

GRASSLAND AND SILAGE —Toolkit—

MARCH 2022

DAIRY
FARMER

A DAIRY FARMER
PUBLICATION IN
ASSOCIATION WITH:

 **KRONE**

volac 


YARA



MAXIMISING MANURE

Utilise to keep increasing
input costs manageable

BETTER SILAGE

Five-point plan brings
improvements

EMBRACING DATA

Yield mapping
for grassland

SOIL COMPACTION

Is it holding back
grass growth potential?



4

INTRODUCTION

7

MITIGATING HIGH FERTILISER PRICES

8

MAKING THE MOST OF SLURRIES

10

CASE STUDY: SHALLOW INJECTION KITS

13

WHAT IS BETTER SILAGE WORTH?

14

FIVE-POINT PLAN FOR BETTER SILAGE

16

CASE STUDY: ADAPTING TO A DRIER CLIMATE

18

YIELD MAPPING

20

SOIL COMPACTION

22

MOWERS, TEDDERS AND RAKES SET UP

23

AN AGRONOMIST'S VIEW



IN THIS TOOLKIT



With the price of ammonium nitrate almost three times what it was this time last year, it is not surprising that many farmers are thinking hard about what they can do to mitigate this escalating input cost. And it is not just fertiliser prices which are rising.

Making more from less

Market experts are predicting purchased concentrate costs will continue to rise over the coming months. What is the answer to minimise the adverse impacts of these unpredictable, but potentially damaging input price hikes?

Tony Evans, senior farm business consultant with The Andersons Centre, believes farmers who keep it simple and have a clear vision of where their business is going will be best placed to weather this storm. But he thinks it is likely

to prove a rough ride for many.

He says: "The prices we are seeing now for fertiliser and feed, diesel and electricity are not going to go down in the short or medium term. Overall, these input cost hikes represent a 7p per litre increase although for many farmers, the full effect of the costs has not yet made itself felt as they are still using stocks bought or booked forward at lower prices.

"These input cost rises have been driven by national and global shortages, meaning stocks of fertiliser and feed are low everywhere and supplies

are likely to remain tight for the foreseeable future.

"The milk price has responded, with recent increases of up to 6ppl from some processors but there is a slight lag. It is likely to climb further, so it is important farmers position themselves to make the best of these higher prices," Mr Evans adds.

Mr Evans suggests these

20%

The cost of protein has gone up by around 20% this summer.

challenges will require 'new thinking' from many dairy producers and he believes the industry may see 'massive changes' as a result.

GOOD PLACE

"Dairy farming could be in a good place at the moment for some; prices for milk are on an upward trend, producers are doing what the consumer wants – high standards of animal welfare, a strong environmental record and there is positive public engagement. Farmers who have a strong business model are already





making the most of the current situation but some will inevitably fall by the wayside.

"Having clarity of vision is key to build a sustainable, robust system. Simplicity is the best approach, as it is the most replicable and transmittable. It is easier to explain to the members of the team and things are less likely to go wrong.

"It is vital to become more 'savvy'; it has never been more important to fully understand your business and know the answers, so it is not necessary to rely on a third party for direction all the time," Mr Evans says.

He adds the cost of protein has gone up by around 20% this summer and this means that grass-based dairy systems may be in the best position.

"Farmers growing high-quality grazing grass with protein



levels around or above 20% will not be as reliant on bought-in protein sources. Those herds with a diet high in maize or wholecrop have a greater requirement for purchased protein sources to balance the starch, so they may be more exposed to this price rise.

"We are lucky in the UK because we generally have sufficient rainfall in the strong dairy areas, so we have the capacity to grow large volumes

"It is vital to become more 'savvy'; it has never been more important to fully understand your business"

TONY EVANS

of high-quality grass. Working with this inherent advantage is the best strategy.

"Remember the ratio of one, two and four; one unit cost of grazed grass will fund one unit of milk production, while two unit costs of silage funds one unit of milk and four unit costs of concentrate cost will fund one unit of milk.

OPTIMISE

"In other words, it costs four times the costs of grazed grass to produce one unit of milk from concentrates. So, to optimise profit, farmers should optimise grazed grass intakes

followed by silage and then concentrates.

"It is also important to have the right cow for the system. I believe our cows are too big in this country because they need a large amount of feed relative to output and are not suited to grass-based systems.

"Many farmers are re-thinking their genetics and moving to a smaller cow, which is often cross-bred and will last longer and produce more milk solids relative to its size and intake. In every breed there are strong and weak genetics but by making use of hybrid vigour, it is possible to have an animal which reflects the best of both," Mr Evans says.

He re-iterates the importance of a simple system, suggesting that while input costs are so high, this is likely to pay dividends.

"While we have high energy costs we will have high fertiliser, power and feed prices. It is important to assess whether you need to use as much fertiliser, or instead could use it more efficiently.

"Opting for lower concentrate use could result in reduced milk production, but there will be a point at which an equilibrium is reached and profit is optimised.

"If improved milk prices do continue, use the additional income to pay off debt if this is appropriate. Or use it to invest wisely in assets or systems which improve labour productivity and reduce the demands on the farm team and this will set up the business for leaner times in the future," he adds.

To optimise profit, farmers should optimise grazed grass intakes followed by silage and then concentrates, says Tony Evans.



Some dairy farmers may have been lucky and have bought-in fertiliser when prices were lower, but most will be weighing up their options of how best to mitigate these higher prices.

Philip Cosgrave, grassland agronomist with Yara, says there are a number of measures farmers can take to minimise the impact of the high fertiliser price on their business. A soil analysis to measure pH, phosphate (P), potash (K) and magnesium and ideally sulphur is a good place to start.

He says: "The optimum pH for grassland soils is above 6.0, but I think on intensively managed grassland there is a strong argument that the optimum should be 6.3, so if soils are significantly below this then applying lime to raise it back up will ensure the nutrients in the soil are available to the plant.

"If phosphate and potash indices are at optimum, it is advisable to focus on nitrogen [N] to ensure it is supplied in sufficient quantities. Note that after silage cuts are taken from fields, it is important to re-balance the effect of the offtake of nutrients, particularly potash.

"It is important not to think solely about nitrogen. Sulphur is an important nutrient also and especially on silage crops. Even when prices are high, sulphur has a role to play in achieving good nitrogen use efficiency, increasing grass yields by 10-20% normally."

Mr Cosgrave also points to the importance of testing slurries and manures, as there can be significant variation in their nutrient content.

"Once the NPK content of slurries is known, and the soil analysis provides information about nutrient indices for each field, producing a nutrient management plan will enable slurries

Market forecasts show fertiliser prices are unlikely to drop any time soon as the perfect storm of high energy prices coupled with supply side issues mean stocks are tight and will remain so for the forthcoming season at least.

Mitigating high fertiliser prices

and fertiliser to be targeted where it is most needed.

GOOD SOURCES

"Because slurry and manures are good sources of P and K, much of which has been imported onto the farm in the form of purchased feed, it may be possible for dairy farmers to make savings on purchased fertiliser.

