

Baled forage can be ensiled successfully in a range of above- and underground systems to produce high quality silage.

Minimise the risk of quality and DM losses during storage by producing well-compacted bales at the target DM content and by sealing the storage airtight with silage plastic as soon as possible after baling. Monitor and repair any damage to the plastic during storage to avoid significant quality and DM losses.

Above-ground storages that depend on plastic alone are only suitable for short-term storage. A protective layer of soil over the plastic will extend the storage life indefinitely, as long as the airtight seal is maintained.

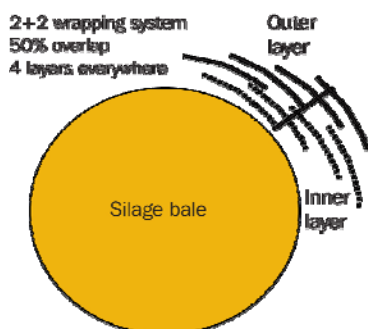
Individual above-ground bale storage

Round and square bales can be stored individually in stretchwrap plastic. The cost of plastic and wrapping makes this the most expensive option per tonne of DM stored.

Minimise losses by wrapping bales as soon after baling as possible (preferably within 1-3 hours). Wrapping at the storage site reduces the risk of damage to the wrap during handling and transporting.

The high surface area to volume ratio for bales (half the silage volume is within 12cm of the plastic) means DM and quality losses can be high if the stretchwrap fails. Minimise losses by using quality stretchwrap and the correct wrapping technique to ensure a cover of at least four layers of plastic. The preferred 2+2 system is shown in Figure 1.

Figure 1. The 2+2 wrapping system ensures at least four layers of plastic over the entire bale.



Goals for Successful Silage

- Choose a storage system that matches your farm operation – from crop and animal type to feedout.
- Minimise DM and quality losses by achieving an airtight seal as soon as possible after harvest, using plastics designed specifically for silage.
- Monitor the storage unit for damage to the airtight seal and repair any holes in the plastic with tape made specifically for repairing silage plastic.

Round bales stored on the flat surface retain their shape better and are easier to feed out. The multiple layers of plastic on the ends also provide greater protection from direct sunlight and sharp twigs or stones between the bale and the ground.

Advantages of individually wrapped bales:

- Flexible system suitable for small batches;
- No construction costs for storage;
- Flexibility in locating storage site;
- Existing hay-making equipment may be used;
- Easy to monitor silage stocks;
- Convenient to handle and feed out; and
- A saleable commodity.

Disadvantages of individually wrapped bales:

- Not suitable for all crop types;
- High cost per tonne of silage DM produced;
- Susceptible to damage if handled after wrapping;
- Susceptible to bird and vermin damage;
- Short-term storage (12 months);
- High feedout costs for large quantities; and
- Plastic disposal is an issue.

Above-ground bulk storage of bales

Round and large square bales can be stored in a variety of ways - in stacks under sheets of silage plastic, in stretchable plastic bags, in sausage rows, in double-bale plastic bags, in above-ground stacks, hillside pits or underground.

The main advantage of these systems is the lower cost per tonne of DM conserved compared to individually wrapped bales.

Large square bales are easier to stack than rounds making them more suitable for most bulk storage systems, either above or underground. Above-ground stacks are not recommended for round bales because pockets of air are trapped between the bales. This can lead to significant losses during storage and feedout.

Above-ground baled silage stacks are difficult to reseal. Damage to the plastic seal during storage and on opening can result in substantial losses to the whole stack. Minimise aerobic and feedout losses by storing bales in compartments as shown in Figure 2.

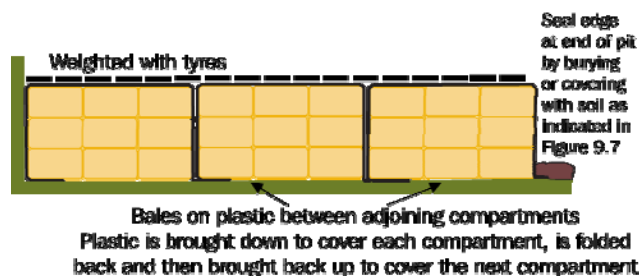
Storage life will depend on the type of plastic used. Stretchwrap plastic will give a storage life of 12 months, while plastic sheet can last for 2-3 years.

Bales stored in underground pits

Unwrapped round and square bales can be stored in pits or hillside bunkers and covered with plastic sheeting. A minimum layer of 30 cm of non-porous soil over the plastic is recommended for long-term storages. Do not cover the bales with soil only – the plastic layer prevents soil contamination and provides a barrier to water and air.

Compared to square bales, round bales are usually at greater risk of mould developing due to their lower density and air pockets between bales in storage. Minimise losses by storing the round bales in compartments of 7-10 days feed supply, with plastic sheeting separating each compartment. Store square bales in compartment of 2-3 weeks feed supply, as shown in Figure 2.

Figure 2. Storing bales in compartments minimises losses when the seal is damaged or the storage is opened.



Stretchwrap plastic film

Good quality plastic film, guaranteed for Australian conditions and applied using the 2+2 wrapping system should provide a 12-month storage life for wrapped bales. Most stretchwrap plastic films contain a UV light inhibitor or stabiliser, colour and some form of tackifier to ensure the layers of film stick together.

Plastic Sheeting

Plastic sheeting used for sealing silage above the ground should contain a UV stabiliser, be strong enough to prevent most puncturing and last several years. Plastics designed specifically for silage are 150-200 micron thick. Most plastic sheet used now is laminated (two sheets joined together - white on one side and black on the other) - and are stronger than traditional black plastics of the same thickness. The plastic is laid white side up, to reflect heat.

Builder's plastic will not provide an airtight seal and is broken down quickly by sunlight. Although not recommended, it may be satisfactory for use in underground pits when protected from sunlight by a layer of at least 30 cm of non-porous soil.

Location of stored silage bales

Consider the following when locating storage sites:

- Time and distance travelling to and from the site at harvest and feedout add to the silage cost.
- Ensure accessibility of machinery during harvest and feedout.
- Avoid low-lying or flood prone areas.
- Avoid water seepages near underground storages.
- Locate above-ground storages clear of trees, powerlines, etc.
- Fence above-ground storage sites.
- Control vermin and destroy potential harbours.
- Clearly mark the location of underground storages.

The information in this Silage Note is taken from the *Successful Silage* manual

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (May 2008). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

Acknowledgement: This Silage Note was originally prepared for the Topfodder Silage project. Topfodder Silage was a joint project run by NSW DPI and Dairy Australia with contributions from other state Department of Primary Industries or equivalent.