NSW GOVERNMENT Trade & Investment

FACTSHEET

Summer forage crop & grain choices for the NSW coast south of Coffs Harbour

IDAF Industry Development Pastures

Summer forage choices

Summer forage and grain crops may be grown for several reasons.

1. Additional grazing to fill a feed gap.

Well fertilised summer forages or summer legumes can produce large amounts of forage from a limited area. Forage sorghum can be very efficient at using limited irrigation water. Legumes can provide high quality forage in late summer autumn when feed quality can be particularly important. Depending on variety summer forages may be used as a carryover feed into autumn while new pastures or winter forage crops are establishing.

2. Preparation for sowing autumn pastures.

Summer forage and grain crops provide an opportunity to control weeds and prepare a seedbed for sowing pastures in autumn. Summer legumes will also increase soil nitrogen levels which will benefit future pastures or crops.

3. Silage production for use in autumn/winter.

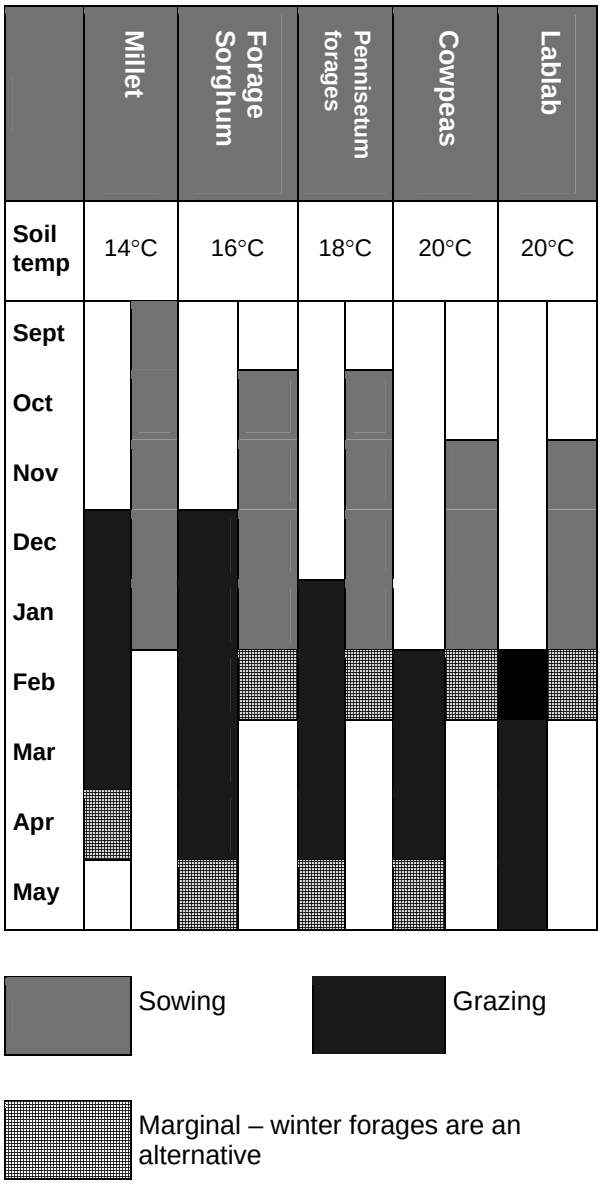
Maize silage offers the highest yield and feed quality potential from any silage crop. It is a specialist crop normally chopped and stored in a bulk pit or bunker. Forage sorghums, millet and summer legumes can be stored as hay or silage but special care is needed to ensure adequate feed quality.

4. Grain.

Both maize and soybean have specialised grain markets for human or animal use.

The agronomy & management used can have a greater influence on the crop productivity than the variety chosen.

Check with your local District Agronomist or advisor to confirm preferred varieties and management. The main summer forage choices are:



NB: Temperatures are stable or increasing for at least 3 consecutive days at 9am DST at seeding depth.

Early summer feed

What to sow	Seed rate kg/ha	Sowing time
Millet e.g. Shirohie, (Japanese)	**Dryland** 10–15 kg/ha **Irrigation & high rainfall** 15–25 kg/ha	Sept–November. Soil temp should be at least 14°C for Shirohie. Can be sown till mid February if a quick crop is required.

