CORN | SUNFLOWER

Crop Guide

2022 - 23

A BRAND OF MAÏSADOUR

masseeds®
UNITED TO GROW

Dear grower,

The European Commission is committed to reducing greenhouse gas emissions by at least 55% by 2030 with an end goal: a climate neutral earth by 2050 and MAS Seeds is happily onboard with this agenda. Today sustainability is at the heart of everything we do to preserve our soil and other resources.

Our purpose is **“Act together for a changing agriculture”**. We act together, with our partners and farmers, to positively impact agriculture and contribute to the change towards an agroecological way of farming.

This means thinking about the ‘how’ in everything they do. How our genetic and agronomic practices benefit the environment? How our digital solution benefits farmers?

A Strategic Approach to Sustainability

Sustainability could have a different meaning depending on the country in which a farmer or company operates. Therefore, we cater attainable innovations based on geography and individual need.

Here’s a brief overview of our efforts to bolster sustainability and farmer livelihoods:

- Improve corn and sunflower seeds. Seeking to offer both organic and non-organic varieties, we are developing genetics that provide tolerance to both water stress and common diseases to adapt to the environmental challenges: respectively the management of the water and the use of pesticides. **GREEN+**, **WATERLOCK**, **HelioSMART** genetic innovations are the fruits of this innovations.
- **Seeds to diversify crop rotation.** We invest resources in various seed types, including soybean, cover crops, alfalfa, sorghum, and other crops. This diversification benefits soil microbiology and helps offset impacts of climate change.
- Develop seed care biostimulant. Branded **AGROSTART®**, this environmentally friendly technology helps to get the crops off to the right start. The benefices are particularly remarkable in stress conditions.
- Provide digital agriculture solutions. **AGROTEMPO®** technology helps meet farmers where they’re at, which varies greatly by country and crop produced. It provides advice and support throughout the growing season to help producers maximize yields.
- Create feed autonomy. With **NUTRIPLUS®** services, livestock growers will be more self-reliant and sustainable as they grow animal protein. With more of the world seeking non-plant protein sources, sustainable livestock production is key.
- Bolster soil health. For crop growers, soil is paramount to life. **AGROPLUS®** is a service that support farmers to improve soil health to protect not only this season’s crop, but the crops of the future, too.

Each initiative speaks to issues farmers care about because we are part of a farmer cooperative. When we reexamined our mission to refocus on sustainability, farmers were the drivers. We are proud to work hand-in-hand with farmers to innovate for the future while we serve for today’s farming challenges.

Pierre Flye Saint Marie
CEO of MAS Seeds

AFNOR Certification attests having assessed the contribution to sustainable development according to ISO 26000 within GROUPE COOPERATIF MAISADOUR.

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SIX DECADES OF CORN RESEARCH AT MAS SEEDS

Corn is one of the most critical crops globally. From humans, to animals, the calories provided by these golden kernels make life-changing differences around the world. MAS Seeds has researched this crop for more than six decades and this means we are poised to bring new, better products to market today faster than ever before.

In 1949, farmers in southwest France, through their cooperative, started producing corn seeds to have more control over the seed options coming to their farm and wanted eventually create solutions tailored to their field and soil needs. For a little over a decade, the group mastered seed production and finally in 1962 broke ground on its first Research and Development and started breeding corn hybrids.

60 YEARS OF CORN BREEDING

A Legacy of Dedication

The goals we have might be similar to 60 years ago, but the work has completely changed. We went from entirely phenotypic selection to a more technological selection. We have so much more data than we did in the past – genotype and environment data – that helps breeders as they make decisions that help farmers.

For breeders, the overall job remains the same: select the best parent lines and hybrids to move through the program and into farmer fields. Look for higher yields, better defense packages and improve nutrient and water efficiency to bolster overall production.

In the early 2000s, MAS Seeds expanded greatly into eastern and central Europe, adding research centers in Romania, Poland, Ukraine and Russia at that time. In April 2019, a short three years ago, we bought a tropical breeding program and expanded our breeding capabilities into South America, Asia and Africa.

60 Years of Corn Research

After gathering six decades of data on a single crop, MAS Seeds knows a lot about the genetic potential of this crop. Combine the 60 years of data with thousands of annual research trials, and the data behind each corn hybrid the team brings to market is incredible.

Sixty years is a lot of information and a lot of genetic gain and genetic diversity to review. The genetic diversity we have created is huge and provides us with a germplasm pool unlike any other. It really helps us to design and develop products that fit the needs of the final product. Today, developing WATERLOCK and GREEN+ corn hybrids are the best examples of genetic innovations we can bring to farmers to tackle the climate challenges.

Because of the long history of corn breeding at MAS Seeds, the team can use data to predict outcomes in the crop to help bring solutions to farmers. This creates improved decision making at each step in the breeding process, which ultimately means farmers gain access to better products, faster.

Whether it's addressing the challenge of Climate Change, input optimization, a troubling disease or any other problem farmers face, the key message is this: MAS Seeds deeply wants to support the farmer and find solutions that support farmers.

1962
Launch of corn R&D activities at MAS Seeds

1989
Purchase of first international corn program in Germany. Investment in corn forage breeding in Europe

2000
Significant investment in biomolecular lab and marker assisted breeding programs

2005
Development of haplo-diploidisation technology

2006
Expansion to Central Europe: Continental breeding program in Romania

2012
Expansion to Eastern Europe: Research Station settled in Ukraine

2018
Breeding programs converted to genomic breeding

2019
Acquisition of tropical germplasm program in Mexico and overseas research operations development: America, Africa, Asia

CORN AS A CARBON SINK

Agroecosystems contribute to global greenhouse gas emissions primarily from fermentation, synthetic fertilizers and tillage. However, it also has a great potential to store vast amount of soil carbon. Agriculture has the ability to transform from CO_2 emitter to CO_2 capturer. Its potential can be increased by using **high yielding crops like corn, alternating crop rotations, adapting cultivation practices, integrating cover crops, fertilizer management or green manures.**

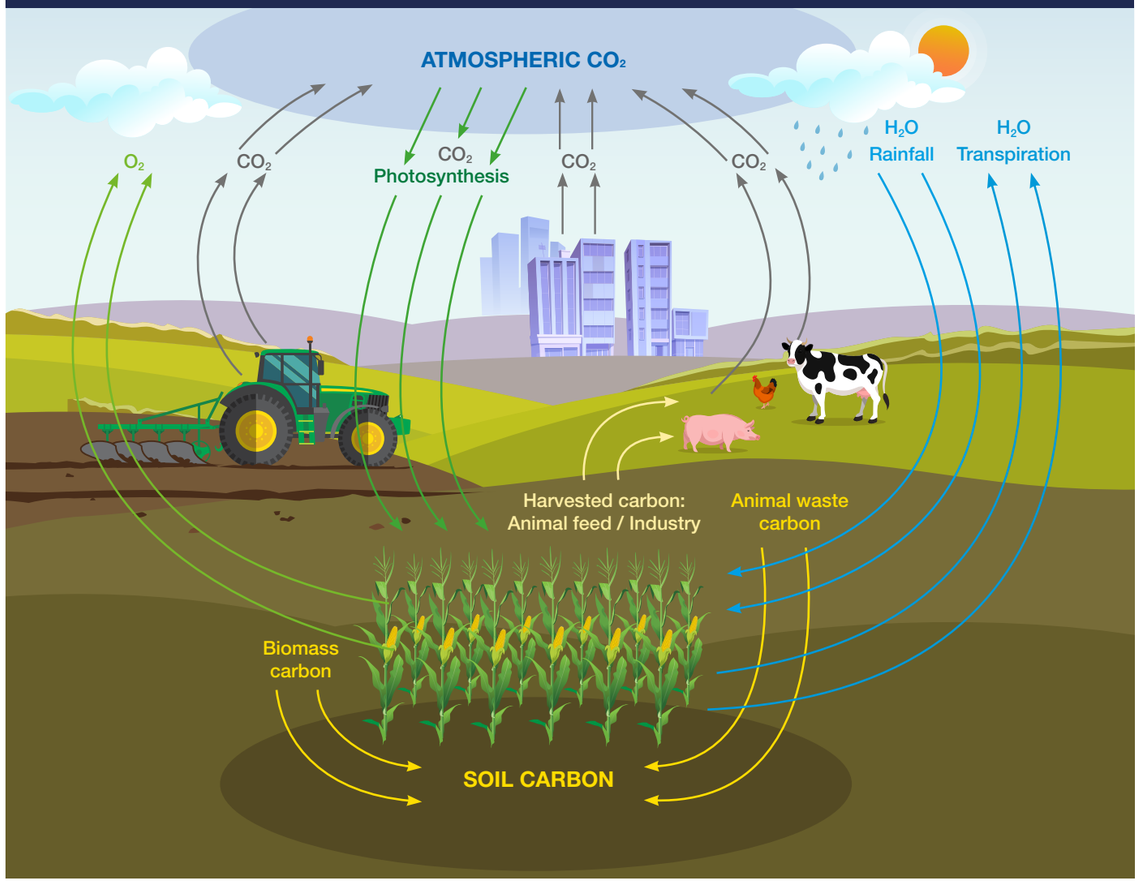
Corn as a crop has multiple benefits :

- Corn recycles nitrogen and organic matter, mainly carbon from the soil to synthesize into biomass.
- It removes carbon dioxide from the atmosphere and returns as oxygen.
- Corn valorizes rainfall and winter water reserves, which it largely releases into the atmosphere. 75% of corn in Europe is not irrigated.

