



# Using crops for silage

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## in a nutshell

- Silage produces high animal growth rates and milk production, and the quality of well-made silage can be almost as good as that of the original forage
- Selecting a pasture or crop for silage making should take into consideration feed value of the species, how easy the species is to ensile, what grows best in the local area and seed availability
- Maize is renowned as the outstanding crop for silage, producing high yields of high energy forage and it is easily ensiled
- **TopFodder Silage**, a joint initiative of NSW DPI and Dairy Australia, gives farmers, silage contractors, advisers and agribusiness unprecedented access to the most comprehensive collection of information and expertise about silage in Australia

***Silage produces high animal growth rates and milk production, and its production for on-farm use has been an important component of many livestock enterprises. However with the advent of small wrapped bales, silage is now being traded widely.***

Most crops or pastures and a range of by-products can be made into silage. To maximise economic returns, crops should be high yielding and high quality.

Feed quality of silage is limited by the quality of the forage at harvest. This depends mostly on the species and the growth stage at harvest. While other factors such as growing conditions, soil fertility and plant disease have an impact, it is the ratio of stem to leaf and grain which has the greatest influence on silage quality.

The feed quality of well-made silage is almost as good as the original forage but silage will never improve on the feed quality of the parent forage. Significant losses in quality can occur if the silage making process is poorly managed.

When using crops for silage all pesticides used must be carefully monitored and steps must be taken to avoid unacceptable pesticide residues occurring in the silage.

## Selecting a silage crop

Selecting a pasture or crop for silage making should take into consideration which species has the highest feed value, which is easiest to ensile (to produce silage from), what grows best in the local area and seed availability.

Maize is renowned as the outstanding crop for silage. It produces high yields of high energy forage and is easily ensiled. It is also a very efficient user of water when plant population, fertility and weed control are correctly managed. However, maize is expensive to grow and requires careful management to produce good silage.

Grain sorghum and winter cereals including oats, wheat,

barley, triticale and cereal rye offer huge potential for silage in Australia. While not quite as good as maize, they are better adapted to a wide range of growing conditions.

Legumes have high feed quality and so have potential to produce high quality silage which can sustain higher intake and animal production than cereals at a given digestibility. However, they are not as easy to ensile as some species, as they resist the change to acid during fermentation.

Early and late cuts of lucerne can be successfully turned into silage if the crop is weedy or if conditions are too moist for hay making. Lucerne can be over sown with oats or ryegrass for silage production. Productive legumes such as vetch and field peas can be grown alone or in mixtures with cereals or grasses to improve feed quality. Soybeans are high in protein and make medium quality silage.

## By-products for silage

Various crop by-products (eg tomato pulp, citrus pulp, grape marc or potatoes) can be used as silage during drought, for opportunistic feed or in feedlots. These generally have medium to high nutritive value (high energy and some have high protein) but low dry matter and long-term storage is difficult. When using by-products it is important to have the feed tested for quality and to ensure there are no toxins or contaminants. The feed must also be acceptable to animals.

## Making silage from crops

The key to good silage making is to harvest at the right plant growth stage, achieve the correct chop length of the forage, to exclude the oxygen from the silage and to seal it well. This helps to ensure that the anaerobic fermentation process of the forage works well, so that the correct pH is achieved for good storage.

Timely harvest and good management of forage before

storage will maximise the quality of the forage. This may be influenced by weather conditions and availability of contractors but the major factor should be the growth stage of the crop.

If crops are harvested too early yield and feed quality are likely to be reduced, the silage will be too wet and effluent may be produced. Not only is silage effluent a pollutant, but valuable nutrients are lost from the silage. If harvested too dry, the silage is difficult to compact to exclude air and the silage will heat and lose feed quality or may go mouldy.

## Timing the harvest

### Maize

Maize is ideal for direct harvesting and storage as silage. Correct harvest timing can be determined by observing the developing grain in the cob. Aim for a milk line score of 2.5 (ie when grain in the middle of the cob is half milky and half solid starch). At this stage yield, feed quality and dry matter content will be optimised.

### Winter cereals

Winter cereals can all make excellent silage. They should be cut at the boot stage and quickly wilted before ensiling. At this growth stage both energy and protein levels will be high. Cereals can also be allowed to grow through to the grain dough stage before harvesting. Energy levels fall as stems and seed heads develop, then rise again as the grain fills. At this growth stage yield will be much higher, but protein levels will be much lower.

Cereal variety selection for silage is the same as for feed grain production – use the best adapted, highest yielding variety for the local area. Forage quality of cereals can be improved by sowing with a legume such as field peas or vetch.

### Grain sorghum

Grain sorghum is grown in areas considered marginal or unsuitable for maize. It can make good silage with 40–50% grain. It should be harvested for silage when grain in the middle of the seed head is at the dough stage. Feed energy levels depend on the proportion of grain in the forage at harvest.