Fertiliser requirements

When sowing:

Cultivated soil (if sulphur (S) is adequate)

a) Sown in rows – 20 kg N (nitrogen) plus 20 kg P (phosphorus) /ha, e.g. 100 kg/ha DAP or equivalent

b) Broadcast – 20–40 kg N plus 20–40 kg P/ha e.g. 100–200 kg/ha DAP or equivalent

Direct drill – 20 kg N plus 20 kg P plus 20 kg S/ha, e.g. 150 kg/ha Granulock 15 or equivalent

Top-dress 45 kg N/ha after grazing if required, e.g. 100 kg/ha urea if irrigating. May also need potassium (K).

Rain or irrigation is needed for best results from nitrogen fertilisers.

Comments

- ❑ The first summer crop to be sown in spring.
- ❑ Can be used where soil moisture or fertility are inadequate for forage sorghum.
- ❑ Not as productive as forage sorghum but better quality feed.
- ❑ Graze when 25–30 cm high (5–6 weeks after sowing). Leave 10 cm residue for strong regrowth.
- ❑ Shirohie is more productive than Japanese.
- ❑ Millet does not cause prussic acid (HCN) poisoning.
- ❑ Millet can cause photosensitisation in stock when stressed plants are grazed –this is particularly a problem with light coloured stock.
- ❑ Japanese/Shirohie is short lived, with only two grazings usually possible. Runs to head when hot and dry, usually by January.
- ❑ Can be conserved as hay or silage if needed, but the best feed value is obtained from young millet forage.

Summer feed

What to sow	Seed rate kg/ha	Sowing time
Summer feed Forage sorghum such as Pacific BMR, BMR Octane, BMR Rocket, BMR Revolution, Nectar, Sweet Jumbo LPA*, Megasweet, Betta Graze, Everlush*, and others	**Dryland:** 5 kg/ha **Irrigation or coastal** 15–20 kg/ha. Use higher rates for irrigation (seed rate will vary depending on seed size).	Oct–Jan Soil temperature should be at least 16°C and rising.
Note: Maturity dates vary between 7–12 weeks. * will not flower until April.		
Hybrid Sudan Grass e.g. Superdan 2, Sprint	**Marginal dryland**: 5-10 kg/ha **Irrigation or favourable dryland:** 10–20 kg/ha. Use high rate for irrigation.	As above.

Fertiliser requirements

For forage sorghum and Hybrid Sudan grass, same as for millet when sowing. Forage sorghum should be more productive than millet, so expect to use more nitrogen fertiliser when topdressing.

Consult your local District Agronomist about the risk of nitrate poisoning due to excessive nitrogen fertiliser being applied.

Comments

- ❑ Be aware of the risk of prussic acid (HCN) poisoning with forage sorghums. This risk is greatest when crops are less than 60 cm high or are moisture stressed or frosted. Some hybrids are selected for low prussic acid.
- ❑ Cut or graze when 60–120 cm high to maintain best quality and avoid HCN poisoning.
- ❑ BMR hybrids generally offer significant improvement in feed quality but may be lower yielding than some other hybrids. Note that there is variation in quality and yield of BMR hybrids.
- ❑ Sulfur/salt blocks will improve animal production.
- ❑ Avoid grazing hungry stock on forage sorghum.
- ❑ Slash old stalks to 15 cm high after grazing for quality regrowth.
- ❑ Forage sorghum produces the largest bulk of summer feed per hectare.
- ❑ Can be used for silage if cut at 100–120 cm high and quickly wilted.

- ❑ Management of forage sorghum will affect growth and feed quality more than variety selection.
- ❑ Nectar can also be used for autumn carry-over feed.
- ❑ Forage sorghums are not recommended for horses.

What to sow	Seed rate kg/ha	Sowing time
Hybrid pennisetum (Pearl millet) Pearler, Nutrifeed*. Will not flower until April.	**Irrigation** 10–15 kg/ha **Dryland** 6–8 kg/ha	Late Oct – Dec. Soil temperature should be at least 18°C.
Siberian millet (white panicum)	10–15 kg/ha	Soil temp should be at least 18°C and rising.

