



# Focus

# on

# Forage



## 1. Why grow maize for silage?

- Maize is higher yielding (typically 25 to 50 tonnes per hectare of green chop) than most other fodders grown for silage
- Maize silage is an energy rich forage that can be used in the ration instead of expensive concentrates
- Maize silage is highly palatable
- Maize silage contains fibre for rumination and energy for milk production and body condition
- Maize is harvested less frequently than grasses and legumes (once a year although two crops a year can be grown in some districts of northern Australia)
- Maize maintains consistent quality over a wide harvest window
- Maize is harvested directly without the need for in-field wilting
- Maize silage has high dry matter and energy, which compliments grass-based rations

E D I T I O N O N E



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## 2. Choose the right hybrid



- Select a hybrid with high grain yield (for high energy silage). Grain contains 70 per cent more metabolisable energy and more carbohydrates than stover (the green parts of the maize plant).
- Make sure the hybrid also has high total dry matter yield (for high silage yield)
- Choose a hybrid with high levels of 'staygreen'. This characteristic helps maize plants maintain green leaf area during periods of moisture stress at the end of the growing period and generally slows crop drydown giving a longer harvest window.
- Make sure the hybrid is suited to your growing area and time of planting including:
  - Disease resistance. Some diseases are more prevalent in some areas or at certain times of the season.
  - Comparative relative maturity (CRM) rating. CRM gives an indication of the number of days between planting and harvest. The actual growing period will vary depending on the amount of heat units during the growing season. Generally hybrids with lower CRM ratings (eg 100) are more suited to southern areas with cooler shorter summers. Those with higher ratings (eg 118) are more suited to northern areas with warmer, longer summers.

## 3. Practise the right agronomy

### Nutrients

Maize silage crops remove more nutrients from the soil than a maize crop grown for grain, especially potassium. Base your fertiliser application rates on a pre-planting soil test and an expected silage yield.

| Silage yield | Maize nutrient removal (kg/ha) |            |           |        |
|--------------|--------------------------------|------------|-----------|--------|
|              | Nitrogen                       | Phosphorus | Potassium | Sulfur |
| 50 t silage  | 190                            | 34         | 150       | 24     |
| 60 t silage  | 240                            | 46         | 188       | 34     |
| 75 t silage  | 320                            | 56         | 236       | 42     |

Yield will be determined by available water and nutritional inputs. Shortages of either will reduce yields.

**Nitrogen** supply has the most influence of all the nutrients on yield, but applying too much is uneconomic and increases the risk of nitrate leaching. Ideally nitrogen applications should be split with some applied at planting in a starter blend and the rest side-dressed, normally as urea.

**Phosphorus** is important in early root and seedling development and in general plant vigour. The best application method is banded near the row at planting.

**Potassium** is essential for vigorous growth and for production and movement of carbohydrates to the developing corn ears. Because this nutrient is not readily leached from the soil, applications can be made any time during land preparation.

**Zinc** – maize plants have moderate to high susceptibility to zinc deficiency, which is vital for healthy plant growth in the first three weeks. If required, soil applications are best, and should be made well before planting.

**Sulfur** and **magnesium** may also be needed if soil tests show inadequate levels for growing maize silage.

### Weed control

Good weed control is very important for high maize silage yields. Weeds, especially grass weeds, compete very strongly for moisture, nutrients and light.

If you are using a grass pasture to grow maize, spray it out as soon as the field can be taken out of the rotation and preferably between three and six weeks before planting.

Inter-row cultivation can be used until the maize crop is about 0.75 cm tall. Cultivate at a shallow depth to avoid root pruning. There are chemicals available that can give good weed control throughout the life of the crop if used correctly. Consult your local area manager or Pioneer retailer for more information.

### Water management

To achieve maximum silage yields maize plants must not be restricted at any stage of growth. The key elements for maximum yields are nitrogen and water.

A 50 tonne crop of maize silage will need between 600 and 700 mm of soil water as stored water before planting, rainfall and/or irrigation.

The most important time for adequate crop water supply is from about two weeks before flowering (tasselling) through to early grain fill.

