

Some problems when making whole crop cereal silage

Frank Mickan
Fodder Conservation and Pasture Specialist
DEDJTR, Ellinbank Centre

Traditionally, cereals have been mainly grown for grain and sometimes for grazing. With droughts and shorter growing seasons occurring more frequently, often resulting in failures of cereal crops to reach maturity, farmers would make hay if there was enough bulk available. In recent years many farmers have been deliberately sowing forage and dual-purpose cereals for grazing and/or grain or harvested for silage or hay.

However, there have been many disappointments in the cereal silages made as farmers come to grips with the specific requirements for making well fermented cereal silage. Failures are usually due to misinformation, incorrect pre-harvest management and inappropriate timing (not always in your control) of various operations, inadequate sealing or maintenance of sealing, etc.

Many problems with whole-crop cereal silage relate to material being ensiled with the incorrect dry matter (DM) content. Whole-crop cereals can be ensiled at the vegetative Flag leaf - Boot growth stage (Figure 1) or in the grain formation late Milk- Soft dough stage (Figure 2).

Due to the high moisture content of the standing crop, cutting at the Flag leaf/Boot stage will require the crop to be wilted before harvesting but, at the more mature and drier Soft dough stage, the crop can be direct cut as it will be at the target dry matter at this stage. Table 1 shows the recommended dry matter contents at which to ensile cereals with various storage types and harvesting equipment.

Table 1. Recommended dry matter contents for whole-crop cereal silage

Growth stage	Silage type	Equipment	DM content (%)
Flag/Boot	Stack/Pit/Bunker	Loader wagon	33 ¹ - 35
		Precision chopper	33 ¹ - 40
	Round bale	Round baler	38 ¹ - 45
		Chopping baler	38 ¹ - 50
	Large rectangular bales	Large square baler	45 - 55
Late milk/early soft dough	Stack/Pit/Bunker	Loader wagon	Not recommended ²
		Precision chopper	35 - 42
	Round bale	Round baler	Not recommended ²
		Chopping baler	35 - 45 ³
	Large rectangular bales	Large square baler	38 - 45 ³

¹ DM contents could be up to 3 – 7 % units lower if suitable silage additive is used but silage will be wetter and heavier/unit volume

² Not recommended because mowing, raking and baler pick-up cause in losses of head and leaves, the most nutritious plant sections. Also, very hard to compact tight enough to exclude air.

³ Not ideal to use these machines for the reasons above but air exclusion is much better.

If you have problems with your cereal silage, it is good to know there is almost always an identifiable reason which can be avoided at the next harvest. Table 2 below discusses many problems, their causes and possible solutions or management options to avoid the problems in future.

Table 2. Problems, causes and possible solutions in whole-crop cereal silage

Problem	Causes	Possible Solutions
Animals reluctant to eat silage	Poor fermentation Low palatability Better feed on offer	Ensiled too wet or too dry. See Table 1. Feed cereal silage before offering other feeds if not aiming for high milk production. Do fermentation tests (Ammonia-N, pH). Use reputable and appropriate silage additives.
Animal production lower than expected	Nutritive value lower than expected. Too wet. Poor fermentation. Many seed heads lost at harvest at soft dough, esp. if harvested by loader wagon or baler. Increased head losses if harvested too dry. Too much fibre (stem:head ratio) in diet. Intakes reduced due to increased waste.	Send representative (cored) sample to FEEDTEST for full quality & fermentation (Ammonia-nitrate, pH) tests. Harvest at correct DM contents - See Table 1. Avoid inclusion of mud and dust. Unpleasant smell indicates poor fermentation. Moisture squeezed from sample indicates too wet at harvest. Do not harvest at Clear liquid – early Milk stages.
Stack is mouldy on top and edges	Air entering stack at top and/or sides	Forage too dry at ensiling? See Table 1. Compact top and edges tightly at ensiling. Cover stack overnight during harvest. Seal same day as harvesting ends. Seal stack edges airtight! Use single width sheet or overlap by 1 m or roll edges of overlapping sheets together approx. 0.3 m and place weights on rolled edge. Place weight eg. types, over entire stack surface. Spread salt immediately under the plastic seal. Check & patch holes regularly. Patch with specific plastic tape. Ideally, discard mouldy silage. Definitely do not feed mouldy silage to sheep, horses or pregnant cattle!
Stack is mouldy as above and further into body of the stack	Air entering stack at top and/or sides. Lot of air entering for long period Poorly compacted	As above. At ensiling, spread forage evenly in layers (~ 15 cm thickness). Roll slowly. Use very heavy equipment. Shorter the chop, better the compaction. Drier material needs to be chopped very short. See Table 1. Discard mouldy silage.
Silage stack heating at feed out	Air entering stack due to poor initial compaction. Silage	Remove only enough plastic sheet for 2 – 3 days feeding. Take more off the face each day. No more than 2 days to feed out whole face to

