

The best forage

 **PÖTTINGER**

For the success
of your livestock



For the success of your dairy cattle



The best forage

The production of high-quality basic ration from meadows, pastures and whole crop is the basis of every grassland farm. High-yield livestock need a high quality basic ration. Ruminants are fussy about their forage. The quality of their basic ration has a decisive influence on yield. Yet producing the best quality forage is no coincidence.

Contents

Basic ration quality is the key

Effective basic ration utilisation	4-5
Factors influencing good basic ration quality	6-11

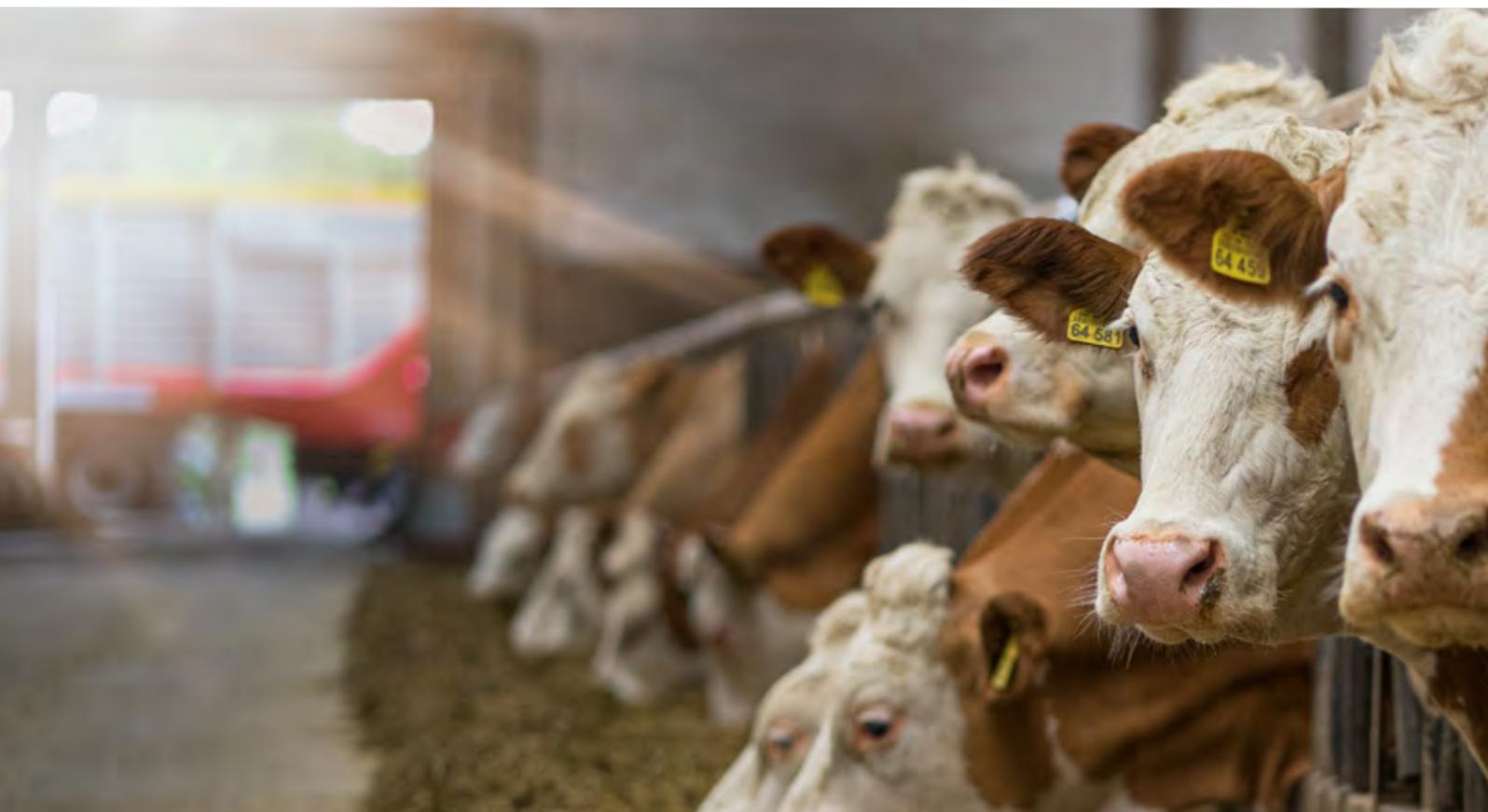
PÖTTINGER product range for forage harvesting

Mowers	14-15
System for detecting animals	16-17
Conditioners	18-19
Tedders	20-21
Rotary rakes	22-23
Mergers	24-25
Loader wagons	26-27
Round balers	28-29

Statements that stand out

Bibliography	30-31
--------------	-------

Effective basic ration utilisation



Forage provides the basis for feeding ruminants.

"For cost effective and sustainable production, dairy cows should produce as much of their milk as possible from a basic ration." This statement lays down the principles of feeding dairy cattle.

Ruminants are able to digest cellulose, plant cell wall components that are actually indigestible for vertebrates, as a result of symbiosis with microorganisms in their digestive tract. In the course of evolution, their digestive system has become specialised precisely for this purpose, which is why they need the corresponding feed, i.e. basic ration, in order to function properly.

Regardless of whether your cattle yield 20 litres a day, or 40 litres a day - high-quality and clean basic ration is the basis for healthy, productive animals and forms the foundation for the success of your business.

Livestock health

Various microbes live in the rumen of every ruminant, which, as a result of the forage fermenting, providing the animal with energy in the form of volatile fatty acids, vitamins and high-quality protein.

These microorganisms have a pH optimum of around 6 to 6.5. The fatty acids that form during the process, however, naturally cause a continuous lowering of the pH value. This would cause the microbes to perish from their own fermentation products. The drop in pH value is counteracted by the buffering effect of saliva in ruminant-friendly feeding. This is because if ruminants eat sufficient quantities of basic ration, the physical structure of the forage causes natural rumination, which produces with sufficient levels of salivation. The pH value in the rumen adjusts to an optimal level.

If the proportion of concentrate in the ration is too high, this self-regulation no longer functions due to the lack of structure in the feed. This leads to acidosis, the over-acidity of the rumen, with long-term health consequences and a reduction in yield.

Basic ration quality is the key to your success



Cost effectiveness

In addition to rumen physiological reasons and the health of the animals, it is also in the business interests of farm management to produce a large proportion of the milk from the basic ration.