Fertiliser requirements

As for millet and forage sorghum

Comments

- ❑ Must have good seedbed, warm soil and good moisture before sowing.
- ❑ Does not tolerate waterlogging.
- ❑ Prefers well drained light soil.
- ❑ Not as fast as Japanese or Shirohie but produces more feed late in the season.
- ❑ Graze when 30–60 cm high. Graze stubble down to 15 cm height.
- ❑ Keep below 1 m high for best results.
- ❑ Hybrid Pennisetum does not cause prussic acid poisoning (suitable for horses).
- ❑ May not recover if cut low for hay or silage.
- ❑ Siberian millet not as cold tolerant but tillers profusely and better regrowth than Shirohie or Japanese in warmer areas.

Autumn carry-over feed or pit silage

What to sow	Seed rate kg/ha	Sowing time
Sweet sorghum, e.g. Megasweet, Hunnigreen, Sugargraze. May also use dual purpose sorghum (see later section) for silage.	10–20 kg/ha. Use higher rates for irrigation or high rainfall.	Nov–Feb

Fertiliser requirements

As for forage sorghum.

Comments

- ❑ Best used for green chop or chopped silage.
- ❑ Direct harvest for chopped silage at soft dough stage.
- ❑ Sweet sorghum can be grazed at greater than 100cm high, shorter plants may have high prussic acid poisoning risk.
- ❑ Does not recover from grazing as well as forage sorghums.
- ❑ See your seed company for further details on seed rate.

Summer legumes

What to sow	Seed rate kg/ha	Sowing time
Lablab e.g. Rongai, Highworth	**Irrigation** 30 kg/ha. **Dryland** 15–20 kg/ha. Use higher rates if broadcasting.	Nov–Jan
Cowpeas e.g. Meringa, Poona, Caloona, Ebony, Red Caloona (early maturing type).	10–14 kg/ha dryland. Use higher rates if broadcasting.	
Soybeans may be used as a summer forage legume.	See pages 4 & 5	

Fertiliser requirements

- ❑ 10–20 kg P/ha, e.g. 125–250+ kg/ha superphosphate, and 50 kg K/ha, e.g. 100 kg/ha muriate of potash, unless soil testing indicates they are not needed.
- ❑ On acid soils use molybdenum (Mo) in super every 4 or 5 years or when inoculating (100g/ha molybdenum trioxide mixed with seed when inoculating).

Comments

- ❑ Summer legumes lablab, cowpeas, soybean are not normally used on the South Coast.
- ❑ Inoculate cowpeas with Group I, lablab Group J.
- ❑ Can apply Trifluralin herbicide before sowing to control summer grasses.
- ❑ Leave 30 cm of stem after grazing to allow quick regrowth.
- ❑ Can be used as a green manure crop.
- ❑ Cowpeas show good drought tolerance but are very sensitive to waterlogging.

- ❑ Ebony is best where phytophthora may be a problem; Meringa is high yielding but later maturing.
- ❑ Lablab is late maturing and therefore gives better late autumn feed.
- ❑ Lablab performs better in heavy soils while cowpeas are better suited to lighter soils.
- ❑ Refer to Agfact P4.2.16, *Summer legume forage crops: Cowpeas, lablab, soybeans*.
- ❑ Poona and Caloona are particularly susceptible to disease in wet seasons.

Other summer crops

Grain sorghum

Grain sorghum can be managed to produce stock feed grain or chopped/bulk silage. Grain sorghum silage will have better feed quality than sweet sorghum silage (due to grain content) but yield may only be 30–50% of the yield from sweet sorghum.

Grain sorghum is earlier maturing than maize. It does not have the high yield potential of maize under good growing conditions but it may out-yield maize if moisture or soil fertility is not ideal. Grain sorghum may be affected by bird damage, ergot or wet weather at harvest.

