

Sorghum (*Sorghum vulgare*) Technical Note F14

Management level	★★★★★
Yield	★★★★★★
Quality	★★
Water use efficiency	★★★★★★
Reliability	★★★★
Versatility	★★★★★★

Where ★★★★★ is the highest rating.

Varieties

Variety selection is dependent on end use:

- Silage vs grazing
- Quality vs quantity

There are a complex mix of open pollinated and hybrid varieties based on three parent types.

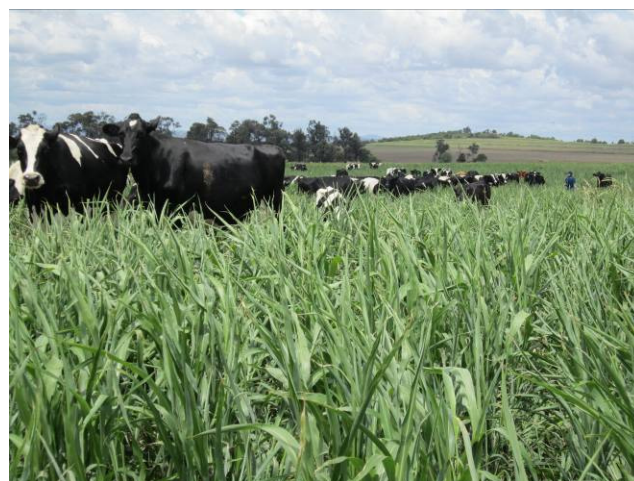
Sudan grass (sudan x sudan) - prolific tillering, rapid regrowth, fine stems, open pollinated, early flowering e.g. Superdan.

Sorghum (female) x sudan grass (male) hybrids - high DM production, rapid regrowth, drought tolerant, often late flowering e.g. Jumbo, Betta Graze.

Sweet sorghum hybrids – thick stems, high sugar, slower regrowth, maintain palatability and useful standover forage e.g. SugarGraze, Mega Sweet.

Sorghums which are bred to express the brown mid-rib gene. This reduces lignin content and so increases ME, without change in CP. Mid rib on leaf and stem may be brown, but not always. May be lower DM yield and more prone to lodging than other forage types e.g. Pacific BMR.

Grain x Grain - Red sorghum grown for grain has become more widely used as a silage crop because it is a short plant and is less susceptible to lodging during storm events. White sorghum grain (Liberty) may be better suited to rumen and monogastric digestion because the outer seed does not contain tannin.



Establishment

Soil temp is critical; at 10 cm depth (maximum daily temperature) + (2 x minimum daily)/3; plant when 18oC and rising (see Table below). Plant at 2 - 5 cm depth into moisture at 15 - 50 cm row spacing. Spacing can be greater than this when moisture is limiting.

Seeding rate when raingrown 1 - 5 kg/ha and under irrigation 10 - 150 kg/ha (seed size varies from 30 000 to 70 000 seeds/kg). Sorghum requires a well prepared seedbed, even and fine. Soil-seed contact is very important for germination (press wheels at 4 - 6 kg/cm).

Soil temp at planting (°C)	Effect on seed	Effect on emergence
12	Slow germination, pests and disease	Poor <50% E.g. Fusarium, pithium
15	Satisfactory	Slow, >50%, disease
16	Good	Adequate
18	Good	Good, quick
20	Ideal	Ideal

The effect of temperature on germination and emergence of sorghum

Zero till less effective, but possible on an even paddock without weeds or compaction. Pre and post-emergent herbicide is critical and treat seed with an insecticide. Sorghums are suited to heavy soils and have medium salt tolerance. Sweet, late flowering types mix well with lablab, providing autumn grazing.

Water use

Dormancy during drought, with rapid recovery after rain. Tolerant of high ambient temperatures.

Water requirements (ML/ha) for sorghum have been calculated based on the sum of evapotranspiration rates less rainfall from November to March 1970 to 2007 (ICalc).