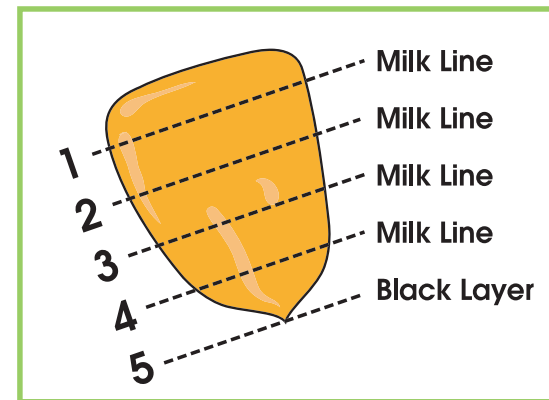
The soil's capacity to store water largely determines the amount and frequency of irrigations (if irrigation water is available) and is of paramount importance in deciding yield goals under dryland farming.

## 4. Harvest at the right time

Harvest your crop when whole plant dry matter is between 30 and 35 per cent. Harvesting a crop at higher moisture contents than this (ie harvesting too early) will lead to yield and quality losses. Harvesting later than ideal leads to higher fibre and less digestible silage that is hard to compact.

Plant dry matter can be estimated by looking at the milk line of the grain. Slide your fingernail along the length of a kernel starting at the flat end. When the milk line has descended one third to half way down the kernel (milk line 2-3) the crop is about 30 per cent total dry matter and ready for the bunker.

Dry matter moisture contents may need to be adjusted depending on the silage storage structure – see section 6 for more details.



### Chop length

A fine, even chop is essential to maintain quality. Aim for an average chop length of around 13 mm with a range in length from 10 to 20 mm. This chop length reduces oxidation losses during storage and maximises the amount of silage able to be stored. If the maize is dryer than 30 per cent, reduce the chop length to 5 mm.

### The squeeze test

Squeeze a handful of chopped maize from the first load. If the palm of your hand feels moist your silage is at about the correct moisture content and chop length. If you can wring water out of the silage you will almost certainly have runoff losses from your stack or bunker. In this case, increase chop length and retest. If there is no improvement, stop harvesting and wait for the crop to mature further.

## 5. Store in the right structure

Maize silage can be stored in a bunker, an aboveground silage stack or a silo. The ideal whole plant dry matter content for bunkers and stack is 30 to 32 per cent (milk line 2-3). Build your bunker or stack on a firm base away from hedges, trees and major drains. Choose a site that will give you access in all weather conditions. Design the bunker or stack so when feeding out silage you should be able to remove at least half a metre from the face every three days.

When constructing a bunker make sure the walls are as perpendicular as possible and the floor is well drained for all weather access (a concrete bunker is ideal).

Upright silos give ease of handling at harvest and feeding out silage but are expensive to install. Dry matter contents of 35 per cent are recommended with an increase of 10 per cent recommended for every three metres above 15 metres in silo height.

### Recommended dry matter for different silage structures

| Structure           | % dry matter |
|---------------------|--------------|
| Bunker/stack        | 28-32        |
| Pit or upright silo | 32-37        |
| Sealed structure    | 40-50        |
| Round bale          | 45-55        |

## 6. Store in the right way

### Spreading loads

Fill the bunker or stack as quickly as possible to minimise exposure of the silage to the air. If possible fill in a wedge shape. Spread each load into a 100 to 150 mm layer for ideal compaction. If large loads are delivered, dump them in front of the stack, then layer small loads into the stack or bunker from the large pile.

### Compaction

Continue compacting by driving a tractor over the stack or filled bunker for up to two hours after the final load has arrived. If possible re-compact the silage 24 hours later.

### Smoothing and covering

The stack or bunker should have a smooth surface with no bumps or hollows. Seal around the base of silage stacks by placing a layer of sand or lime on top of the cover. If the cover must be overlapped, ensure that the joints are sealed well. If possible avoid a large overlap as condensation can form between layers of plastic and run into the silage causing spoilage. Weigh down your silage cover firmly with tyres or sandbags placed closely together.



