

Maize and cereal silages for finishing cattle

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High yields of quality **grass** ensiled with minimal losses and produced with restrained input costs support sustainable systems on many farms. Besides providing winter feed, grass silage also facilitates grazing management, permits efficient and hygienic recycling of animal manures and can be used to help reduce the internal parasite challenge to grazing cattle.

Alternative forages are worthy of consideration on some farms, and need to be considered in terms of relative total costs of production, relative revenues from the sale of beef, and ultimately farm profits.

Experiments with **maize** silage have shown its nutritive value for beef cattle to range from being inferior (Table 1) to good grass silage to being superior (Table 2), with the difference in nutritive value relativity being predominantly determined by the content of developed grain. The digestibility of the forage portion of the crop (i.e. stover) would also influence nutritive value. Thus, highly digestible maize silage of high grain (i.e. starch) content can support rates of carcass gain by beef cattle that are superior to what are achieved with good grass silage, but often with a lower efficiency of converting forage dry matter (DM) to carcass.

A minimum target of 13 tonnes harvested DM per hectare (in the absence plastic mulch) should be expected for commercially viable crops, with subsequent conservation losses being restricted to below 15%. Target harvested crop DM concentration would be 30%DM with a corresponding starch concentration of at least 25% of the DM.

Experiments with **whole** (small grain – wheat, barley or triticale) **crop cereal** silage conserved using conventional technologies indicate that:

- The nutritive value of whole-crop cereal silage for beef cattle can range from being inferior (Table 3) to good grass silage to being superior (Table 4), with the difference in nutritive value relativity being predominantly determined by the content of developed grain (Table 5). Again, the digestibility of the straw component of the crop also has to be important.
- Elevating the cutting height of the cereal crop can increase the feed value of the whole-crop silage (by reducing its content of straw and therefore increasing the proportion of grain present) (Table 6).
- Harvesting should not take place until after the cereal grain has progressed beyond the milky-ripe growth stage – not until it has at least reached the soft-cheddar consistency (i.e. above 35%DM)
- The crop nutritive value is effectively constant from the "soft-cheddar" stage until the cereal grain has reached the hard-cheddar consistency (approx. 55%DM) (Tables 3 and 4) – this is a window of almost three weeks
- It could be speculated that allowing the crop ripen so that its DM concentration increases beyond 60%DM would allow grains to fill with starch, but this would produce grains that, if not processed, would be more likely to pass through the animal undigested. The straw component of this more mature crop would likely have diminished digestibility. Such a crop could benefit from processing the grain.
- Whole crop wheat, barley or triticale silages should ideally be produced from crops that would have yielded at least 8 tonnes harvested grain DM /hectare. Depending on the system adopted, the crop would be between 40 and 55% DM. Conservation losses should be limited to below 15%, producing aerobically stable silage with negligible mould presence.
- Whole-crop cereal silages of high nutritive value can be successfully made from wheat, barley or triticale, provided that they are harvested at the correct stage and have a high content of grain. However, they generally have poorer feed conversion efficiency compared to maize silage (Table 7).

Table 1. Low quality maize silage (**low** starch content) vs. good quality grass silage for finishing cattle

	Maize silage	50:50	Grass silage
Silage DM intake (kg/day)	6.1	7.1	6.1
Liveweight gain (g/day)	1068	1377	1385
Carcass weight gain (g/day)	633	787	870
DM intake/carcass gain	13.5	12.3	10.0

Source: *Teagasc, Grange*

Table 2. High quality maize silage (**high** starch content) vs. good quality grass silage for finishing cattle

	Maize silage	50:50	Grass silage
Silage DM intake (kg/day)	6.8	6.8	5.1
Liveweight gain (g/day)	979	950	846
Carcass weight gain (g/day)	737	698	653
DM intake/carcass gain	13.0	13.6	12.0

Source: *Teagasc, Grange*

Table 3 Low quality whole-crop wheat silage (**low** grain yield) vs. good quality grass silage for finishing cattle

Crop DM% at harvest	Whole-crop wheat silage at two growth stages		Grass silage
	35% DM	50% DM	
Silage DM intake (kg/day)	5.1	5.8	5.0
Liveweight gain (g/day)	889	921	1051
Carcass gain (g/day)	575	577	747
DM intake/carcass gain	13.7	14.8	10.2

Source: *Teagasc, Grange***Table 4.** High quality whole-crop wheat silage (**high** grain yield) vs. good quality grass silage for finishing cattle

	Whole-crop wheat silage at two growth stages		Grass silage
	36% DM	51% DM	
Silage DM intake (kg/day)	6.3	6.0	4.8
Liveweight gain (g/day)	987	869	866
Carcass gain (g/day)	695	636	596
DM intake/carcass gain	13.1	13.7	12.6

Source: *Teagasc, Grange***Table 5.** Whole-crop wheat (low, medium or high grain content) silages, grass silage or *ad libitum* meals for finishing cattle

	Whole-crop wheat silage			Grass silage	Meals <i>ad libitum</i>
	Low grain	Med. grain	High grain		
Silage DM intake (kg/d)	8.0	8.8	8.4	6.6	1.3
Total DM intake (kg/d)	10.6	11.4	11.0	9.2	10.9
Liveweight gain (g/d)	840	1075	1043	929	1335
Carcass gain (g/d) ¹	577	708	757	664	915
DM intake/carcass gain	18.3	16.1	14.5	13.9	11.9

Source: *Teagasc, Grange***Table 6.** Impact of elevating the cutting height when making whole-crop triticale silage for finishing cattle

Cutting height of crop	Whole-crop triticale silage	
	Low cut	High cut
Silage dry matter (DM) intake (kg/d)	7.1	7.7
Total DM intake (kg/d)	9.6	10.3
Liveweight gain (g/d)	790	934
Carcass gain (g/d)	422	491
DM intake/carcass gain	16.8	15.7

Source: *Teagasc, Grange***Table 7.** Maize silage, whole-crop wheat silage, whole-crop barley silage or *ad libitum* meals for finishing cattle

	Maize silage	Whole-crop wheat silage	Whole-crop barley silage	Meals <i>ad libitum</i>
Silage DM intake (kg/d)	6.6	7.2	7.2	1.3
Total DM intake (kg/d)	9.2	9.8	9.8	9.5
Liveweight gain (g/d)	1235	1254	1151	1473
Carcass gain (g/d)	781	741	736	939
DM intake/carcass gain	12.0	13.5	13.6	10.3

Source: *Teagasc, Grange*