"Early spring is an opportunity to replace an application of mineral nitrogen with slurry on paddocks if they have low grass covers or immediately after a grazing. This should preferably

be done with precision application methods such as trailing shoe or dribble bar, so as to minimise the contamination of grass with slurry and to reduce losses of nitrogen to the atmosphere.

"This slurry will also go a good way towards supplying maintenance P and K for the year.

"There is scope on many farms to utilise the nitrogen in manures more efficiently, but unfortunately we know that it will not be enough to offset the full impact of higher fertiliser prices. If farmers intend to reduce fertiliser usage this year, then it is

important they consider the full implications of doing so.

"If a shortfall of grazed grass or silage is translated into an equivalent value in purchased feed, it shows any savings in reduced fertiliser use can be outweighed by the cost of buying-in more concentrate or forage.

"Yara has a 'value of grass' calculator on its website which uses the costs of alternative standard bought-in feeds to calculate the value of the grass as a feed. It also shows the cost of nitrogen fertiliser to grow the grass as a proportion of the value of that grass.

"Being aware of the relative costs of fertiliser and feed can allow informed decisions to be made about inputs," Mr Cosgrave adds.

"If farmers intend to reduce fertiliser usage this year, then it is important they consider the full implications of doing so"

PHILIP COSGRAVE

Philip Cosgrave says there are a number of measures farmers can take to minimise the impact of the high fertiliser price on their business.



Taking a targeted approach to the use of manures and slurries as part of a comprehensive nutrient management

Analyse to use manures

According to Joe Winstanley, an independent agri-environment adviser based in Cheshire, who says understanding the baseline on any farm is the best starting point and obtaining a soil analysis across the whole farm is key to this.

He says: "I advocate farmers carrying out the soil sampling themselves as they know their land and which atypical parts of a field are best to avoid. Walking the farm in late winter and early spring can be quite instructive, allowing identification of compacted areas or where the grass is not growing well.

"Most laboratories offer a range of standard and bespoke analysis suites and I would recommend including calcium, which is important for plant cell development and soil structure, and sulphur, as well as the usual pH, phosphate [P] and potash [K] and magnesium [Mg].

"Identifying fields where the pH is below 6.0 is the starting point. Lime has not increased markedly in price and still represents the best value input any farmer will invest in.

"I would advocate a pH of 6.2 on fields which are receiving higher inputs because here the availability of nutrients needs to be spot on.

"It can be misleading to

assume that because soil pH is at target levels, calcium levels are optimal. The high neutralising value of magnesium is often overlooked and it is not uncommon to find high magnesium soils with a high pH, but low levels of calcium.

"The next stage is to identify the land where the P and K levels in manures can be best utilised. Fields which are below the target indices and especially those used for multi-cut silage are where manures should be directed.

WASTEFUL

"Applying manures to grazing fields where P and K reserves are at target levels or above is wasteful but may also have an adverse environmental effect because it will build up residual P levels and excessive K levels can cause issues with sward rejection and in extreme cases, metabolic disorders."

Mr Winstanley points to the importance of analysing slurries, highlighting nutrient values can vary not only from farm-to-farm but also throughout the year. Laboratory analysis for slurry costs around £25 per sample and is, he says, money well spent.

"It is vital to obtain a representative slurry sample and slurry should be fully agitated before sampling. In the interests of safety, sub-sam-



VALUE OF SLURRY

THE value of the NPK in 1cu.m of 6% DM cattle slurry.

- Available N is worth £2.08
- Phosphate is worth £1.43
- Potash is worth £2.25
- Total value is £5.76 per cu.m
- The available N constitutes 36% of its value

ples should be taken from a reception pit or from a slurry tanker or spreader if it is fitted with a suitable valve.

"Taking representative samples for analysis in both winter and summer is recommended as depending on housing, feed inputs, rainfall dilution and dirty water separation, slurry dry matter [DM] can vary significantly from standard book figures.

"Taking into account the results of soil and slurry analysis, target application rates should be calculated for each field. If using contractors, they should

be provided with clear guidance on the target application rates.

"For example, at 6% DM, an application rate of between 28cu.m and 39cu.m per hectare should be optimal for first and second cut fields," Mr Winstanley says.

Adopting precision application techniques is key to achieving the best uptake of available nitrogen, Mr Winstanley adds, and equipment such as trailing shoes and dribble bars also minimise emissions of ammonia and therefore increase the amount of nitrogen available for crop uptake.

"RB209 states losses from trailing shoes are typically 7.5% less and from dribble bars, 5% less than those from a splash plate. I would suggest that depending on the weath-

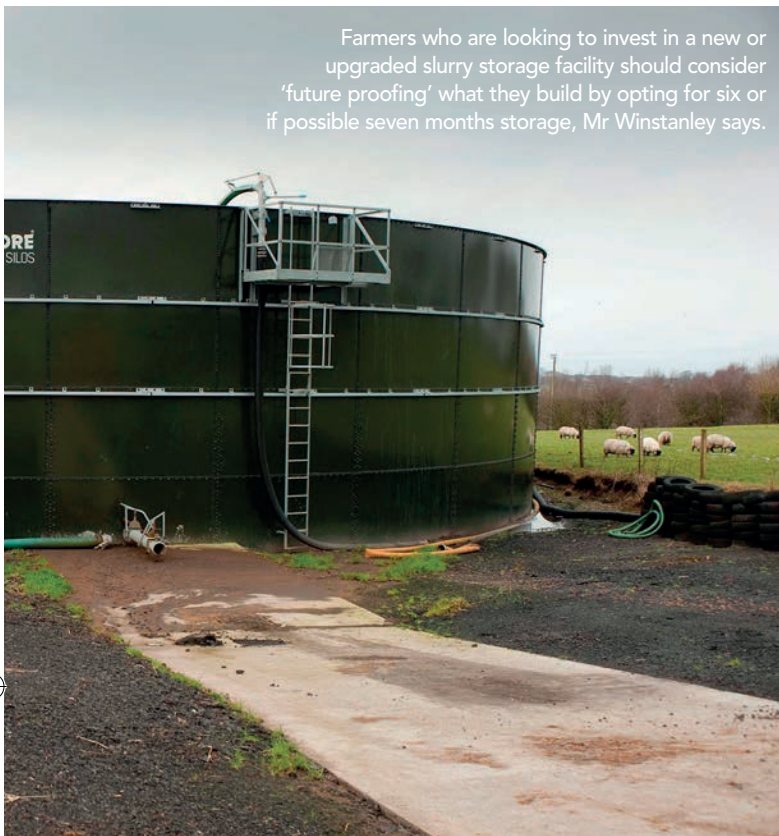
"I would be very wary of slashing inputs, as it may have consequences next winter in terms of forage supplies"

JOE WINSTANLEY

planning process is essential to keep input costs manageable.

and slurries right

Farmers who are looking to invest in a new or upgraded slurry storage facility should consider 'future proofing' what they build by opting for six or if possible seven months storage, Mr Winstanley says.



er, reductions in losses could be greater than this.