On dairy farms, feed (forage production and purchase) accounts for the largest part of the value chain, accounting for almost 50% of production costs per litre of milk¹. So there is enormous potential here.

The more milk that can be produced from the farm's own forage, the lower the proportion of expensive concentrate that needs to be added to achieve high yield targets.

The annual milk reports² of the Bavarian Research Centre for Agriculture, among others, show that profits on dairy farms also increase in line with higher basic ration consumption. However, whether the animals actually consume the basic ration in sufficient quantities depends to a large extent on the quality of the forage provided.

Crop take-up

Ruminants are fussy about their forage. The quality of their basic ration will determine whether your animals consume the forage in high quantities, or not.

With dairy cows, approx. 50% of forage consumption is influenced by animal-related factors such as live weight, milk yield and lactation day, with the other 50% depending on the forage itself.³ Ultimately, it is the energy density of the basic ration that is decisive.

Many years of research results involving over 2,200 Holstein, Fleckvieh and Braunvieh dairy cattle have gone into the DLG forage intake estimation equation: If the energy content of the basic ration increases by 1 MJ NEL / kg DM, the total forage intake increases by approx. 1 kg DM per day.³

It is therefore worthwhile actively improving the quality of the basic forage as far as possible on all levels.

Factors influencing good basic ration quality



It all starts with the plant

Good basic ration is no coincidence. It is the result of site conditions, good management and the best harvesting technology. The foundation for this is laid by the plant crop.

In many places, permanent grassland provides the basis for successful cattle feeding. Whole crop production with clover-grass mixtures and alfalfa is also becoming increasingly important due to rising protein feed prices and prolonged dry periods.

Maintaining performance

The botanical composition of the grassland plants determines both the performance and quality potential of the fields to be harvested. Permanent pasture, unlike whole crop forage, is generally not subject to cultivation. In order to achieve decent yields over the long term, a certain amount of grassland management is required. This is because yield-driven farming with several cuts per year deprives the plants of the opportunity to reproduce generatively by seeds. In the long run, there is a growing risk that less nutritious grasses and herbs will take over. The required crop plants can be stocked up by reseeding on a

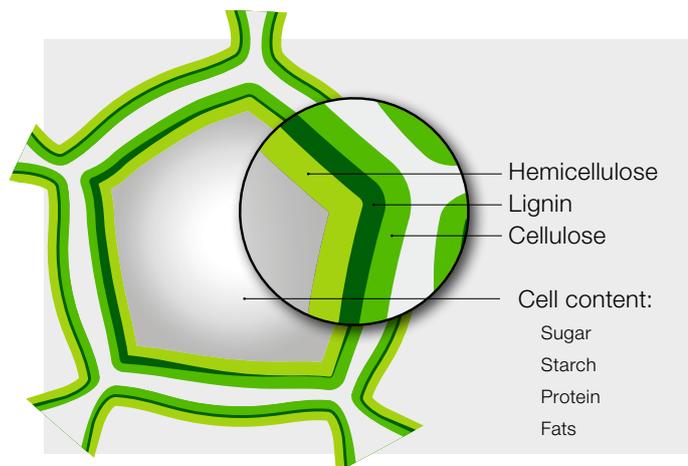
regular basis. In addition, applying the just the necessary quantities of fertiliser will provide the plants with the nutrients they need.

Make sure you do not reduce the potential of your grassland through incorrect harvesting.

Only consistent grassland care can achieve a harmonious plant crop with a dense sward. It is very important that the sward is conserved during harvesting. Well-dried soil is the first prerequisite for this. Harvesting equipment that has been properly set up, and, most importantly, offers good ground tracking, will also help you prevent damage to the sward and avoid gaps in the plants, that would otherwise lead to weed infestation and a loss of yield.

In addition to using harvesting equipment properly, it is just as important to choose the right time for harvesting in order to get the maximum quantity and quality from each cut.

The potential of your plant stock



Timing the cut optimally

For harvesting, the timing related to the physiological age of the plant is a compromise between the best quantity and the best quality. As the volume increases, the concentration of valuable plant nutrients gradually decreases.

Lignin and cellulose, as part of the plant cell wall, form the most important indicator of changes in forage value during the course of vegetation growth. The parameter used to measure this is the crude fibre content or the sum of the structural substances (NDF, ADF).

As the plant ages, the content of indigestible lignin increases and grows into the cavities of the cellulose structure. This makes the cellulose indigestible for the microbes in the rumen. At the same time, the valuable cell ingredients become difficult to access. The forage becomes "lignified". In addition, as the proportion of structural substances increases, they dilute all other nutrients.

In the case of grass silage, harvesting when the leading grasses reach the "panicle and seed head" stage of development is considered optimal, because high energy and protein contents can be achieved at the same time as yielding high volumes.

High output and reliability matter

Especially for the valuable first cut, the optimal time window is limited to just a few days. Rapid growth in the spring makes the plants "age" very quickly. According to long-term maturity tests, the energy content drops by around 0.3-0.6 MJ NEL per week during the main growth phase, depending on the geographical location.⁴

This means that for the best yields, you need reliable and powerful harvesting equipment that enables you to reliably take advantage of the short harvesting windows.

One harvest leads to another

By slicing through assimilating parts of a plant during forage harvesting, the plant is subjected to considerable injury. Through its wounds, the plant loses water containing dissolved nutrients.

The faster the cut heals, the lower the losses. The plant will soon be able to focus on growing and forming leaf mass again. Rapid growth of the crop after harvest lays the foundation for high annual yields per hectare.

Sharp knives and optimised cutting height for rapid growth

Sharp mower blades deliver a smooth, straight cut that leads to rapid healing. Blunt blades, on the other hand, create a torn and frayed cut. Delayed healing and an enormous loss of nutrients are the result. Development into a crop with reasonable cover can take several days longer.⁵

The most decisive factor for rapid growth, however, is the balance between a sharp, smooth cut and the correct cutting height. For high-yield grassland, you need to aim for a cutting height between 6 and 8 cm. On the one hand, this leaves sufficient nutrients in the stalk base and, on the other hand, there is plenty of residual assimilation area for rapid growth.

Factors influencing good basic ration quality



Clean harvesting technology

The perfect crop, the best cutting time, the highest yields - factors that only work if the forage also retains its quality by the time it ends up at the farm. Until then, dirt ingress is another key factor. Soil is often the cause of inferior quality basic ration. The negative effects are often underestimated.

