

Correct tyre selection for silage kit



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The appalling weather that delayed this year's silage season has not only put contractors' schedules to pot, it also threatens to leave a legacy of seriously compacted soils as heavy trailers and machinery have had to be operated in conditions less than ideal underfoot.

However, contractors and farmers conserving winter forage supplies can mitigate the impact of silage harvesting machinery in two ways; by kitting them out with tyres that have good 'flotation' characteristics, and by managing inflation pressures to optimise that capability.

Unusually, the impact of field traffic on grass yields is less appreciated than it is on tillage crops. Maybe that is because the effects are often more visible in a tillage situation — on the soil and in the crops.

Yet, several farm vehicle operations on tillage ground are confined to tramlines, concentrating at least some of the sub-surface damage that occurs and making it easier to target remedial action such as sub-soiling.

That is not the case with grassland operations where tramlines are as rare as the proverbial hen's teeth.

As a result, trafficking on pastures is widespread and repeated, and it limits the capacity of stock farms to get as much production as possible from grass; first, by constraining yield potential (waterlogged roots from poor drainage, reduced soil nitrogen mineralisation) and by limiting the grazing season, again from poor drainage.

Remedial treatments such

as slitting with an aerator and breaking through compacted sub-soils with a purpose-made 'sward lifter' type implement can mitigate some of these effects, but is it not better to minimise the impact of machinery in the first place?

POWERFUL MACHINERY

Since the ongoing trend of employing bigger, heavier and more powerful machinery is unlikely to be reversed, the only solution is to equip such machines with tyres that can spread the load more effectively, and manage inflation pressures to obtain maximum benefit.

Forage wagon manufacturers have clearly picked up on this message, judging by the generously-proportioned tyres seen fitted to their machines, not to mention the purpose-built eight-wheel running gear developed, for example by Pottinger, to spread the weight of wagon and load over the largest area of rubber possible.



Trailer makers, too, have got the message that a remould truck tyre designed to carry big loads, over long distances at high speeds on a hard surface is not going to be soft and supple enough to do the type of job needed to carry hefty weights on vulnerable soils with minimum impact.

For that, an advanced radial construction tyre, capable of carrying typical silage trailer weights at modest inflation pressures, is the solution; There are plenty of options with the Bandenmarkt Euro-Grip and Kargo-Radial TL, Nokian ELS and County King; Michelin Cargo X Bib; Vredestein Flotation Pro and Flotation Trac, and Trelleborg Tractor Implement Flotation Radial.

These tyres will out-perform older generation radials, (let alone crossplies and stiff radials designed for other applications), in a number of respects as a result of being able to carry required loads at lower inflation pressures.

Because this results in a longer, as well as wider, footprint on which to spread the load across the field surface, these tyres cause less extensive sub-surface compaction,

leave shallower ruts and, as a result of the latter, are easier to pull.

Together with being generally less prone to rips and punctures, that means running costs should help offset the inevitable premium pricing that goes with premium performance.

Michelin provided a graphic illustration of the benefits of a tyre's ability to stay on the surface instead of sinking into the mire when it launched the Cargo X Bib.

At the time, the Michelin XS and newer XZL were popular trailer fittings, and effective ones too, in comparison with other trailer radials. But, with the Cargo X Bib being designed and built to give its best performance within a range of typical agricultural trailer weights, it could carry between 5% and 14% more than the XS at pressures up to 2.5 bar (36psi), and operate at lower pressures than could the XS.

To illustrate the performance advantage of the Cargo X Bib, Michelin technicians ran identical tractors and trailers alongside one another over a 250m run across a well-cultivated, but firm, clay soil.

The trailers, with an all-up weight of 18t, were equipped with three different tyres—a narrow option in the shape of a 14.00R25 XZL, and two others of broadly similar width and diameter, 24R20.5 XS and a 600/55R26.5 Cargo X Bib.

Predictably, the outfit with the Cargo X Bib-equipped trailer pulled ahead, as they powered up the gently sloping field, completing the 250m run at an average speed, from a standing start, of 10.6kph.