"Precision application techniques also reduce contamination and improve photosynthesis as the grass leaves are not smothered in slurry. Because trailing shoe applicators apply the slurry directly onto the soil surface



Joe Winstanley

£25

Laboratory analysis for slurry costs around £25 per sample.

below the canopy of the sward, they offer a bigger window for spreading."

Farmers who are looking to invest in a new or upgraded slurry storage facility should consider 'future proofing' what they build by opting for six or if possible seven months storage rather than the legal minimum, Mr Winstanley says.

"Creating more slurry storage than required by current legislation, where practical, is a sound investment as it allows slurry to be applied when conditions are ideal. For farmers who can install a clay-

lined lagoon, the extra cost can be as little as £6-£7 per cu.m, so is minimal.

"New slurry storage facilities do not have to be adjacent to farm buildings. Where practical and safe, smaller 'satellite lagoons' located by multi-cut silage fields, fed by pumped slurry, can significantly reduce spreading costs.

"Investing in mechanical slurry separation can give the equivalent of between 15 and 20% additional storage capacity, but it is not cheap with a payback period of several years.

"Separating slurry provides a liquid fraction which is very easy to pump and spread and the nitrogen in it is in a more highly available form for the growing crop. Precision application techniques should always be used for dilute slurry to maximise nitrogen availability.

"For farmers with land further afield, transporting the solid fraction is generally more economical. The material is friable and easy to spread evenly," Mr Winstanley adds.

PRODUCT CHOICE

Most farmers will still need to apply fertilisers even when using manures prudently. Mr Winstanley urges careful thought about choice of product as opting for the cheapest may prove to be a false economy.

"Including an amount of sulphur at the start of the growing season and with mid-season nitrogen applications, can be beneficial where the analysis shows sulphur is lacking. Sulphur is key to the

TOP TIPS FOR MAKING THE MOST OF MANURES

- Carry out a field-by-field soil analysis before planning slurry and fertiliser applications and include sulphur and calcium
- Ensure pH of higher input grass fields is close to pH 6.2; for other lower input fields it should be at least pH 6.0
- Carry out a twice-yearly slurry analysis in winter and summer
- Plan slurry applications to target multi-cut silage fields and those with low P and K indices
- Use precision application technology such as a dribble bar or trailing shoe to minimise nitrogen losses and reduce contamination of grass
- Future-proof slurry stores to provide a minimum of six months storage

efficient utilisation of nitrogen, it is a precursor of amino acid production and it is essential for high protein levels in grass.

"Where calcium levels are found to be low, but soil pH is at pH 6.2 or above, then calcium sulphate fertilisers should be considered."

Despite the high price of fertiliser, Mr Winstanley suggests farmers think carefully before making dramatic changes to nutrient management plans.

"I would be very wary of slashing inputs, as it may have consequences next winter in terms of forage supplies. If grass yield drops as a consequence, it is important to consider how this loss in ME and DM will be replaced, given the likely high price of purchased feeds later this year."

10 | Grassland and Silage Toolkit

Switching to precision slurry application techniques leads to reduced contamination and improved grass growth. Two farmers share their stories.

Precision slurry application in practice

Using low emission slurry spreading application methods can improve nitrogen utilisation by the grass crop, meaning fertiliser applications can potentially be reduced.

In all UK nations, splash plates will be banned within five years, so now is a good time to consider investing in low emission slurry spreading equipment. Research in Ireland has shown the value of nitrogen gained by applying slurry with a trailing shoe to be £36 per hectare more than if the same slurry was applied by a splash plate.

One farmer who has chosen to make the switch to low emission technology is Mark Hodgkinson, who farms near Buxton in the Peak District. Harley Grange Farm is all grass with some herbal leys extending to just more than 170ha and the 120-cow milking herd averages 8,000 litres.

Cows are grazed for a minimum of six months a year and silage is made across around 60ha of grassland. In 2020, Mr Hodgkinson switched to a dribble bar, with his purchase

was helped by a grant from the Countryside Productivity Scheme.

"We had already invested in a large slurry store so we could make better use of our slurries, so the dribble bar was the obvious next step. We needed something that was quite light because of the hills here and because we do not have very large horsepower tractors.

DRIBBLE BAR

"Our soils are thin and overlay limestone so we couldn't use an injector. We are really pleased with the dribble bar; we notice there is no smell so this shows the ammonia emissions must be far less.

"We start spreading on first cut ground in mid-February just ahead of when the grass might start growing. It is noticeable how much difference this has made to grass growth, compared to the splash plate and if we ever miss a bit, you can

"We find the dribble bar is a real asset on the grazing land because we can spread up until six weeks before we graze"

MARK HODGKINSON



HARLEY GRANGE FARM

- An all-grass farm south west of Buxton in the Peak District which extends to 171ha (422 acres). Mark Hodgkinson farms with his wife Lynne and son James
- The milking herd numbers 120 cows, plus around 200 followers ranging from calves to in-calf heifers. The farm is

also home to a flock of 200 breeding ewes

- Cows are grazed for more than 200 days each year on permanent grassland. The farm is in a Higher Level Stewardship scheme and the Hodgkinsons also participated in a farm trial of herbal leys in partnership with the Peak District National Park

see clearly where the grass has come on far better.

"This year, in addition to the slurry, on the silage ground we hope to spread 85kg/ha of nitrogen with sulphur and selenium split between first and second cut.

"We find the dribble bar is a real asset on the grazing land because we can spread up until six weeks before we graze and we now may not need to use any fertiliser on these fields. The

dribble bar only weighs an extra 425kg, so it does not cause any extra compaction.

"We intend to measure how much extra grass we have had since using the dribble bar, but we estimate there is probably a payback period of around five years. But then there are also all the other benefits, such as far less contamination and waste-age," Mr Hodgkinson says.

Andrew Mycock farms just over the hill from the Hodgkinson family and he opted for an umbilical system and trailing shoe when he decided to invest in a low emission spreading system.

For Mr Mycock, there were



Mark Hodgkinson switched to a dribble bar in 2020.

many potential benefits of this system, so after securing a grant which covered 60% of the cost of the equipment, he took the plunge.

He says: "We installed a six inch diameter underground main pipeline extending to 900 metres forming a Y shape which crosses under the road. We bought a further five 200m lengths of flat laid hose which means we can now access 141ha of our total land area of 162ha.

"The further away from the farm we are spreading the greater the resistance, so pump speeds vary from 120cu.m per hour close to the farm down to 75cu.m/hour when we are spreading the furthest fields from home. The slurry is spread via a trailing shoe attached to a lightweight tractor, minimising the risk of compaction," Mr Mycock adds.

He says setting up the umbilical system for spreading takes around an hour-and-a-half and he starts spreading in the furthest fields and then it is easy to simply drop off sections of hose

as the tractor spreads nearer and nearer to home.

