BCG shared solutions

LANDCARE AUSTRALIA

'The Fresh Food People' WOOLWORTHS

Cutting Crops for Hay

This guide is a summary of the BCG experience cutting droughted and frosted crops for hay.

Which crops to target?

- Crops that don't have enough moisture to fill grain – particularly crops that started off well but experienced drought stress in spring.
- Frost damaged crops where frost has damaged the head and affected grain filling.
- Crops that are likely to return more by cutting for hay than harvesting for grain, eg. cereals grown on high nitrogen paddocks without enough soil moisture to finish grain fill.

How do I make the decision?

Inspect the paddock carefully

- Inspect the developing grain head and check for any sign of damage to the grain sites. Is there any sign of tipping/ lost florets from drought or frost? Is the head still green or has it gone white/brown? If the head is still within the stem, split the stem open to inspect the head.
- Sometimes the head will fill even when it is stuck inside the boot – especially in barley. But grain will not form where the head has turned white or brown. Check the head size and the likelihood of filling the head of these crops that are stuck inside the boot.
- How much green leaf area is remaining? In drought situations the plant can remove all of the nutrients from its leaves to support flowering and only the stems remain green. These crops are the least likely to be able to respond to rain as the leaf area (the "factory" for grain production) is lost.

Do the sums

Grain yield - When drought conditions set in before/ at flowering, a true grain yield assessment is very difficult because there are many unknowns – e.g. how many grains will fill? how big will the grains be? will it rain? Previous experience, crop simulation models such as Yield Prophet® or basic water use efficiency equations can be used as a tool for estimating the likely grain yield outcome.

Hay yield - It is relatively easy to estimate hay yield. The methods suggested below will help to calculate good hay yield estimates on which to base decisions.

METHOD 1: **A quick way to estimate hay yield in the field**
1. Cut 1m² of crop - at the height you will cut at (NOT ground level)
2. Weigh this fresh material using airseeder scales or similar to calculate **kg/m²** fresh weight
3. Multiply this figure by 10 to calculate **t/ha** fresh weight
4. To account for moisture and baling losses assume 20-30%* of the fresh weight will make it into the bale. Multiply step 3 figure by 0.2 or 0.3 to calculate **HAY YIELD t/ha**
5. Repeat at 4 or 5 locations across the paddock

METHOD 2: **Accurate calculation using actual dry weight**
1. Cut 1m² of crop – at the height you will cut at (NOT ground level)
2. Dry in the oven at low temperature (50°C) and weigh after a minimum of 24 hours to calculate **kg/m²** dry weight at approx 12% moisture
3. Multiply this figure by 10 to calculate **t/ha** dry matter
4. Assume 80-90%# of the dry weight (t/ha) will make it into the bale. Multiply step 3 figure by 0.8 or 0.9 to calculate **HAY YIELD t/ha**
5. Repeat at 4 or 5 locations across the paddock

** The percentage conversion increases with crop maturity. For crops that have flowered and are into grain fill, assume closer to 30% as the estimate of final hay yield. Less mature/fresher crops use 20-25% as the estimate of final yield.*

 # Final hay yield will depend on losses after cutting, such as those due to weather, raking or baler setup.

EXAMPLE:
Five 1m² cuts on a barley paddock weighed an average of 1.09kg/m² fresh weight
1.09 x 10 = 10.9t/ha of fresh material
10.9 x 25% = 2.7t/ha – estimated hay yield

When and where to start cutting

Order of cutting: Start with crops that will be the least likely to respond to rain.

Delaying cutting already very stressed crops will further dry down the leaf which can reduce quality and make the crop more difficult to bale (greater leaf loss).

Hold off cutting crops that are more likely to respond to rain until the most stressed crops have been cut. These crops will most likely keep growing and increase in hay yield. (These crops also have more chance of being harvested for grain if rain eventuates).

Cutting height: Realistically how low will you be able to cut this crop?

The rule of thumb for export quality oaten hay is "beer can height". This rule helps to maintain the quality of very thick crops by keeping them up off the ground, avoiding any dirt contamination and keeping the poor quality part of the stem out of the hay.

