Forage oat variety guide 2014

Forage oats is the main winter forage crop in Queensland, due to its ability to produce good-quality feed when most pastures are dormant. Many farmers rely on oats to fatten livestock during the period from autumn to early spring. The use of improved varieties and better management practices are the key factors to increasing the level of productivity of oat crops.

This guide discusses the recommended management practices for growing oats for forage and strategies to minimise leaf rust infection. The current varieties of forage oats available for commercial sale in Queensland and northern New South Wales are described in Table 2 on the last page.

Planting

Optimum planting time for forage oats is from mid March to June in southern Queensland and northern New South Wales, and early April to June in central Queensland. Avoid planting before the start of April in central Queensland. Planting too early or too late can reduce forage yield. Late planting will hasten maturity and reduce the potential for multiple grazing. However, late planting may be a suitable practice for hay production. Oats for grain and seed are best planted in May to June.

The recommended planting rates are 40–60 kg/ha in southern Queensland and northern New South Wales, and 25–40 kg/ha in central and western Queensland. The recommended planting rate for irrigated crops is 55–60 kg/ha. Planting rates should be adjusted for germination, seed size and percentage establishment in the field. Planting rates can be increased by 20% for late planting, planting under hot conditions, or where there is a weed problem. Farmer-saved seed and carry-over seed from the previous season should be tested for germination prior to planting. There are approximately 50 000 seeds per kilogram, but always check the seed container for the correct seed size and germination rate.

The optimum soil temperature for the germination and establishment of oats is between 15 °C and 25 °C. Avoid planting into warm or hot soils, as soil temperatures above 25 °C during the period from January to March will reduce seed germination and result in poor crop establishment.

Oat seed is best sown at 5–7.5 cm depth in row spacing of 18–25 cm, into moist soil in a well-prepared seedbed.

Nutrition

Ensure the crop receives adequate fertiliser and weed control. Forage oats will grow on most soils but will not provide good recovery on strongly acidic soils or wet soils that develop aluminium and manganese toxicities. Most oat varieties grown on poor soil (e.g. low in nitrogen) could develop red-tipping (see Figure 1) on the leaves and this may result in below-optimum yields.

Nutrition requirements and fertiliser rates are similar to those recommended for wheat nutrition. Starter fertiliser at sowing is recommended, but should be applied separately to the seed as the fertiliser can damage the seed and reduce its germination (Table 1).

An application of nitrogen after grazing (20–40 units of nitrogen per hectare) will increase the speed of plant recovery, reduce tiller death and increase overall forage yield.

Table 1: Suggested safe rates (kg/ha) of some nitrogen fertiliser products sown with oat seed at planting

Row spacing		Maximum nitrogen rate	Urea	DAP	MAP
cm	in				
18	7	30	65	158	230
36	14	15	33	79	115

Red-tipping

Red-tipping of leaves is usually a symptom of nutrient deficiency on grazing oats. It is associated with low levels of nitrogen, phosphorus, potassium, zinc or sulphur in the soil. Nitrogen deficiency is the most common cause. Red-tipping is not a symptom of rust infection.

The reddish colour, seen mostly on the tips of mature leaves, is caused by the presence of a purple-red pigment called anthocyanin. The intensity of the redness varies with the season. Early stages of the disorder show light-yellow veins running parallel to the midrib of the leaf. In the later stages, the tips turn red. In cold, dry winters the colour deepens to almost purple, while in mild, wet winters it is a more washed-out orange-red.

Affected plants are slightly stunted and less palatable for livestock. Red-tipping tends to occur over large areas of the crop where fertiliser application has not been adequate. Red-tipping can also be confused with barley yellow dwarf virus. Red-tipping is more common than barley yellow dwarf virus in Queensland.

Red-tipping can be avoided by practising good crop nutrition. In paddocks with a history of this problem, increase nitrogen rates to 70–80 kg of nitrogen per hectare and check whether other nutrients are adequate. Top-dressing can be used to correct the problem, but good rainfall after application is necessary and, as a consequence, results can be erratic.

Figure 1: Red-tipping in oats

Grazing

Intermediate and late-maturing varieties remain vegetative until late in the season and provide a longer duration of grazing for livestock.

