Farmnote

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Growing dwarf chickling (Lathyrus cicera)

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Dwarf chickling or vetchling (*Lathyrus cicera*) is a winter growing annual grain legume with a similar growth habit to field peas. It is grown mainly in southern Europe and the Mediterranean region for the production of forage and grain. In Australia dwarf chickling is intended as a multipurpose crop for feed grain in cattle and sheep, fodder, hay and green manure. Unlike field pea, it does not suffer from diseases when sown early and has better tolerance to waterlogging.

Dwarf chickling is a weak-stemmed climbing plant with slow prostrate growth in winter. It becomes more vigorous and semi-erect in spring, forming many branches. Flowers are pea-like, single and red-brown. The pods are relatively flat and contain one to six seeds. Seeds are about half the size of a field pea and have an angular, blocky appearance.

Figure 1. Lathyrus cicera *crop with flowers*

Figure 2. Lathyrus cicera *crop with pods*

Many *Lathyrus* species contain the neurotoxin 3-(N-oxyalyl)-L-2,3-diaminopropionic acid (ODAP). The consumption of large quantities of *Lathyrus* grain containing a high concentration of ODAP causes a paralysis of the lower limbs known as lathyrism in humans and animals. This has been mainly associated with *Lathyrus sativus* (the grasspea) in the Indian sub-continent. In contrast to grasspea, the grain of dwarf chickling contains low amounts of ODAP and other plant parts have insignificant ODAP concentrations.

Soils and rainfall

Dwarf chickling grows well on neutral to alkaline loamy sands and clay loams. Soil pH in $CaCl_2$ of greater than 5 at the surface, and increasing with depth, is required. The crop is well adapted to soil types suited to field pea but tolerates some waterlogging.

Dwarf chickling is adapted to low to medium rainfall regions with 250 to 600 mm annual rainfall.

Varieties

Currently, there are only two released varieties of dwarf chickling. Lath-BC was released in South Australia in 1997 while Chalus was released in Western Australia in 1998 by the Centre for Legumes in Mediterranean Agriculture (CLIMA). Chalus flowers earlier than Lath-BC and about 10 to 15 days later than Dundale field pea. It has rapid seed filling and reaches maturity at about the same time as Dundale field pea.

On average over all sites, seed yields are similar for both dwarf chickling varieties. However, Chalus outyields Lath-BC in low rainfall conditions. Also, Chalus consistently has much lower levels of ODAP in the seed in southern Australia (Table 1). ODAP concentration varies in different environments.

Table 1. Mean seed ODAP concentrations and range of ODAP concentrations indifferent environments for two dwarf chickling varieties.

	Chalus	Lath-BC
Mean ODAP (%)	0.09	0.16
Range in ODAP (%)	0.07 to 0.12	0.13 to 0.21

In trials Chalus has yielded well over a range of low and medium rainfall sites, within Western Australia and throughout southern Australia. Yields have been equivalent to Dundale field pea yields at some dry sites, but are, on average, 30 per cent lower (Table 2).

Table 2. Mean yields of Chalus and Dundale field pea in eastern Australia and Western Australia

	Yield (t/ha)	
	Eastern Australia[1]	**Western Australia[2]**
Chalus	1.44	0.96
Dundale field pea	2.21	1.28

[1] Narrabri (NSW), Wagga Wagga (NSW), Walpeup (Vic), Roseworthy (SA), Minnipa (SA), Wynarka (SA) in 1996
[2] Konnongorring, Merredin, Latham and Perenjori in 1995 and 1996. Bencubbin, Chapman, Corrow, Cunderdin and Mullewa in 1997.

Time of sowing

Sowing dwarf chickling in mid April to mid May is recommended to maximise seed yields. Unlike field pea, early sowing does not promote disease. However, later sowing can be used for the purposes of weed management, with a small yield penalty.

Sowing rate

In medium to high rainfall zones (greater than 350 mm per year), target a plant density of 50 plants

per square metre. This is equivalent to sowing rates of about 50 to 75 kg/ha, depending upon germination percentage and seed size. In drier areas, up to 80 plants per square metre is recommended (80 to 100 kg/ha). Higher sowing rates will increase forage yield.

Inoculation

Inoculate dwarf chickling with Group E inoculum every year. Poor nodulation will result in low nitrogen fixation, low yields and small rotational benefits.

Fertiliser

The fertiliser requirements of dwarf chickling are similar to many other pulses. Unlike chickpea, maintenance applications of phosphate are required every year, equivalent to 10 to 30 kg/ha of phosphorus. A starter dose of nitrogen (10 to 15 kg/ha) at seeding may be useful if the soil has a surface pH less than 6.0 in $CaCl_2$ or a low nitrogen status.

Sowing depth

Sow dwarf chickling at 4 to 6 cm depth. Rolling is desirable after sowing to enable a low harvesting height. This will also minimise harvester wear and contamination of the grain.

