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Options for harvesting cereals for beef cattle feed

This information is only relevant where cereal crops are to be fed to livestock, in particular ruminants. Conventional harvesting by combining when the grain is hard and ideally around 12-16% moisture content, is the final stage at which grain can be harvested. Any later and grain yields rapidly fall due to grain shedding etc.

Alternative options for harvesting cereals for livestock are all based on harvesting the crop earlier than normal. Most of the techniques apply to all cereals (wheat, barley, oats, triticale) and most legume crops, (peas, beans, lupins).

Advantages

1. Higher DM yields per hectare for both grain and straw. When there is no green in the plant it cannot photosynthesise so grain energy is used to continue to respire. In addition, as the crop dries grain shedding and leaf shatter losses increase.
2. A higher feed value of the straw. Less mature straw will be greener and contain more leaf which is 2-3 times more digestible than stem. Protein levels will also be higher. However, straw may need to be left in the swath to dry before being baled.
3. For undersown crops, early harvest allows better growth and ground cover of the undersown sward. Where the undersown crop has grown well, then there is the option of baling and wrapping the green straw/forage for stock feed.
4. When harvested with a combine, the sieves can be opened to help maintain speed of harvesting. This will allow chaff etc into the grain tank which will also increase the amount of feed being made available for stock feed.
5. Fields are cleared earlier, allowing early sowing of arable crops eg OSR, or allowing establishment of forage/root catch crops, cover crops etc. The establishment of these can be enhanced by broadcasting seed into the standing crop a week before it is harvested.
6. Spreads harvesting workload.
7. Crops can be harvested in damp conditions/light rains, significantly increasing harvesting opportunities and the length of harvesting days.
8. Most systems involve processing grain, avoiding the need to process grain over the winter.
9. Produces a damp feed which is less dusty, reducing the risk of pneumonia, farmers lung etc. However the lower dry matter does mean higher fresh weights need to be fed.

10. In most cases the product can be stored in pits with no production of effluent. However this does mean that for most systems good baiting for vermin is essential. Straw should not be used to weigh down the top sheet as it provides an ideal home for rats etc. In systems which require pits to be rolled for consolidation it is essential that the walls and retaining rails are structurally sound.
11. Crops preserved by ammonia (urea additives) have a high pH 8-9 making them relatively rumen friendly feeds (low acidosis risk).
12. Rations containing significant levels of moist grain will require supplementation with higher levels of vitamin E and selenium.

Systems

1. Drier Crimped Grain

Days Early		Machinery	Grain MC (%)	Crop Stage	
1-4		Combine + crimper	18-22%	Mature	

Store	Pit Rolled	Additive	When Applied (post harvest)	Vermin	Protein
Pit	No	Propionic acid or additives such as Maxammon or Home n'Dry	ASAP	Yes	No
Heap	No		ASAP	No	Yes +3-4% CP

- Moist grain in a heap rapidly starts fermenting, producing acid and lowering the pH of the grain and destroys the urease. When using urea it is therefore essential that moist grain is treated within 1-2 hours of being harvested and ideally immediately after harvest

2. Moist Crimped Grain

Days Early		Machinery	Grain MC (%)	Crop Stage	
21-28		Combine + crimper	30-45%	Soft dough	

Store	Pit Rolled	Additive	When Applied (post harvest)	Vermin	Protein
Pit	Yes	Acid, organic acids, inoculants	ASAP	Yes	No

3. Urea Treated Grain

Days Early	Machinery	Grain MC (%)	Crop Stage		
21	Combine	Minimum 30-40%	Soft dough		
Store	Pit Rolled	Additive	When Applied (post harvest)	Vermin	Protein
Pit	No	Urea	ASAP	No	Yes +8-10% CP

- This is probably the cheapest of all systems
- Inclusion rates are 30kg urea/tonne DM for wheat and oats and 40kg for barley/triticale
- The best way of applying urea is as a liquid applied at the base of a auger. However some producers have used bags of feed grade urea on the combine, emptying them into the grain tank as it is being emptied. Another alternative is to mix moist grain with water and granular urea in a mixer wagon for at least 5 minutes
- The pit must be sheeted to keep the ammonia gas in but should not be rolled
- The high pH of the grain (pH 8-9) breaks down the seed coat so that the grain does not need processing, particularly wheat due to its thinner seed coat

4. Fermented Wholecrop

Days Early	Machinery	Grain MC (%)	Crop Stage		
40-60	Forage harvester	50-60%	Late milk, soft cheese		
Store	Pit Rolled	Additive	When Applied (post harvest)	Vermin	Protein
Pit	Yes	Inoculants	At harvest	No?	No

- This has now largely been superseded by cracked wholecrop which provides heavier DM yields per hectare containing higher levels of starch

5. Cracked Wholecrop (CWC)

Days Early	Machinery	Grain MC (%)	Crop Stage		
14-21	Forage harvester with grain cracker	20-35%	Hard dough		
Store	Pit Rolled	Additive	When Applied (post harvest)	Vermin	Protein
Pit	Yes	Inoculants	ASAP	Yes	No
Pit	Yes	Urea (eg Home 'n' dry)	ASAP	Yes	Yes +3-4% CP



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- A major advantage of cracked wholecrop is that the whole field is cleared in one operation.
- Although cracked wholecrop will only have an ME of 10-10.5, its intake potential can be 30% greater than grass silage. Hence the performance of cattle fed to appetite will be higher compared to silage of a similar energy value.
- CWC produces very dry dung which helps keep cattle extremely clean – an important factor to minimise clipping pre slaughter.
- Head cut CWC just removes the head but leaves standing straw which is difficult to harvest. Its advantage is its high energy (11-11.5 ME) and starch content.

Note: Always use additives or preservatives according to the manufacturer's instructions – the information provided here is intended to give an overview of some of the options available for grain and wholecrop preservation but is by no means comprehensive.



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