CORN AS AN OXYGEN PRODUCER

1 ha of corn = 4 ha of forest

Carbon and Water Cycles for Corn



How corn reduces greenhouse gases

One hectare of corn captures 4 to 8 times more CO_2 than it emits to produce it.

This process produces 15 to 20 tons of biomass per hectare, half of which is in the form of straw and roots.

After harvest, the straw that is incorporated into the soil decomposes into humus, a guarantee of soil fertility and a carbon store. For example, 7.5 to 10 tons of stem, straw and roots produce 1.1 to 1.5 tons of stable humus in the soil. This represents a stock of 450 to 600 kg of carbon, or 1 650 to 2 200 kg CO_2 eq per hectare. (Source: Arvalis 2020). This is referred to as **“carbon sink”**.

“Higher yields increase carbon storage in soils”

In 10 years, the maize yield has increased by one ton of grain per hectare and one ton of residues returned in addition. **This corresponds to 220 kg eq CO_2 captured per hectare!**

Agronomic experiments at maisadour group to anticipate agricultural practices of tomorrow

Together with MAISADOUR GROUP experts and farmers, 6 agronomic experimental sites were established 9 years ago to anticipate farming systems for a sustainable use of resources. Today 5 farming subjects are being tested:

- Tillage
- Cultivation systems
- Nitrogen management and reduction
- Organic fertilization management
- Weeding strategies

One of the goals is to know where our farmers are in terms of carbon storage and greenhouse gas emissions today and to propose solutions to generate more carbon credits in the future. It is also inline with MAS Seeds’ strategic pillar to **integrate cover crops and agroecological solutions.**

ORGANIC SEEDS AT MAS SEEDS

Organic farmers rely on organic seeds to meet the growing demand for certified organic products. These seeds are essential to the integrity of the supply chain for quality organic food, feed and other products.

Organic farming challenges can be quite different from conventional systems. Seed provides the genetic tools to confront these day-to-day challenges in the field.

Specific variety selection criteria

- Excellent **starting vigor** and **strong root development**.
- **Disease tolerance** in order to reduce losses through pests and secure yield.
- Management of competitive weeds: **rapid soil cover** and **row closure**, robust stems adapted to mechanical weed control.
- **Performance, stress tolerance** and regularity under all conditions.
- In order to evaluate these achievements, MAS Seeds invests every year in a special Organic test network from Terres Inovia and Arvalis.

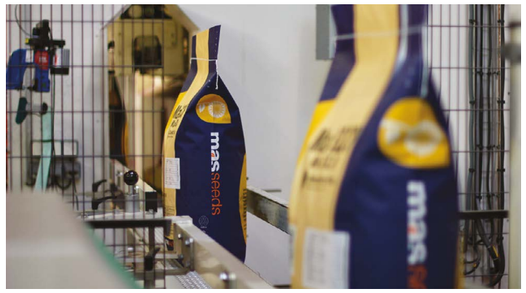
Special production network

We have built a well-functioning network of organic seed producers who follow all the rules and requirements set out in the EU and GNIS specifications. We define a cultivation protocol adapted to the production area to produce every hybrid where the yield potential is the highest.

Own production facility

MAS Seeds is ORGANIC certified, and we have a specific production line for organic agriculture seeds.

We renew our accreditation through semi-annual audits by a certified organization (CERTIPAQ Organic).



For over 15 years, MAS Seeds invested in development and production of organic seeds.

WE ASKED OUR EXPERT:

What is special about ORGANIC Seed Production?

The organic production fields are well **isolated**:

- Keeping isolation distances is essential. We increased the distance from recommended 500 m to 700 m to ensure the purity.

The **sowing date** is optimized:

- Not too early, so that weeds have enough time to emerge. We carry out mechanical weed control before the sunflower is sown.
- Not too late not to endanger the harvest. Also, special attention should be paid to botrytis. It is a criterion for the certification for organic seeds.

The **weeding** is done mechanically. We also conduct trials and tests for innovative solutions and use some organic weed control measures.

Nicolas LABEYRIE
MAS Seeds Seed Production Expert

Our organically produced corn and sunflower seeds portfolio:

CROP	VARIETY	TYPE	EARLINESS	EARLY VIGOR	MILDEW	DISEASE TOLERANCE	STRESS TOLERANCE
CORN	**MAS 10.A** BIO	Flint	Very early	***		****	****
	MAS 16.B BIO	Flint	Very early	****		****	****
	MAS 26.R BIO	Flint-Dent	Early	****		****	****
	MAS 43.P BIO	Dent	Mid Late	****		****	****
SUNFLOWER	**MAS 81.K** BIO	Linoleic	Early	****	RM9	****	****
	MAS 808.OL BIO	High Oleic	Early	***	RM9	***	****
	MAS 815.OL BIO	High Oleic	Early	****	RM9	****	***
	MAS 830.OL BIO	High Oleic	Mid Early	****	RM9	***	***

** correct *** good **** excellent

CORN VARIETIES AND ADVICES 2022-23

masseeds
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	VARIETIES	MATURITY	FAO Silage *	FAO Grain **	USE AND CARACTERISTICS					SOWING DENSITY (grains/hectare)			AGRONOMY					DISEASE TOLERANCE							VARIETIES	
					Type of grain	Use	Energy type	GREEN+	WATER-LOCK	Silage - Optimal	Silage - Limited	Grain- Optimal	Grain - Limited	Early vigor	Dry down	Stay-green	Water stress tolerance	Harvest lodging	Fusarium (stem)	Fusarium (ear)	Hel-mintho	Eye spot	Head smut	Commun smut		
	DM0501	Ultra early	190	190	Flint	Silage, Biogas	Fast	◢		105 000	95 000			7	7	9	8	8	8	9	9	8	9	9	DM0501	
NEW	DM1310	Very early		220	Dent	Grain						100 000	90 000	6	9	7	9	9	8	8	7	8	8	8	DM1310	NEW
	MAS 08.F	Very early	180	180	Flint	Silage	Fast	◢		105 000	95 000			8	7	8	7	8	8	8	7	8	8	8	MAS 08.F	
NEW	MAS 195.P	Very early	230		Flint - Dent	Silage, Biogas	Fast			99 500	89 500			7	7	8	7	8	8	7	8	8	6	8	MAS 195.P	NEW
NEW	CHARLOTTA	Early	270		Flint	Silage, Biogas	Balanced	◢		98 000	90 000			8	6	9	8	9	8	8	8	8	5	8	CHARLOTTA	NEW
NEW	DM3501	Early	290		Flint - Dent	Silage, Biogas	Fast			92 000	82 000			9	7	7	7	8	8	8	8	8	9	8	DM3501	NEW
NEW	MAS 23.M	Early		290	Dent	Grain			◢			95 000	85 000	7	8	7	8	8	8	8	9				MAS 23.M	NEW
	MAS 24.C	Early	280	270	Flint - Dent - Dent	Grain, Silage	Fast		◢	95000	90000	95000	90000	8	8	8	9	8	7	8	8	8	5	8	MAS 24.C	
	MAS 250.F	Early	270		Flint - Dent	Silage, Biogas	Fast	◢		95 000	85 000			8	7	8	8	8	8	8	8		7	8	MAS 250.F	
NEW	MAS 253.K	Early	250		Flint - Dent	Silage, Biogas	Fast			95 000	85 000			9	8	8	8	7	8	8	8	8	6	8	MAS 253.K	NEW
	MAS 26.R	Early	280	280	Flint - Dent	Silage, Grain	Fast	◢		95 000	90 000	95 000	90 000	8	8	8	8	8	8	8	9	8	8	9	MAS 26.R	
	MAS 28.A	Early	280	280	Flint - Dent	Silage	Balanced	◢		95 000	85 000	90 000	80 000	7	6	8	7	8	8	9	7	8	4	8	MAS 28.A	
NEW	CITADEL	Mid Early	340	340	Dent	Grain			◢			95 000	70 000	7	7	7	8	7	8	8	6		8	8	CITADEL	NEW
NEW	MAS 333.T	Mid Early		390	Dent	Grain			◢			85 95 000	70 75 000	8	7	6	8	7	7	7	6		8	8	MAS 333.T	NEW
NEW	MAS 400.D	Mid Early	360		Dent	Silage, Biogas	Balanced			89 000	82 000			7	7	8	7	8	8	8	8	8	5	8	MAS 400.D	NEW
	MAS 43.P	Mid late		450	Dent	Grain			◢			90 000	85 000	8	7	6	8	9	7	8	7		7	8	MAS 43.P	
NEW	MAS 524.A	Late		530	Dent	Grain						80-90 000	75-85 000	6	7	8	8	8	8	7	8		7	7	MAS 524.A	NEW
NEW	MAS 576.N	Late	540	540	Dent	Grain						75-85 000	70-80 000	7	7	8	7	8	8	7	8		8	8	MAS 576.N	NEW
	MAS 582.D	Late		570	Dent	Grain						75-85 000	70-80 000	8	7	6	7	7	7	7	6		7	7	MAS 582.D	
	MAS 59.K	Late			Dent	Grain						75-85 000	70-80 000	8	8	7	7	7	7	7	6		7		MAS 59.K	
NEW	MAS 765.A	Very late	700	700	Dent	Silage	Balanced			95 000	85 000			8	8	7	8	8	8	8	8		8	8	MAS 765.A	NEW
	SHANIYA	Late	720		Dent	Silage	Balanced	◢		100 000	90 000	90 000	80 000	9	7	9	8	8	8	8	8		8	8	SHANIYA	
NEW	DM4330	Mid late		480	Dent	Grain						85-95 000	70 - 80 000	8	7	7	8	8	8	7	8		7	8	DM4330	NEW