Weed management

Dwarf chickling has slow growth during winter and is vulnerable to early weed competition. Fortunately, sowing can be delayed without a major yield penalty, allowing time for controlling weeds with knockdown herbicides. If weeds are large, high rates of herbicides may be needed.

Dwarf chickling has great potential in the control of resistant ryegrass through delayed sowing. Ryegrass germination can be stimulated by harrowing before sowing, reducing the seed bank for following years. Also, the herbicide 2,2-DPA (for example Dalapon® , Propon®) has good activity against most resistant ryegrass, while dwarf chickling has good tolerance to it. Thus, any germination after sowing can also be controlled in the crop without raising levels of herbicide resistance.

Finally, the crop can also be 'green manured' by ploughing-in or spraying-out the crop with a knockdown herbicide at early podding, before any surviving ryegrass have set viable seed. This will also dramatically increase soil nitrogen and organic matter contents, leading to large increases in the yields and quality of following cereal and canola crops.

By using this whole management package, three or four weed germinations will be controlled without any weed seed set or increase in resistance level.

Unfortunately, no herbicides have been registered at this time for use on dwarf chickling crops for hay or seed. There are no such restrictions when the crop is sown for green manure. The crop has shown good tolerance to a range of broadleaf herbicides in filed trials conducted in Western Australia (Table 3). Most grass selective herbicides are also well tolerated.

Table 3. Dwarf chickling has shown good tolerance to the following herbicides in limited trials

Application time	Herbicides, combinations and rates
Pre-sowing	Bladex® (2L/ha) simazine (2L/ha)
Immediately post plant	Spinnaker® (200 mL/ha) Spinnaker® (150 mL/ha) + diuron (1 L/ha) Lexone® (300 g/ha) diuron (2 L/ha diuron (1 L/ha) + Lexone® (150 g/ha) diuron (1 L/ha) + 2,2-DPA (1 kg/ha)
Post emergence (3 to 4 leaf stage)	Brodal® (80-100 mL/ha) Brodal® (100 mL/ha) + Lexone® (100 g/ha) Broadstrike® (25 g.ha)

Forage

Dwarf chickling can be directly grazed in late winter and early spring, providing a nutritious forage. In winter, growth is slow and there is relatively little feed available. Seed yields will be reduced considerably if dwarf chickling is heavily grazed.

Diseases

No serious diseases have been recorded in dwarf chickling to date. Powdery mildew and downy mildew have been reported overseas but these are unlikely to occur in Western Australian conditions. Bean yellow mosaic virus has been detected in field trials but this is less likely to be a serious problem in large-scale paddocks, especially in low rainfall areas.

Insect pests

Dwarf chickling is less susceptible to redlegged earth mite and lucerne flea than field pea. Crops are most susceptible while emerging and when young. Heavy infestation can seriously damage the crop, so early control with insecticides is recommended. Paddocks that were previously pasture have a high chance of early insect damage. Check the edges of dwarf chickling paddocks as these

insects often move from adjoining pasture paddocks and fence lines.

Aphids are generally not a serious pest of dwarf chickling; however, they can be an important vector of viruses.

Helicoverpa caterpillars (native budworm) are a severe pest of dwarf chickling and many pulse crops towards the end of the season. Eggs are laid from August to November and small caterpillars (less than 10 mm long) feed on the developing pods and seed.

Check the crop for caterpillars twice a week during flowering and podding. More than three caterpillars per square metre requires spraying with an appropriate insecticide. Recheck the crop following spraying to ensure the caterpillars are dead and that new hatchings do not take place.

Harvesting

Harvesting requirements for dwarf chickling are similar to those for field pea, although its seed size is smaller (100 seed weight of 7 g compared to field pea at 18 g). Maturity is evident when pods lose their green colour and plants become brittle.

Crop lifters will handle dense crops but pick-up fronts are more desirable in thin and uneven crops. Cutting height must be close to the ground. Do not delay harvesting as pod shattering may occur during adverse weather and the crop will collapse on the ground, making harvesting difficult.

Stubble

The stubble and grain remaining in the paddock after harvest can be grazed and is nutritious for both sheep and cattle. As with field pea, avoid grazing, especially on sandy surfaced soils to reduce the potential for soil erosion. Limited grazing trials have shown that most grain is eaten in about four weeks.

Markets for grain

At present, world markets for dwarf chickling in sheep, cattle, pig and poultry industries are underdeveloped.

Anecdotal evidence from overseas indicates that the grain of dwarf chickling is a valuable feed for sheep and cattle. Exercise caution when feeding dwarf chickling to pigs or poultry, as excessive intake can cause lathyrism in monogastrics.

Work has commenced on investigating the feed value of dwarf chickling grain. It has a lower protein content than narrow leaf lupin, but its lysine content is greater than that of narrow leaf lupin (Table 4). Preliminary feeding trials indicate protein degradability is 93 per cent, similar to narrow leaf lupin.

Table 4. Comparison of protein and lysine content of Chalus with narrow leaf lupin		
	Chalus	**Lupin**
Protein (%)	28.6	32.2
Lysine (g/kg of protein)	36.4	29.1

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