**Figure 1: Maize silage stored in stacks or concrete bunkers is widely used as the basis of dairy feedlot rations**

Note that all sorghums run the risk of containing poisonous levels of prussic acid if cut too early or moisture stressed. Grain sorghum for silage should be more than 60 cm tall and should not be stressed at harvest.

Conventional grain sorghum varieties can be used although there are several specialist silage varieties on the market which grow taller and produce a greater bulk of forage. Low prussic acid varieties are also available.

### Sweet sorghum & forage sorghum

Sweet sorghum and forage sorghum can also be made into silage. Sweet sorghums produce a large bulk of leaf material, which is easy to store as pit or bunker silage. However, they have relatively low feed quality that will limit animal production. Forage sorghums should only be stored as silage if they cannot be grazed. They require a quick effective wilt to achieve effective silage fermentation.

### Lucerne

Lucerne for silage should be harvested between full bud and flowering to ensure the best quality. Dry matter increases but quality declines as the crop matures. Cutting when any grass weeds are in boot may assist fermentation.

### Soybeans

Early to mid season varieties of soybeans that are sown early are recommended for silage making to ensure there is no leaf drop. The crop should be harvested when the pods are 65% filled with seed (growth stage R5–R6). Harvesting earlier at R3 improves quality but reduces yield potential by 30–40%. Wilting is important to achieve the correct moisture content for storage (35–40 % for chopped forage, 40–50% for baled silage).

It is critical that legume silages are wilted quickly and effectively to produce a well-preserved silage.

### By-products

The important thing with by-products is to exclude the air as quickly as possible to promote fermentation. Silage inoculants may also be needed to ensure that there are enough lactic acid bacteria present. The silage must also be sealed very well to prevent large storage losses.



**Figure 2: Winter cereals can make high quality silage – well-made silage has a good colour, no mould and smells sweet**



## Learning to make silage

### TopFodder Silage

**TopFodder Silage** is a national project aimed at improving the quality of silage produced on Australian farms. Improved silage practices could save many thousands of dollars a year in supplementary feed costs and reduce the “unseen” losses during harvesting, storage and feed-out.

A better silage system can boost production levels and enhance pasture management. Producing high quality silage and storing it effectively is also an important part of drought-proofing a farm.

TopFodder Silage is a joint initiative of NSW DPI and Dairy Australia. The project gives farmers, silage contractors, advisers and agribusiness unprecedented access to the most comprehensive collection of information and expertise about silage in Australia.

### Farmer short courses

Short courses for farmers are being conducted throughout Australia as part of the TopFodder Silage program. These show farmers how to increase the profitability of their farm by improving the feed value of their silage and reducing losses and wastage in all stages of the silage operation, from harvest to feed-out.

The course covers a range of topics including:

- the principles of silage making
- integrating silage into whole operation
- how to store silage
- best practice mowing, wilting and harvesting to maximise silage quality
- feeding management to reduce losses
- economics of decisions to make silage.

The course is delivered by presenters trained in best practice silage making and includes practical exposure to silage including visits to local farming operations. 🌾

TopFodder Silage courses are conducted by NSW DPI at Murrumbidgee Rural Studies Centre.

For more information about the courses phone 1800 628 422 or see the website: [www.mrsc.nsw.edu.au](http://www.mrsc.nsw.edu.au)

### Further information

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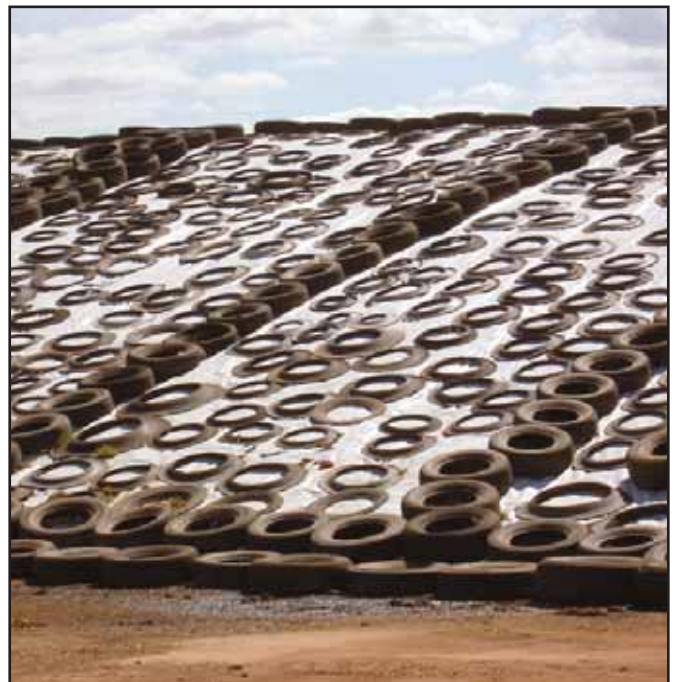
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**Figure 3: Improved silage practices could save many thousands of dollars a year in reduced supplementary feed costs and reduced losses during harvesting, storage and feed-out**