Crude ash as a parameter for forage contamination

A frequently used parameter for forage contamination is the crude ash content. It should be noted, however, that crude ash does not equal "dirt". Each plant contains minerals and trace elements that contribute to the crude ash content. These amount to a good 70 g/kg DM, depending on the plant species and the stage of development. In addition to these minerals, dirt ingress in the form of sand and clay is also counted as crude ash.

The guideline value for a clean forage crop is a crude ash content of less than 100 g/kg DM.

High levels of forage contamination have a doubly negative impact in terms of supplying nutrients to livestock:

- Lower forage value
- Lower forage intake by the livestock

The increase in crude ash content inevitably results in diluting the nutrients. In terms of energy content, with 10 g of crude ash, about 0.1 MJ NEL / kg dry matter is lost due to dirt ingress.⁶ The crude protein content decreases by about 1.6 g/kg DM.⁷

In addition, contaminated forage is consumed by ruminants in smaller quantities. The reason for this is because it tastes different, it is not as digestible, and the forage has a lower energy content.

As a rule of thumb: 1% of dirt contamination results in 200 kg less milk from the basic ration per cow and lactation.⁸

How to generate cash with clean forage

The following graph shows how poor quality basic ration has a negative effect on performance, and in turn due to its lower nutrient density and lower intake by dairy cattle also impacts the farm's profit. For this purpose, recipes were compared between a ration with clean forage, and a ration contaminated as a result of dirt ingress. To achieve the target of 30 litres of milk per day, a varying amount of concentrates is required depending on the basic ration performance.

	Contaminated basic ration	Clean basic ration	Your advantages	
Basic ration quality	Crude ash:	130 g/kg DM	100 g/kg DM	-30 g crude ash
	Crude protein:	153 g/kg DM	158 g/kg DM	+5 g crude protein
	Energy:	5.82 MJ NEL / kg DM	6.08 MJ NEL / kg DM	+0.26 MJ NEL energy
Basic ration performance	Forage intake grass silage	12.1 kg DM / day	12.8 kg DM / day	+0.7 kg DM forage intake
	Forage with structure (hay)	2 kg FM / day	2 kg FM / day	+/- 0 kg FM forage with structure
	Milk yield from basic ration	12.8 l / day 3,904 l / lactation	15 l / day 4,575 l / lactation	+2.2 l milk / day +671 l milk / lactation
Use of concentrates	Necessary energy feed (triticale)	7 kg FM / day	6.2 kg FM / day	-0.8 kg FM / energy feed
	Necessary protein feed (rapeseed meal)	1 kg FM / day	0.7 kg FM / day	-0.3 kg FM protein feed
	Concentrate costs*	€ 1.43 / day € 436 / lactation	€ 1.21 / day € 369 / lactation	€ -0.22 / day € -67 / lactation

Total benefit per cow and lactation

€ 67

*Triticale: € 160/t; rapeseed meal: € 310/t

Dairy cow with 650 kg live weight, milk yield 30 l/day, standard lactation 305 days

Basic ration from grass silage in the 1st cut (panicles/seed head)

DM = dry matter, FM = fresh matter

Increasing veterinary costs have not yet been considered in this calculation (disturbed trace element utilisation, decreasing fertility).

Factors influencing good basic ration quality



Optimum basic ration preservation

To ensure that you can provide your animals with high quality, nutritious forage throughout the year, it is necessary to preserve the harvested basic ration. Silage is a method that preserves nutrients well and at the same time is efficient in terms of production costs.

Preservation with lactic acid fermentation

The plants are covered in various microorganisms, including lactic acid bacteria. In the absence of air, these convert part of the sugar in the plants into lactic acid. The acid formed leads to a rapid reduction in pH value and keeps the forage stable from a microbiological point of view. The forage can now be stored.

However, there are companions to the lactic acid bacteria on forage crops can cause problems during the silage making process.

Undesirable microorganisms

Clostridia are among the biggest enemies of lactic acid bacteria. They convert sugar, protein and lactic acid into butyric acid, which is not good. Clostridia are found in the soil and therefore enter the silage primarily as a result of dirt ingress during harvesting.

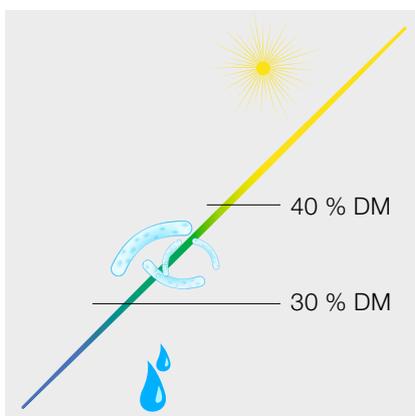
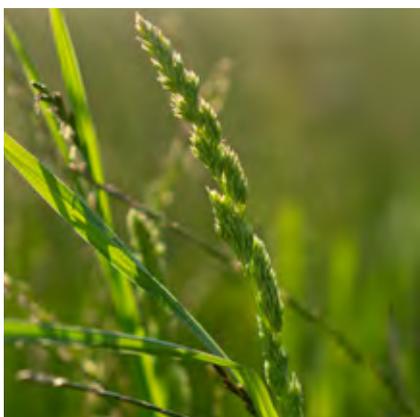
Coli bacteria predominantly produce pungent smelling acetic acids. Putrefactive bacteria decompose high-quality protein. These bacteria enter the equation as a result of contaminated forage.

Yeast and mould can form as a result, causing unwanted reheating.

Competitive advantage for lactic acid bacteria

All of these microorganisms are in strong competition with each other. The big advantage is that they have different requirements to thrive. The way to get the best silage is therefore to give the lactic acid bacteria a clear competitive advantage right from the start by immediately sealing off the air supply and rapidly lowering the pH value.

The best forage all year round



A cleanly harvested crop

When it comes to the best silage making conditions, avoiding contamination due to dirt ingress is one of the top priorities. This prevents many of the unwanted microorganisms from entering the silage in the first place.

Another major influence on successful ensiling is the botanical composition of the crop. Crops with a high proportion of grasses are very suitable for making silage. This is because grasses contain high sugar levels compared to legumes and herbs and therefore provide plenty of nutrients for lactic acid bacteria. In addition, the content of protein compounds and minerals with a buffering effect is lower, which can promote rapid drop in the pH value.

But the timing of the cut also plays a major role. The crude fibre content must not be too high, otherwise it is difficult to compact the forage well. Compaction completely expels any air left in the crop from the clamp.

