

Contents

Introduction.....	pg 2
Growing Maize	pg 3-5
Hybrids	pg 6-8
Trial Results	pg 9-10
Soil Compaction	pg 11
Fertilizer	pg 12
Insect Risks.....	pg 13
Weed Control.....	pg 14-15
Plant Health	pg 16-17
Foliar Diseases	pg18
Film	pg 19
Harvesting	pg 20
Inoculates & Storage	pg 21
Testimonials	pg 22-23
Feeding Maize.....	pg 24-25
Economics	pg 26
F.A.Q.	pg 27
Events Diary	pg 28
Notes	pg 29



Introduction

Welcome Growers,

More than 100 billion litres extra milk is required by 2020 worldwide to meet global demand. We currently find ourselves working in an environment where a global food surplus has pushed down farm gate prices, however the future is bright. We must now more than ever concentrate on controlling costs on the farm and create better awareness of increasing output. Higher quality home grown forages such as maize gives farmers the ability to reduce feed bills and concentrate fed. Modern maize hybrids and the use of film has increased yield stability allowing growers to produce consistently high quality yields year on year.



Gordon Shine
General Manager

There are a number of reason for considering maize;

- Increases milk yield and solids.
- Dramatically reduces imported feed costs.
- Increase live weight gain and body condition score.
- Offers growers a more reliable dry matter yield than grass silage.



Growing Maize

Establishing a profitable maize crop relies on the grower following a number of simple steps outlined in this booklet.



Field inspection

Choose a site for your maize crop in late Autumn or early spring and give yourself adequate time for spraying off etc.

Soil sampling

Always take a representative and current soil sample into consideration or you and your advisor will be working in the dark.

Apply correct fertilizer

Only with a soil sample and correct organic fertilizer records (slurry) can the correct programme be put in place. Always ensure the PH is between 6.5-7.2.



Seedbed preparation

Plough on time to give the soil adequate time to dry before planting. Sub soil continuous maize land every three years.

Suitable maize seed

Consult one of our team to best select from the wide range of pioneer seed hybrids best suited to your altitude, region and soil type.



Herbicide program

Herbicide regulation is continuously changing from year to year, however changing the programme and application rates will ensure good weed control under the Samco System.

Samco drill and film

For best results choose only the Samco degradable film to grow your crop as it has been specially developed for the Samco System and machines.

Qualified drill operator

Only employ a contractor or drill operator that has been trained by the Samco team and is aware of all aspects of the Samco drill.



Crop inspection

A representative of Shines Agri is always available for crop walking and consultation to ensure the grower gets the best advice.

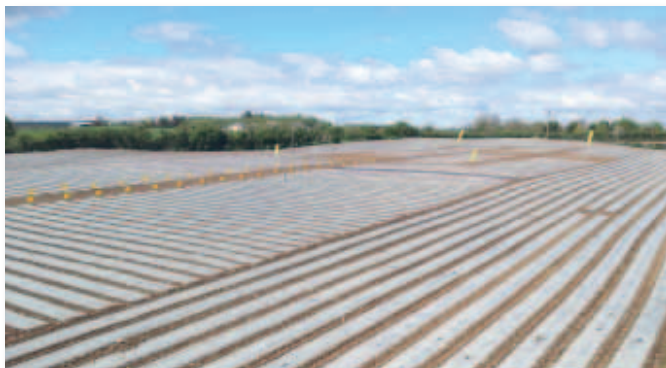
Pit sampling

Consult your nutritionist on sampling the crop in the pit as they will advise best on balancing the winter diet or Shines Agri can provide one for you.



Hybrids

Independent research has demonstrated that the Samco system provides the potential for significant yield increases and/or earlier harvest date in the maize crop. Such effects have been shown to be particularly valuable in marginal areas or seasons with low levels of accumulated heat. The micro climate created by the film increases the ability of the seedling to survive during cold periods where in the open it would die. This in turn helps achieve a high maize plant population and is crucial to achieving maximum silage yields.