* Silage maturity at 32 % DM
** Grain maturity for 35% for flint, 32% for dent

1-3 bad | 4-6 everage – good | 7-9 excellent

MAKE THE BEST OUT OF EACH DROP

We at MAS Seeds have 70 years seed experience. Historically, our breeding structures were based in France and Germany and used to provide varieties well adapted to oceanic climate.

Since 2000, our commercial deployment in central and eastern Europe combined with more severe and frequent droughts with high temperature peaks in Western Europe have leaded our breeding programs to select new hybrids with better drought tolerance.

Today, corn hybrids from MAS Seeds portfolio that are offering a superior ability to thrive under drought stress conditions are labelled WATERLOCK.

BREEDING CRITERIAS FOR WATERLOCK HYBRIDS

Early flowering

During flowering stage corn plant are highly sensitive to drought stress. Speed up the flowering time permits to take advantage of water ressources available in spring and avoid summer heat waves.

Strong root system

Strong and deep root system to explore the soil is essential to improve water uptake by the plant and to delay drought stress damages.

Synchronisation of male and female flowering

Timely synchronisation between silks emergence and pollen shed are critical to ensure proper pollination and kernel number on ear.

Leaf area index establishment and upkeep

Efficient establishement and maintenance of leaf area, even under drought stress, is a priority to maximize photosynthesis activity.

IMPROVED PHYSIOLOGICAL RESILIENCE

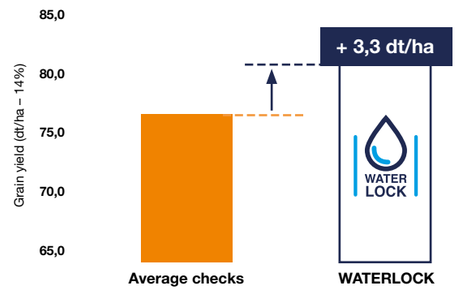
Plants have better capacity to return to a normal activity after a drought stress period

Benefits for the farmer

In situations where corn plants have to face short or long period of drought stress, WATERLOCK corn hybrids have demonstrated their yield superiority compared to market competitors. They bring security to the farmer, and a guarantee of profitability in all weather scenarios.

WATERLOCK –
corn hybrids to get the best
from each drop!

WATERLOCK : performance is visible in the field



Data R&D MAS Seeds
Seasons 2012-2020 – fields with drought stress detected

Investments in agronomy and technology

A wide corn trial network, rich of diverse weather scenarios

MAS Seeds is deloping its R&D centers in Ukraine, Romania, Russia with local breeding programs. In these regions where water supply is limited, our teams are able to identify accurately the most productive genetic resources.

A large data collection

- Phenotype data : plant morphology, physiology, yield components
- Environmental data : climate data, soil water supply, crop management
- Genotype data : complete genetic screening of all resources involved

Modern data analytics methods

Our data scientist team is integrating the data collected in the field and in the laboratory, in order to evaluate and predict the drought tolerance of our new coming corn hybrids.

MID EARLY | FAO 340 NEW

WATER LOCK

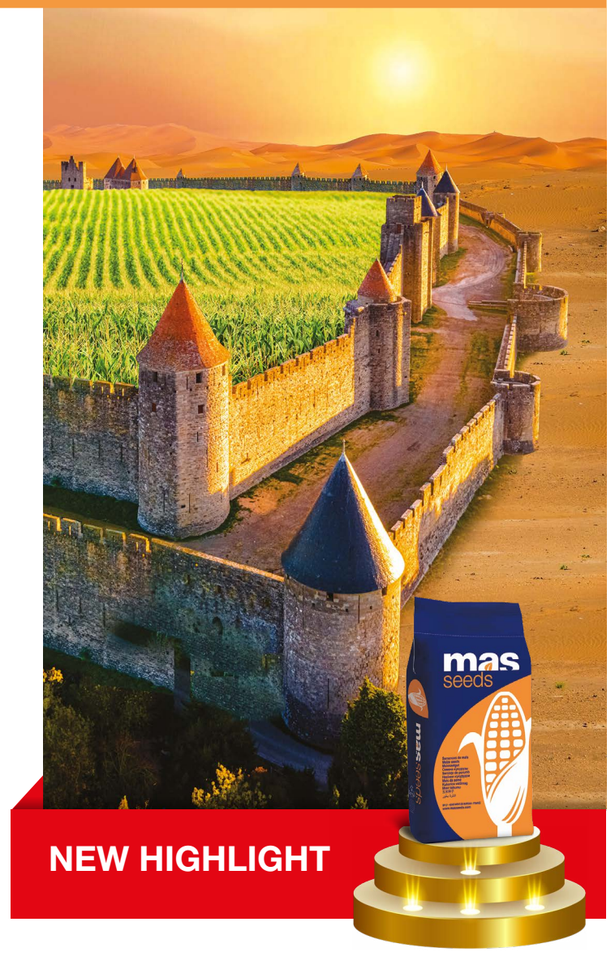
CITADEL

THE FORTRESS TO DEFEND YOUR YIELD

- **LARGE USE POSSIBILITIES**
  Performance from 30 to 130q
- **GOOD STEM QUALITY**
  Good stem fusarium
- **WATERLOCK**
  Very good on stress situations

PRODUCT ID

Registration:	2021 Italy
Maturity:	C - Mid early
FAO (S/G):	340 - 340
Use:	Grain



NEW HIGHLIGHT

CHARACTERISTICS

Plant height:	Medium
Ear insertion:	Low
Type of grain:	Dent
Nr of rows:	16-18
Nr of grains per row:	30-34
TKW:	300-320g
Flowering (°C):	930°C
Silage maturity 32% DM:	1540°C
Grain maturity 35% H2O:	1840°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	7
Stay green:	7
Dry down:	7
Helminthosporium:	6
Fusarium (ear):	8
Lodging:	7
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

GROWING RECOMMENDATIONS

	Optimal conditions	Limited conditions
Adaptation	+++	++++
Density (Silage Pl/ha)	95.000	70.000

CITADEL is a new mid-early hybrid launched in spring 2021. It is a new member of the WATERLOCK family, it offers remarquable tolerance to drought. This hybrid is mainly offered in central Europe where it brings security to farmers in continental climate.

EARLY | FAO 270

WATER LOCK

MAS 24.C

A PROVEN GENETIC FOR OUTSTANDING YIELD

DE-ÖKO-001

STARCH ENERGY

- **EXCELLENT GRAIN PERFORMANCE**
  High and stable yield, up to 15t/ha
- **EXCELLENT SILAGE PERFORMANCE**
  Massive yield up to 21t/ha dry matter
- **VERY HIGH STRESS TOLERANCE**
  Adapted to all growing environments

PRODUCT ID

Registration:	2016 Italy
	2017 France Germany
	Russia Ukraine
Maturity:	B - Early
FAO (S/G):	280 - 270
Use:	Grain - Silage

CHARACTERISTICS

Plant height:	Medium - High
Ear insertion:	Medium
Type of grain:	Flint- Dent - Dent
Nr of rows:	16-18
Nr of grains per row:	26-34
TKW:	330-350g
Flowering (°C):	880°C
Silage maturity 32% DM:	1520°C
Grain maturity 35% H2O:	1700°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	8
Stay green:	8
Dry down:	8
Helminthosporium:	8
Fusarium (ear):	8
Lodging:	8
Drought tolerance:	9

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

LATE | FAO 580 NEW

WATER LOCK

MAS 59.K

THE BALANCED YIELD SOLUTION

- **HIGH YIELD POTENTIAL**
  In all growing situations
- **BALANCED PLANT**
  To secure the harvest
- **STRONG EARLY VIGOR**
  To secure crop installation