Consistent DM content

The ideal conditions for optimum silage making is a dry matter content of 30-40%.

Up to 28% DM, fermentation juices form and incur considerable dry matter losses during ensiling. At the same time, there is an increased risk of butyric and acetic acids forming in forage that is too wet.

Above 40% DM, on the other hand, the forage is more difficult to compact and it becomes too dry for the lactic acid bacteria. Fungi can form as a result of yeast and mould activity.

In addition, the DM content must be the same throughout the forage. For optimum silage making conditions, the fluctuations throughout the entire crop should not exceed +/- 5 percentage points.⁹ This requires a clean and tidy spread pattern by the tedder and precise placement by the conditioner.

Chop length

The chop length is a compromise between ruminant-friendly feed and suitability for compaction.

The shorter the material, the better it can be compacted. At the same time, if the forage is too short, the plant structure necessary for the ruminant is lost. For sufficient rumination activity, the particle length should not be less than 22 mm.

To avoid the cows being selective at the feed barrier, the particle length must be uniform. Consistent chop length is therefore crucial. This keeps particles that are too long to a minimum, significantly increases the compactibility of the silage, and prevents the cows from being selective. In forage management terms, the principle should always be: As short as necessary, as long as possible.

How to harvest the best forage





First class cut



The basis for clean forage

A mowing process that conserves the grass is the best basis for clean forage. Ultimately, this is about maintaining the correct cutting height of 6-8 cm. That is how crude ash ingress is reduced to a minimum right from the start of the harvest chain. Subsequent harvesting machines then do not have to work so close to the ground to collect the forage cleanly. At the same time, sufficient residual assimilation area remains for the grass to grow again more quickly.

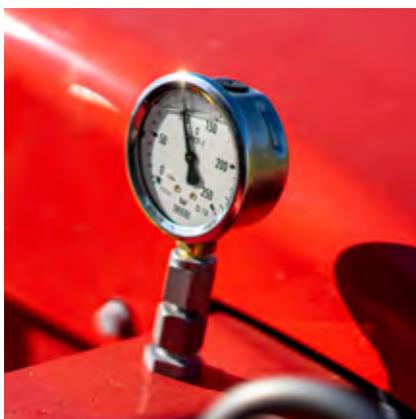
If the areas to be mowed are not flat, it is particularly important that the mower can adapt well to the ground to maintain the set cutting height and prevent dirt entering the forage as the first cause of forage contamination.

Thanks to their unique ground tracking system, optimum weight alleviation of the cutter bar, and excellent cutting quality, our mowers give you the basis for a clean forage harvest and rapid regrowth of the plants.



"We have 70 dairy cattle on our farm. The quality of the forage is very important to us and that's why we take great care to make sure the mown crop is clean. The ground tracking of our PÖTTINGER front and rear mowers on our very hilly terrain is outstanding."

Pierre-Yves Michel
Domsure | Auvergne-Rhône-Alpes | France



Best ground tracking

Regardless of whether it is a front-mounted or rear-mounted mower, the mowing unit must be able to adapt independently to any undulations in the ground. This means that it has to have sufficient freedom of movement. With $+22^\circ / -30^\circ$ on our side pivot mounted rear mowers and $\pm 22.5^\circ$ on our centre pivot mounted models, our mowers deliver perfect ground tracking.

For front mounted mowers, the trend is toward trailed designs due to their excellent ground tracking properties. That is why PÖTTINGER's ALPHA MOTION technology has been the market trendsetter since 2005 thanks to its three-dimensional ground tracking.

Floating cut

In connection with ground tracking, the weight alleviation of the mower unit is also an important factor. This must react quickly to any unevenness in the ground and at the same time guarantee a uniform cutting height even at high driving speeds. Whether the weight alleviation system is mechanical or hydraulic depends on the design and size of the mower, as well as the on-site conditions.

Regardless of whether front or rear mower unit with centre pivot or side pivot mountings, PÖTTINGER guarantees that in every situation the mower unit acts on the ground with the same pressure over its entire width while delivering excellent ground tracking.

Clean cut

The geometry of the cutter bar also contributes to ground tracking performance. The PÖTTINGER cutter bar, which is only 28 cm deep, tracks perfectly even on bumpy terrain. The extremely flat design with a height of just 4 cm also guarantees perfect forage flow. The streamlined leading edge of the cutter bar allows the soil to flow underneath, separating it cleanly from the crop.

The clamped mower blades create a tidy mowing pattern. They rotate very close to the surface of the cutter bar and the counter blade. This guarantees a clean and tidy cut even in damp and muddy conditions.



ALPHA MOTION – a worldwide success story

ALPHA MOTION trailed front mower technology features an active support frame, which reacts lightning fast to any bumps in the ground. Independently of the tractor's hydraulics, the cutter bar inclines upwards over bumps and slants downwards into dips. Thanks to the large suspension springs, the pressure on the ground remains virtually constant over the entire path of vertical travel.

- Inclination adjustment: $-9^\circ / +12^\circ$ (PRO); $-7^\circ / +13^\circ$ (MASTER)
- Transverse movement: $\pm 16^\circ$.

For the welfare of wildlife and livestock



Take away the risk

The timing of the first cut in grassland farming coincides with the fawning season of roe deer and other wild animals. Due to their natural reflex to seek cover, fawns do not run away from danger. This instinctive behaviour makes it especially difficult to spot animals hiding in the grass. It happens over and over again that they are seriously injured or even killed during mowing. This must be avoided at all costs.

If the carcass of a wild animal ends up in the clamp, it will decompose and contaminate the forage. Under anaerobic conditions, bacteria of the species *Clostridium botulinum* produce the neurotoxin botulinum. Feeding silage contaminated in this way can expose cattle, sheep, horses and poultry to botulism. This disease usually causes death within 1 to 3 days due to respiratory paralysis.

With SENSOSAFE, we at PÖTTINGER offer you a convenient and efficient solution for detecting wild animals in the field directly during the mowing process.



"If my customers are happy, then I'm happy. That is why I am always open to new technologies that help me to improve the quality of the service I offer. SENSOSAFE gives me three benefits that I can pass on directly to my customers. Firstly, I prevent unnecessary animal suffering. Secondly, I prevent animal carcasses from contaminating the silage. And thirdly, I can start mowing at the drop of a hat without having to search the fields first."

Thomas Neudorfer
Peilstein | Austria

Assistance system for detecting animals



Making perfect use of short harvest windows

Harvesting windows are short and time is precious. Often there are no resources available at this time to search the entire area to be mowed for wildlife.

