

Introduction

A.1 Agronomy at a glance

- Sorghum requires a warm, summer growing period of about 4–5 months, with planting times usually between September and January.
- The crop is highly drought-tolerant, but responds well to rainfall, especially during head-forming and grainfill stages.
- Lodging is a major problem in many grain sorghum-producing areas and is usually associated with moisture stress. Use of lodging-resistant hybrids is recommended.
- It is now possible to adopt a practical integrated pest management (IPM) strategy that eliminates the use of chemical sprays for *Helicoverpa* and midge in most years.
- Adequate control of summer weeds (especially grasses) is necessary.
- Sorghum usually yields better than maize on soils of poor fertility.
- Control weeds within 4–5 weeks after planting or risk yield loss.
- Use no-till for dryland crops to increase soil moisture storage compared with conventional fallows.
- Set a target yield based on moisture availability.
- Be aware of the risks associated with growing sorghum after canola or mustard, because arbuscular mycorrhizal (AM) levels are at their lowest following these crops.
- Match the plant population and row spacing to the target yield. Uniformity is critical.
- Use nitrogen (N) fertiliser rates based on target yields, soil tests and/or previous crop yields and protein levels.
- Use effective weed control, especially for grasses.
- Consider previous herbicide applications for potential residues in the soil and herbicide resistance in weeds.
- Select at least two high-yielding hybrids that have the desired characteristics for your sowing conditions to spread production risk.
- To reduce the risk of ergot in northern New South Wales (NSW), plant crops so that they complete flowering by mid-March.
- Wide sowing windows occur for most areas. Avoid sowing too early (cold) or too late (ergot and frost). Aim to avoid flowering during the extreme heat of late December to late January.
- Monitor and if necessary control insects, especially wireworms (planting), midge (flowering), *Helicoverpa* and Rutherglen bug (grainfill).
- Use knockdown herbicides at the end of grainfill to hasten dry-down, improve harvesting and start the recharge of the fallow in dryland crops.
- Be prepared to dry grain from late sown crops.¹

MORE INFORMATION

Graeme Hammer University of Queensland discusses the effect of high frequency hot days on sorghum. [GRDC Podcast: 107 Summer weed control - the latest](#)

¹ N Moore, L Serafin, L Jenkins (2014) Grain sorghum. Summer crop production guide 2014, pp. 5–16, NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/303485/Summer-crop-production-guide-2014.pdf

A.2 Crop overview

Grain sorghum (*Sorghum bicolor* (L.) Moench) is the main summer grain crop in the northern grains region (Figure 1), and plays a key role in providing feed grains to the beef, dairy, pig and poultry industries. It is a good rotation crop, tolerating heat and moisture stress, and performing better than maize on soils with marginal potassium (K) levels.²

Grain sorghum is a major component of the dryland cropping system of north-eastern Australia. Approximately 60% of the Australian crop is grown in Queensland and the remainder in northern NSW. Grain sorghum is predominantly a summer season crop, with an extended season in higher latitudes including Central Queensland and further north.

The area of sorghum planted for grain in northern NSW is on average 160,000 ha and Queensland 470,000 ha annually. The main zones for sorghum production are the area east of the Newell Highway and the Liverpool Plains in NSW and the Darling Downs in Queensland.³ Average farm yields vary around 2 t/ha and reflects the severity of constraints, as water stress during grainfilling is the common production environment.

Sorghum produced in Australia is used almost exclusively for feed, especially for cattle, pigs and poultry. None is used for human consumption and a significant market exists in the pet food industry. An export market of around 1 Mt exists, particularly to Japan, but the average amount exported is in the order of 300–500 kt.⁴

Grain sorghum was first grown in Queensland in 1938 and in NSW in 1940, using dwarf varieties introduced from the USA. Following the development of cytoplasmic male sterility in the 1950s in the USA, hybrid varieties were first grown commercially in Australia in 1962, and within 3 years, most farmers were growing the new hybrid varieties.⁵

A large variety of forage sorghum hybrids are available that can provide very rapid summer production (growth rates >100 kg/ha/d are typical). Biomass yields of >10 t DM/ha are reported at Trangie, 80 days after sowing. However, grazing should be initiated earlier (height 60–80 cm) to maximise forage quality, which declines rapidly as the crop develops. Forage sorghum also requires high levels of available N to optimise production and quality. Forage sorghum is better suited to cattle grazing than sheep, as it quickly gets too high for sheep grazing. The advantage of a forage sorghum over a grain sorghum in the farming system is that it could be terminated earlier (e.g. 70 days c.f. >100 days) after providing some grazing and allow the soil profile more time to refill.⁶