PRODUCT ID

Registration:	2020 Italy
Maturity:	F - Late
FAO (G):	580
Use:	Grain

CHARACTERISTICS

Plant height:	Medium
Ear insertion:	Low
Type of grain:	Dent
Nr of rows:	16 - 18
Nr of grains per row:	43 - 45
TKW:	345g
Flowering (°C):	1015°C
Grain maturity 35% H2O:	2020°C

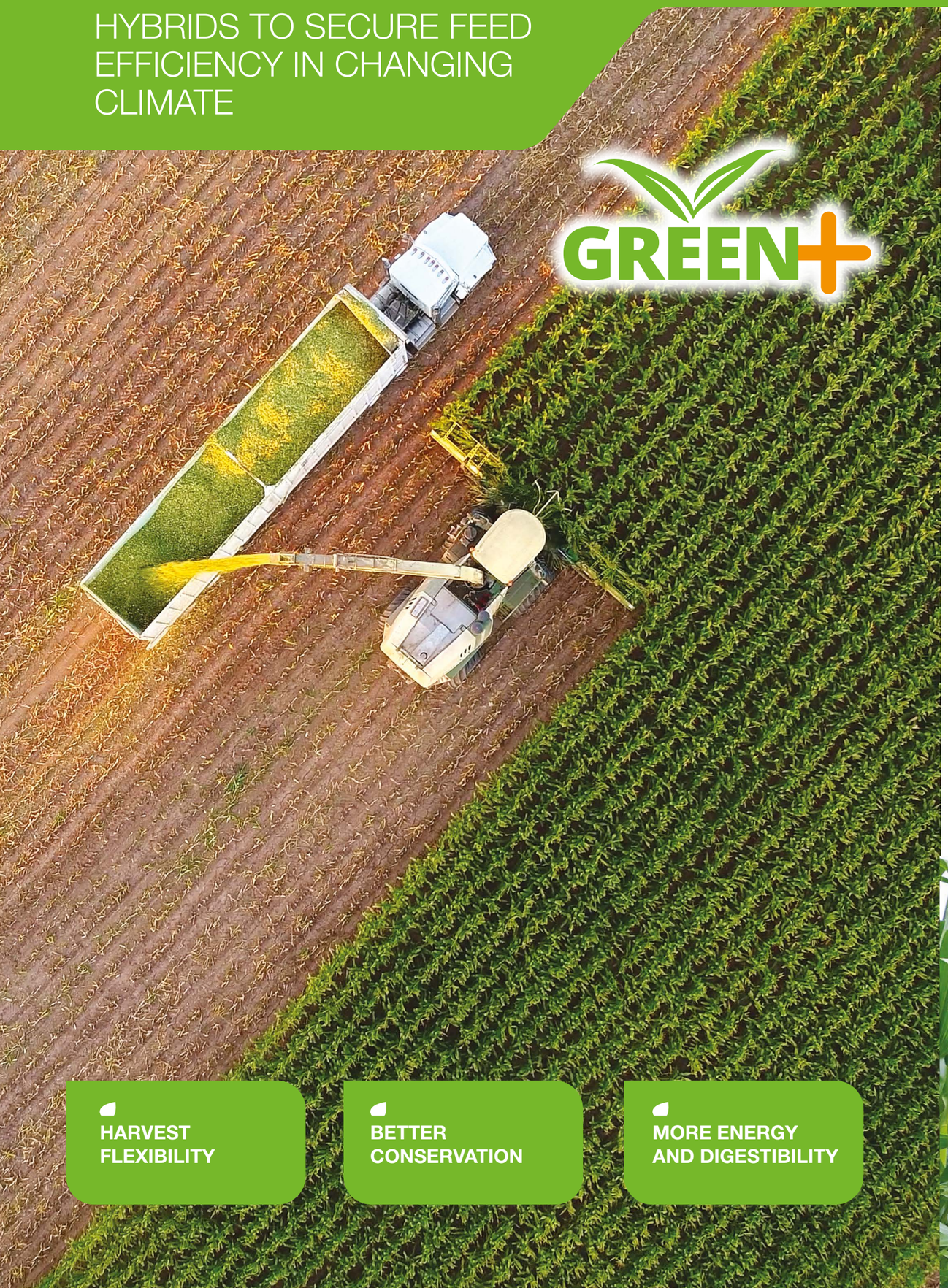
Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	8
Stay green:	7
Dry down:	8
Helminthosporium:	6
Fusarium (ear):	7
Lodging:	7
Drought tolerance:	7

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

HYBRIDS TO SECURE FEED EFFICIENCY IN CHANGING CLIMATE



BREEDING CRITERIAS

Harvesting high-quality silage at correct maturity is a major objective for the farmers in order to ensure the feeding of their dairy cows. Milk production is closely linked to the **quality of harvested and stored silage.**

In addition to dry matter (DM) yield, feed value and starting vigour, **MAS Seeds maize silage R&D has worked for 15 years on drought tolerance** of plants. **GREEN+ portfolio** is the result of this research.

KEY RESEARCH AXES OF MAS SEEDS SILAGE R&D PROGRAM:

- DM yield/ha
- Feed value (starch & digestibility)
- **GREEN+***
- Starting vigour

*GREEN+ is defined as genetic ability of a variety to delay maturity of leaves and stems, and so maintain their photosynthetic area active for longer period.

Characteristics and advantages of GREEN+ hybrids for farmers:

HARVEST

- Good **stay-green** of the plant
- More **flexibility to harvest** **+5 to 10 days**
- Better organisation of **harvest planning**

STORAGE IN SILO

- More **soluble sugars** in the plant
- Better **conservation in silo** **+3% of green forage grain**
- Quicker start of fermentation and **pH decrease**

FEEDING

- Slower evolution of **grain dry matter**
- Higher **valorisation of starch** **+5% digestible starch**
- Grains easier to crash

*Source: MAS Seeds trial results in mini clamps – 2017 & 2018.

EARLY | FAO 270

GREEN+

MAS 250.F

GOOD YIELD IN ALL CONDITIONS

STARCH ENERGY

- **VERY GOOD YIELD**
  in all conditions
- **HIGH LEVEL OF STAY-GREEN**
  to secure harvest and conservation
- **GOOD FEED VALUE**
  thanks to a good level of starch

CHARACTERISTICS

Plant height:	Medium - High
Ear insertion:	Medium
Type of grain:	Flint - Dent
Nr of rows:	14-16
Nr of grains per row:	32-34
Flowering (°C):	850°C
Silage maturity 32% DM:	1460°C
Grain maturity 32% H20:	1750°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	8
Stay green:	8
Dry down:	7
Helminthosporium:	8
Fusarium (ear):	8
Lodging:	8
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

FEED VALUE

Starch:
dNDF:
UFL:

GROWING RECOMMENDATIONS

	Optimal conditions	Limited conditions
Adaptation	++++	++++
Density (Silage Pl/ha)	95.000	85.000

MAS 250.F is a voluminous plant with large leaves adapted in many situations and also in cold area thanks to its good behavior in stressful conditions.

The hybrid has a good stay green, it secures the quality of silage harvest and conservation.

VERY EARLY | FAO 220

GREEN+

MAS 10.A

THE MIXT PERFORMANCE

STARCH ENERGY

DE-ÖKO-001

- **DOUBLE PERFORMANCE**
  in silage and grain
- **ADAPTATION**
  with superb ability to build regular cobs in anycondition
- **HIGH DISEASE RESISTANCE**
  To fusarium, helmintosporium and eyespot

CHARACTERISTICS

Plant height:	Medium - Short
Ear insertion:	Medium - Low
Type of grain:	Flint
Nr of rows:	16-18
Nr of grains per row:	24-28
TKW:	260-280 g
Flowering (°C):	800°C
Silage maturity 32% DM:	1340°C
Grain maturity 35% H2O:	1585°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	7
Stay green:	8
Dry down:	7
Helminthosporium:	7
Fusarium (ear):	8
Lodging:	7
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

FEED VALUE

Starch:
dNDF:
UFL:

EARLY | FAO 280

GREEN+

MAS 26.R

INCREASE YOUR YIELD

STARCH ENERGY

DE-ÖKO-001

- **TREMENDOUS YIELD FOR GRAIN AND SILAGE**
  Impressive plant and ears to outclass competitors
- **VERY STARCHY SILAGE**
  Big ears and big kernels, on big plant
- **SAFE HYBRID WITH GOOD AGRONOMY**
  Good vigor and disease tolerance

CHARACTERISTICS

Plant height:	Very high
Ear insertion:	Medium - Low
Type of grain:	Flint - Dent
Nr of rows:	14-16
Nr of grains per row:	28-32
TKW:	330-360 g
Flowering (°C):	880°C
Silage maturity 32% DM:	1510°C
Grain maturity 35% H2O:	1690°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	8
Stay green:	8
Dry down:	8
Helminthosporium:	9
Fusarium (ear):	8
Lodging:	8
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