With SENSOSAFE you complete two tasks in one: Mowing and detecting wildlife. The time-consuming organisation of people, dogs, drones and other systems for detecting wildlife is a thing of the past. You can focus fully on harvesting the forage.

What's more, you don't need special training or a permit to operate the SENSOSAFE system.

Reliability

Many technical systems such as drones with thermal imaging cameras have the problem that they can only be used in the early morning hours. As soon as the grass has warmed up due to solar radiation, thermal imaging cameras are no longer effective.

SENSOSAFE is the first system of its kind in the world that uses the interaction between optical sensors and an integrated light source. This system operates independently of daylight and temperature. Unlike thermal imaging cameras, you can rely on SENSOSAFE to work reliably around the clock in any operating conditions.

Save wildlife, prevent botulism

A bar with optical sensors scans the area in front of the mowers during the mowing process.

If an animal is detected, the control terminal gives the driver both a visual and acoustic warning. The driver then has plenty of time to stop the tractor. Depending on the system, the mower also lifts automatically.

Wildlife are saved and botulism in cattle is prevented.

"Easy to use and very reliable in detecting animals"

"On the pilot farms at INNOVATION FARM Wieselburg, the performance of SENSOSAFE has completely convinced us of its reliability. An average triggering probability of 92% was recorded across all test variants. In normal conditions, reliable detection is possible at any (technically reasonable) driving speed. In extreme conditions (crop height of 60 cm or more), mowing speed needs to be limited to around 10 kph to reliably detect and rescue animals."

INNOVATION FARM Wieselburg | Austria

Clean and tidy conditioning



Accelerate drying

Plants have a waxy coating to protect them from drying out. The necessary gas exchange with the ambient air is regulated only by stomata; microscopic openings in the leaves and stem. Immediately after mowing, these openings close to protect the plant. This means that during drying, water can only escape through the less permeable waxy coating.

The conditioner has the job of breaking up the waxy layer of the mown crop, which brings about two major advantages. The mowed crop dries faster. Less nutrients are lost by reducing the time the crop is left wilting in the field. As a consequence, this also facilitates the release of cell juice in the clamp. This results in faster pH value reduction. What this means is that the silage reaches a stable state more quickly.

For the best working results, a conditioner must be chosen that suits the crop to be mown. For crop with a high grass content, a tine-type conditioner achieves good results. For especially leafy forage, the roller conditioner is recommended.



"We operate three PÖTTINGER mower combinations with conditioners on our farm. We use roller conditioners for alfalfa and tine conditioners for grass. We particularly like the fact that we can switch the two conditioners between each mower. It is a very quick and easy system that only PÖTTINGER offers. That's a brilliant thing for a business like ours."

František Toman
Radostín nad Oslavou | Czech Republic



Tine conditioner

The V-shaped tines made of hardened steel on the ED tine conditioner accelerate the crop past a conditioning plate with conditioning bars. During this process, the stalks are beaten, rubbing off the wax layer.

The conditioning intensity can be flexibly adapted to the crop by adjusting the distance between the tines and the counter flap. Intensity should always be matched to the most sensitive component in mixed plant forage.

The round, high volume conditioner hood and the adjustable guide vanes enable a loose and airy blanket to be placed.

Roller conditioner

The RC roller conditioner is especially suitable for alfalfa and clover due to its precision conditioning capabilities.

Two rollers inter-mesh to uniformly crimp the stalks, break up the waxy layer and produce a uniform blanket of forage. The conditioning intensity can be adjusted by changing the gap and pressure between the two rollers.

Placement strategies

Thanks to their adjustable swath doors, both conditioner systems can either spread the crop wide or forming a swath, depending on the specific requirements.

Wide placement offers the advantage that because the forage is in an airy loose blanket, the tedder can either be omitted, or drying can be shortened by 2-5 hours with a subsequent tedding process. In the case of hay, the wide placement makes a 2-day harvesting process possible by drying quickly from the start and greatly minimising the weather risk.



1 mower – 3 possibilities

With PÖTTINGER you have maximum flexibility. Thanks to the optional quick-change kit both the tine-type and roller conditioners can be easily removed. You can switch between the tine and roller conditioner depending on the working conditions. If you want to work without a conditioning effect, a guard curtain can be fitted. That is pure versatility.

The neatest spread pattern



Leave nothing behind

If you harvest during the phase when the buds or panicles are forming, the crop has a dry matter content of around 20 %. In order for the crop to be stored properly, this must still be raised to a greater or lesser extent depending on the storage method.

For best storage stability, none of the forage should be wet. High volume forage crops require the use of a tedder. The forage must be distributed evenly over the surface without forming heaps and, if necessary, turned over one or more times. Depending on the rate of wilting, there is a greater or lesser risk of losing valuable organic nutrients through disintegration losses in the field. The drier the forage, the higher the risk. That is why forage conservation is the be-all and end-all.

Gentle handling of the crop - that's what PÖTTINGER tedders stand for. The small diameter rotors and the sweeping tines on the proven DYNATECH rotors, in combination with matched rotor speeds, reduce the risk of disintegration losses to a minimum and at the same time ensure minimum dirt ingress.



"As a supplier of high-quality hay to horse stables, forage quality is of great importance to us. Because the material needs to be as dust-free as possible, the ground tracking of the machinery has to be excellent. The ground tracking is awesome thanks to the jockey wheel out in front and the rotors being mounted on individual frame sections. With the small rotors and swept tine arms, the HIT 8.81 has a super spread pattern and no material gets snagged on the tine arms."

Sven Erlemayer
Ennepetal | Germany



Neat work

When it comes to tedding quality, the diameter of the rotor is often the subject of discussion. In terms of forage quality, however, there is a lot to be said for small rotors:

- Small rotors adapt ideally to bumpy ground and reduce the amount of crude ash entering the forage.
- They pick up smaller portions of crop, resulting in neater forage handling.
- You do not have to spread the forage so widely, which results in an exact spread pattern with homogeneous lateral distribution.
- They can be operated at lower speeds because they do not have to spread the forage as far. That is how disintegration losses can be avoided.

DYNATECH

In addition to using small rotors, PÖTTINGER goes one step further to further increase forage quality. Curved, sweeping tine arms ensure that the tines are guided dynamically through the crop. The forage is picked up more easily and more gently than with straight tines, this results in minimising disintegration losses.