## Microwave moisture testing for silage

1. Collect average samples from your maize crop (grain and stover) and mix thoroughly to make up the test sample.
2. Cut sample into 5-10 cm pieces, weigh 100-500 grams of sample of a small accurate scale. This is the wet weight.
3. Place sample on a microwave-safe shallow plate and spread into a thin layer.
4. Put a half full glass of water in the back of the microwave. Keep water level constant during oven use.
5. If you estimate the sample to be 50-70 per cent moisture, dry for three to four minutes. If the sample feels almost dry after this drying period, weigh and record weight. Stir sample and place it back in the oven for one minute.
6. Continue procedure No 5 reducing the time to 30 seconds until drying does not reduce the sample's weight by more than two grams. Stop drying if the sample begins to char. If charring occurs, use the previous weight for calculating moisture content. In other words, the dry weight is the last recorded weight after drying does not decrease the sample's weight by more than two grams and charring has not occurred.
7. To calculate per cent moisture, subtract the dry weight from the wet weight and divide this number by the wet weight. Multiply the result by 100. For instance:

**Wet weight of sample = 200 grams**

**Dried for four minutes = 70 grams**

**Dried for another 30 seconds = 65 grams**

**Dried for a further 30 seconds = 64 grams (dry weight)**

**Wet weight - dry weight = 136 grams**

**136 grams divided by wet weight (200 grams) = 0.68**

**0.68 multiplied by 100 = 68% moisture (or 32% dry matter)**

Note: Drying time may vary between microwaves because of power differences.

## 7. Inoculate with the right product

### Pioneer™ brand 1132 maize silage inoculant

This is a bacterial silage inoculant that is used to enhance silage quality. Pioneer 1132 contains bacteria that are specially selected to give a faster, more efficient fermentation leading to silage with higher palatability and digestibility. As a result you get more milk or meat per tonne of maize ensiled.



## 8. Feed out in the right way

Aim to keep the face of the maize silage stack tight throughout the feed-out period. You should not be able to push your fingers into the stack any further than the depth of your fingernails. Loose silage allows air to penetrate into the stack causing spoilage. Maize silage that is well compacted and sealed will not contain moulds, which grow once the silage has been exposed to the air for a few days or more.



Some moulds can cause animal health problems and even death.

Careful use of the tractor bucket at feed-out time will minimise silage loosening. If possible, use the bucket to chip down silage then scoop it up from the ground. Avoid digging into the stack as this loosens silage that will not be fed for several days. An alternative is to move sideways across the bunker face removing small amounts of silage from the whole face.

Introduce maize silage into the diet over a period of 5-10 days. Start by allocating each animal 1-2 kg dry matter and increase the amount that you feed each day. This will allow the cow (and its rumen) time to get used to the maize silage. Feeding out large quantities of maize silage in the first few days may result in wastage.

A well fermented, high-grain-content maize silage can have an energy level in excess of 11.5 megajoules of metabolisable energy per kilogram of dry matter. Maize silage will always have a low crude protein content but urea can be added to increase protein levels.

## Pioneer brand™ maize hybrids ideal for silage:

38F70 (CRM 95)

A very early hybrid that produces excellent yields of high quality silage. Ideal for growers who want to plant and harvest early. Outstanding vigour.

36H36 (CRM 100)

Early maturity. Excellent double-cropping option for irrigators or to spread harvest windows. Very good early growth, standability and disease resistance.

3527 (CRM 106)

Produces outstanding silage yields with well-filled cobs. Early-mid season market leader. Excellent standability, stress resistance and staygreen.

3335 (CRM 113)

Good staygreen and grain content. Responds to good management and conditions making it an excellent choice for high quality silage.

31G98 (CRM 117)

An exceptional new hybrid with outstanding silage yield potential. Regularly tops grain and silage trials.

3237 (CRM 118)

Very high grain yield in full season areas giving high quality, high energy silage.

31H50 (CRM 123)

The silage specialist with outstanding disease tolerance. Very vigorous early growth. A large plant with high grain content and good staygreen producing excellent silage yields. Suited to early or late planting.

### For further information contact:

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