FEED VALUE

Starch:
dNDF:
UFL:

LATE | FAO 720

GREEN+

SHANIYA

BALANCED ENERGY

BIG PLANT FOR SILAGE

- **GOOD LEVEL OF YIELD**
  In all potential conditions
- **GOOD FEED VALUE**
  Thanks to the digestibility of fibers
- **GOOD CROP INSTALLATION**

CHARACTERISTICS

Plant height:	Very high
Ear insertion:	Medium - High
Type of grain:	Dent
Nr of rows:	16
Nr of grains per row:	38 - 42
TKW:	360 g
Flowering(°C):	1070°C
Silage maturity 32% DM:	1890°C
Grain maturity 35% H2O:	2100°C

Sum of temperature in °C based on AGPM

AGRONOMY

Early vigor:	9
Stay green:	9
Dry down:	7
Helminthosporium:	8
Fusarium (ear):	8
Lodging:	8
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

FEED VALUE

Starch:
dNDF:
Energy:

EARLY | FAO 270 NEW

GREEN+

CHARLOTTA

BALANCED ENERGY

A TREAT FOR THE COWS

- **ELITE YIELD POTENTIAL**
  The strongest in difficult situation
- **TOP AGRONOMY**
  Good early vigor and healthy plant
- **GREEN+ GENETICS**
  Ensures a flexible harvest window and good conservation of silage

AGRONOMY

Early vigor:	8
Stay green:	9
Dry down:	6
Helminthosporium:	8
Fusarium (ear):	8
Lodging:	9
Drought tolerance:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

EARLY | FAO 280

GREEN+

MAS 28.A

BALANCED ENERGY

HIGHLY ADAPTED

- **STABLE HIGH YIELD**
  With excellent quality
- **MASSIVE SILAGE**
  High in silage yield
- **STRONG PLANT**
  High tolerance to plant fusarium and lodging

AGRONOMY

Early vigor:	7
Stay green:	8
Dry down:	6
Helminthosporium:	7
Fusarium (ear):	9
Lodging:	8
Drought tolerance:	7

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

SELECT A SILAGE VARIETY SUITABLE FOR YOUR CATTLE DIET

The nutritional quality of silage varieties is in the heart of our silage corn breeding program. The energy in the corn silage comes from the starch and the fiber digestibility of stem and leaves. MAS Seeds has determined 2 different energy types to categorize corn silage varieties, depending on the dominant source of the energy:

- **Balanced energy from starch and fiber**
- **Energy from starch**

Principle of the approach

All MAS Seeds silage varieties are analyzed for their nutritional quality and the ratio of their fiber and starch energy at harvest between 32 and 35% DM. We then categorize varieties by their energy profile and recommended depending on the diet practiced by the cattle farmers.

Practiced diet	Corn Silage Dominant	Grass and Alfalfa dominant
Corn ratio	**More than 70% corn**	**Less than 70% corn**
Recommended corn silage profile	• Need fiber digestibility in corn • No excess starch • Acidosis risk management	• Need energy concentration • Quick available energy • High level of starch
Feeding Period	Late Autumn - Winter	Spring - Summer - early Autumn
Silage Energy profile	BALANCED ENERGY	STARCH ENERGY
Use Advices	Can be supplemented with energy concentrates: Grain or cereal Corn cob mix	• It combines excellently with our ALFALFA varieties and FORAGE mixtures • Limit the additional the starch source (acidosis risk)

Higher methane production with MAS Seeds biogas hybrids

Corn is the main substrate (~ 50 - 60%) for the most biogas plants as it is a unique crop with the highest carbon efficiency per hectare.

The main criteria for highest methane production/ha:

- **Massive yield in dry matter (DM)**
- Methane production in liter per kg of DM.

We observe in our network of biogas trials that the production of methane/ ha is directly linked to **DM yield. This is the key criteria of selection of our biogas varieties in MAS Seeds, respecting a minimum of 32% of DM to ensure the best quality of plant.**

MAS Seeds research is also focused on secondary parameters :

High stay green

- to secure the harvest window
- to have a quicker fermentation on the silo and a better conservation of the quality

Good fat content : Increase biogas production

Good level of hemicellulose for a better retention time in the digester

OUR ORGANIC SEED PORTFOLIO

VARIÉTIES	Earliness	Type de grain	Rendement Biogaz/ha	"Index Biogaz (RATH Formule)"	Stay green	Matière grasse	Hemicellulose
SEMATIC	Très Précoce	corné	***	****	****	***	****
MAS 10.A	Très Précoce	corné	***	****	****	***	****
MAS 16.B	Précoce	corné	****	***	****	****	****
MAS 245.A	Précoce	corné denté	****	***	***	****	***
DM2519	Précoce	corné denté	****	****	***	***	****
MASTODON	Mi précoce	corné denté	****	****	****	****	***
MAS 26.R	Mi précoce	corné denté	****	***	****	****	***

** correct *** good **** excellent

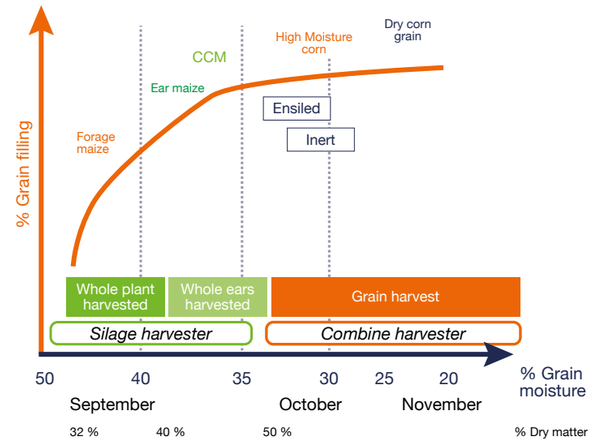
High Moisture Corn for animal feeding

Corn is an excellent source of energy for animals and can be harvested at different maturities depending on the final use.

High moisture corn (HMC) is a farmland grown feed resource, which increases farm sustainability by limiting purchasing of off-farm feeds, transport and cost of energy for drying. It can be ensiled or stored in oxygen-limiting storage structures for a natural conservation.

The advantages in using HMC are numerous for pigs, dairy cows, beef, sheep and ducks: **nutritive, economic and organisational.**

The different harvesting methods of maize



Our advices to take the best profit from high moisture corn

The main target is to guarantee a **healthy maize** crop and avoid mycotoxins development due to fusarium:

- harvest before November 1st (select hybrids with an adapted maturity)
- destroy and bury harvest residues
- control grain borers .

Advantages of high moisture corn

1. No drying cost
2. A source of quicky digestible starch
3. A multipurpose feed
4. An efficient use of maize grown on farm.
5. An adapted and easy form of storage.

MAS Seeds maize varieties for high moisture corn use

Each MAS Seeds maize hybrid is **described and evaluated** by our R&D teams in our European trial network. Following characteristics are considered when selecting high moisture corn varieties:

- Good tolerance to graminearum fusarium
- Low rate of mycotoxins (DON, Zearalenon)
- High energy value
- High specific weight
- Low vitreousness to get an optimum size of particles
- High protein %/ kg and raw lysine g/kg (for pigs)
- Lowest fat and linoleic acid % (for pigs)

AGROSTART® MAIZE SEED APPLIED SOLUTION

AGRO START®

INNOVATIVE CORN SEED CARE
FOR BETTER FIELD ESTABLISHMENT AND YIELD SAFETY

Biostimulant

+ Fungicide

AGROSTART®: MORE THAN A SEED TREATMENT, IT IS AN INNOVATIVE TECHNOLOGY!

Innovative formulation to boost and protect plants in all environments

The innovative AGROSTART standard formulation for stronger and well protected seedling.

Two advanced formulations for environments with higher pest pressure, composed with the standard formulation and complementary solutions.

AGRO START®

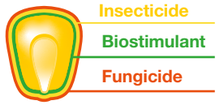
STANDARD FORMULATION

- **Biostimulants:** a new humic acid formulation to improve the absorption of nutrients available around seedling.
- **Fungicide:** prevents damage during the early growth phase from fungus and secure the emergence.

AGRO START + INSECT

ADVANCED FORMULATION FOR SOIL INSECT PRESSURE

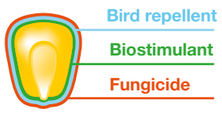
- **Biostimulant** and **fungicide** standard formulation.
- **Insecticide** (FORCE): protects against the principal soil insects as wireworms.



AGRO START + BIRD

ADVANCED FORMULATION FOR BIRD PRESSURE

- **Biostimulant** and **fungicide** standard formulation.
- **Bird repellent** (KORIT).