Extensive trials have shown that certain maize hybrid are more suited to sowing under film than others. Most recently pioneer hybrids P7905, P8000 and P8200 have been extensively grown under the Samco system and are slowly becoming its backbone here in Ireland. The main features of all the different pioneer hybrids intended for cultivating with the Samco system are:

P7892

- Early Maturity
- High % Starch Yield
- Suitable for late Sowing

P7326

- Early Maturity
- Ideal for Marginal Sites
- High Starch Content



P7524

- Similar DM yield to Justina
- Two weeks earlier harvest than Justina
- Super cob fill out

P7051

- Tall growing Hybrid
- Early to mature under film
- Great dry matter yields



P7905

- Shines Agri biggest seller in 2016
- Obvious replacement for Justina
- Good balance of starch and DM yields.

P8200

- New but very promising
- Intermediate maturity
- 10% higher DM yield than Justina



P8000

- Consistent all round yielder
- Between Justina and Benicia on maturity
- Resistance against lodging

P8201

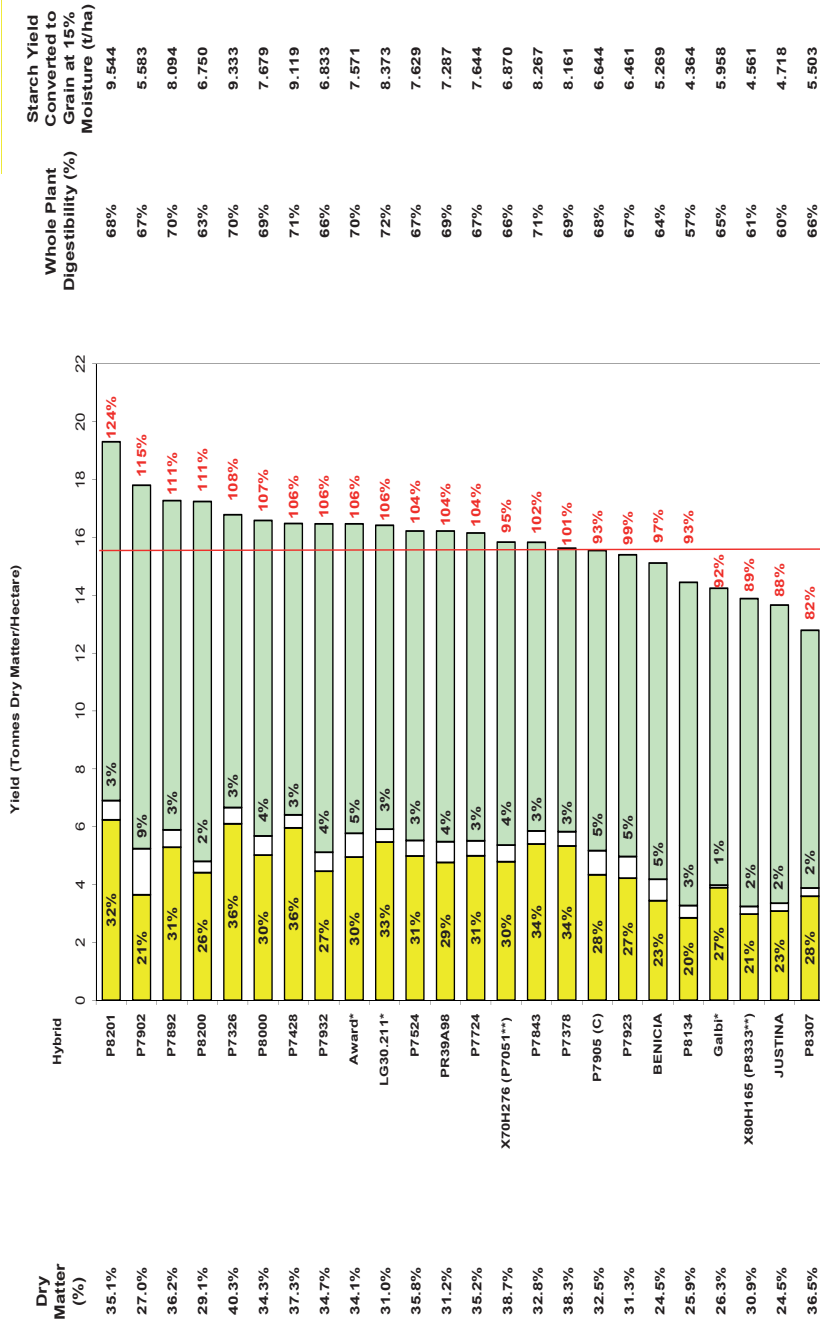
- Very tall, large stature
- Very dry high matter yields
- Excellent early vigour

