



Haylage: Don't cut corners!

**Frank Mickan
Fodder Conservation & Pasture Specialist
DEDJTR, Ellinbank Centre**

What's rectangular and stored within or under plastic but contains white or grey mould and is not very pleasant to the nose when the plastic is removed? It is large square baled silage, often referred to as haylage, that has gone bad or still going bad? Like many other new technologies some farmers and contractors just have to push the boundaries to try to get more from it or to try to make the output cheaper. Not to say that this is a bad thing in many cases, but for those making haylage, there are some traps for the unwary or misinformed.

Background to haylage

Australia was the first country to research and develop wrapped round baled silage. This research showed that the correct dry matter (DM) content range at which to bale for round baled silage was 40 to 50 per cent with the balers available at that time.

If baled below about 40 per cent, the forage often underwent a poorer fermentation resulting in both lost quality and DM silage of lower palatability. Conversely, if baled too high above the range, the bales underwent very restricted fermentation and were often mouldy. If holed, these much drier bales allowed air to move in more quickly and further than lower DM bales.

Then the large square balers arrived, producing tighter bales than the round balers, resulting in much less air being entrapped in the bales. This enables the anaerobic fermentation process to begin sooner, and theoretically, should result in slightly less nutrient and DM losses than in round bales and reduced incidence of mould growth.

Why has the DM range shifted upwards for large squares?

In earlier years the answer was very often that the drier bales were easier on the baler to punch out than in the 40 – 50per cent DM range despite most European balers being designed to handle square bales as low as 30 – 35per cent DM. However, contractors and farmers soon started to push the baling DM content levels above the recommended 40per cent to 50 per cent DM round bale silage range, the upper limit sneaking up to 60 to 65 per cent DM, and heaven forbid, even higher in some cases!

Haylage is the term now referring to forage ensiled, usually in large square bales, in the 45 – 65 per cent DM range, i.e. somewhere between silage and hay storage DM content ranges. However, the upper end of this range is approaching a danger zone where the material is too dry for the desirable ensiling bacteria to work efficiently. Very little fermentation occurs, if at all, but is still way too wet for safe hay storage, if plastic was not applied. The risk of heating and mouldy silage substantially increases as dry matter contents surpass about 55 to 60 per cent DM.

Having said all this, there are some farmers and contractors who do often succeed in producing large square baled silage with nil or minimum mould growth at DM in the 50 to 60per cent DM range but their large squares bales are individually wrapped soon after baling.

In the Australian context I like to see haylage being in the 45 – 60 per cent DM range as the material will still be moist enough to ferment and so ensile and is backed up by the experience of many seasoned operators.

Now, some traps for the unwary

Over recent years the transport of large squares as an alternative fodder has increased substantially. This is due to their shape, compactness, potential for high quality and high palatability. Among the successes of this approach to fodder purchasing, there are quite a number of disappointments and the following information may allude to the causes of the failures.

Wrapped vs modular stacks. Large square baled silage can often be successfully ensiled up to about 60 per cent DM, maybe even slightly higher, but, only if baled very tightly and individually or continuous in-line or sausage (Figure 1) wrapped very well and soon after baling. These systems should be successful provided there are at least six layers of plastic over the entire bale surface and the bales are not holed. If so, immediately repair with tape specifically developed for stretchwrap plastic.

Double rowed sausages are prone to air moving down the entire line at the juncture of the top and bottom rows so try to install “plugs” or plastic caps to try to stop this occurring.



Figure 1. Large square bales continuous-in-line wrapped

An alternative system is the storage of large squares in small modules or stacks under sheets of plastic which can be reasonably successful, if well sealed. To ensure the greatest chance of success with modules, the bottom edges of the plastic must be sealed airtight (preferably with soil/sand containing clay) and some form of weighting on top of the module to stop plastic flapping when windy (Figure 2). If not, the plastic will eventually crack and it needs only a very small hole/crack to allow the entire module to become filled with air and eventually mould growth and silage deterioration. These cracks are rarely noticed and/or never patched so air continues to enter the module. Air in equals dollars lost.

If the bales are extremely high DM, they are very likely to heat and start to become mouldy soon after the module is opened as the air can move into the bales further and more quickly. A major problem with storing this way is that if the plastic is holed during storage, and even if the hole was quickly patched (less than a few hours), the module will now have a lot of air entrapped which will allow some deterioration to start. If left unpatched for too long (several days to weeks), the bales will most likely be heating and mouldy at opening. For this reason small modules are preferable over large modules to contain any breaches of the stack.



Figure 2. Module well sealed and plastic well weighted

If storing in small stacks/modules, seriously consider using “aerobic spoilage inhibitor” type silage additives to delay mould growth and heating upon opening the modules at feed out. They will not be effective after three – five days in stacks with ongoing slow leaks from holes or poor sealing at the base. Be aware, these are not the general run-of-the-mill “fermentation enhancing” silage additives of which the majority are bacterial inoculants. Both are applied at harvesting.

Greater risk of rain. An issue in some regions aiming for the high DM large squares bales could be the arrival of rain or extended (greater than two – three days) wilting period before the DM target is reached. Either rain or an extended wilting period will result in lost quality and unseen lost DM material leading to lost dollars.

Too dry at baling. Sometimes, despite the best of intentions, bales may be baled 65 – 75+ per cent DM. This could be due to very large areas being cut and/or the weather suddenly becomes very hot which dries the forage quicker than it can be baled at the right DM content. It could be also caused by mechanical breakdowns, late contractor arrival, later maturing crops which dry more quickly than leafier crops, etc. Baling excessively dry forage can often result in DM being in the danger zone and nutrient loss in the form of dust. Any dust seen when raking and baling high DM large squares will be the highly nutritious leaf material resulting in DM and quality loss. Think too dry or dust, think dollars lost.

Delayed transporting and/or sealing. As mentioned earlier, unwrapped haylage bales are now being hauled many kilometers after baling and then sealed on farm. Bales should be on the truck as soon as possible after baling, ideally within the hour, and then sealed within an hour or so after arrival at the destination. Despite large square bales being relatively airtight compared to round bales, air will still be in contact with the outer edges and especially the bales at the front of the truck and may lead to slight breakdown of the forage into carbon dioxide + heat + water. Not a large issue if sealed airtight very soon after arrival.

As the outer areas are exposed to air, this then allows more air to move further into the bale/stack to continue the process. If bales are felt to be warm or heaven forbid hot, with maybe mould starting to appear then losses will occur deeper into the bales over time. Think heat and/or mould, think dollars lost.