"We choose to spread little and often, aiming for 30cu.m/ha, after each of our four cuts of silage. We have some ground six miles away and so we recently purchased a dribble bar for the tanker part-funded by a Countryside Productivity small grant specifically to spread on these fields.

SLURRY

"We also separate all our slurry so by spreading the more dilute fraction, we find it washes in very easily and the grass bounces back after spreading. It is difficult to see where we have spread the slurry, so we now have GPS in the tractor and once we have done one length of the field, we turn on the autosteer.

"We find the GPS has been very useful for many things; we use it for fertiliser spreading and for any spraying we need to do on the wholecrop so we no longer put tramlines in. It is quicker and more efficient in terms of input use which is very



Andrew Mycock opted for an umbilical system and trailing shoe when he decided to invest in a low emission spreading system.

FLAGG HALL FARM

■ Flagg Hall Farm is situated between Bakewell and Buxton in the Peak District and extends to 176ha (440 acres), plus 48ha (118.5 acres) of land near Buxton rented on an annual basis. Of this total 80ha (198 acres) is permanent grassland, 109ha (269 acres) is temporary grass and 35ha (86.5 acres) is wheat grown for wholecrop

■ The autumn-calving 330-head Holstein herd is rotationally grazed on a 78ha (195 acres) grazing platform. The aim is to achieve at least 15 days of daytime grazing in March for the milking cows and at least 25 days in April and to have grazed the entire platform by April 25

■ Cows go out at night usually in early to mid-April depending on grass growth and ground conditions. All paddocks are connected by tracks and most have at least two entrances

important now with prices where they are," Mr Mycock says.

With the high price of fertiliser, Mr Mycock is planning his applications carefully, focusing on applying in accordance with soil analysis results and using the right product for the crop.

He says: "We have all the fields tested for a broad spectrum of nutrients every four years, including measuring the calcium:magnesium ratio, the soil organic matter and sulphur alongside the main elements.

"This year we have enough urea for the wholecrop and silage ground but we use a calcium ammonium nitrate product with sodium and selenium on the grazing land. We find the sodium increases palatability of the grass.

"Cows are grazed on a three-to-four-week rotation and we apply 35kg/ha N after each grazing. This year we may trim rates back a little but even at the current high prices, nitrogen is still the most cost-effective input we have to grow grass," he adds.

Dairy farmers are constantly being urged to increase milk from forage, but the exact financial benefits of doing this are not always spelled out.

Financial benefits of feeding better silage

Analysis carried out by Volac has quantified the monetary gain from increasing milk from forage, based on current feed prices, and the results are noteworthy.

Michael Woodrow, global

technical manager at Volac Animal Nutrition, points to the ability to make better silage being one factor a farmer has an influence over.

Feed costs can account for up to half of the cost of milk production, so keeping these under control is critical.

He says: "By cutting at the right time, enabling a rapid wilt, clamping correctly with the required amount of consolidation and using an additive, farmers can improve the feed value of their forage.

"When grass is cut later, it will generally contain higher

levels of fibre and therefore limit the amount of energy and protein consumed as part of the forage dry matter.

"This will have a negative effect on performance and efficiency. Higher NDF silages will result in higher methane emissions from cows."

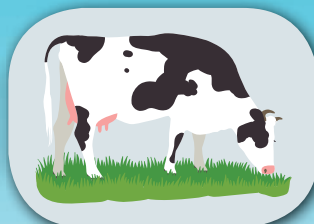
FEEDING A HIGHER QUALITY GRASS SILAGE VERSUS A LOWER QUALITY SILAGE

CONSIDER a high output Holstein herd comprising cows with an average body weight of 650kg and yielding 36 litres per cow per day at 4% butterfat and 3.2% protein. The total ME required would be 279.1MJ/cow/day. This is made up of 75MJ required for maintenance plus 190.8MJ required for milk production* totalling 265.8MJ/day, plus a 5% allowance for uneaten ration left in the trough, and taking into account it is a herd of cows being fed, not an individual.

BASED ON 27 TRIALS WHERE GRASS SILAGE WAS MADE WITH AND WITHOUT ECOSYL

Metabolisable energy

The untreated silage had an average ME of 10.86MJ/kg DM compared to silage made using Ecosyl with a higher ME of 11.39MJ/kg DM



The treated silage was more digestible because the fibre was found to be less bulky in the rumen, so cows were able to eat more of it

+0.4kg

This resulted in 0.4kg extra intake from silage treated with Ecosyl

58%

By multiplying the ME content of untreated and treated silage with the intake, the untreated silage provides 162.9MJ of the target requirement of 279.1MJ/cow/day ME equating to 58%, leaving 116.2MJ to come from concentrate

63%

The silage made with the Ecosyl treatment provides 175.4MJ, equivalent to 63% of energy requirements, meaning just 103.7MJ has to come from concentrate

£300/t

Concentrate cost at the time of writing is about £300/tonne, translating into concentrate feed costs of £2.80/cow/day if feeding the untreated silage, compared to £2.49/cow/day if feeding treated silage



For a 200-cow herd, this adds up to a four-month peak lactation saving of about £7,500



There are further financial gains because the intakes for cows eating the treated silage were 0.6kg/day less to produce the same amount of milk compared to cows eating untreated silage, demonstrating improved feed efficiency

Notes: * Based on each litre of milk requiring 5.3MJ to produce it at 4% butterfat and 3.2% protein.

Peter Smith, sales manager for Wales at Volac, says making sufficient quantities of quality silage will be key to achieving the desired volumes of milk. He admits this could be challenging given the recent hikes in input costs.

He says: "The high price of fertiliser means many farmers may be looking to apply less this season and this could have implications both for the volume of silage made and quality.

"Reduced fertiliser applications may result in the grass plant becoming nutritionally stressed meaning it will head earlier. If this is the case, it could be necessary to cut a week or more earlier than usual, to avoid any losses in nutritional quality.

"Once the grass heads, for every week cutting is delayed, you lose half a unit of D-value every day, which is equivalent to a reduction of 1.5 litres of milk per cow per day.

"Farmers who have already switched to a multi-cut system are seeing the benefits of cutting earlier and more frequently. Research shows it will result in £225-worth of milk more per acre after paying additional costs.

EXTRA CUT

"Not everyone will want to opt for a multi-cut system, but it is still worth considering an extra cut if it is an option as the extra contractor costs will certainly be more than paid for by the increased grass grown and the improved quality of the silage made.

"Instead of cutting every six or seven weeks, consider a five- to six-week interval to enable an extra cut at the end of the season. If the weather is right, and it is feasible, go early, as long as any fertiliser or slurry applied to the grass has been used up," Mr Smith adds.



As market analysts predict milk price rises into autumn 2022, dairy farmers who can maintain milk yields over this period will be in the best position to take advantage of this buoyant market.

A five-point plan for making better silage

High fertiliser prices are encouraging farmers to look at how they can make the most of their slurries this year. There are risks associated with spreading slurry onto ground which is used for multi-cut silage, but these can be mitigated with careful planning, according to Mr Smith.

