mix. The best responses to nitrogen are achieved when the pasture is ryegrass dominant and during winter and spring. Nitrogen fertilisers should be applied as soon as possible after grazing to allow the pasture sufficient time to respond prior to the next grazing. Urea needs to be washed into the soil within 24 hours of application to minimise losses.

Surface crusting is a common problem on sodic and newly land-graded soils and can be a major concern when establishing a new pasture as it can prevent seedling emergence. In this situation, the use of gypsum can be beneficial.

Soil salinity can affect pasture growth with the effect more pronounced in some species than others. Approaches to reduce impacts include ensuring use of low EC water, application of gypsum or lime (containing calcium) to displace sodium, using salt tolerant species or lowering the water table.

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5. Fodder conservation

The supply of pasture during spring usually exceeds herd requirements on most dairy farms. To maximise the benefits of the surplus pasture, feed surpluses need to be identified and conserved.

During spring when there is a feed surplus, the first priority for conservation are annual pastures. (Note that BMPs are required to maintain the density of perennial pastures and hence the priority for the conservation of annual pastures).

When ryegrass is included in mixtures with Persian clover, it is important that the pasture is grazed during late winter and early spring to ensure a high clover and protein content in the conserved forage.

The later maturing Persian clover cultivars usually allow sufficient growth in late spring to obtain two cuts for fodder conservation. The rapid regrowth of Persian clover after cutting means that the bales need to be carted away as soon as possible. Note: the stems of Persian clover are much slower to dry than the leaves and this may require the use of conditioners to ensure even drying.

6. Cultivars

A range of cultivars are available. When choosing a cultivar consider:

- time to seed set or maturity. This will affect potential dry matter production and water use during spring.
- willingness to resow each year. Cultivars differ in their ability to regenerate each year.
- soil type.
- disease tolerance.
- likelihood of waterlogging.

When including short-lived ryegrass in a mix containing Persian clover, it is important that the maturity of the short-lived ryegrass is matched to that of the Persian clover ie. both the grass and clover grow until a similar time.

Finding information on cultivars

Grassland Society of Victoria – Pasture species database. Go to www.grasslands.org.au, and click on the link to the pasture species database.

Sales brochures – pay attention to where trials were located.

Seed merchants – should be more tailored to the local region than sales brochures.

7. Weeds

Persian clover is very sensitive to competition from weeds during the early growth stages. Common weeds include:

- **Barnyard grass** (*Echinochloa sp.*) is often a problem in early irrigated paddocks. Barnyard grass is best controlled by grazing once the Persian clover is established.
- **Winter broadleaf weeds** can be controlled using herbicides, but some plant damage is likely as Persian clover is very sensitive to some herbicides commonly used for broad-leaf weed control.

Always consult the label before applying herbicides.

8. Pests and Diseases

The major pests and diseases of Persian clover are:

- **redlegged earth mites** (RLEM) and **lucerne flea**. These pests can have severe impacts upon Persian clover during establishment. Control is often required within a week of germination. Effective management relies upon early identification of the problem and spraying if required.
- **Leaf rust** (*Uromyces trifolii-repentis*) and **clover rot** (*Sclerotinia trifoliorum*) can present serious problems in thick pastures during warm, humid weather in autumn or spring. Grazing the pasture will remove a large proportion of the inoculum and reduce humidity within the canopy, usually controlling the disease.
- Persian clover is highly tolerant of **sub clover scorch** (*Kabatiella caulivora*) and **subclover root rot** (*Phytophthora clandestina*).

Published by the Victorian Government Department of Primary Industries
Melbourne, February 2004

Also published on www.dpi.vic.gov.au

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Authorised by the Victorian Government, 8 Nicholson Street,
East Melbourne.
Printed by Prominent Group, 57-61 Drummond Rd., Shepparton.

ISBN 1 74146 031 X

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