Location	ML/ha
Allora	2.2
Beaudesert	1.9
Gatton	2.3
Monto	2.5
Oakey	2.7

Nutrient requirements

When grazed, typically 50 kg N/ha at planting and 50 kg N after first grazing.

Nutrient requirement	N	P	K
Nutrient (% DM)	1.7	0.2	1.8
kg applied (/ha)	339	46	358

Typical mineral content of a sorghum silage crop and requirements to produce 20 t DM/ha

Diseases

Relatively free of diseases. Wireworms and cutworms may be a problem at germination, this can be prevented by purchasing seed coated with an insecticide. Sorghum ergot sometimes develops in flowering heads, and can be toxic.

Growth and grazing

Graze to keep stem elongation and flowering to a minimum, this is often difficult to achieve because growth rates are very high following prolonged rainfall or irrigation. Ideal height at grazing is 1 m, with 0.25 m residual. Expected yield for raingrown sorghum is 10 - 12 t DM/ha from 2 to 3 grazings. Well irrigated and fertilised sorghum can yield 15 - 20 t DM/ha in 4 grazings.

Nutrient quality

Medium nutritional value and declines rapidly at heights above 1 m. Leaf content 60% DM at 1 m, 38% at 2 m.

At 1 m in height expected quality will be:

- 8 - 9.5 MJME/kg DM
- 9 - 18% CP

Sweet sorghum – sugar content of stems 10% at 1 m, 20% at 2 m, maintains ME content about 9 MJ/kg DM.

The quality parameters of sorghum harvested as silage or grazed is highly variable and can be seen in the Table below.

Quality (% DM)	Average		Minimum		Maximum	
	Silage	Graze	Silage	Graze	Silage	Graze
Crude protein	10.7	16.4	4.8	8.3	19.7	29
Starch	7.3	3.3	0.2	0.1	32.3	20.5
Sugar	9	13.3	0.3	0.9	19.6	18.4
NDF	57.7	55.4	38.9	34.3	70	65.8
Fat	2.8	3	1.7	1.9	4.7	7.1
ME (MJ/kg DM)	9	9.7	7.2	7.9	11.4	12.9
DM (%)	49.1	23.2	25.6	12	78.6	43.5

Range in quality for sorghum harvested as silage or grazed

Animal health

Prussic acid (HCN) higher in sweet sorghum varieties and when plants are vegetative, stressed or heavily supplied with nitrogen. Ensilage destroys prussic acid, as does hay making to a lesser extent. Feeding sulphur and salt to cattle reduces the effects. If toxicity occurs drench with hypo (sodium thiosulphate).

Nitrite poisoning can occur if plant nitrate levels high (>2000 ppm) due to high soil N or halt to growth e.g. cold, cloudy weather. Ensilage and hay making do not destroy nitrate.

Silage

Are specialist silage varieties with very high yield and high sugar content. Greenchop usually sudan grasses or sorghum-sudan grass hybrids. Fine stem Sudan grass types if wrapped, any variety is suitable if chopped. Direct chop silage: 32 - 35% DM, cut and wilt; higher quality, lower yield. Rapid growing hybrids also useful as green manure crops. Sweet sorghums (Chopper, Mega sweet) 70 to 80 days to cutting at 2 - 2.5m height. Lower yielding grain sorghums are becoming more widely used to minimise crop lodging prior to harvest.

Further information

Contact the DAFF Customer Service Centre by Phone 13 25 23, or Email callweb@daff.qld.gov.au

More technical notes can be found at: www.dairyinfo.biz

Collett I.J. (2004). Forage Sorghum and Millet. New South Wales government fact sheet.

Kaiser et al. (2003). Successful Silage. TopFodder.

Sorghum Production in Queensland. Queensland Government fact sheet.

Stuart P. (2002). Forage Book.

Callow et al. (2013) Successful Dairy Production in the Sub-Tropics

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