BENICIA

- Very late maturity
- A favourite for many years
- Unbeatable if full maturity can be achieved

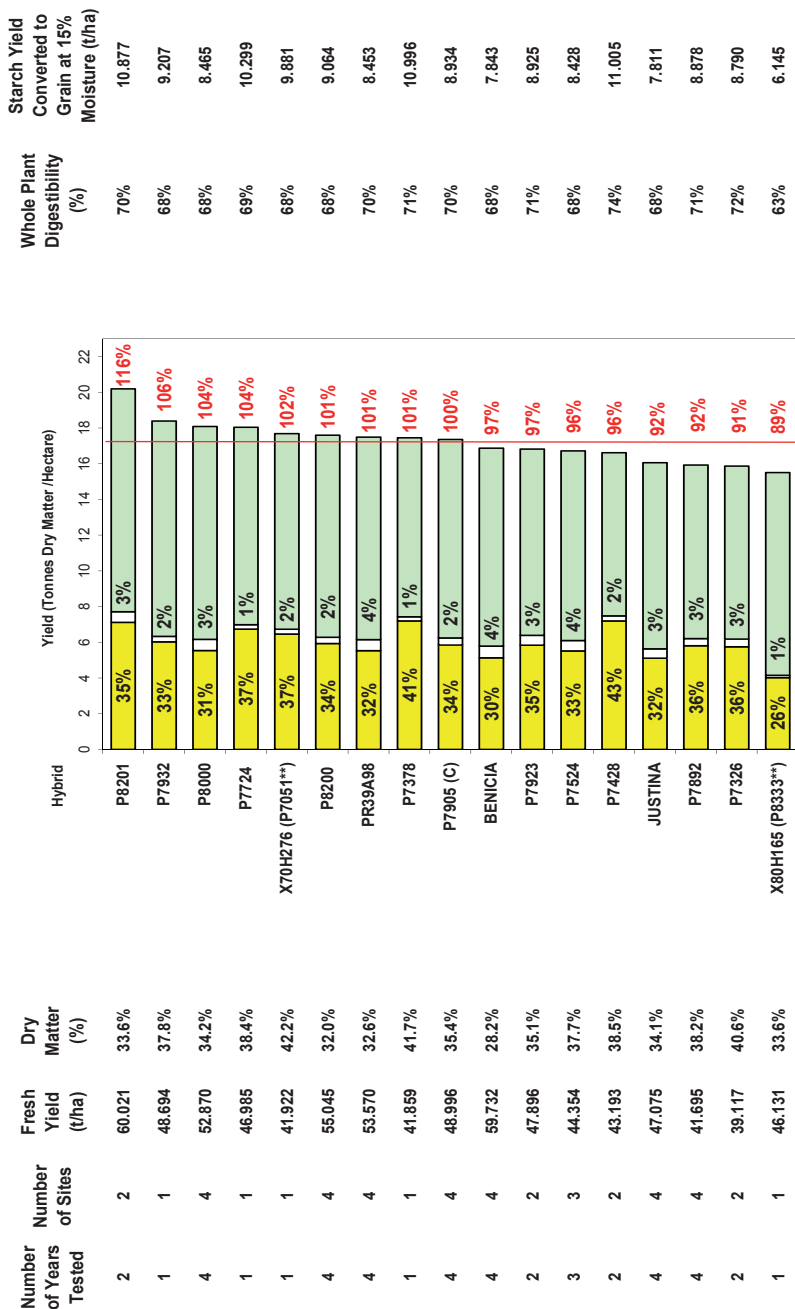


Shines Agri Trial 2016



■ Starch Yield & % ■ Sugar Yield & % ■ Hybrid Relative DM Yield Index (C = 100%)

Shines Agri 2012 - 2016



Starch Yield & %
 Sugar Yield & %
 Stover Yield
 Hybrid Relative DM Yield Index (C = 100%)

Soil Compaction

Soil compaction occurs when soil Particles are pressed together, reducing pore space between them. Heavily compacted soils contain few larger pores and have a reduced rate of both water infiltration and drainage from the compacted layer. This occurs because larger pores are more effective in moving water through the soil when it is saturated. This in turn effects the plants deep rooting development and limits the plants nutrient up take.