In addition, the sweeping effect protects the sward. If the tines do contact the ground, the tines are guided in such a way that they have a much gentler effect on the sward and the machine.

Ground tracking

First-class tedding across the entire working width places high demands on the ground tracking of the machines.

To achieve the best ground tracking, the MULTITAST jockey wheel system on the pivoting headstock tracks the ground immediately in front of the tine path and responds to each undulation. The jockey wheel ensures an exact working height. You are now able to drive faster and can achieve higher output as a result. On trailed high output tedders, it is the transport chassis that takes over the function of the jockey wheel.

If the tedder is set up properly, dirt ingress can even be minimised as drying progresses.



HAYTOOL ASSIST

Match your tedder to the working width of your mower to get the highest utilisation and best work quality from your machines. The best spreading quality is achieved when the tedder completely covers the swath of mowed grass on each pass. And ideally, the tractor should drive along a forage-free lane. The forage then remains loose on top of the grass stubble, making it an easy target for the tines. Haytool Assist helps you quickly and easily find the right tedder for your mower. The following QR code takes you directly to the application.

Clean and tidy raking



Only the best goes into the swath

At the end of the harvest chain, it is a matter of getting all the forage lying in the field into the swath. But only the forage. Raking and collection losses must be kept to a minimum, while at the same time dirt ingress must be avoided.

To do this, the tines on the rake should not draw the forage over the ground, but lift it slightly. The distance between the tines and the ground should be 3.5 cm at the beginning and 2 cm at the end of the raking arc. This gradient towards the swath side ensures clean raking with the lowest possible dirt ingress over the entire working width right up to the swath. Precise ground tracking is needed to ensure that the set distance is maintained under all operating conditions.

Our range of TOP rotary rakes feature unique ground tracking and precise rotor inclination adjustment on the tandem axles of the rotor chassis so you can rake the forage onto the swath without contamination.



I run an organic farm with 120 hectares. I also have a sheep farm and a contracting business. That is where I use the TOP 1252 C. A clean and tidy swath and a good raking quality are essential for high output and clean harvesting, which this rake delivers in full. Because forage quality is what matters most to my customers, I have equipped my rake with the MULTITAST jockey wheel system.

Dominik Anzengruber
Geiersberg | Austria

Rotary rakes



Ground tracking

From the point of view of the tines, the wheels on the rotor chassis inside the tine arc do not react to bumps in the ground until it is already too late. Regardless of whether it is a three-wheel or six-wheel chassis - due to the width of the tine array, the front wheel is located around three quarters of a metre behind the arc of the outermost tine.

The only thing that helps here is a jockey wheel running in front of the tines. The MULTITAST jockey wheel system from PÖTTINGER detects bumps in the ground ahead of the outermost tine and tilts the rotor upwards when there is an incline. This provides the ideal gap between the tines and the ground. Together with a wide rotor chassis, smooth running of the rotors is guaranteed.

Cleanly collected crop

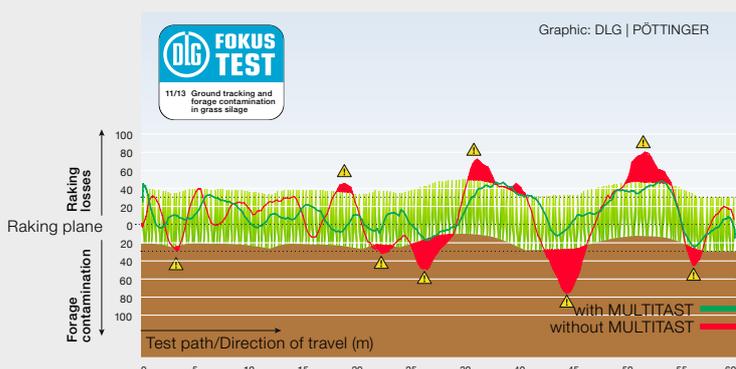
PÖTTINGER tines are angled forward in a dynamic position. Due to this shape, they actively lift the forage away from the ground - like a pitchfork. As more forage is collected, it rides up the tine unhindered. As a result, the forage is not dragged over the ground along the entire arc of the raking action. Dirt ingress and disintegration losses are minimised.

The special feature of the PÖTTINGER tines is that they pass just above the ground directly below tine carrier at only a slight angle. This means that they do not lift upwards to avoid high volumes of forage. They pick up the crop cleanly even in difficult conditions.

Loose and airy swath placement

The large dimensioned cam track with a diameter of up to 420 mm provides the basis for forming loose and airy swaths. The large cam track diameter with its smooth ramps makes sure that the tines exit the forage ergonomically to place an airy swath. This means that the forage can be raked into a swath in good time and yet it can still dry in the wind.

The cam track is infinitely adjustable. This enables flexible adjustment to different types of crops and harvesting conditions.



The DLG Focus Test "Ground tracking and forage contamination in grass silage" confirmed this back in 2013: The PÖTTINGER MULTITAST wheel delivers ideal ground tracking and clean forage. By comparison, the tines on the rotor without the MULTITAST wheel had five times more ground contact over a test distance of 60 metres. At the same time, the tines on the rotor without a jockey wheel skipped over the raking elevation three times more often and caused raking losses. During the test, crude ash ingress was reduced by up to 2.3 g when raking with the MULTITAST jockey wheel system.

Every leaf counts



Nothing is left in the field

Alfalfa and clover are among the crops that are considered particularly sensitive to disintegration losses during harvest. Here, the valuable leaves quickly fall off the stem, representing an enormous loss of nutrients. However more frequent dry summers are making it increasingly popular to grow these crops, in particular to use as a supplemental basic ration for your livestock.

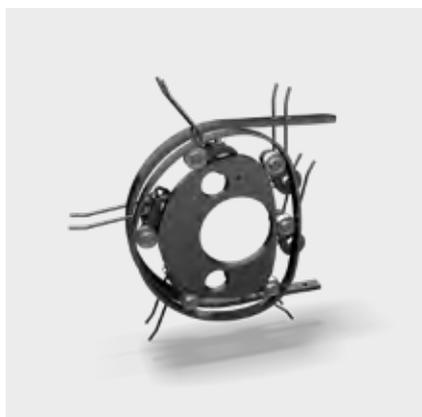
The longer the wilting progresses, the higher the risk of disintegration losses. That is why, especially during raking, forage conservation has top priority.