Benefits at field establishment and harvest

Boost and protect the seedling for a better emergence:

- Quicker and more regular emergence
- Higher emergence rate in cold conditions (+ 5% of raised plants)
- Better roots exploration and nutrient absorption

Boost and protect the seedling for a better emergence:

- + 3% Yield in average*
- + 11% Yield in cold conditions at emergence*

* Compared to standard treatment. Source: MAS Seeds Research in Seeds Production Data

SUNFLOWER VARIETIES AND ADVICES 2022-23

	VARIETIES	HARVEST MATURITY	FLOWERING MATURITY	USE AND CARACTERISTICS							SOWING DENSITY (grains/hectare)		ADAPTABILITY		AGRONOMY			DISEASE TOLERANCE							
				Oil type	Oil content	Oleic acid content	Herbicide tolerance	Boomrape tolerance	Helio-SMART	NO RUST	Optimal conditons	Limited conditions	Optimal conditons	Limited conditions	Early vigor	Water stress tolerance	Lodging	Mildiew	Verticillium	Sclerotinia (head)	Sclero-tinia (collar)	Pho-mopsis	Phoma		
NEW	MAS 804.G	Early	Early	Linoleic	44-45 %			G			70-65 000	60-50 000	••••	••••	7	8	9	RM9	8	7	9		6	MAS 804.G	NEW
	JULIUS	Early	Early	Linoleic	43-45 %			G			70-65 000	60-50 000	•••	••••	7	8	9	RM9	7	7	9			JULIUS	
	MAS 83.SU	Early	Mid Early	Linoleic	45-47%		Express® SX	E		◢	68-65 000	55-50 000	•••	••••	8	8	7	RM9	7	7	6	9		MAS 83.SU	
	MAS 89.HOCL	Early	Mid Early	High oleic	45-47%	87-90%	Clearfield® Plus				75 000	65 000	••••	••••	7	7	7	RM9	7	6	7	8		MAS 89.HOCL	
	MAS 815.OL	Early	Mid Early	High oleic	45-47%	89-91%					65-68 000	50-55 000	••••	•••	7	8	9	RM9	8	7	8			MAS 815.OL	
NEW	DT3301OL	Mid Early	Mid Early	High oleic	44-45%	85-86%					68-65 000	55-50 000	••••	•••	7	7	8	RM9	7	9	7		7	DT3301OL	NEW
	MAS 826.OL	Mid Early	Mid Early	High oleic	44-45%	88-90%					70-67 000	60-55 000	••••	•••	7	7	9	RM9	7	8	9			MAS 826.OL	
	MAS 920.CP	Mid Early	Mid Early	Linoleic	43-45%		Clearfield® Plus	E	◢	◢	65-70 000	60-65 000	••••	••••	8	9	9	RM9	8	9	9		8	MAS 920.CP	
	MAS 98.K	Mid Early	Mid Early	Linoleic	44-45%			E			70-65 000	60-55 000	••••	••••	7	8	9	RM9	9	8	9	9		MAS 98.K	
	MAS 85.SU	Mid Early	Mid Late	Linoleic	46-47%		Express® SX	E			70 000	65 000	••••	••••	8	8	7	RM9	8	8	8	8		MAS 85.SU	
	MAS 86.OL	Mid Late	Mid Early	High oleic	45-47%	84-87%		E		◢	70 000	65 000	••••	•••	8	8	7	RM9	9	8	7	7		MAS 86.OL	
	MAS 92.CP	Mid Late	Mid Early	Linoleic	44-49%		Clearfield® Plus	E			68 000	62 000	••••	••••	7	9	6	RM9	7	8	9	7		MAS 92.CP	
NEW	DOVER.CLP	Mid Late	Mid Late	Linoleic	45-47%		Clearfield® Plus	G			72-68 000	60-58 000	••••	••	6	7	9	RM9	7	7	9			DOVER.CLP	NEW

THE BEST DISEASE TOLERANCE TO SECURE THE YIELD

HelioSMART hybrids have the highest genetic tolerance to the main diseases of sunflower

Managing the risk of diseases is a major issue for sunflower cultivation because diseases can impact the yield by 30% up to 100% depending on the conditions and the intensity of the attacks, and furthermore can decrease the oil quality.

Sunflower diseases have a direct impact on the income of farmers and the performance of sunflower grain collectors. Good agricultural practices must be accompanied by genetic innovations.

HelioSMART hybrids are the results of a breeding program with the best tolerance against main sunflower diseases, in particular mildew, present at the start of the cycle, sclerotinia, which attacks mainly from flowering, and verticillium, the signs of contamination of which appear more at the end of the cycle. This genetic innovation is the result of many years of research and experimentations carried out in area where disease pressure is the highest across Europe.

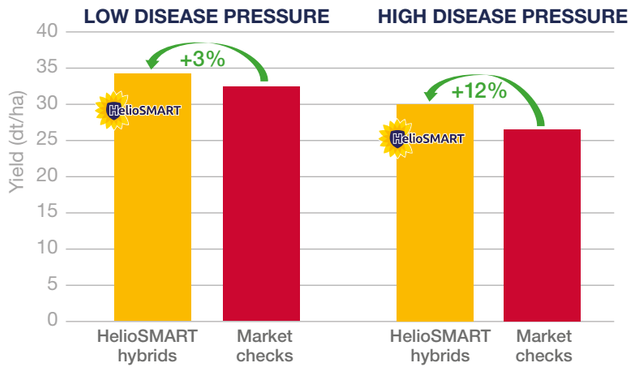
HelioSMART hybrids diseases profil

- **Verticillium**: 8-9* **
- **Sclerotinia**: <5% attacks**
- **Mildew**: RM9 profile**

** 1= bad 9= very good*

*** Based on MAS Seeds R&D network*

HelioSMART hybrids are selected on their high productivity in all disease situations



** Results from MAS Seeds R&D network 2019-20 with HelioSMART hybrids and market checks.*

The HelioSMART hybrids have contamination levels that are 3 to 15% lower than the market reference varieties.

This translates into **an increase in crop yield up to 12% in high disease pressure situations.**In low disease pressure, HelioSMART hybrids offer in average 3% yield bonus compared to market standards.

HelioSMART hybrids ensure high performances whatever disease pressure conditions.

SUNFLOWER HYBRIDS WITH THE BEST TOLERANCE TO BLACK RUST

Black rust life cycle and symptoms on sunflower

Black rust is a disease caused by the Basidiomycota fungi Puccinia helianthi spp. Originally discovered in United States, the disease is now widely spread in most of sunflower planted areas all over the world and is a major problem in several regions of Russia and Ukraine.

	Two internodes stage **BBCH32**	Inclined flower bud **BBCH61**	Falls of ligulate flowers **BBCH73**
			
PERIOD	**June** After over-wintering in crop residues, telia germinates and the fungi infect sunflower leaves.	**End of June to end of august** Reproductive and spraying phase. Pustules appear after 2 weeks on both sides of leaves and repeat cycle every 10-14 days.	**August to harvest** Cold temperatures or maturity of sunflower stop reproductive phase and induce the change to overwintering stage (Telia).
SYMPTOMS	**Pycnia:** Yellow-orange spot on top side of lower leaves. **Aecia:** orange spots on underside of lower leaves in opposite of pycnia.	**Uredinia:** Orange-brown spot with spores on both side of leaves.	**Telia:** dark brown-black spots without spores.

Impact on sunflower crop: up to 80% yield losses

Black rust induces several impacts on sunflower by pumping nutrients:

- Increase of transpiration (water losses).
- Decrease of plant nutrients transfer to the grains.
- Acceleration of senescence.
- It can induce huge impacts of sunflower performances, depending on the severity of the attack: 25 to 80% yield losses and 4 to 15% oil content losses.
- The impact on yield is already significant if 1% of leaf area surface is infected by either Uredinia or Telia.

The solutions against black rust

Crop rotation: Respect a delay of 4 years between two sunflowers in the same field.

Plant protection: Fungicides, apply at first symptoms of rust (1% of leaf area surface infected) to limit further development.

Genetic: Choice of hybrids tolerant to rust.

MAS Seeds genetic solution: NORUST hybrids

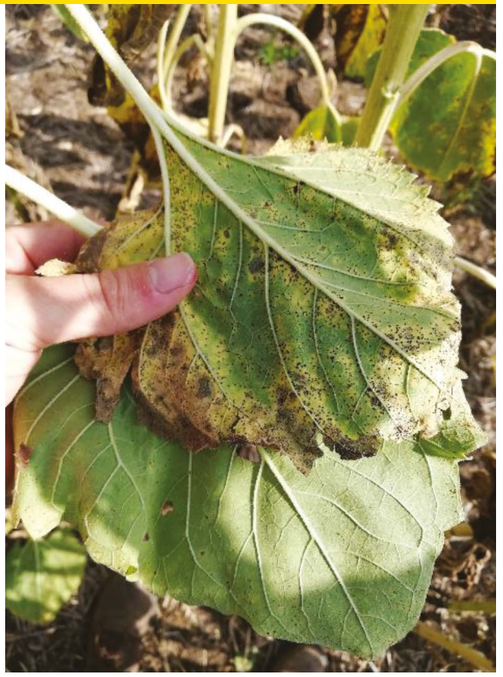
NORUST HYBRIDS HAVE THE BEST TOLERANCE AGAINST BLACK RUST IN THE MARKET:

For many years, MAS Seeds have invested to evaluate its hybrids under Black rust pressure.