Causes

- Too much FYM during prolonged wet periods
- The use of heavy machinery
- Late Season Harvesting
- Minimal crop rotation



Soil Compaction Metre



Solutions

- Crop rotation
- Cover crops
- Subsoiling
- Low ground pressure tyres

Fertilizer

Always take a recent soil sample in to consideration. Recommendations can be made by the lab or a member of the Shines Agri team. Ensure PH is brought to between 6.5 and 7.2.

When calculating fertilizer to spread be aware that;

1000 Gallons (4500 lit) of cattle slurry = 50 kg bag of 6-5-38

1000 Gallons (4500 lit) of pig slurry = 50 kg bag of 19-7-20

1 ton of farmyard manure = 50 kg bag of 3-2.5-12

1 ton of 30% DM chicken Litter = 50 kg bag of 14-6-12

1 ton of 55% DM chicken Litter = 50 kg bag of 23-11-24

Soil Index for NPK	Index 1	Index 2	Index 3	Index 4
Nitrogen	180kg/ha	140kg/ha	110kg/ha	75kg/ha
Phosphorus	70Kg/ha	50kg/ha	40kg/ha	20kg/ha
Potash	250kg/ha	225kg/ha	190kg/ha	120kg/ha

Recommendations on soil samples are generally made in kg/ha.

To convert kg/ha into units per acre simply divide the kg/ha figure by 1.23.

Conversion Rate:

1 Unit per Acre = 1.23 KG/HA

1 Hectare = 2.47 Acres

Example:

1 Bag of Urea 46% = 56.6 KG/HA

1 Bag of Can 27.5% = 33.5 KG/HA

The same formula applies to P and K

Insect Risks

Insect threat is a problem when developing seedlings as at this stage they are very vulnerable to any attack. Seed dressings act as a barrier to such attack.

MesuroI

MesuroI is a flowable concentrate for seed treatment containing 500g of methiocarb per litre. It reduces the probability of damage by crows, pigeons and pheasants. The seed treatment also controls frit fly and is an essential component of quality seed.

Sonido

Sonido cannot be applied with MesuroI although not a bird repellent it may slightly reduce the attractiveness of maize seed to birds. It is the preferred treatment for wireworm, cutworm and frit fly up to 8 leaves but is only an option. Use for the first two years out of five.



Weed Control

To control broadleaved and grass weeds it is advised that some form of round-up (Glyphosate) is used pre ploughing. Controlling weeds is one of the most critical factors in the successful production of forage maize. Maize is particularly susceptible to competition from weeds in the early stages of growth, so good early season control is essential.

Pre Emergence Sprays such as Calaris (Terbuthylazine & Mesotrione), Stomp Aqua (Pendimethain) and Wing P (Dimethenamid-P & Pendimethain) are applied under the samco system when the maize seed is been drilled. These herbicides are used in the controlling of annual broad leave weeds and grasses in the crop.

In dry weather conditions it is often necessary to apply a post emergence herbicide such as Calaris or Accent (Nicosulfuron). The timing of spray application for post emergence is essential.

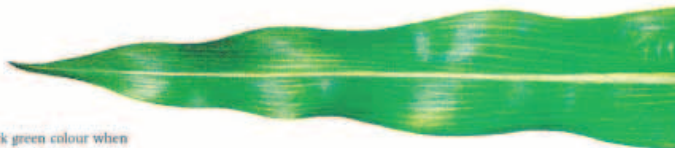




Contact your Pesticide Advisor in Shines Agri to recommend a post spray program.

SYMPTOMS OF NUTRIENT DEFICIENCY ON MAIZE LEAVES

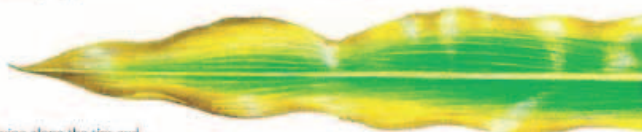
HEALTHY leaves shine with a rich dark green colour when adequately fed.



PHOSPHATE shortage marks leaves with reddish-purple, particularly on young plants.



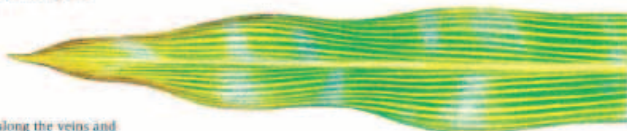
POTASH deficiency appears as a firing or drying along the tips and the edges of lowest leaves.



NITROGEN hunger sign is yellowing that starts at the tip and moves along the middle of the leaf.