It is precisely in these operating conditions that the MERGENTO comes into a class of its own. The merger collects the forage from the ground using its pick-up. Without further contact with the ground, cross conveyor belts transport the forage to the swath. Disintegration losses are reduced to a minimum by this gentle crop transport system, even with highly sensitive plants. In addition, forage contamination is minimised.



"Clean forage in the swath and a clean and tidy raked field, that's what our customers like to see. We used the MERGENTO for one-third whole crop and two-thirds permanent grassland. The machine impressed us both on permanent grassland and raking alfalfa and clover crops. The shape of the swath is comparable to a centre-swath rake, even with a side swath. Personally, I especially appreciate that it is easy to operate and easy to maintain."

Johannes Müller
Bad Teilnach-Zavelstein | Germany



Controlled pick-up

The six-row controlled PÖTTINGER pick-up ensures maximum crop intake performance with minimum forage contamination.

The crop is gently collected from the ground by the controlled pick-up tines and accelerated towards the cross conveyor belt. Meanwhile, dirt and stones remain on the ground.

Thanks to the cam track control system, the full length of the tines conveys the crop right up to the cross conveyor belt. The tines dip down at right angles just in front of the belt. This guarantees the best forage flow in all operating conditions.

Ground tracking

For perfect ground tracking, the support rollers are placed very close to the tine pick-up.

The complete freedom of movement provided by the centre pivot mounting of the belt units ensures constant weight alleviation over the entire working width. At the same time, it forms the basis for 3D ground tracking. The ingenious design of the boom with three hydraulic cylinders reacts in a split second to any bumps in the ground.

Loose and airy swath placement

Especially with very sensitive plants, it is advisable to form the swath early and let the wind dry the crop while it is still in the swath. This allows the forage to be formed into a swath with an even higher water content and further minimise the risk of disintegration losses.

On the MERGENTO, the cross conveyor belts take over the major part of transporting the crop. The forage only comes into contact with the tines of the pick-up for a short time. Ultimately, a loose and airy swath is placed, providing ideal conditions for drying.



Flexible swath placement

You can set the direction of rotation and position of both cross conveyor belts individually from the tractor cab. This lets you choose different swath configurations:

- Centre swath placement
- Side swath to the left or right
- Two separate swaths
- Convey from the inside out
- Load forage for a short period

The perfect flow



The best forage in small quantities

If the forage fields are far apart, or if ensiling is to be carried out in stages, or if only small quantities of forage need to be collected, then the harvest chain can be ideally optimised using round balers.

With a baler & wrapper combination, silage harvesting can be carried out by one person. Transporting the crop to the farm and the silage making process are no longer interlinked. As soon as the wrapped bale leaves the wrapper platform, the fermentation process can start immediately in the field. The tightly compressed crop is safely preserved.

With the IMPRESS, you can bale small quantities of the highest quality forage because the crop is collected cleanly and finely chopped thanks to the unique short-chop knife bank. For feeding livestock, round bales are perfect for mixing different crops and forage qualities.



"Our aim is to produce the best quality forage possible - this is very important to us and the IMPRESS is the best choice for achieving this.

The 32 knives and top-mounted knife bank offer us a great advantage over other manufacturers' machines. With the film & film binding, the bale is held together more securely, which also prevents air entering and ensures the best forage quality."

Thomas & Josef Lustenberger
Seetal in Lucerne | Switzerland

Round balers



Clean crop collection

Perfect ground tracking thanks to 120 mm of freedom of movement makes the IMPRESS pick-up stand out.

Due to the cam track control of the 5 rows of tines, the pick-up can rotate more slowly so the forage is handled gently as it is guided into the LIFTUP rotor. The careful transfer of the forage to the rotor combs out the material less to ensure better chopping quality. In addition, gentle collection also reduces disintegration losses and provides nutrient-rich forage.

Height-adjustable jockey wheels guide the pick-up and ensure clean and tidy crop collection.

Chopped short

One of the main features on the IMPRESS is the tangential crop flow into the baling chamber. Compared to other round balers, the LIFTUP rotor from PÖTTINGER rotates in the opposite direction. The forage passes gently over the rotor and is fed in a straight line into the rotation of the baling chamber, instead of being pressed under the rotor into the bale. This conserves the forage and protects the machine.

In addition, the overhead chopping system delivers a slicing cut with a theoretical chopped length of 36 mm across the entire width of the chamber right up to the edge. This unique short chop system provides the same quality as a loader wagon so the bale can be highly compacted more uniformly.

The best package

Using binding film prevents the bale from expanding when it leaves the baling chamber. Depending on the number of layers of net applied and the type of net used, the bales can expand by up to 3 cm in diameter after ejection. This expansion corresponds to a volume of 70 litres with a bale diameter of 1.25 metres.

The resulting additional volume allows air to enter the bale, which inhibits the fermentation process. Binding film can be pre-stretched to a greater extent to prevent expansion. The density of the bale remains constant and no air can enter. This provides optimum conditions for the fermentation process.

"The PÖTTINGER pick-up was awarded top marks"

"The test drivers agree: It picks up the crop best - even downhill. With a width of 1.98 m - measured from outer tine to outer tine - the pick-up was the widest in the test. The pick-up's float range was impressive. As a result, it adapts well to undulations in the ground.

We noticed one more special feature about the pick-up: The scrapers are open underneath. This way, stones and dirt are separated better."

LANDWIRT - The magazine for the farming family | Round balers in test 2021

Forage harvesting at its best



The basis for your success

The loader wagon is a real all-rounder in the harvest chain. It can perform the tasks of crop collection, chopping and transport, all in one machine. In addition, this harvesting process can react easily and quickly to changing conditions. This allows forage to be collected from different fields and mixed at the clamp. Because it operates completely independently of other machines, the loader wagon can also react quickly to bottlenecks in compacting forage in the clamp.

The loader wagon process is best suited for farms with most of the harvested area within a radius of less than 10 km. The low labour requirements and manageable purchase costs make the loader wagon an excellent choice for mechanising your own farm. Often every hour counts, because dry matter content is crucial for silage making. This is where owning your own machine gives you the advantage, because you can start collecting the crop whenever you want. At the same time, loader wagons also enjoy an excellent reputation among contractors thanks to their flexible and easy-to-plan deployment.



"When it comes to loader wagons, we place particular emphasis on the chopping quality. The wagon has to deliver top chopping system performance and the new JUMBO gives us exactly that.

The hydraulically driven, controlled pick-up is a very good solution from my point of view, because you can regulate the pick-up speed depending on the driving speed. This prevents the forage from being dragged through so that it passes into the rotor parallel to the knives."

