

Making the most of maize silage

Key points

- ✿ High-yielding maize is not always the most profitable
- ✿ Manage water and nitrogen together
- ✿ Adjust plant density to improve quality



HIGH yields are desirable in maize crop silage, but the most profitable maize crop for silage is not necessarily the one with the highest yield.

The nutritional value of high-yielding maize crops tends to drop because the increase in grain percentage can be offset by an increase in fibre content.

We learnt this the hard way in FutureDairy trials where we consistently obtained 25-plus tonnes dry matter (DM) a hectare (harvested) but with energy contents always lower than 10 megajoules of metabolisable energy per kilogram of DM.

It is best to aim to manage the maize crop to optimise both yield and nutritive value.

Water and nitrogen (N) are the two most critical inputs to ensuring a profitable crop of maize silage. They are interrelated, so they need to be managed together to optimise yield and quality.

A high-yielding maize crop will extract more than 300kg N/ha. At least 80 per cent of this needs to be added to achieve high yields.

Nitrogen-use efficiency improves with irrigation and water-use efficiency improves with nitrogen application. But there is a point where the marginal return decreases and it's not



To achieve profitable maize silage, manage the crop to optimise both yield and nutritive value.

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profitable to increase inputs beyond that 'optimal' level.

Tip 1: Do not apply the full amount of nitrogen to a crop if water will be limiting.

When planning fertiliser applications for a maize crop, take into account irrigation water availability. If water is likely to be limiting, adjust nitrogen application. For example, N application both presowing and at V6 stage are highly recommended, but if an adjustment is needed, save the N for the V6 stage.

Tip 2: Time water application for greatest response.

If irrigation water is likely to be limiting, resist the temptation to under-irrigate throughout the whole season. There will be a better response to water by timing water applications to critical periods. This means prioritising water around crop establishment (up to about six-leaf stage) and the five-to six-week period around tasselling. Maize uses most (about 70 per cent) of its water requirements in the three weeks either side of tasselling so make sure it receives its irrigation needs at this time.

Tip 3: Match fertiliser rates to target yield.

Aim to apply at least 80 per cent of nutrient requirements as fertiliser. Soil testing or tissue sampling is the best way to determine fertiliser rates. ▶

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◀ However, as a rule of thumb, high-yielding maize crops remove:

- 10-12kg N/t DM/ha;
- 2-3kg phosphorus/t DM/ha; and
- 8-10kg potassium/t DM/ha grown.

Tip 4: Time nitrogen applications for greatest response.

Maize uses nutrients throughout the growing cycle but its greatest need for nutrients is when the plant is growing most rapidly, from about 45cm high to grain fill.

To supply the crop's needs, it is best to apply at four stages (if fertigation method is available): pre-planting, planting, at 45cm high (V6) and at tassel emergence (V12). If this is not possible, split nitrogen application into about half pre-sowing and about half at V6.

If a limited amount of nitrogen is available (for example, less than 120kg N/ha) it is better to save it for around the V6 stage. In our trials, application at V6 only increased grain content by 36-57 per cent across a range of irrigation regimes, and increased water use efficiency by about 30 per cent compared with 12 per cent when the N was applied pre-sowing only.

Tip 5: Adjust plant density to nutrients and water.



FutureDairy's Professor Yani Garcia says water and nitrogen are the two most crucial inputs for achieving profitable maize silage.

Plant density should be managed in relation to available nutrients and water.

We have used high plant densities (more than 100,000 plants/ha) to achieve greater than 25t DM/ha with full irrigation and about 270kg N/ha but this results in excess fibre accumulation across the whole plant, and particularly in the cob. A plant density of about 80,000-85,000 plants/ha

will normally give a better balance with irrigation and fertigation (or pre and post sowing application of N) are available. **D**

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