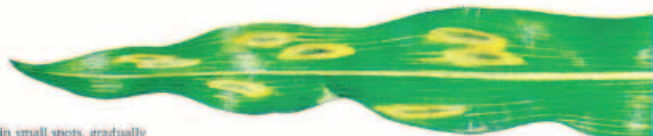
MAGNESIUM deficiency causes whitish strips along the veins and often a purplish colour on the underside of the lower leaves.



DROUGHT causes the corn to have a greyish-green colour and the leaves roll up nearly to the size of a pencil.



DISEASE helminthosporium blight, starts in small spots, gradually spreads across the leaf.



CHEMICALS may sometimes burn tips, edges of leaves and at other contacts. Tissue dies, leaf becomes whitened.



SYMPTOMS AS A RESULT OF NUTRIENT AND AGRONOMY PROBLEMS



DEEP, SPREADING ROOTS of healthy, high-yielding plant will crowd a half-bushel basket.



PHOSPHATE shortage during early weeks causing a shallow root with little spread.

ROOTWORMS prune heavily as they eat small roots, tunnel in larger ones.



POOR DRAINAGE and hardpan are causes of a flat, shallow root system. Corn with poor roots can't stand drought and is easily blown over by high winds.



ACID SOIL is indicated when the lower part of the root is discoloured and decayed, particularly when brace roots shoot from third or fourth node.



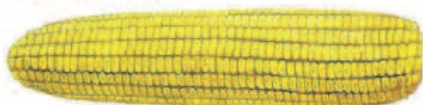
PRUNED ROOTS are work of a cultivator. Shovels were too deep and too close.



CHEMICAL damage makes root writhe and twist. Joined brace roots and another symptom.



NORMAL EAR on well fertilised high-producing cob weighs about 2/3lb. It has well filled tips.



BIG EARS weighing up to 1lb, indicate that plant population was too small for profitable yields.



SMALL EARS usually are a sign of low fertility. For better yields, boost fertiliser application.



POTASH shortage shows up in ears with poorly filled tips and loose chaffy kernels.



PHOSPHATE shortages interfere with pollination and kernel fill. Ears are small, often are twisted and with underdeveloped kernels.



NITROGEN is essential throughout the growing season. If plant runs out of nitrogen at critical time, ears are small and protein content is low. Kernels at tip do not fill.



GREEN SILKS at maturity may be caused by too much nitrogen in relation to other elements.



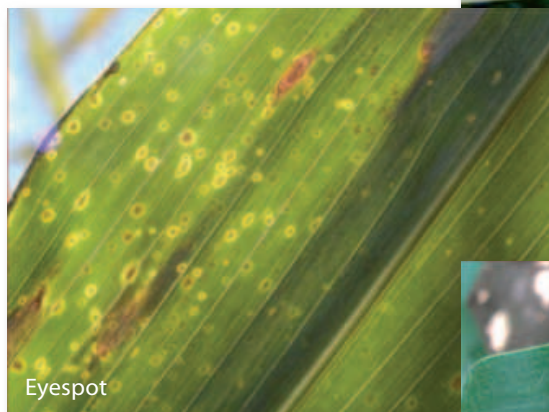
DRY WEATHER slows silking behind tasseling kernels are not pollinated.

Foliar Diseases

In recent years maize crops all across Ireland have been showing increased levels of infection from different foliar diseases. Mild and damp weather conditions are the main contributing factors to disease infection. Coastal regions are more prone to such weather conditions hence are at a greater risk of infection.

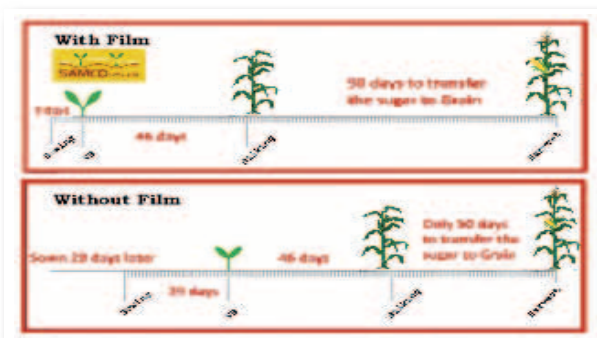
Measures to reduce disease exposure

- Crop rotation
- Sow hybrids with proven disease resistance strains
- Cover spray the crop with a fungicide spray such as Opera



Film

When film is used to cover the maize seed it creates a mini greenhouse affect by locking in moisture and increasing soil temperatures, this increases the availability of nutrients in the soil particularly phosphorus. The cover provides extra protection during germination and the first few weeks of growth when the plant is often challenged by poor weather conditions. Rapid root development and the opportunity for growers to plant earlier creates a longer growing season which has the ability to drive yield and/or bring forward harvest date.



