Silage Harvesting in Difficult Conditions

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Poor ground conditions are causing serious problems, for all attempting to harvest silage, this year. There are no easy answers or quick solutions. However, there may be scope to improve the likelihood of harvesting or in some situations to minimize the damage caused when harvesting.

Decision making

- Making decisions in these situations is most difficult. Farmer and contractor interests differ. However, decisions should not be avoided.
- The tendency is to wait for conditions to improve and later to regret not having moved earlier, as conditions disimproved! Changes in weather can make either decision look foolish. Make decisions based on what is known about the weather today. Unless conditions are very bad, only wait if a definite improvement in the weather is forecast.

Field strategy

- Walk the fields before harvesting, examining wet spots, slopes, gateways etc., with a view to harvesting in less-than-ideal conditions.
- Plan the harvesting and transport strategy to minimize damage. Consider avoiding the wettest areas altogether or harvest downhill with an empty trailer.
- Leave large headlands and rounded corners to avoid tight turning.
- Drive smoothly and maintain momentum at all times. If a tractor and trailer begins to sink, keep moving in any direction to find better ground. Get all drivers to think about what they are doing.
- Consider opening new or extra gateways to avoid getting stuck or causing excessive damage.
- Minimize traffic at all costs. Plan routes carefully. Let a trailer go part-loaded, if near a headland, sooner than bringing it around the headland again to fill it completely.
- Don’t mow too far ahead of the harvester unless the forecast is very solid. Bare ground is slower to dry than that with a growing crop.

Machinery

The aim should be to reduce weight and lower ground pressure. As machinery has developed, weight has increased. Silage trailers, in particular, have increased dramatically in weight.

- Shed any unnecessary weight (ballast)
- Use smaller trailers with good-sized tyres if available.
- Larger tandem-axle trailers can weigh up to 5 t when empty, with another 10-13 t load of grass on top. The standard 15R22.5 tyres are hopeless in this situation.
- Part-filling trailers will greatly help to reduce axle loads. If the tractor is very well shod (e.g. >650 mm wide tyres), fill the load towards the trailer front.
- All machines in the system need to be fitted with good tyres capable of operating at low pressures. Start with the mower. In extreme conditions, if the tractor and mower start making wheel-tracks, it will greatly add to the damage caused by the heavy machinery that follows.

Tyres and pressures

The tyre size that is needed depends on the conditions and the load that is being carried. The tyre capacity can be gauged from the inflation pressure needed to carry the machine/trailer load. Conventional harvesting equipment with standard tyres can have inflation pressure requirements of more than 3.0 bar. For moderately wet conditions, tyres large enough to work at 1.0 bar or less are needed. This requires a big increase in tyre size. Standard and LGP tyre options for a large capacity outfit are given in Table 1.

Table 1: Axle loads, tyres and pressures for self-propelled system

	Axle load (t)	**Tyres**		**Pressures (bar)**
Self-propelled harvester	9.0	Standard	24.5-32*	1.5
		LGP	30.5-32	0.9
Tractor (115 HP)	6.5	Standard	18.4-38*	1.6
		LGP	650/65-38	1.0
Trailer (5.5 m tandem)	12.0	Standard	15-22.5*	3.0
		Standard	18-22.5	2.3
		LGP	650-22.5	1.0

* The first tyre is the standard option

The 650/50R22.5 trailer tyre is big and may require a modified axle to allow clearance. Even this tyre will not cater for very wet conditions. The trailer is the most difficult machine to sort from a ground pressure perspective, but tractors, mowers and harvesters should also be dealt with.

In wetter conditions, even lower ground pressures are needed, requiring even larger tyres and/or smaller loads. In these situations, 0.5 – 0.9 bar should be the target!

To achieve this pressure with trailers, radical modifications are often needed. In 1985/86, in the western counties, 12' x 7' trailers were fitted with stepped axles and wide rear tractor tyres to greatly improve their wetland performance. The trailers were wide, but the large diameter tyres were a real boon. This option would not satisfy the demands of the large 18' trailers seen today. These need to be radically redesigned to incorporate much wider and taller low ground pressure tyres.