If possible, first grazing should be delayed until secondary roots are well established and before stems begin to elongate. Grazing can commence when there is enough root development to ensure plants will not be pulled out. This usually corresponds with about 25 cm of growth for upright types and 10–15 cm for prostrate varieties.

For quick recovery, do not graze too low. Where possible, only graze down to the height of the lowest stem node—about 12–15 cm (5–6 inches) above ground level. Avoid hard grazing, as this can remove the growing points and delay subsequent regrowth. Also avoid grazing the crop when the soil is very wet, as the crown and root will be damaged and regrowth will be slow and reduced.

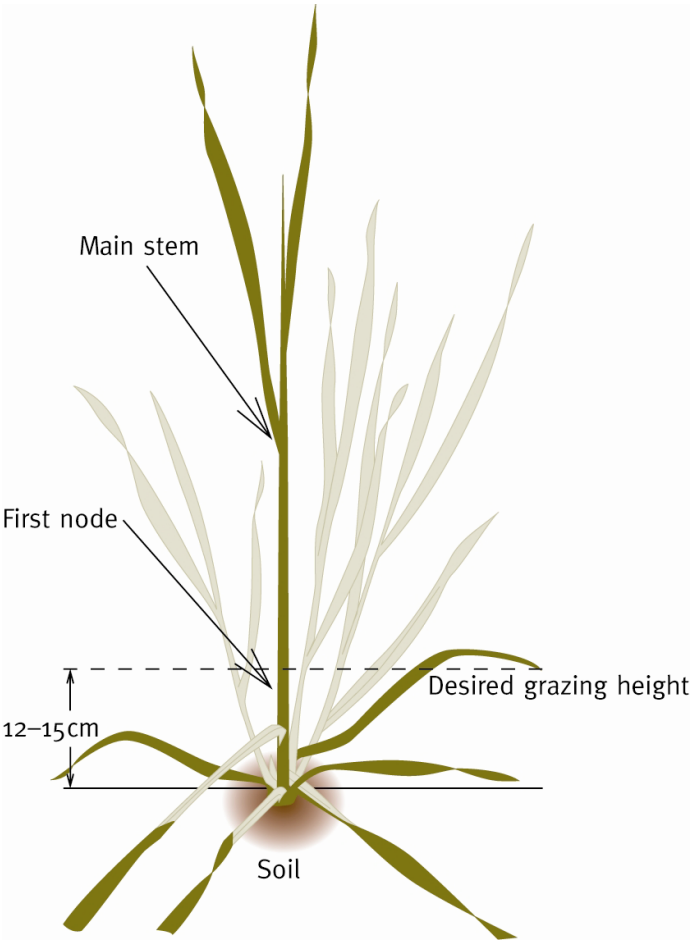

Figure 2: Recommended grazing height for forage oats

Continuous grazing

With continuous grazing, stock remain on the forage oats for the entire feeding period and may or may not have access to alternative pasture. This is an easy management option that allows stock greater opportunity to select the young nutritious growth and maximises weight gain per head. In contrast, however, there is less efficient use of oats due to trampling and reduced regrowth potential.

Rotational grazing

Rotational grazing involves regularly moving stock between two or more oat paddocks, which allows the oats to regrow between grazing. Dryland oat crops can be grazed several times depending on rainfall, irrigation, nitrogen, and timeliness and severity of grazing.

Strip grazing

Strip grazing is common on dairy farms where electric fences control stock access. It is used to minimise trampling losses, increase crop utilisation (less selection) and encourage regrowth for greater forage production. Fertilising following grazing is an option with irrigation or favourable rainfall.

Stocking rates

Suggested carrying capacities for fattening steers include:

- dryland—black soil—2 animals per hectare
- dryland—light soil—1.5 animals per hectare
- irrigation or favourable dryland—up to 5 animals per hectare.

Expected weight gains include:

- general range—0.7–1.2 kg per day
- weaner/yearling cattle—0.7–1.1 kg per day (average 0.9 kg)
- heavy steers (export)—0.8–1.2 kg per day (average 1.0 kg).

Scouring

Reduce scouring on oats by allowing stock access to roughage or introducing stock gradually by limiting grazing time. Ensure cattle are not hungry when going onto a new feed.

Scouring is commonly seen on oats and is caused by a massive change in the diet from a dry, fibrous pasture to a lush, high-moisture (70–80%) grazing crop. Initially, the digestive system is purged, causing a loss of gut fill and a fast passage of feed. Also, the rumen bacteria need time to adapt to the new feed. Cattle may lose condition and it often takes a few weeks for cattle to commence high weight gains.