A series of pin holes which are located above the seedling along the film act as a temperature regulator to protect the plant from overheating.

The pin holes also assist the plants to break through easily and reduce damage to the leaves. A second series of pin holes (water holes) are located along the centre of the roll which help reduce water running along the film and into field depressions.

Shine's Agri can supply three types of film - grey, clear and green, which are recommended based on the customers requirements for plant break-through and degradation timescale.



Harvesting





Harvesting begins in mid September and should be all done before the 1st of November. Determining harvest date depends mainly on the cob maturity as 80% of the total feed value is in it. The stover accounts for just 20% of the total plants feed value. Our aim for harvesting is 30% DM and 30% starch. Higher starch is a bonus, however higher DM is not desirable as it leads to reduced feed intake and volatility at the pit face.



The whole plant DM can be determined by looking at the milk line of the grain.

Steps to determining Harvest date

- o Take a cob from a plant at least 10 metres into the field.
- o Break the cob in half and discard the half attached to the plant.
- o Remove a Kernal (grain) from the spindle.
- o Squeeze the Kernal to assess the level of milk in it.
- o Note the line where the solid starch and the milk begins.
- o Refer to below chart.

Grain Maturity Kernel	Kernel Description	Cob Percentage DM	Whole Plant Percentage DM
	Top 10% Hard Insufficient Starch	10%-15%	15%
	Top 40% Hard Still Too Watery	40%-45%	22%
	Top 75% Hard Harvest In One Week	60%-65%	27%
	100% of Hard Harvest Immediately	80%-85%	33+%

Inoculant and Storage

If whole plant dry matters are above 30% we recommend using an inoculant. Due to its high dry matter Maize is prone to heating at the pit face, so it is recommended that a narrow pit face is kept at all times. Shines Agri along with Pioneer have provided Irish farmers with quality silage inoculant for over 10 years and in this time have gained a lot of experience. The advanced Pioneer products now available ensure stable and high quality silage is achievable for all farmers whatever the silage being made.

Benefits

- Reduced heating
- Higher feed intakes
- Increased fibre digestibility
- More milk and meat, using Pioneer 11GFT
- More methane, using Pioneer 11CH4



Storage Clamp



Pioneer Applicator

Testimonials

James Barry – *Listowel, Co. Kerry*

James owns an autumn / spring calving Holstein Friesian dairy herd averaging 9,000 Litres with 680Kg Milk Solids. Along with the dairy herd he and his brother operate an extensive tillage and beef enterprise amounting to nearly 1,000 acres. The 260 cow dairy herd works off a grazing block of just 50 Ha with a stock rate of 5.2 (LU/Ha).

Growing Maize since 1996, James aims to feed 5-10Kg in the summer months and 15Kg of the Maize in the winter months. His diet plan also consists of Crimped Grain, Soya Bean & Palm Kernel.

Convenience and reliability are two major factors James highlighted as reasons for choosing to grow maize over the alternative wheat or barley. Due to the farms fragmented nature and the ability of maize ground to utilise slurry far away land parcels become more productive.

James says ***"We can only reach these high levels of production because we use forage maize as a buffer feed in the spring and autumn."***



John and Shay Galvin – Croom, Co. Limerick.

John and Shay manage a beef / tillage farm along with other family member in county Limerick. The beef enterprise consists of 300 acres predominately Friesian cross cattle, while the tillage enterprise of approximately 500 acres includes a wide range of crops. John and Shay's family have been growing maize for over 20 years for finishing cattle. In recent years the maize crop has played an essential role in crop rotation, the three crop rule and as a cash crop.

Cattle are fed approximately 9 Kg of maize per day in the winter finishing diet along with crimped grain, barley and distiller's grain. Along with a reduced consternates bill, less or no acidosis and little digest upset John and Shay find including maize in the diet is a must.

The Galvin brother explained maize is a high quality home grown consistent yielding crop with excellent benefits, however stress that hybrid selection and soil fertility are key to success.