2 QDAF (2012) Overview of the sorghum industry. Department of Agriculture, Fisheries and Forestry Queensland, <http://www.daff.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/sorghum/overview>

3 L Serafin, G McMullen (2015) Sorghum agronomy to manage risk and improve yield in the western zone, GRDC Update Papers 31 July 2015, <https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2015/07/Sorghum-agronomy-to-manage-risk-and-improve-yield-in-the-western-zone>

4 QDAF (2012) Overview of the sorghum industry. Department of Agriculture, Fisheries and Forestry Queensland, <http://www.daff.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/sorghum/overview>

5 NSW DPI (2005) Grain sorghum. Agfact P3.3.5. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0006/146355/grain-sorghum.pdf

6 L Bell (2015) Likely fit of summer and winter forage crop options in Central West farming systems, GRDC Update Papers 24 July 2015, <https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2015/07/Likely-fit-of-summer-and-winter-forage-crop-options-in-Central-West-farming-systems>



Figure 1: Sorghum is the main summer grain crop in the northern grains region.

A.2.1 Production and utilisation issues

The major limiting factor to production is water stress during grainfill. This results in reduced yield, causing lodging and reduced grain number and grain size.

The major insect pests are a complex of soil-borne insects, the sorghum midge (*Stenodiplosis sorghicola*) and cotton bollworm (*Helicoverpa armigera*). The major disease is sorghum ergot (*Claviceps africana*), which was first reported in Australia in 1996. Other diseases are sporadic and have relatively minor significance.

The major constraints to effective use as a feed grain include variable grain size, cost of processing (e.g. steam flaking), particularly for ruminants, and grain weathering.

These and other issues have been identified in conjunction with industry and dictate the direction of the sorghum research program in Australia.

Marketing

The sorghum trade is completely deregulated. Sorghum produced in Australia is used almost exclusively for feed—especially cattle, pigs and poultry—and this totals ~1.4 Mt (Figure 2). None is used for human consumption and a significant market exists in the pet food industry. There is a substantial export market for sorghum, especially to Japan.⁷

⁷ QDAF (2012) Overview of the sorghum industry. Department of Agriculture, Fisheries and Forestry Queensland, <http://www.daff.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/sorghum/overview>

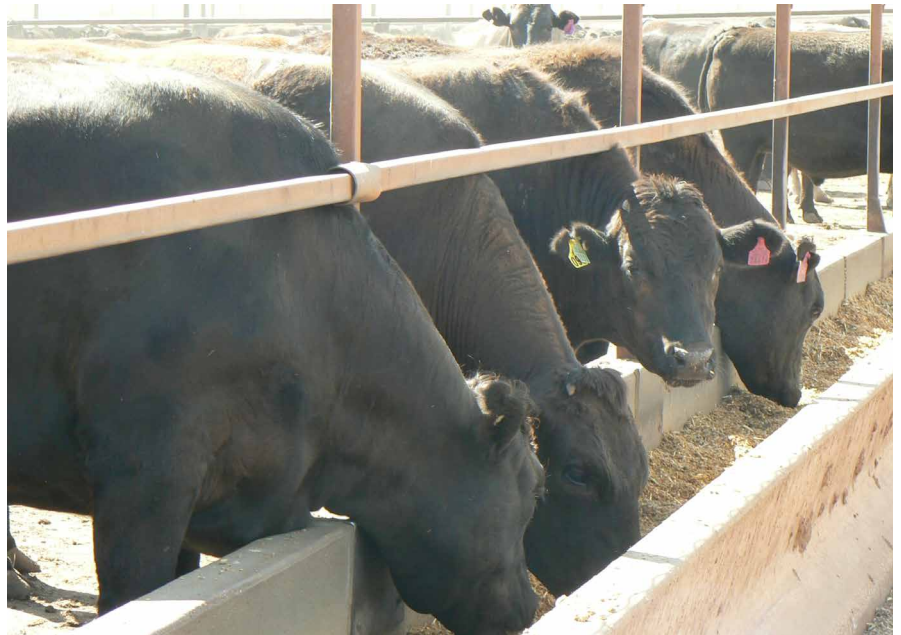


Figure 2: Sorghum produced in Australia is used almost exclusively for feed.

Photo: Rachel Bowman, Seedbed Media

A.3 Keywords

Grain sorghum, summer grains, dryland cropping, irrigation, feed grains, lodging, sorghum midge, *Helicoverpa*, ergot, lodging.