Some methods of reducing scouring are allowing access to dry pasture, providing hay or limiting initial grazing times on forage oats if practical (e.g. 1 hour for first 4–7 days).

Haymaking

Some forage oat varieties are also suitable for haymaking. Cutting at the milky dough stage of grain fill will produce the highest yield of good-quality hay. Choose a variety with intermediate maturity, medium stem thickness and a high leaf-to-stem ration. After multiple cuts, the stems may increase in thickness. A high sowing rate (up to 80 kg/ha) will improve the quality of hay by helping to reduce the thickness of stems.

Oaten hay for the export market should be free of visible damage due to leaf and stem rust.

Diseases

Leaf rust (*Puccinia coronata*)

The symptoms are small, light orange-yellow pustules, appearing about 7–10 days after infection. Leaf rust mostly occurs on leaves and leaf sheaths, but also occurs on stems. It is seen first on the lower leaves and then spreads to the upper canopy.

This disease is most severe under mild temperatures and moist conditions (e.g. early autumn and early spring after wet, overcast conditions). This disease will build up very quickly on susceptible varieties. It will complete its life cycle and re-infect every 2–3 weeks.

Resistant varieties are available, but new varieties are often overcome by new pathotypes or races of leaf rust. Many different races of leaf rust are present in Australia, and each race will often occur on one variety only.

Spores are windborne, can spread over large distances through the air and will survive over summer on volunteer oats and wild oats. Leaf rust can dramatically reduce forage yield, hasten maturity and reduce forage quality and palatability.

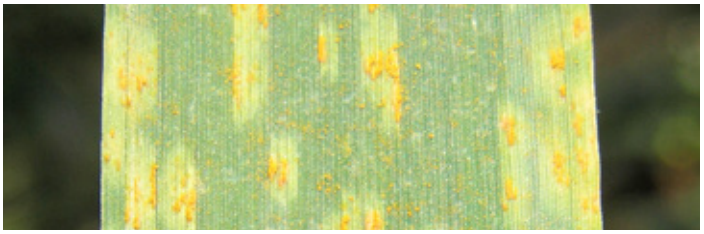

Figure 3: Leaf rust on oats

Stem rust (*Puccinia graminis*)

The symptoms are large, dark red-brown pustules, appearing about 7–10 days after infection. Stem rust mostly occurs on stems, but will also appear on leaves and seed panicles.

This disease is most severe under warm temperatures and moist conditions, and infection levels are highest in late spring and summer. Spores are windborne, can spread over large distances through the air and will survive over summer on volunteer oats and wild oats.

Stem rust will cause major yield loss in seed crops of forage oats and hay crops of oats. However, stem rust is less important on grazing oats since it occurs late in the growing season after most of the crop has been consumed.

No resistant varieties are available—all varieties in Australia are susceptible. As with leaf rust, many different races of stem rust are present in Australia, and each race will often occur on one variety only.

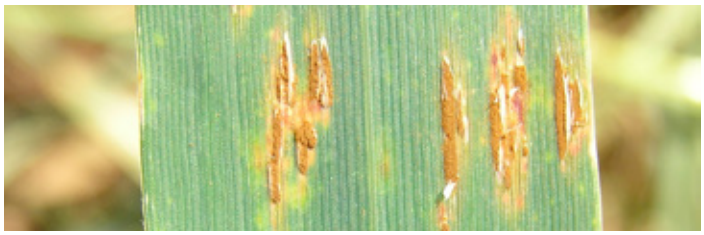

Figure 4: Stem rust on oat leaves

Figure 5: Stem rust on oat stems

Bacterial blight (*Pseudomonas syringae*)

The initial symptoms are light-green, water-soaked oval spots. Spots will develop into brown, water-soaked blotches (sometimes halos) or brown, elongated stripes. Stripes and blotches can merge to cause leaf crimping and leaf death.

The disease spreads by raindrop splash or mechanical means, and survives on seed and plant stubble. Bacterial blight is controlled by grazing to remove infected plant tissue (seed treatment is not effective).