Shay says ***"he has found a notable yield increase in his winter wheat crops following maize due to its deep routing nature."***



Feeding Maize

Maize silage can be fed as part of a winter diet or as a buffer feed in the spring and autumn while cattle are at grass. Maize silage which is high in dry matter and low in protein is the perfect complement for early spring and late autumn grazed grass which is high in protein and low in dry matter. Due to its high starch content maize needs to be introduced into the diet gradually. A higher protein concentrate will need to be fed during the winter months if maize is included in the diet.

Providing they are well-managed, forages can be more cost-effective sources of nutrients for dairy and cattle feeding rather than concentrates in many circumstances. Feeding a mixture of forages rather than grass silage alone will generally give higher dry matter intakes resulting in higher yields or allowing savings in concentrate supplementation.



Key points when feeding maize

- A source of long fibre should generally be included in diets
- Low protein content makes protein supplementation essential
- Introduce to the diet gradually
- Be aware of the low trace elements such as Ca, Mg and P

Buffer feeding

While grazing cattle is seen to be the ideal natural basis for ruminant feeding on its own the nutrient concentrations are generally insufficient to support modern dairy herd production levels. However care is required in supplementing grazed grass with forages as a buffer feed as they can easily displace more dry matter from the diet than they add and so reduce performance. Research carried out in Teagasc Moorepark showed that feeding maize silage to cattle while inadequate levels of grazed grass exist increased milk yield and solids. Along with playing a vital role in high stocking rate systems maize is considerable cheaper per ton of dry matter than grass silage or concentrate.



Buffer feeding can play a valuable role in filling gaps in grazed pasture supply or extending the grazing season for some or all classes of ruminant animals in spring and autumn. Most farmers are able to produce high yields of nutritious feed per hectare. However doing this consistently year after year with variable weather conditions can often result in relatively low feeding values in some forages. Buffer crops need to be managed correctly if yields and utilisation are both to be maximised.

Advantages of buffer feeding

- Provide excellent source of nutrition during breeding season
- Helps meet the nutrient demands of high yielding ruminant animals
- Extends the grazing platform in the shoulders of the year
- More sustainable and economical than concentrate options

Economics

COMPARATIVE FEED CHART

	Maize Silage	3 Cut Silage	Beet	Whole Crop	Spring Barley
Ploughing	40	5	40	40	40
Tilling	45	10	50	25	25
Sowing	50	7	50	25	25
Seed	81	8	65	45	45
Herbicide / Fungicide	45	5	75	60	60
Fertiliser	184	170	180	150	150
Harvesting	115	290	130	115	55
Spraying		5	50	35	35
Film	106				
Rolling / Crimping					34
Washing / Chopping			110		
Straw Sale					-50
Total Cost per acre	666	500	750	495	419
Tons of DM per acre	6.9	5	5.2	3.2	2.4
Cost per ton of DM	98	100	144	155	174
UFL per kg as feed	0.8	0.76	1.12	0.8	1
Ufl per acre	5520	3800	5820	2560	2400
Total Cost per UFL	120	132	129	193	174

* Figures taken from Teagasc Cost and Returns 2016 and are subject to vat

FAQ

Do I need a diet feeder to feed Maize?

No a diet feeder is not essential. However for best results and calculating feed out it is recommended.

Can maize be fed with beet?

Yes maize is often feed with beet it actually complements the beet well due to Beets low Dry Matter and high Sugar content.

Can I grow Maize 300 + feet above sea level?

Yes however greater emphasis needs to be put on planting the correct Hybrid ensuring its early maturity and suitability for high altitude sowing.

Will Maize reduce other feed bills?

Yes. Along with being an excellent source of dry matter forage maize also contains a grain content so less concentrate is needed in the diet.

Who can I look to for advice on balancing the diet?

A member of the Shines Agri team can assist in balancing the winter diets or any local nutritionist can easily give advice.

Can I feed Maize to young stock?

Yes. However greater need must be put to ensure the TMR is at an adequate protein level as the Maize can sometimes stunt the growth of younger cattle due to its low protein nature.



Events Diary

STEPS	Target Date	Actual Date
Select Site		
Soil Sample		
Spray Off		
Apply Organic Fertilizer		
Plough		
Apply Lime		
Till, Sow		
Over Spray (if necessary)		
Harvest		