

Silage harvesting: wet soil challenges

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Wet weather is playing havoc with silage harvesting in many parts of the country. While a few good days may improve the situation dramatically, if the weather stays poor, it may be best try to harvest if ground conditions are even barely trafficable. This is essential, not only to secure winter feed, but also to get the heavy crops off the field to allow re-growth. Harvesting may simply not be possible in very wet conditions, but we can improve our chances. Three topics are dealt with here:

- Decision making about harvesting
- Equipment, particularly tyres/wheels
- Field work strategy

Decision making

- Making decisions in these situations is difficult but should be actively taken. The fall in quality, once grass has headed and decayed at the base, is severe. Not cutting will leave delayed, or no, after-grass and the sward may need to be reseeded if this seasons grass is not removed.
- The tendency is to wait for conditions to improve and regret later as conditions get worse! Changes in weather can make either decision look foolish.
- Make decisions based on what is known about the weather today. If grass can be ensiled cleanly without excessive soil damage from machinery, it should be harvested. This implies that effluent storage and appropriate additive application methods are available if needed. .

Field strategy

- Walk the fields before harvesting, examining wet spots, slopes, gateways etc., with a view to harvesting in less-than-ideal conditions.
- Plan all field operations carefully 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.
- Good sensible driving is essential. While high-powered 4WD tractors may be able to keep going – the damage caused by these machines, in the wrong hands, can be tremendous.

- Avoid excessive traffic at all costs. If a trailer is mostly full when reaching a headland – let it off to the pit rather than turning it and facing down the field again, even if that requires a wait for the next trailer.
- Drive smoothly and maintain momentum at all times. If a tractor and trailer or baler begins to sink, keep moving in any direction to find better ground. Get all drivers to think about what they are doing before they get in trouble.
- Consider opening new or extra gateways to avoid excessive damage.
- Don't mow too far ahead of harvest unless the forecast is very solid. Bare ground is slower to dry than that supporting a growing crop.

Machinery for wet conditions

Weight and tyres are key to machine performance in difficult conditions. Lower ground pressure is achieved by fitting larger tyres capable of running at lower pressures, or by reducing weight.

The move to bigger machines has brought a huge disadvantage in terms of trafficability and soil damage such as rutting, smearing and soil compaction. All machines have increased in weight, although the weights and axle loads of silage trailers are a particular cause for concern. While pit-silage machinery has less traffic passes in the field, the baled silage system has smaller loads which are easier to adapt for low ground pressure.

Pit silage machinery action

- Shed any unnecessary weight (ballast)
- Use smaller trailers with larger tyres if available
- Larger tandem-axle trailers can weigh more than 5 t when empty, with another 10-15 t load of grass on top. The standard 15R22.5 tyres are hopeless in this situation
- Part-filling trailers will help to reduce axle loads. If the tractor has wide tyres (e.g. >650 mm), 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

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 conventional system 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
		Wide	30.5-32
Tractor (130 HP)	6.5	Standard	18.4-38
		Wide	650/65-38
Trailer (5.5 m tandem)	13.0	Standard	15-22.5
		Standard	18-22.5
		Wide	560/45R22.5
		LGP	650-22.5

The 560/45R22.5 wide trailer tyre will fit on a standard axle and give some improvement in performance, but it is a long way short of being an ideal tyre in wet conditions. The 650/50R22.5 trailer tyre is big and will require a modified axle to allow clearance. Even this tyre will not cater for very wet conditions.

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 low pressure with trailers, radical modifications are often needed. In the past, in wet areas, 12' x 7' trailers were fitted with stepped axles and wide rear tractor tyres to greatly improve their wetland performance. Purpose built research trailers with tyres running at 0.5bar also proved their worth. Today's trailers 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
- 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.

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, and with appropriate tyres, the system is more suitable for wet conditions than conventional pit silage.

- Balers should be fitted with large trailer-type tyres, 500-22.5 or, better again, larger tractor-type tyres (16.9R24, 18.4R24 or similar). Axle and baler modification may be needed to accommodate these.
- Unfortunately the move to combined baler wrapper units adds to the problems in wet conditions. These weigh-in at about 5.5t when empty or about 7.0t with two bales on board. Typical 550R22.5 tyres would probably need about 1.4 bar pressure. Larger tyres are available.
- When worked separately a standard wrapper should also be fitted with larger tyres, but options here may be limited. Consider hauling the bales to the wrapper to avoid wrapper traffic in very 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.
- 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! At least 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 if 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.