Figure 6: Bacterial blight on oats

Septoria blotch (*Septoria avenae*)

The symptoms first appear on leaves as small, dark-brown spots. Spots develop into larger, oval-shaped blotches, surrounded by light-brown margins. Infection may spread to the leaf sheaths and stems resulting in lodging.

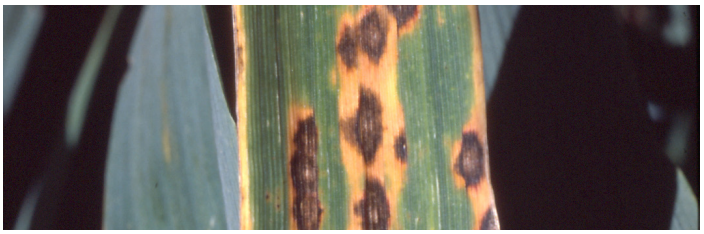

Figure 7: Septoria blotch on oats

Barley yellow dwarf virus

Barley yellow dwarf virus (BYDV) is a viral disease spread by aphids and can cause significant yield loss in susceptible varieties. BYDV is more common in northern New South Wales than in Queensland. The disease is favoured by mild, moist autumns that allow aphid populations to build up.

The stems, leaves and roots of infected plants become stunted and leaves turn pale-green with reddish tips. Later in the season, panicles have a blasted appearance with white and sterile florets. BYDV most often occurs as ‘hotspots’ in a forage oat crop.

Insecticidal seed dressings can be used to control aphids in the seedling stage and reduce BYDV infection. Control of alternate aphid hosts and good crop nutrition will prevent infection and reduce yield loss.

Figure 8: Barley yellow dwarf virus on oats

Covered smut (*Ustilago hordei*) and loose smut (*Ustilago avenae*)

In plants infected with covered or loose smut, the individual oat grains are replaced with powdery, black spore masses. The smut-infected heads can be seen as soon as the heads emerge from the boot, and the spores are easily transported by wind.

Any seed that may be used for seed crops should be treated with a suitable fungicide before planting. Check to see if seed has been treated. If not, dress with Vitavax, Vitaflo or another registered seed treatment. Check the chemical label for details.

Figure 9: Loose smut on oats

Rust management

Losses from leaf rust can be reduced by grazing or cutting rusted crops before the disease becomes severe. Given suitable conditions, it takes 7–14 days for a rust spore to infect and produce more spores. During this period, oat plants will normally produce several new leaves on each tiller. During active growth of the crop, the upper canopy may remain free of rust symptoms. Therefore, it is necessary to regularly inspect the crop to monitor rust occurrence. If leaf rust is obvious below the top two leaves on each stem, the crop should be grazed or cut regardless of growth stage.

Tebuconazole (e.g. Folicur) and propiconazole (e.g. Tilt) are registered for control of leaf rust and stem rust on forage oats in Queensland. No information is available on economic thresholds for fungicide application in forage oats, but fungicide control is more likely to be economically viable in higher value crops (e.g. seed crops, high-quality hay crops).

Other tips for controlling leaf rust include the following:

- Select a variety with good resistance to leaf rust (see Table 2 on the last page).
- Avoid planting too early (before mid March) or too late (after June). Very early plantings (January to early March) of susceptible varieties should be avoided to minimise the risk of leaf rust infection.
- Control out-of-season oat plants and wild oats. Leaf and stem rust spores survive on these plants between seasons and provide a continual source of inoculum for outbreaks each year.
- Plant in wider rows to produce an open canopy and reduce losses from trampling.
- Maintaining good soil and crop nutrition with nitrogen will minimise the effects of leaf rust.

Seed production

Grain oats are less important in Queensland and northern New South Wales because no grain varieties are available with stem rust resistance and adaptation to the warmer growing conditions. Forage oat crops can be harvested for grain in Queensland and northern New South Wales, but the harvested grain is usually used for planting seed in the following season.

Both leaf and stem rust are major constraints for oat grain and seed production. These diseases can be severe under favourable conditions. Stem rust causes pinched grain, resulting in low seed vigour and poor germination. If the seed is poor, it may be unsuitable for planting and commercially sourced seed should be sown in preference.

The expected grain yield is 1–1.5 t/ha (with grain density 50 kg per hectolitre) for dryland cropping on the eastern Darling Downs. Grain yield can be maximised by planting later in the season (May or June) to reduce forage growth prior to flowering. To minimise the potential for lodging prior to harvest, plant populations can also be significantly reduced to less than half the normal rate.