The XS-tyred trailer averaged 9.3kph and had covered 219m in the time taken for the Cargo X Bib-equipped trailer to cross the line — a 14% advantage to the purpose-built radial, even though the XS put down wheelings barely 2cm deeper.

RUTS

Ruts created by the slim XZL tyres were narrower, but appreciably deeper at 140mm, making the trailer a lot harder to pull.

It averaged 7.7kph, lagged by 80m on the test run, and managed just 170m in the time taken by the Cargo X Bib-shod trailer to finish the 250m course.

Extrapolate those figures



With trailer tyres, there is no real substitute for weighing to determine axle loads, so that the most appropriate inflation pressure for the tyres, load and operating conditions can be used.

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The advantage of using purpose-designed strong, but supple, radial tyres on silage trailers. In this case, 385/65R22.5 truck tyres in comparison with 500/60R22.5 Cargo X Bib on a pair of 14 tonne trailers.

over a harvesting season, and it is clear that good flotation characteristics can do much to enhance the economics and efficiency of harvesting and other trailer operations, apart from protecting the soil from compaction.

Exploiting that potential calls for active management of inflation pressure; in other words, using the lowest possible pressure to spread the contact patch of the tyre relative to the load being carried.

This calls for some time spent weighing tractors and implements to determine individual tyre loadings and, with reference to the tyre's load/speed index tables, the appropriate inflation pressure.

There is a lot to be said for obtaining professional advice at this stage, because other factors can influence the final pressures chosen.

For example, machinery operating repeatedly across serious slopes would sensibly have a few additional psi to help maintain stability.

It also pays to use a high quality pressure gauge to take readings and ensure accuracy, because remarkably small differences in inflation pressure can be significant in this context. With a convenient weigh-bridge, or better still a portable weigh cell device, harvest machinery can soon be weighed. But remember, it is important to take worst-case weighings, such as when the tyre is carrying the greatest load. The tractor's front tyres carry most weight when the trailer is empty, and there is less weight transfer to the back axle due to the leverage effect of the drawbar.

The same goes for tractors using mounted equipment.

The front tyres carry most when the implement is on the deck, the rear ones when it is raised for a headland turn.

Bear in mind the travel factor; few tyres like to be driven long distances at fast speeds carrying heavy loads along the road at inflation pressures calculated to be optimum for the field.

Table 1: Effect of compaction on annual nitrogen off-take (kg/ha) from silage ground

Soil condition	Year 1	Year 2	Year 3	Average
Non-compacted	41.3	34.7	39.5	38.5
Typically compacted	25.8	27.1	25.7	26.2

From a trial on grass receiving no mineral fertilizer, so reflecting soil N mineralisation.



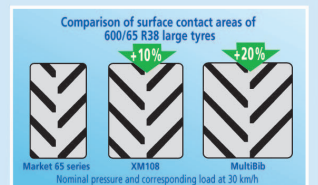
Big radial trailer tyres do not come cheap, but running costs can be lower than with tyres of inferior specification thanks to greater puncture resistance and making trailers easier to pull.

MultiBib, the new workhorse

Better in the fields, further on the road

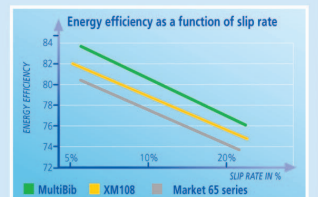
A larger footprint for better yields

Up to a 10% wider tread than the XM108, a low operating pressure and more flexible sidewalls, MultiBib ensures better soil preservation.



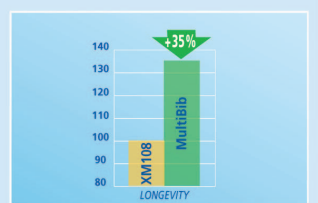
More efficient traction

New deeper tread lugs result in excellent self-cleaning and optimise the transmission of power, increasing productivity.



Up to 35% longer tyre service life*, more comfort, greater road safety

The flatter crown profile and the new rubber compound significantly improve comfort at speeds up to 65km/h** and MultiBib's service life is much longer.



* compared with XM108
** where authorised by the legislation in force in the country



MultiBib, the new leader for 80 to 200-hp tractors improving performance