"Applying slurry as soon as possible after cutting the grass is beneficial, as spreading onto a short stubble before the re-growth starts will help to keep the fresh growth cleaner. Spreading while the grass is short will allow any rain to wash the slurry into the soil.

"In sunny weather, the sun's

"Rapid wilt is important because once grass is mown it continues to respire, burning up sugars as it does so"

PETER SMITH

UV rays will help to kill off some of the undesirable bacteria found in slurry before a grass canopy forms creating a micro climate protecting these bacteria.

"The bacteria which are found in slurry, typically enterobacteria, result in very inefficient fermentation in the clamp as they metabolise the sugars losing 40% of the dry matter [DM] value in the process.

"Enterobacteria in slurry produce a mixed fermentation resulting in several different acids and alcohols. As a consequence, the pH will not fall as quickly as when lactic acid is the dominant end product, leading to greater nutritional losses."

Mr Smith recommends diluting thick slurry before applying to a grass crop as this will help



For most cows, except very high yielders, silage which is a little wetter than the target is not nutritionally a big problem, says Peter Smith.

WHAT DOES THE RESEARCH TELL US?

- A 10am cut time is optimum to achieve the rapid wilt
- Tedding immediately will improve wilting times
- Reduced crop density will cut time needed to reach 30% DM
- Leaving a silage cut overnight will result in greater losses
- Making silage without an additive can double dry matter losses as a consequence of fermentation by undesirable bacteria

it wash in more easily and will result in less contamination.

A rapid wilt to 30% DM is the best way of ensuring high-quality silage, Mr Smith says, and can limit the risk of undesirable bacteria from slurry causing a poor fermentation. He adds that wetter silages suffer greater fermentation losses, while wilting for too long can result in greater field losses.

"Research carried out on a dairy farm in Pembrokeshire

showed that mowing in the morning and then tedding the grass immediately led to the most rapid wilt. For a light crop cut on a sunny, dry day, it should be possible to harvest on the same day at 30% DM.

"This rapid wilt is important because once grass is mown it continues to respire, burning up sugars as it does so. The bacteria in the swath which were previously quite inactive because of a lack of an available food source will now be able to access the sugar released after cutting and conditioning of the grass leading to bruising and moisture.

"These bacteria are generally undesirable species and will cause a less efficient fermentation. The shorter the wilting period, the less time these bacteria have to multiply. After 24 hours, around 20% of the sugars in the grass will be lost and as the wilting period is extended, these losses increase further," Mr Smith says.

The target figure of 30% DM is significant because it is the optimum to achieve maximum intakes, to minimise clamp slippage and to reduce the adverse effects of slurry on the grass. To achieve this, cutting in good weather is obviously ideal, but

the aim should also be to wilt for no more than 24 hours, Mr Smith adds.

"Leaving the grass to dry longer in the field results in more sugar losses, but also means the silage made will be less palatable and can be more difficult to consolidate in the clamp.

WETTER SILAGE

"For most cows except very high yielders, silage which is a little wetter than the target is not nutritionally a big problem, especially where blends and straights along with drier forages are incorporated in a mixer wagon."

Finally, Mr Smith urges farmers to consider using an additive such as Ecosyl as this provides a source of beneficial bacteria which will outcompete the undesirable species that can cause a poor fermentation.

"Undesirable bacteria result

in nutrient losses even on the best made untreated silages, accounting for 8-10% of DM losses in a well fermented silage. These losses take some of the most nutritious fraction resulting in silages with a lower ME value.

"Trials by Ecosyl show that silage made with an additive will undergo a more efficient fermentation process where DM losses are halved."

Adopting these measures is especially relevant in the current market climate, Mr Smith points out, but it should be considered best practice every year.

"The weather is not always conducive to making the best silage, but by following these five recommendations, farmers stand a better chance of making good silage which in turn, will reduce their requirement for expensive bought-in feed over the coming year."

FIVE TOP TIPS FOR MAKING THE BEST SILAGE

- 1 Apply slurry as soon as possible onto mown grassland
- 2 If the slurry is thick, dilute it to reduce the risk of contamination
- 3 Ensure a rapid wilt, ideally within 24 hours
- 4 Wilt to 30% dry matter
- 5 Use a proven additive for the best results





Paul Kelly has had to adjust his approach to suit the conditions at Cambridge University Farm.

Exploring all the options to increase milk from forage is yielding results on one Cambridgeshire dairy farm.

Adapting to drier climate

After moving from one of the wettest dairy farms to one of the driest, Paul Kelly has had to adjust his approach to suit the conditions at Cambridge University Farm. A move to multi-cut silage coupled with better use of slurries has now secured significant savings in input costs and improved cow health.

Although the main purpose of the farm is to provide a resource for the vet students at Cambridge University, it is managed as a commercial enterprise. There is also a strong environmental focus, with investments in equipment and infrastructure to improve its carbon footprint and overall sustainability.

When Mr Kelly arrived at the farm, he recognised that managing with half the rainfall compared to Dumfries would bring challenges. This, coupled with

the heavy boulder clays meaning soils could turn from too wet to travel to concrete in three days, led to some doubts regarding his strategy of switching to multi-cut.

He says: "Multi-cut works really well here because it means we can have two cuts in the clamp

before the dry weather has a real impact on grass growth.

OPTIMUM WILT

"We have the opposite problem here compared to Dumfries when seeking an optimum wilt. Back home, we had to ted the

grass immediately after mowing to achieve a quick wilt.

"Now, I tend to row it up as soon as possible to conserve moisture as otherwise it will become too dry and then it is difficult to consolidate in the clamp.

FARM FACTS

- The Cambridge University farm extends to a total of 692 hectares (1,709 acres) of which 259ha (634 acres) is arable and the rotation is typically two years winter wheat followed by oilseed rape and occasionally spring barley
- Forage crops including temporary grass, maize and wholecrop oats are grown across a further 199ha (491.5 acres) and there is also 145ha (358 acres) of permanent grass and parkland
- The milking herd numbers 215 pedigree Holstein Frie-

sians and 76 dairy replacements aged between 12 and 24 months. Currently there are 112 calves on the ground and a further six dairy cross beef calves

■ The herd is all-year-round calving and housed throughout. Cows are fed a total mixed ration of grass and maize silage, wholecrop and a protein blend which is soaked overnight to achieve a version of compact feeding to stop the cows sorting plus concentrate fed to yield at the four Lely robots



The cows started being fed multi-cut in September 2020 and Paul Kelly says he immediately saw an improvement in milk yield.

"We have also invested in an additional forage wagon because using the old equipment regime, it was taking over two days to collect and clamp all the silage and this meant much of it was becoming too dry. Now we can clamp everything in a day which has made a significant difference to quality," Mr Kelly adds.

Using Ecosyl additive is key to achieving a good fermentation, Mr Kelly says, and it also creates a far more stable product. With the new forage wagon, he is now experimenting with the application rate to ensure the Ecosyl is added consistently throughout the harvesting process.