What to sow	Seed rate kg/ha	Sowing time
Grain Sorghum Raingrown, good conditions, e.g. MR Buster, MR43, MR Bazley, Dominator, Tiger.	**Favourable dryland:** 50–75,000 plants/ha. 3–5 kg/ha sown in rows.	Late Oct to Jan. Soil temperature at least 16°C and rising at sowing depth.
Marginal conditions, quick maturing e.g. 84G99, Tiger, Venture.	30–40,000 plants/ha (2–3 kg/ha)	
Irrigation e.g. MR Buster, MR Bazley, MR Maxi, 85G56, Enforcer, Liberty White.	100,000 plants/ha	Beware of sorghum midge and ergot risk to late plantings.
Silage Any above or special purpose varieties, e.g. Graze-N-Sile, Chopper, Liberty White.	4–8 kg/ha (high rate for irrigation).	

Fertiliser requirements

- ❑ 20 kg N and 20 kg P/ha, e.g. 100 kg/ha DAP or equivalent at sowing. Place fertiliser below or to the side of seed, not with the seed. Plus
- ❑ 100–250 kg/ha urea either pre-plant or top-dress.
- ❑ Zinc may be needed on alkaline soil. May need extra nitrogen for high yields under irrigation.
- ❑ See note on nutrient removal for more information.

Comments

- ❑ Need subsoil moisture (100 cm) and/or rain for reliable yield.
- ❑ Control broadleaf weeds with atrazine and grasses with metolachlor products. If using metolachlor ensure seed is treated with Concep II. When using atrazine, beware of residues affecting the following crop.
- ❑ Check for sorghum midge and heliothis activity from head emergence till end of flowering if grain product is desired.
- ❑ Direct harvest silage when mid-head grain at early dough stage.
- ❑ Beware of insecticide residue withholding periods for silage crops.
- ❑ Can modify seeders to sow rows at 50–100 cm.
- ❑ Prussic acid poisoning, nitrate poisoning and ergot (alkaloid) poisoning is possible if stubble is grazed or made into hay. If possible, seek veterinary advice prior to grazing.
- ❑ Number of seeds per kilogram ranges from 25,000 to 35,000 (check the label).
- ❑ Specialist silage-type grain sorghums are taller and may be higher yielding for silage than regular grain sorghum hybrids. The higher yield is due to increase in stover (leaf and stem) compared to grain which may reduce silage quality.
- ❑ For further information Summer Crop Production Guide 2011 at www.dpi.nsw.gov.au/pubs/scpg

Soybeans

Soybeans can be grown as a rain fed crop or under irrigation. They can be sold for crushing to the Cargill oilseed factory at Newcastle or can be harvested for either round bale or chopped bulk silage. Soybeans are a very useful crop prior to sowing an improved pasture.

What to sow	Seed rate kg/ha	Sowing time
Grain or Silage Intrepid, Valiant, Hale.	250–350,000 plants/ha (25–35 plants/m^2) from 65–90 kg/ha seed.	Early Nov to early Dec best.
Manta, Zeus, Soya 791, Poseidon.		Note: Sowing time varies depending on location & variety – see Summer Crop Production Guide for details

Fertiliser requirements

- ❑ 20–40 kg P/ha (e.g. 250–500 kg/ha superphosphate or equivalent) unless soil test says phosphorus is not needed and sulphur is adequate.
- ❑ High analysis fertilisers may be more convenient.
- ❑ Molybdenum (Mo) required on acid soil, best applied as Mo trioxide seed dressing.
- ❑ Potassium will be needed in many areas. Use 100–250 kg/ha muriate of potash.

Comments

- ❑ Soybeans tolerate wet conditions better than cowpeas.
- ❑ Soybeans can be grazed once only.
- ❑ Seed must be inoculated with Group H inoculant.
- ❑ High rates of fertiliser should be applied pre-plant and/or separated from the seed to improve establishment.
- ❑ Harvest for silage at mid pod fill growth stage.
- ❑ Some North Coast varieties, e.g. Manta, Poseidon and Zeus, are less susceptible to weather damage at harvest and acid soil problems caused by manganese. However, they are only suited to late sowing in this area.
- ❑ **Control weeds** – cultivated soil should be treated with Trifluralin herbicide pre-planting. A range of herbicides are available to control grasses and broadleaf weeds when they emerge.
- ❑ **Control insects –** especially where the crop is grown for grain.