We use a large range of supports (R&D network, Marketing demo fields, Commercial fields) to characterize the tolerance of each hybrid.

With NORUST hybrids, you can sow it in all situations:

- **In low pressure:** no visible symptoms.
- **In high pressure without fungicides:** later appearance of Black rust infection and less impact compared to competitors.
- **In high pressure with fungicides:** only minimal infection and less impact compared to competitor.



Picture: comparison of MAS 93.CP against competitor with in high pressure of black rust

NORUST hybrids

TECHNOLOGY	CLASSIC	EXPRESS® TS 2X HERBICIDE	Clearfield® Plus Виробнича система	IMISUN HERBICIDE TOLERANT
SUNFLOWER HYBRID	**MAS 81.K** **MAS 96.P** **MAS 86.OL**	**MAS 83.SU** **MAS 880.SU**	**MAS 920.CP** **MAS 92.CP** **MAS 93.CP**	**BLADE**

EARLY | LINOLEIC NEW

MAS 804.G

A STAR IS BORN

- **YIELD POTENTIAL**
  In all conditions
- **EARLINESS**
  At flowering and at maturity
- **BROOMRAPE TOLERANCE**
  An ORO G profile

NEW HIGHLIGHT

PRODUCT ID

Registration:	2021 Romania Spain
	2023 Russia Turkey Ukraine
Maturity:	Early
Oil Type:	Linoleic

CHARACTERISTICS

Flowering:	Mid late
Plant height:	High
Head shape:	Convex
Head position:	Inclined
TKW:	52 - 58 g
Oil content:	46 - 47 %

AGRONOMY

Early vigor:	7
Lodging:	9
Drought tolerance:	8
Broomrape:	G
Mildew:	RM9
Phomopsis:	7
Sclerotinia (head):	7
Sclerotinia (stem):	9
Verticillium:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

GROWING RECOMMENDATIONS

	Optimal conditions	Limited conditions
Adaptation	++++	++++
Density (Grain Pl/ha)	70 - 65 000	60 - 50 000

MAS 804.G has been developped to deliver high and secure top yields for early sunflowers areas under broomrape pressure. It has been tested during two years in all MAS Seeds R&D trial locations and the results are very impressive whatever cultivation conditions and weather conditions.

In addition, its ORO G profile presents an excellent disease and agronomic profile for maximum safety. MAS 804.G is the best-seller of early linoleic with broomrape tolerance market.

MID EARLY | LINOLEIC NEW

MAS 920.CP

MISTER YIELD

- **YIELD PERFORMANCE**
  Unlock the potential
- **SECURITY OF POTENTIAL**
  To fill silos in all situations
- **HELIOSMART VARIETY**
  To ensure yield from seed to harvest

PRODUCT ID

Registration:	2021 France
	2021 Italy
Maturity:	Mid Early
Oil Type:	Linoleic
Herbicide trait:	Clearfield Plus

CHARACTERISTICS

Flowering:	Mid Early
Plant height:	High
Head shape:	Flat
Head position:	Straight
TKW:	55- 65 g
Oil content:	43- 45 %

AGRONOMY

Early vigor:	8
Lodging:	9
Drought tolerance:	9
Broomrape:	E
Mildew:	RM9
Phomopsis:	8
Sclerotinia (head):	9
Sclerotinia (stem):	9
Verticillium:	8

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

MID EARLY | HIGH OLEIC NEW

MAS 83.SU

TECHNICAL ADAPTABILITY IN EARLY GROUP

- **EARLINESS/YIELD POTENTIAL RATIO**
  Adaptability in all territories
- **HIGH OIL CONTENT**
  To secure quality
- **FLEXIBILITY TO WEED CONTROL**
  To forget weed problems

PRODUCT ID

Registration:	2019 Italy
	2019 Ukraine
Maturity:	Early
Oil Type:	Linoleic
Herbicide trait:	Express SX

CHARACTERISTICS

Flowering:	Mid Early
Plant height:	High
Head shape:	Slightly convex
Head position:	Mid erected
TKW:	50 - 55 g
Oil content:	45 - 47 %

AGRONOMY

Early vigor:	8
Lodging:	7
Drought tolerance:	8
Broomrape:	E
Mildew:	RM9
Phomopsis:	9
Sclerotinia (head) :	7
Sclerotinia (stem) :	6
Verticillium:	7

1-3 sensitive | 4-6 medium – good | 7-9 tolerant | excellent

Clearfield® Plus
Production System for Sunflower

The Clearfield® Plus Production System for Sunflower

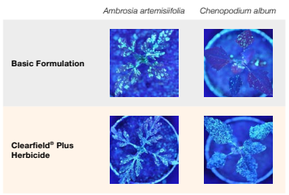
1. **Clearfield® Plus Hybrids**
2. **Clearfield® Plus Herbicide**
3. **Stewardship Program**

The Clearfield® Plus Herbicides

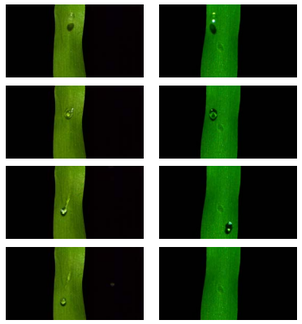
- Researchers and specialists have worked together to develop tailor made, complex herbicide solutions exclusively for the Clearfield® Plus Production System for Sunflower
- New formulations based on the need to provide better and more fl exible weed control to farmers
- Clearfield® Plus Herbicides deliver a consistently increased post emergence efficacy against broadleaf weeds, grasses and Orobanche
- This is based on better uptake, retention an adhesion

New Herbicide solutions for Clearfield® Plus

Herbicide Clearfield® Plus at the leaves of the target weeds*



Improved plant adhesion of Clearfield® Plus Herbicides, reduced roll off*

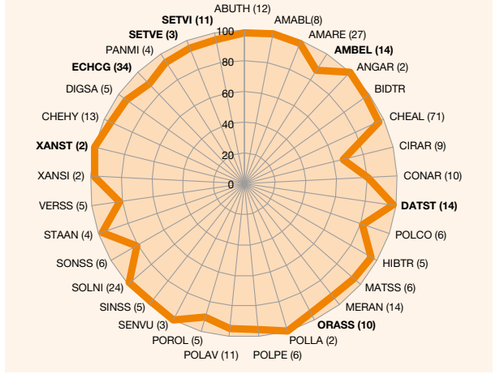


The Clearfield® Plus Production System for Sunflower – development and targets

- Excellent herbicide tolerance
- Robust and reliable weed control
- Flexibility
- Best genetics

Improved selectivity of Clearfield® Plus Hybrids, improved effi cacy from Clearfield® Plus Herbicides*

Clearfield® Plus Herbicides deliver high level efficacy towards important Sunfl ower weeds including grasses, *Ambrosia* and *Orobanche cumana**



*results and pictures derived from BASF research and development 2004–2015

BASF
We create chemistry

FMC An Agricultural Sciences Company

SUNFLOWER POST EMERGENCE HERBICIDE

TAKE THE HEAD OF THE EVOLUTION

MAS Seeds hybrids are now available with Express tolerance.

Express™ SX®
herbicide

A UNIQUE AND MODERN BROAD-LEAVED WEED HERBICIDE TO MAXIMISE SUNFL OWER GROWTH SAFELY

USE PLANT PROTECTION PRODUCTS SAFELY AND WITH RESPONSIBLE CARE.

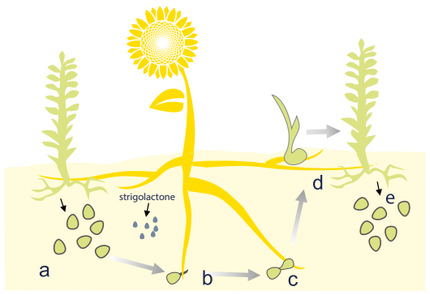
BROOMRAPE: A KEY PARASITE TO MANAGE CAREFULLY

Orobanche cumana (english: broomrape) affect significantly final sunflower yield. This parasitic plant, affecting specifically and exclusively sunflower (and some other Helianthus types), is expanded around the Black sea and also in south of Spain and in few regions in France. Fortunately, solutions exist to manage broomrape and reduce his impact on yield. Between herbicide tolerant sunflowers and hybrids genetically tolerant to F, G and G+ races, MAS Seeds propose a large choice of solutions for farmers. Nevertheless, some basic best practices are important to secure the field and limit the propagation of Orobanche Cumana.

Orobanche cumana life cycle

Broomrape plant produce thousands of seeds kept in soil many years before emergence (a).
Broomrape seeds germination is stimulated by sunflower: strigolactone released in soil by sunflower roots (b)
Fixation on sunflower roots, broomrape grows using sunflower energy and produce seeds (c, d, e).