"Last year we had so much grass from the first and second cut that we had plenty to last us, so we sold the third cut. And the quality has been exceptional at 26.3% dry matter [DM], 70 D-value, 11.3 metabolisable energy [ME] and 13.8 crude protein [CP] for the first cut, while the second cut was better still at 34% DM, 73 D-value, 11.7 ME and 15.9 CP.

"We began feeding multi-cut to the cows in September 2020 and immediately saw an improvement in milk yield, so we were able to reduce the amount of purchased feed used. So far

we have seen savings of 5p per litre for concentrate," Mr Kelly adds.

He admits the typically dry summers mean they often have the most significant grass growth when it is least useful; this year they had better growth in autumn than for most of the summer. Similarly, the wet autumns of 2019 and 2020 caused difficulties when harvesting the maize crop.

EARLIER ENTRY

Mr Kelly says: "We have halved the area of maize we grow and instead now grow wholecrop oats as we can harvest them in July allowing an earlier entry for the grass ley which we direct drill into the stubbles. This also reduces cultivation costs and so gives us more flexibility as well as improving sustainability."

A Higher Level Stewardship scheme across the farm includes a range of options such as very low input grassland, but also an area of 24 hectares (60 acres) of herbal leys. Mr Kelly has been pleasantly surprised at how well these have performed both in terms of yield and nutritional value.

"Even though it receives no inputs except slurry, the herbal leys

yield around three-quarters of the forage compared to the yield from the intensively managed grass leys. The cows seem to like the variety they provide and given the much lower cost to grow the herbal leys, it is something we are looking at seriously going forward.

"This year we have clamped the herbal leys separately so we can obtain a discrete analysis for them. Previously we clamped them together with the rest of the silage, so it was not possible to get individual figures.

"The herbal leys tick a number of boxes for us, because our three big issues with regard to our greenhouse gas emissions are purchased feed, methane production and fertiliser. They provide more protein, do not need any fertiliser or herbicides so they could help us become more efficient and reduce our carbon footprint," Mr Kelly says.

The experience with herbal leys has prompted Mr Kelly to

"We began feeding multi-cut to the cows in September 2020 and immediately saw an improvement in milk yield"

PAUL KELLY

drill more clover into the newer grass leys to reduce the need for nitrogen fertiliser. Although he bought-in two-thirds of their usual fertiliser quantity early when it was around £300/tonne, he says with prices where they are, he does not intend to buy any more.

"We will make do with what we have and so we will have to rationalise and use it to best effect," he adds.

Investing in a new 6,000cu.m slurry tower has been instrumental to making best use of slurries because prior to this, large quantities were exported off-site, representing a valuable loss of nutrients and a huge expense to the business.

BALANCE

"All our slurry is spread with a trailing shoe and this helps reduce the residuals on the silage crop and maximise the amount of nitrogen reaching the growing crop. We have to balance cutting time to maximise the feed value of the grass but also to ensure sufficient time has passed since the slurry application," Mr Kelly says.

This approach of making a number of improvements across different areas of operation is now having a positive effect on several performance indicators.

Mr Kelly adds: "Milk from forage has increased by around 1,000 litres since we introduced the multi-cut system and I think our cows are healthier. There is still more we can do to push milk from forage even more forward, such as looking at our genetics and our grass varieties moving forward, but we are in a good place."



Yield mapping for grassland provides vital information to inform future decision-making and diet planning and the technology need not cost the earth.

Embracing data

Yield mapping was once the preserve of arable farmers with expensive combines, but now the ability to measure the differential yield of grass across a field can be done for little extra cost. Many new forage harvesters have the technology as standard, with even balers and forage wagons providing helpful data.

Craig Bryson, Krone's territory manager for the North, says that knowing how much grass different areas of the field are producing can help inform land management practices and highlight issues.

He says: "All Krone forage harvesters are now fitted with GPS and yield mapping technology as standard, enabling the operator to produce detailed maps of the relative yield down to 10sq.m resolution.

"These maps will highlight the range of yields as tonnes per hectare and because some forage harvesters are also fitted with a moisture metre it is possible to calculate tonnes of dry matter [DM] per hectare.

"This information can highlight areas in the field which are producing very low yields, so the causes of the problem can be investigated. It may be due to compaction or a nutrient deficiency, or the sward may have been damaged or worn out.

£3,000

Basic telematics equipment costs around £3,000 when fitted to forage wagons and balers.

"We find some farmers make use of this information so they can carry out simple on-farm experiments, such as comparing different varieties, or slurry spreading techniques, or they might try out aeration and then measure the extra yield generated."

Mr Bryson says some of the newer combination balers have GPS technology so it is possible to see how many and where bales were dropped. With built-in weigh scales and a moisture meter, the combination baler will also record the weight and measure the moisture percentage of each individual bale.

"By knowing the weight of each bale, the moisture content and how many bales were produced from a field, this makes it very straightforward to calculate the total DM of the baled silage produced.

ACCURATE VALUE

"Knowing the DM content of both baled and clamped silage and the total quantity made enables the farmer to provide an accurate value to the nutritionist who can then more easily formulate a diet," Mr Bryson adds.

There are other applications of this information such as allowing the quantity of silage additive required to be measured more accurately.

"Silage additive is an expensive input and to have the best effect, it needs to be added at the correct rate. Because the forage harvesters, wagons and balers are able to measure the weight of grass passing through, this enables the machine to add

the precise amount of additive needed.

"For farmers who are zero grazing, knowing the amount of grass harvested before they arrive back at the yard is invaluable information as they can gauge how much they need for feed out, so it is sufficient for the total mixed ration for the herd, while avoiding wastage.

"Knowing the moisture content of the grass as well means it is possible to adjust the weight of grass fed depending on the weather; wet grass is heavier than dry grass, so quantities will need to be altered accordingly to ensure the right DM content is fed out," Mr Bryson says.

On the new forage harvester models, it is possible to obtain a real-time grass analysis including metabolisable energy, crude protein and ash content, but Mr Bryson suggests this level of detail and information is not necessarily utilised by all farmers.

"For many people, the basic telematics providing data on weight of grass and a tracking facility is more than sufficient. This equipment costs around £3,000 when fitted to forage wagons and balers and if used for the range of applications described provides very good value for money.

"Providing information about yields to the nutritionist or being able to point to poorer yielding areas of fields when in discussion with an agronomist can be the first stage of identifying solutions and improving performance," Mr Bryson adds.



CASE STUDY: ANDREW

ANDREW Houseman is a farmer and contractor based near Harrogate. Their farm extends to 69 hectares (170 acres), where they rear British Blue cross dairy calves which are sold as stores.

The family has a large contracting business working for dairy and beef farmers around Harrogate and further afield. Most of the work is grass silage, but they also do a small amount of maize and wholecrop.

Mr Houseman purchased a Krone 780 forage harvester in spring 2020 and the machine arrived with telematics as standard. He admits that initially he did not think he would make use of the features it offered.