	removal allowing too much air too far back into stack. Unstable silage. Silage too long and/or too dry at harvesting.	depth of at least 20 – 30 cm. Use shear grab/block cutter to leave tight face. If using bucket or grab, remove silage by crowding down the face. Remove loose silage from floor and sides daily. See above for target DM's. Use specific silage <i>aerobic spoilage inhibitor</i> additives.
Bales are mouldy	Air in bales. Material too dry at harvest. Poorly compacted. Wrapping delayed (several hours to overnight), not enough wraps, too much underlapping. Plastic over stretched. Plastic holed during transport or storage.	Increase compaction by baling tighter or using chopper baler. Bale slower. See Table 1 for correct DM's. Wrap within 0 – 2 hrs after baling. Need minimum 4 layers over entire bale. Consider 6 layers if bales left on stubble or stand on end. Remove bales from paddock within 1 day of wrapping. Regularly inspect and patch holes immediately with specific plastic tape. Do not feed mouldy silage to sheep, horses or pregnant cattle! Ideally, discard mouldy silage if prevalent in outer layers.
Bales very wet or water sitting at base	Too wet at baling. Baled below 33% DM at boot stage or less than 38% DM at soft dough. Silage may be decomposing. Poor fermentation	Bale at correct DM content - See Table 1. Holes in plastic seal leading to silage break down (CO ₂ + water + heat). Do fermentation test (Ammonia-nitrate, pH).
Patches come off plastic sheets or wrap	Wrong tape. Wrong colour tape used. Surface not suitably prepared.	Use tape specifically manufactured for silage plastics. Use similar coloured tape on holed plastic eg. not green tape on black plastic. Don't use duct tape. Plastic surface to be clean, dry, cool and tape cut to length and allowed to shrink before applying.
Holes in plastic wrap in bales	Mice. Attracted to cereal silage made at soft dough stage.	Place bales on clear ground or sand/rock base. Lay bait some distance (5 - 10 m) away from bales so not to attract them to the bales. Form a hilled barrier of slaked lime around bale perimeter (burns claws).
	Birds	Move bales out of harvested paddock within 1 day - birds seek freshly exposed worms, slugs, etc. THEN attack bales. Stretch bale netting along tops of bales (birds hate claws being caught in netting). Sit old tyres on top (Birds worry about snakes inside?). Place net sheets over tyres/drums on tops of bales. String plastic humming wire diagonally across stacks of bales to catch (& hum) whichever way wind is blowing. String fishing line about 20 - 30 cm above bales to prevent birds landing/taking off.

Waste at feed out	Inappropriate feed out system, material too long, low palatability silage due to poor fermentation or mould	Use tombstones type feed rings or feeders. Fit metal or small mesh skirt to bottom of feeders. Material too long. Bale at correct DM (Table 1).
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Several Agnotes in the Victorian DPI Information Note Series, under Forage Cereals contain details about the making of whole-crop cereal silage.

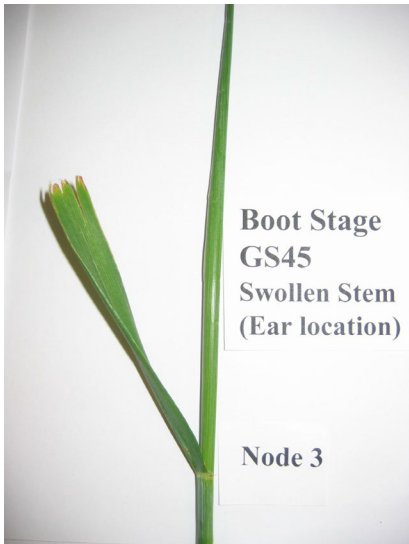


Figure 1a. Cereal at Boot stage

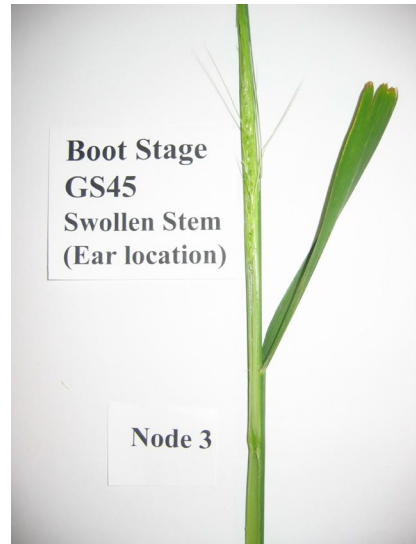


Figure 1b. Plant dissected to expose head



Figure 2. Crackerjack triticale crop at milk - early soft dough stage