Droughted crops can be cut much lower than this depending on the presence of rocks or stone in the paddock and how smooth the soil surface is with clods.

Try to strike a compromise between yield, quality (no contamination) and ease on machinery.

Approx 35-40% of a cereal crop's bulk is below 12.5cm (data from BCG trial work at Manangatang 2007). Cutting lower than 12.5cm, if possible, will increase hay yield but will also expose the paddock to risk of erosion. You might decide some paddocks are not appropriate for hay as they will be too exposed over summer.

Cutting equipment: *Do you own any equipment that will do the job?*

Droughted crops are often short and don't contain a lot of bulk. When they are cut with narrow mowers the windrows are too narrow to bale without raking, but the raking process damages the hay by knocking leaves off. In 2006 and 2007 droughted crops in the Wimmera and Mallee were successfully cut using headers with draper fronts setup in the windrow position (so the output goes to one side).

The advantage of this cutting method is that losses can be minimised by going up and back in the paddock to put two windrows together, effectively doubling the size of the windrow and making it viable to bale failed crops that otherwise would experience too many losses during mower cutting and raking.

This method will double the size of the windrow, eg. a 11m (36ft) front will bring together a 22m (72ft) windrow – vastly improving the chances of a short crop being able to be baled.

Curing: If the head has not emerged from the boot at cutting time, the hay will take a long time to cure - usually up to 6 weeks or more in the September/October period.

Conditioning: Will decrease the time between cutting and baling but also increase the risk of rain damage.

If using a conditioner, try to leave some of the cut crop unconditioned. That way if a large rainfall event does eventuate the quality of the unconditioned hay will be maintained.

At baling, hay should be around 12-14% moisture, however moisture probes sometimes cannot detect the moisture trapped in the heads of droughted hay.

Tip: the best way to check there is no moisture left in the nodes or the head before baling is to lie some heads and nodes on a piece of flat metal then bash with a hammer to check there is no moisture left.

What about canola?

The above calculations can also be used to estimate canola hay yield.

Earlier cutting of canola will improve hay quality but also produces lower yields. Unless there are good premiums available for high quality canola hay, the optimum time of cutting is at **late flowering**.

Cutting late in pod fill reduces hay quality and does not add much to hay yield. Crops close to windrowing time have no leaves remaining, test poorly for quality and are very difficult to market.

Canola crops that are unlikely to be harvested will decline in colour and drop leaves with each day. If the crop is wilted and no longer growing it will not be increasing in dry weight but will be declining in quality as the leaves continue to drop. These crops should be cut as soon as possible!

Most dairy farmers prefer canola to be conditioned, which can improve hay quality. Careful marketing is required as the demand for canola hay is usually less than lucerne or clover hay of similar quality, as these hay types have been the traditional preference.

Costs

Contract costs will vary depending on the area on offer to cut and bale and the proximity of the contractor to your paddocks. Expect to pay around:

- $35 - $46/ha ($14.50 - $19/acre) for cutting, with the higher costs for self propelled windrowers.
- Approx $30/t or $17-18/bale for an 8 x 4 x 3 six string baler.

Storage

Unless hay is sold in the paddock you will need to think about where to store the bales until they are sold. Stacking bales in the paddock will cause damage to the top bales but little to those underneath and is acceptable if it is likely hay will be sold within 6 months. Expect uncovered hay to sell at a slight discount to shedded hay.

Example:		
INCOME:	2.7t/ha @ $250/t	**$675/ha**
COSTS:		
Cutting		$45/ha
Baling	2.7t/ha x $30	$81/ha
TOTAL COSTS		**-$126/ha**
MARGIN		**$549/ha**

At $300/t for grain this crop would have to yield 1.8t/ha in grain to match the hay margin *before* costs.

Make informed decisions

The best decisions are those made after consideration of all the information available at the time and consideration of all consequences. Making the decision to cut a crop for hay is a hard decision to make but it does not need to be difficult.Conduct estimates of hay yield and make a realistic assessment of the crop's ability to make harvestable grain before calling the contractors. If your assessments and calculations show that hay is the best outcome for the crop then take action on that decision as soon as possible. Seek support from your agronomist/consultant and/or experienced friends or neighbours to help you make the decision.

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