"At the time, most of our customers did not request any information relating to tonnage of silage. Then one of the service advisers from Krone showed our driver how to use the telematics and how to obtain a printout of the statistics for a customer in the cab.



The family has a large contracting business working for dairy and beef farmers around Harrogate and further afield.

HOUSEMAN

"After this, our driver started printing off these tickets for the farmers, showing how long the machine has worked, how much diesel has been used and tonnage of grass which has passed through the machine. Now most of the farmers ask for the print outs.

"I find the telematics very useful when I am advising customers as to when we can get to them as it means I do not need to ring the drivers to find out. I can just

log onto my phone and see where the machine is working, how much he has got to do and then I can tell customers when we will be able to get to them," he says.

MAIZE

Mr Houseman does some maize harvesting each year and he says these customers are keen to know what each field is yielding. He can provide this information to them as the machine is driving out of the field.

"The grassland farmers are not as keen to know tonnages at the moment, but I think that will change"

ANDREW HOUSEMAN

"The grassland farmers are not as keen to know tonnages at the moment, but I think that will change as they choose to record more information for benchmarking or because their suppliers are asking for it.

"The other feature we use on the forage harvester is the controlled additive gauge so we can just set this at the correct rate rather than having to do calculations and guess work as we go along. This means farmers can save on additive as it is being applied more accurately and there is less waste," Mr Houseman adds.

He says the telematics is also very useful for preparing bills. In the past he used to write everything in

his diary, and he still makes notes but the information he can source direct from the machine means he has the ability to refer back to check details and ensure his billing is completely accurate.

FUTURE

Looking ahead, Mr Houseman believes it is likely he will make more and more use of this technology.

"If you had told me five years ago I would be looking at my phone to see where our machines are or logging in to view the relative yields across a field I would not have believed it. But this information is now an important element of our business planning and I would not be without it," he says.

Andrew Houseman purchased a Krone 780 forage harvester in spring 2020 and the machine arrived with telematics as standard.



Soil compaction often goes unnoticed in grassland soils and yet it can have an adverse impact on productivity comparable to the effect in cultivated soils.

Is soil compaction holding back grass growth potential?

Research by Scotland's Rural College shows dry matter (DM) yield on grassland soils which suffer repeated compaction episodes caused by vehicle trafficking is 14.5% less by the third year compared to soils suffering no issues, on both heavy and lighter soil types.

Iain McDonell, senior environment officer, agriculture in Yorkshire at the Environment Agency, says some dairy farmers may not even realise they have a compaction problem.

"There are some obvious signs such as standing water, sheet water run off during very wet weather and patches with less sward growth, but unless farmers are walking their fields during wet periods they may not always spot these.

"The best place to start when compaction is suspected as the cause of poor grass growth is to dig a hole. When the spade is pushed into the ground, if it goes in easily then this suggests a good soil structure.

"Where more force has to be exerted to push the spade into the soil, then it is likely there is some compaction. To look at the soil properly a section of the topsoil should be examined by digging out a square which is at least 50cm by 50cm to a depth of 20cm.

"In clay soils, some gleying or mottling suggests air is not able to move through these soils and they will often smell pungent. It should be possible to identify a pan in the soil; if this is nearer the surface, it suggests the compaction has been caused by trampling livestock whereas if it is deeper, it is likely to be caused by machinery.

"Look carefully at the roots to see how far they penetrate into the soil profile and whether they go down so far and then start growing laterally. The point at which they begin to grow along the horizontal indicates the pan depth," Mr McDonell adds.

EFFECTS

He points to the effects of soil compaction on plant growth, because air, water and nutrients cannot be easily accessed by the roots. He also highlights the potential environmental impacts.

"Where soil is compacted, there is likely to be more run off and the water will take sediment and phosphate with it, especially on clay soils. If this water is running off the land, it

has to go somewhere and it will end up in streams, which flow into rivers, causing flood risk downstream.

"Prevention is better than cure, so farmers should seek to avoid causing compaction in the first place. Not trafficking over fields when ground conditions are too wet is the best advice but this is not always possible.

"Remember that 80% of the compaction occurs in the first wheeling on newly-established leys, so re-using the same routes across a field where possible can minimise damage.

"Where compaction is identified, it is important to take remedial action. On grassland, it is difficult to use deep rooting crops to help to break through the compacted layer, unless legumes can be over-seeded into a ley.

"The best option is to use an aerator or a sward lifter. The machine used will depend on the depth of compaction, the type of sward and the availability of a suitable machine.

"If used correctly, aerators can have the same effect as an extra

"Prevention is better than cure, so farmers should seek to avoid causing compaction in the first place"

IAIN McDONELL



Iain McDonell

bag of fertiliser per acre. Once the soil structure is opened up, farmers we have worked with report an extra month of suitable ground conditions, meaning animals can stay out longer or it is possible to run over soils with machinery earlier and later without causing damage."

Machinery such as forage harvesters and wagons, and even balers, have the potential to cause compaction in wet conditions but recent advancements in design and features are reducing the risk of this occurring.

This is according to Jamie Morton, territory product support manager in the North at Krone, who says the advent of individual wheel motors driven by one hydraulic pump on the company's forage harvesters means it is possible to monitor the amount of power going to each wheel.

"This development means it is possible for the inside wheels on a turn to go round more slowly than the wheels on the outside of the turn, controlling the amount of slip and therefore

reducing the risk of damage to the sward through cutting up.

"Designing the machine around the crop flow has led to a 60:40 ratio front end to back end on the machines. This means the harvesters can travel on the roads at lower tyre pressures, as they are better balanced to begin with.

"So when the machine moves into the field, there is no need to reduce tyre pressures to reduce compaction and slippage risk. This saves valuable time and it also means there is one less system to go wrong.

"It is important to realise that tyre pressures are critical, so they should be altered if different headers are used as otherwise it can affect the functioning of the transmission if not set up correctly. Consult the tyre pressure chart on the inside of the door on the forage harvester," Mr Morton adds.

The size of tyres used on all machinery will also make a

difference to how much compaction is caused, so aiming for as wide a tyre as is possible and legal is recommended when travelling on wetter ground, Mr Morton says.

"Using as wide a tyre as possible and legal on a forage harvester will help to spread the weight of the vehicle, but it is important that this width of tyre does not tip the vehicle over the legal three-metre width.

"The wishbone suspension fitted on the rear axle of Krone forage harvesters helps to ease out the bumps over rough terrain, meaning it is less likely the wheels will dig into the turf.

"It also means it is feasible to achieve a 50-degree steering angle while retaining even

pressure on each wheel and making it possible to avoid having to take wide turns and running over headlands continually," Mr Morton says.

When using mowers, tedders and balers, he says one of the more frequent causes of rutting can be inflating tyre pressures too much, meaning they will tend to skid around more.

TYRES

"Where tyres are rock hard, they will affect machine performance, preventing it from gripping as well, but also meaning it is bouncing about on the ground more. This can cause vibration through the machine, potentially damaging it."