Note: This information on soybeans is based on experience growing dryland soybeans on the NSW Coast and North West. Information on irrigated soybeans is also available.

Further information

- ❑ Soybean: North Coast NSW Planting Guide
- ❑ Publication ; Summer Crop Production Guide 2011 www.dpi.nsw.gov.au/pubs/scpg
- ❑ Raising the bar with better soybean agronomy: soybean case studies and demonstration site activities 2010 (available from GRDC)

Beef and Beans

Some North Coast producers are finding soybeans provide useful income diversification and excellent preparation for a pasture improvement program.

Maize

Maize needs good soil, fertiliser and weed control to be worthwhile. A good maize crop should yield 40–70 t/ha of silage (15–25 t/ha dry matter/ha) or 8–10 t/ha of grain.

Fertiliser requirements

- ❑ Up to 200 kg N + 40 kg P/ha + 150 kg K/ha. Check that soil sulphur is adequate.

What to sow	Seed rate kg/ha	Sowing time
Grain or silage e.g. PAC 624, PAC 607IT, GH5010, Hycorn 675, Pioneer 31H50, Pioneer 31G66, Pioneer P2309, Pioneer 32P55, PAC 924, Sirius, Olympiad, Amadeus, others available. There are quicker growing varieties available for late sowings but they generally have a reduced yield and may be susceptible to turcica leaf blight.	**Raingrown grain** 45–55,000 plants/ha. **Silage** 65 - 80,000 plants/ha. **Fully irrigated** 70 - 80,000 plants/ha.	October to early January.

Sowing

- ❑ 200 kg/ha DAP or equivalent applied to the side or below seed. Extra DAP may be applied separately.
- ❑ 150 kg K/ha e.g. 300 kg/ha muriate of potash where required. Deep banded below seed if possible.
- ❑ Apply pre-sowing or side-dress with 250 kg/ha urea or equivalent.
- ❑ Foliar zinc spray or soil application may be needed on alkaline soils.

Comments

- ❑ Pre-emergent herbicide to control grasses and broadleaf weeds – use atrazine + metolachlor mixture (e.g. Primextra Gold®).
- ❑ Post-emergent control of broadleaf weeds – use 2,4-D and others where necessary. See *Weed Control in Summer Crops 2010–11.*
- ❑ Fertile alluvial soils preferred. High fertiliser input needed for high production.
- ❑ Calibrate planter to ensure accurate seed placement. Silage crops usually aim for 10–20% higher plant population than for grain crops.
- ❑ Sow in good soil moisture. Sowing depth of 4–5 cm is preferred.
- ❑ Chop for silage when grain has a milk line score of 2.5 – this is after the kernels have started to dent.
- ❑ Control African black beetle – avoid sowing maize straight after kikuyu or paspalum pasture – black beetle is often between generations in early December. You can band spray with chlorpyrifos insecticide when planting and/or use seed treated with insecticide and a fungicide.
- ❑ See Summer Crop Production Guide 2011 for details on varieties, maturity, husk cover, lodging resistance, disease and plant height from www.dpi.nsw.gov.au/pubs/scpg
- ❑ See NSW DPI agronomists for local maize silage trial data.

Major seed companies have publications suggesting sowing rates and characteristics for their own products.

Maize crop checking guide

You can use this table to check the seed output of your planter and to check plant numbers in an emerging crop. When sowing maize remember to increase seed numbers to allow for germination percentage and establishment losses.

Plants per 10 m of row

Plants per ha	70 cm	75 cm	80 cm	85 cm	90 cm
70,000	49	52	55	59	63
65,000	46	49	52	55	59
60,000	42	45	48	51	54
55,000	38	41	44	47	50
50,000	35	38	40	43	45
45,000	31	34	36	38	41
40,000	28	30	32	34	36

Calculating seed rates

To determine the number of kilograms of seed you require to sow 1 ha, divide the number of plants you want per hectare by the number of seeds per kilogram.