Jeff Reiff
Troisvierges | Luxembourg

Loader wagon



Clean crop collection

All PÖTTINGER loader wagons are equipped with the proven controlled floating pick-up. Due to their large freedom of transverse movement, they can follow any ground contour. For particularly difficult conditions, a trailing jockey wheel chassis is available to guide the pick-up over bumps. This reliably eliminates dirt ingress by preventing the tines from contacting the ground.

By using cam track controlled tines, the tines reliably pick up the material from the ground at low speed and convey it right up to the loading unit. This prevents the stalks from being combed out. The forage is fed in with the stalks at right angles to the knives as far as possible to achieve optimum chopping quality.

An exact chop

Thanks to the excellent chopping quality of PÖTTINGER loader wagons, the forage can be easily distributed and compacted in the clamp. It is also easier to mix in the feed mixer. The shorter the theoretical chopped length, the lower the risk of longer particles being left by the animals. That is how you minimise forage losses and maximise your success.

The JUMBO is available with a chopping length of 25 mm. The smaller models achieve 34-45 mm in silage mode. All the knives are individually protected against foreign objects. This protects the health of your animals.

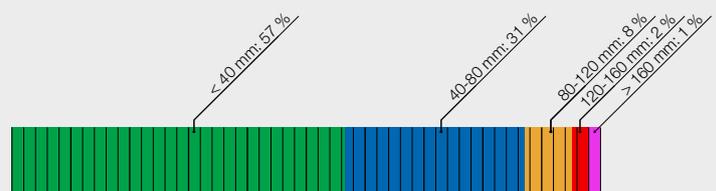
Soil conservation

So you can harvest the best quality forage on your land for many years to come, it is particularly important to protect the sward. This means preventing harmful compaction. That is why all PÖTTINGER loader wagons are available with large volume tyres. In addition, steered axles can be specified to prevent damage to the sward when cornering. Tearing out the sward not only reduces the subsequent yield, because there is also a risk of the roots covered with soil getting into the forage and significantly reducing forage quality.

That is yet another advantage of the loader wagon process, because only one vehicle is on the move in the field to collect the forage. It minimises the total surface area that is driven over.

Chopped length distribution* 25 mm short chop system on the JUMBO 8000

Stalk length frequency distribution as a percentage of each chopped length range:



*Source: Study by Josephinum Research 2021 on permanent grassland

We focus on quality



Bibliography

- 1 Dorfner, G. und Hofmann, G. (2008): Hohe Grundfutterleistung – ein Schlüssel für den erfolgreichen Milchviehhalter.
- 2 LfL (2021): Milchreport Bayern 2020. Ergebnisse der Betriebszweigabrechnung Milchproduktion 2019/20
- 3 Gruber, L.; Pries, M.; Schwarz, F.-J.; Spiekers, L. und Staudacher, W. (2006): Schätzung der Futteraufnahme bei der Milchkuh. DLG-Information 1/2006.
- 4 Klocker, H.; Prünster, T.; Peratoner, G. und Matteazzi, A. (2018): Leitfaden Grundfutterqualität. Nr. 01/2018, 2. Auflage 2019.
Berendonk, C. (2006): Schnittzeitpunkt bestimmt die Futterqualität.
Landwirtschaftskammer Nordrhein-Westfalen: Reifeprüfung 2019 (13.05.2019)
Landesbetrieb Landwirtschaft Hessen: Siloreife 2021 (02.06.2021)
- 5 Frühwirth, P. (2020): Der stille Schrei der Gräser. Landwirtschaftskammer Oberösterreich.
- 6 Resch, R. (2009): Qualitätsbewertung von österreichischen Grassilagen und Silomais aus Praxisbetrieben. Abschlussbericht Silageprojekt, 29.
- 7 Resch, R.; Frank, P.; Stögmüller, G.; Tiefenthaller, F.; Peratoner, G.; Adler, A.; Gasteiner, J. und Pötsch, E. M. (2014): Futterverschmutzung mit Erde - Ursachen, Erkennung und Auswirkungen. Landwirt Sonderbeilage.
- 8 Resch, R. (2012): Qualität der Silagen – Theorie und Praxis. 3. Burgenländisch-Steirische Bauerntage. 9.2.12.
- 9 Resch, R. (2017): Gärfutterqualitäten Wo stecken die Reserven? 44. Viehwirtschaftliche Fachtagung 2017, 81-93.



More Success with PÖTTINGER

- A family-owned company since 1871
your reliable partner
- Specialist for arable and grassland
- Future-safe innovation for outstanding working results
- Roots in Austria - at home throughout the world

Harvest your success

- Take responsibility for your forage quality
- Insist on the best basic ration
- Increase your milk yield
- Enhance animal health
- Optimise your profit

Ask for more information:

PÖTTINGER Landtechnik GmbH

Industriegelände 1
4710 Grieskirchen
Austria
Phone +43 7248 600-0
info@poettinger.at
www.poettinger.at

Alois PÖTTINGER UK Ltd.

15 St Marks Road, Corby
Northamptonshire,
NN18 8AN
United Kingdom
Phone + 44 1536 272 220
info@pottinger.uk
www.pottinger.uk

POETTINGER Canada Inc.

460 Rue Robinson Sud
Granby, QC, J2G 7N6
Canada
Phone +1 450 372 5595
Fax +1 866 417 1683
info@poettinger.ca
www.poettinger.ca

POETTINGER US, Inc.

393 Pilot Drive
Valparaiso, IN 46383
USA
Phone +1 219 510 5534
Fax + 1 219 707 5412
info@poettinger.us
www.poettinger.us

PÖTTINGER Australia PTY LTD

11 Efficient Drive
Truganina VIC 3029
Australia
Phone +61 3 8353 2770
info@poettinger.com.au
www.poettinger.com.au

POETTINGER Ireland Ltd.

Glenaleamy, Powerstown Road,
Clonmel, Co. Tipperary
Ireland
Phone +353 52 6125766
info@poettinger.ie
www.poettinger.ie

Importer for New Zealand:

Origin Agroup
PO Box 673, 57 Hautapu Road
Cambridge
New Zealand
Phone +64 7 823 7582
info@originagroup.co.nz
www.originagroup.co.nz

Importer for South Africa:

VALTRAC
Cnr. Water & Buiten Street
9585 Parys
South Africa
Phone +27 56 817 7338 7308
wynn@valtrac.co.za
www.valtrac.co.za