Tyre types

For any machine used in poor soil conditions, low ground pressure tyres should:

- be large enough to operate at low pressures as indicated above.
- have a pliable carcass, i.e. not stiff or not high ply rating.
- have as large a diameter as possible, as the tyre will tend to ride out of any rut it is tending to form.
- have a tractor type or grip tread pattern to keep the tyre turning.
- be operated at the lowest inflation pressure allowed for the load being carried. Axle loads and tyre specifications are needed to determine the pressure.

Big bale silage

The baled silage system involves lower axle loads, but more individual traffic operations than conventional silage. The smaller loads make it easier to reduce ground pressure, but traffic levels demand that all machines from mowing to bale transport must be fitted with LGP tyres.

Balers should be fitted with large trailer-type tyres, 500-22.5 or, better again, tractor-type tyres (16.9R24, 18.4R24 or similar). Axle and baler modification may be needed to accommodate these. The wrapper should also be fitted with larger tyres, but options here may be limited. Consider hauling the bales to the wrapper to avoid traffic in wet areas. Bale transporting tractors should be fitted with large tyres, or even dual wheels, to get the ground pressure to 0.5 – 0.8 bar. It is imperative that low pressures are achieved because of the amount of transport traffic. The tractor and mower should receive particular attention, as the baler is often forced to travel in the mowing tractor's wheel tracks.

The future

Our memories are short! On average, one in every four years presents some silage harvesting difficulty caused by poor ground conditions. We tend to struggle through that year and forget about it once it is followed by a dry year. Reducing ground pressure can help improve trafficability. However, the benefit doesn't stop there. Our research has shown that, even on dry years, the use of low ground pressure equipment can significantly increase grass yield by preventing compaction.

We need to rethink our approach. Heavier equipment needs much larger tyres, not alone to solve immediate trafficability problems, but also to prevent long-term compaction difficulties. We must radically review our approach to the use of heavy equipment on our land. We need a big and quite expensive step up in tyre size to prevent long-term damage being caused. However, this is something that contractors cannot address themselves. Farmers should demand lower ground pressure (better tyres), but also be prepared to pay for it. The payoff will not just be there in the difficult years – but on the dry ones too.

Separate panel 1

Kilmaley

The Teagasc dairy unit at Kilmaley is based on very wet land with high rainfall amounts and impermeable soils. This year is proving immensely difficult. In the last couple of years, a contractor was used to cut silage with a precision-chop harvester (but using the farm's own LGP trailers). This year, James O'Loughlin reverted to the farm's own single-chop harvester, working with a 95 HP 4WD tractor fitted with rear duals. The farm's trailers are all fitted with large diameter, low-pressure, rear tractor-type tyres, capable of working at 0.5 to 0.8 bar inflation pressure. Although the output from this system was low, it was able to harvest successfully in the wettest ground last week, when no other baled or conventional system could operate.

Separate panel 2

Additive application

The situation concerning additive application has changed dramatically over the last 15 years. Acid additives were widely used in the 1980s, but are rarely used today. Contractors have dictated this change because of machine corrosion and handling problems. The availability of alternative additives,

such as inoculants, has also played a role. Most of all, farmers now exert more control on the ensilability of their grass, making the need for a preservative much less.

What happens on a year like this though, where there are definite needs for a preservative (acids or sugar products)? Contractors do not have the equipment to apply acids fitted any more, as they prefer the powder applicator that will not accommodate acids.

In my opinion, contractors should supply an acid application option, but the farmer should pay extra if acid is used. This charge should cover the cost of the applicator, depreciation caused by corrosion and acid handling costs. If a proper change was put in place, the equipment used to apply acid could be improved. This could make it safer, more accurate and, most importantly, less corrosive to the machine. Additive application needs to be treated like any other service – it should be viable or profitable in its own right. Farmers need to demand this service and be prepared to pay for it.

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