Heavy grazing of forage oats will markedly reduce the potential for grain yield. Oat crops respond best to regular quick grazing, occurring in the early vegetative stage well before the first node or joint in the tiller can be detected. When a crop is intended for grain harvest, grazing should not continue beyond the end of July.

More information

For more information, contact the Department of Agriculture, Fisheries and Forestry (DAFF) on 13 25 23 or visit **www.daff.qld.gov.au**

Varieties

Table 2: Forage oat varieties available for commercial sale in Queensland and northern New South Wales in 2014

Variety	PBR	Released/sold by	Year of release	Early growth habit	Speed to grazing[1]	Maturity	Reaction to[2]	
							Leaf rust	Stem
Leaf rust–resistant varieties								
Aladdin	ⓑ	DAFF/Heritage Seeds	2012	Semi-erect	Medium/quick	Late	9	1
Leaf rust–susceptible varieties								
Culgoa II		DAFF/Cultivar Marketing	1991	Prostate	Slow	Medium	1	1
Drover	ⓑ	Pacific Seeds	2006	Intermediate	Medium	Medium/late	2*	1
Genie	ⓑ	DAFF/Heritage Seeds	2008	Erect	Quick	Late	1	1
Galileo	ⓑ	DAFF/Heritage Seeds	2007	Erect	Quick	Late	1	1
Graza 51	ⓑ	Heritage Seeds	2007	Erect	Quick	Medium/late	1	1
Graza 80	ⓑ	Heritage Seeds	2005	Erect	Quick	Late	1	1
Moola	ⓑ	DAFF/Cultivar Marketing	1998	Erect	Quick	Late	1	1
Outback		Seed Distributors	2005	Erect	Quick	Medium/late	1	1
Riel		DAFF/Cultivar Marketing	1993	Erect	Quick	Late	1	1
Sual		NSW DPI		Intermediate	Medium	Medium	1	1
Taipan	ⓑ	Pacific Seeds	2001	Erect	Quick	Late	1	1
Targa	ⓑ	DPIPWE (Tas)	2000	Intermediate	Medium	Late	1	1
Newly released varieties								
Comet	ⓑ	Pacific Seeds	2014	#	#	#	#	#
Superseded varieties (may not be available commercially)								
Algerian		NSW DPI	1918	Intermediate	Medium	Medium	1	1
Coolabah		NSW DPI	1967	Intermediate	Quick	Early	1	1
Dawson	ⓑ	Pacific Seeds	2008	Erect	Quick	Medium	1	1
Graza 50		Pioneer Hi-Bred	1994	Erect	Quick	Medium/late	1	1
Graza 68		Pioneer Hi-Bred	1998	Erect	Quick	Late	1	1
Minhafer		DAFF	1962	Erect	Quick	Early	1	1
Mortlock		DAF (WA)	1983	Erect	Quick	Early	1	1
Nugene	ⓑ	DAFF/Heritage Seeds	2000	Erect	Quick	Late	1	1
Panfive		Panorama Seeds	1990	Erect	Quick	Medium/late	1	1
Volta	ⓑ	DAFF/Heritage Seeds	2003	Intermediate	Quick	Medium	1	1
Warrego		Pacific Seeds	1999	Intermediate	Medium	Medium	1	1

Notes

* There were reports of a new pathotype of leaf rust in southern Queensland in early 2013 that infects Drover. This pathotype has since spread more widely. In the absence of this pathotype, Drover will appear to be resistant.

#DAFF data not available at time of publication.

[1] Speed to grazing varies with planting date—ratings based on mid March to April planting.

[2] The numerical scale indicates levels of field resistance to leaf and stem rust in Queensland and northern New South Wales:

9–7 (High)	Highly resistant, forage yield unlikely to be reduced
6–5 (Medium)	Moderately resistant, some yield loss may occur in favourable conditions
4–3 (Low)	Moderately susceptible, moderate yield loss may occur in favourable conditions
2–1 (Very low)	Highly susceptible, substantial yield loss may occur in favourable conditions

ⓑ Cultivars displaying this symbol are protected under the *Plant Breeders Rights Act 1994*. Unauthorised sale of seed of these varieties is an infringement under this Act.

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