Mr Morton says minimising damage to soils is also down to the driver's care and attention and says as tractors have become larger and more powerful with all-wheel drive, it is less necessary to observe the conditions in each field.

"Modern tractors can go anywhere, so sometimes we see drivers taking less care about where and how they drive in a field. Avoiding wet areas, trying to prevent gateways becoming too rutted and trying to stay off headlands is down to the driver and all contractors have a responsibility to look after their customers' land."

With rapid advances in global navigation satellite systems, Mr McDonnell suggests some dairy farmers and contractors are looking to systems already in widespread use in arable farming.

He says there is scope to adopt this technology on grassland farms to minimise the likelihood of compaction occurring.

He adds: "Using GPS and autosteer can reduce the amount of wheeling across fields and it maybe in the future, advancements such as controlled traffic farming become a reality for grassland farmers."

80%

The first wheeling on newly-established leys causes 80% of the compaction.

Recent machinery advancements in design and features are reducing the risk of compaction occurring in wet conditions.



22 | Grassland and Silage Toolkit

Machinery which is set up correctly lasts longer and makes better silage. These simple steps enable tedders, rakes and mowers to work effectively.

Setting yourself up for the job

When time is precious and the dry weather is not going to last, the temptation can be to 'crack on' rather than take time to make sure equipment is set up correctly. But never has the old adage of a 'stitch in time' been more appropriate.

Iain Faulds, sales support manager with Krone, says one

of the most common, but important, mistakes is made when attaching a tedder to a tractor.

"The headstock design of tedders typically has two sets of holes, a slotted one and a fixed one, and the top link must always be attached to one of the fixed holes. Otherwise the tedder drops forward into undulations and will scar the ground.

"No two fields are the same, so it is always worth jumping out to check the height again when moving into a different field"

IAIN FAULDS

"It is also important to set up the tedder so its whole weight is taken by the top link, allowing the lower links to float.

"Once in the field, check the tedder height is set correctly, with a base setting of 20mm tine tip to stubble so it moves the whole crop; this adjustment is made on the top link. It might take a few runs so that it is exactly right.

CHECKS

"If the tedder is too high, it will leave lumps of grass behind whereas if it is too low, it will 'scalp' the grass and may drag up soil. Be aware that no two fields are the same, so it is always worth jumping out of the cab to check the height again when moving into a different field," Mr Faulds adds.

Matching the right size of tedder to the mower is also important so the grass is left in the appropriate width of swath, he says. If it is not possible to use compatible sizes of equipment, it will be necessary to do a second run with the tedder slightly off set from the first run.

Mr Faulds says similar principles apply with rakes but attaching the top link to the

20mm

A tedder height base setting of 20mm tine tip to stubble ensures it moves the whole crop.

fixed hole is even more critical to allow the desired sweeping movement of the rake.

"The rake must be set at the right height so it will sweep up all the grass without picking up soil. For both the rake and the tedder, choosing the most appropriate forward driving speed for the conditions is critical so the equipment can operate properly."

Likewise, when fine-tuning the mower prior to use, setting the suspension so the right ground pressure is achieved can be done by a simple heavy-duty spring and pin or can be operated hydraulically allowing it to be altered easily from the cab.

"Ensure there is enough contact between the mower and the ground so it does not bounce but not too much so that it causes smearing as this will pull soil into the silage. This will also cause excessive wearing of the skids, so it is imperative to seek the right balance.

"One way to check is to stop the mower after a while and if the skid is very warm, the pressure on the ground is too high," Mr Faulds adds.

He also urges farmers to check their equipment is working in plenty of time before they intend to use it so there is sufficient time to obtain any parts.

"Making sure machines such as tedders, rakes and mowers are serviced regularly, are stored clean and are well looked after will lead to fewer problems and better silage," he says.

Matching the right size of tedder to the mower is important so the grass is left in the appropriate width of swath.



An agronomist's view

Ross Dilks, an agronomist with Agrii and a dairy farmer in Derbyshire, says although his clients have tried a variety of home-grown feed sources over recent years, his experience shows grass is consistently the most cost-effective way to feed dairy cows.

Mr Dilks says: "Before drastically reducing the amount of fertiliser they use, I would urge farmers to do their costings. Grass is always the cheapest form of feed and if grassland has received significant applications of nitrogen for many years, going 'cold turkey' will result in a substantial yield penalty in grass growth.

"It may be possible to reduce nitrogen use by 20-30% and find a 'sweet spot' where yield does not drop significantly. Input costs can be cut but it is essential to work through the figures before making these decisions as otherwise the end result might be the need to buy more purchased feed, which is likely to be a far more expensive option," he adds.

One option available to farmers is to include or increase the amount of red clover in silage leys or white clover in grazed ground. But Mr Dilks warns this is not a quick fix.

"Overseeding the grazing platform with white clover now is unlikely to provide much benefit in terms of fixed nitrogen until the summer of 2023. Where

clover is already in a sward, but the land has been receiving quite high rates of inorganic fertiliser, the clover will not be fixing much nitrogen of its own as it will rely on the applied nutrients.

"It is easy to see if the clover is fixing nitrogen by digging up a plant and looking for the nodules on the roots. If none can be found, then the clover is not fixing nitrogen. Nodules on the roots, particularly where they are pink when cut open, indicates the clover plant is actively fixing nitrogen.

"It is also worth bearing in mind that clover does not really 'wake up' until May when temperatures rise sufficiently. So the fixed nitrogen in clover leys is unlikely to help improve yields until at least the second silage cut."

POTENTIAL

Mr Dilks says a grass crop, well-grown, has the potential to contribute a significant amount to the protein requirement in a cow's diet.

"A good silage grass ley containing high yielding grass varieties and red clover should be able to give a silage crop



"Focusing on the detail to make sure conditions are optimal for growth is the best strategy to mitigate for high input costs"

ROSS DILKS

which analyses at between 16-18% protein.

"At home, our red clover and grass silage analysed at 16% protein last year and this year, we plan to cut a little earlier and we hope we can achieve 18% protein. The red clover also has the benefit of fixing nitrogen and improving fertility and soil structure because it is deep rooting.

"I am seeing dairy farmers

growing a range of crops such as beans, lupins, peas and barley and while including them in the diet can reduce the need for bought-in feed, they are generally more expensive to grow and less consistent than grass.

"Wholecrop beans, grown well, might analyse at up to 20% protein, but it is important to look at the costs of production compared to grass and clover silage.

"There is no substitute for good grass when feeding dairy cows and so focusing on the detail to make sure conditions are optimal for growth is the best strategy to mitigate for high input costs," he adds.

ROSS DILKS' TOP TIPS FOR GROWING GOOD GRASS

- Aim to include clover in grazing and mowing leys
- Make the best use of slurry – know its nutrient value, target it where it is needed most,
- apply little and often using precision application methods
- Ensure pH on grassland does not fall below 6.2
- Increase the number of cuts
- where possible to improve grass quality
- Rotationally graze grassland rather than opting for set stocking