Since, under field conditions, only 80–90% of the seed sown will produce a plant you need to adjust for this. For example if you require a maize population of 45,000 plants/ha and there are 3,200 seeds/kg, given that only 90% will geminate and 90% of those that germinate will produce a plant, the equation is:

$$\frac{45{,}000}{3{,}200} \times \frac{100}{90} \times \frac{100}{90} = \textbf{17.4 kg/ha of seed}$$

Nutrients removed

Per tonne of dry matter harvested as silage:

Nutrient	kg/ha
Nitrogen (N)	14
Phosphorus (P)	2
Potassium (K)	10
Sulfur (S)	1
Calcium (Ca)	2

Grazing height

Grazing height is critical to ensure good feed quality, forage production and regrowth. Graze at these heights:

Millet	20–30 cm
Forage sorghum	60–120 cm
Pennisetum forage	50–100 cm
Cowpeas & Lablab	Full canopy cover which is usually 50 cm until start of flowering. Only graze leaves leaving a framework of stems for quick regrowth

Soil temperature

Soil temperature is important. If summer crops are sown when the soil temperature is too cool, germination will be slow and the seedlings are more prone to pests, diseases and competition from weeds.

To measure the soil temperature, put a thermometer at planting depth in the paddock ready to be sown. Do this at 9.00 am Daylight Savings Time for a few days. If the temperature is at the recommended level and rising, then it is OK to sow. Alternatively, you can use the average of the maximum plus minimum daily air temperatures (max + min) ÷ 2 to get a rough guide for the soil temperature.

For all summer grain crops

Summer Crop Production Guide 2011

For information on summer growing pastures

See local sowing guides, e.g. *Pasture and Winter Forage Crop Sowing Guide – Hawkesbury–Nepean, Hunter and Manning Valleys* or consult your agronomist for more specific information.

More detailed publications are available on the website or for sale.

Website address: www.dpi.nsw.gov.au Select Field Crops and Pastures, then Pastures, then Pasture Planner for detailed information on each species mentioned. Browse the site for additional information.

DairyLink and DairyCheck

This series of handbooks and workshops for groups of dairy farmers covers:

- establishing pastures
- managing pastures
- growing heifers
- realistic rations.

See www.dpi.nsw.gov.au

PROfarm

A wide range of short courses are now available under the NSW Department of Primary Industries PROfarm program. Courses include:

Weekend short courses

- planting pastures
- soil and fertilisers
- chainsaws
- weeds
- managing improved pastures
- safe use of tractors
- Prograze Abridged
- fencing
- farm chemicals
- Cattlecare

For more details contact your local NSW DPI office or phone 1800 025 520 or (02) 4939 8881 or www.tocal.com or www.profarm.com.au

PROGRAZE

A series of workshops for beef producers covering:

- pasture assessment
- livestock production from pastures
- cattle condition scoring
- cow breeding
- pasture and grazing management
- and more!

Topfodder Silage

A 3-day course covering all aspects of fodder conservation with emphasis on silage. It includes:

- principles of making silage
- crop/pasture selection
- making, storing and feeding silage
- economics of fodder conservation.

LANDSCAN

LANDSCAN will give you skills to:

- understand your landscape limitations
- assess paddock potential
- understand your landscape limitations
- choose the right pastures for different landscapes
- understand and manage soil fertility, acidity and salinity
- match livestock requirements with landscape variability
- prioritise inputs and manage for production and sustainability.

For further information contact:

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Warnings

Animal health aspects

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

Native vegetation

The *Native Vegetation Act 2003* may restrict some pasture improvement practices where existing pasture contains native species. Inquire through your local Catchment Management Authority for further details.

Always read the label

Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product and strictly comply with the directions on the label and the conditions of any Permit.

Users are not absolved from compliance with the direction on the label or the conditions of the Permit by reason of any statement made or omitted to be made in this publication.

Pesticide residues may occur in animals treated with pesticides or fed any crop product, including crop residues, which have been sprayed with pesticides.

It is the responsibility of the person applying a pesticide to do all things necessary to avoid spray drift on to adjoining land or waterways.

ISSN 1832-6668

PUB07/49[v2]