Choosing adapted sunflower hybrids, broomrape can't emerge and produce new seeds: most effective strategy to avoid increasing number of seeds in fields and develop new contamination areas.



Cultivation practices under broomrape infestation

Before sowing – rotation
- Identify risky fields
- Implement proper crop rotation: minimum 3 years between 2 sunflower crops in the same field

Variety choice – cultural operations
- Use sunflower **hybrids genetically tolerant to broomrape** race identified or use a Clearfield/Clearfield PLUS variety
- Clearfield or Clearfield® PLUS hybrids → use proper herbicide sprayed at maximum advised dosis*
- Choose **double protection (hybrid genetically tolerant to broomrape + Clearfield® PLUS) for hardest cases**
- Avoid nutrients deficiency in order to have strong sunflower crop

After harvest
- Harvest orobanche-free fields first & infested fields at the end
- **Clean carefully harvesting equipment** between each fields
- Bury residues in soil to avoid broomrape seeds dispersion by wind and wild animals

MAS Seeds solutions for broomrape infested areas

EARLINESS	CONVENTIONAL	Clearfield Plus – Système de production Tournesol	OPTIMISED FOR EXPRESS™ HERBICIDE
EARLY MID EARLY	**JULIUS MAS 804.G**		
MID LATE LATE	**MAS 91.G MAS 90.F MAS 96.P**	**DOVER CLP MAS 93.CP**	**MAS 880.SU**

*For right hybrid choice and dosis advices, don't hesitate to ask your local MAS Seeds contact

HIGH OLEIC SUNFLOWERS – HIGH VALUE CROP FROM GROWER TO ENDUSER

An extra price for farmers, a healthier oil, an useful oil composition for companies, **High Oleic (HO) Sunflowers** all have qualities to seduce the protagonists of the sunflower market.

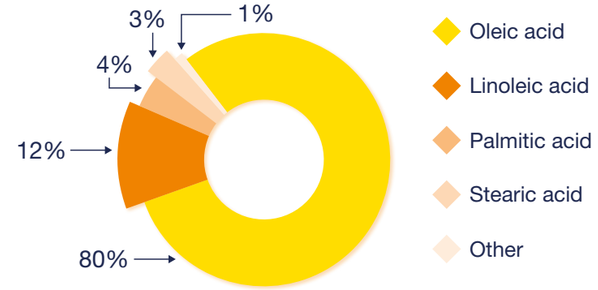
What is a HIGH OLEIC sunflower?

HO sunflowers are different in oil composition. Contrary to linoleic sunflowers, the oil transformation chain is blocked by enzymes before the full transformation. The transformation from oleic acid to linoleic acid is stopped and the concentration of oleic acid increases and surpasses easily 80% (vs 20% for linoleic sunflowers).

In field, there are none differences in cultivation practices between the two types of sunflower and the oil content is also the same.

For a HO sunflower, **30 days following the flowering are particularly important** to establish the oil content and the oleic acid content.

High oleic sunflower composition



Why is it useful to cultivate HO sunflowers?

Health

HO oil contains a high percentage of monounsaturated fatty acid. This fatty acid family permits to **reduce the cholesterol** content in blood and to **struggle against hypertension** problems. HO oil is also rich in vitamin E and antioxidants which protect our cells.

Industry

HO oil has a better stability during the cooking than a classic oil therefore HO oil is very appreciated by agribusiness companies. HO oil is also frequently used in green chemistry companies and **can be used like bio lubricants, green ester and biofuels.**

Environment

Contrary to palm oil, which comes from far countries and which increases deforestation problems, **HO oil is produced in Europe** and doesn't require destruction of forests. Today, more and more farmers are launching in organic sunflower cultivation to answer a new demands from customers.

AGROSTART® SUNFLOWER SEED APPLIED SOLUTION

AGRO START®

INNOVATIVE SUNFLOWER SEED CARE

FOR BETTER FIELD ESTABLISHMENT AND YIELD SAFETY

Biostimulant

\+ Fungicide

AGROSTART®: MORE THAN A SEED TREATMENT, IT IS AN INNOVATIVE TECHNOLOGY!

Innovative formulation to boost and protect plants in all environments

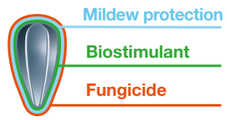
The innovative AGROSTART standard formulation for stronger and well protected seedling.

Two advanced formulations for environments with higher pest pressure, composed with the standard formulation and complementary solutions.

AGRO START®

STANDARD FORMULATION

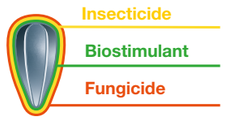
- **Biostimulants:** a new humic acid formulation to improve the absorption of nutrients available around seedling.
- **Fungicide:** prevents damage during the early growth phase from fungus and secure the emergence.
- **Mildew protection:** Possibility to treat with a mildew protection in accordance with the local regulation, to support genetic protection.



AGRO START® + INSECT

ADVANCED FORMULATION FOR SOIL INSECT PRESSURE

- **Biostimulant** and **fungicide** standard formulation
- **Insecticide**: protects against the principal soil insects as wireworms.



Benefits at field establishment and harvest

Boost and protect the seedling for a better emergence:

- Quicker and more regular emergence
- Higher emergence rate in cold conditions
- Better roots exploration and nutrient absorption

Improve yield in all situations, especially in cold conditions at emergence:

- + 5% Yield in average *
- + 7% Yield in cold conditions at emergence*
- Better yield in more 80% of situations*

* Compared to standard treatment. Source: MAS Seeds Research in Seeds Production Data

INCREASE THE NUTRITIONAL EFFICIENCY OF YOUR FODDER CROPS

Maximising Your Dairy Feed with Elite Genetics

The NUTRIPLUS® program helps dairy farmers increase **forage nutritional efficiency**.

- **Silage corn varieties:** Offering a complete range of high-quality varieties segmented by their silage quality type with specific tolerance traits.
- **Alfalfa varieties:** We offer a range of different varieties that deliver strong agronomic performance and quality in different dormancy classes.
- **Supplements and other forage crops:** A new generation of seeds to supplement your forage crops, such as silage sorghum, fodder beet and specific ray grass complete the NUTRIPLUS® product portfolio.

Expert Services and Personalised Tools

Our crop production experts run field trials to provide **personalised recommendations to assist you in optimising the nutritional performance of your dairy feed and fodder mixtures.**

Four components of research and development and crop production, go into the programme, which consists of:

1. A complete forage silo diagnostic on your farm with **NUTRIPLUS® SILO**.
2. Providing the most suitable suggestions of seed species and varieties for an effective dairy diet.
3. Our specialists ensure crop establishment and yield optimisation using **AGROTEMPO®**.
4. We advise you on how to best optimise forage harvest with **NUTRIPLUS® HARVEST** Service and storage with **NUTRIPLUS® SILO** Service.

agroTEMPO® nutri PLUS® HARVEST nutri PLUS® SILO nutri PLUS® SAT

Harvest a the right date the silage corn or lucerne is a key objective for dairy farmers. It's the guarantee **to harvest the best feed value and to have a good conservation on the silo.**

To support farmers, MAS Seeds develop different tools:

Nutriplus® Harvest Service

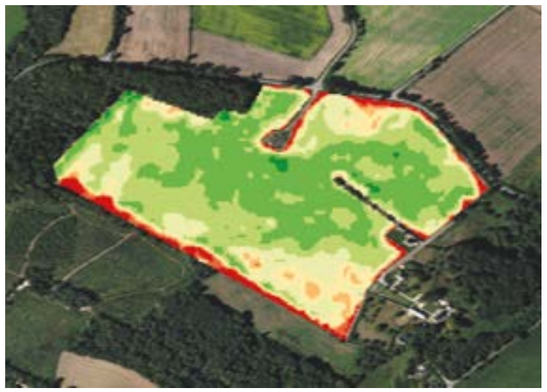
1. AGROTEMPO® app: Customized and precise advice at the field level to predicts all stages of the crop till silage harvest date.
2. Event with NIR System: analyse by NIR of the the fresh matter of the crop coming from the field: Calculation of optimal harvest date in the same time.

agroTEMPO® nutri PLUS® HARVEST

Nutriplus® SAT Service

1. Observe evolution of % DM at the field level thanks sateite images.
2. Report with the forcast of % DM field maps for the followig 15 days.
3. Forecast your silage havest thanks the recommandation of the best harvest period.

nutri PLUS® SAT



Nutriplus® Silo Service

NUTRIPLUS® SILO is a **complete diagnosis of your maize silage after opening the silo**. Advices given in the individualized report will contribute to improving the quality of your forage and adapting your diet.

nutri PLUS® SILO

MAXIMISE FIELD CROP EFFICIENCY AT YOUR FARM

agro PLUS®

ELITE PRODUCTS

Grain corn varieties: a diversified portfolio in all maturity groups completed by specific grain corn hybrids such as organic, waxy, white and vitreus

Sunflower varieties: a wide offer answering to all market needs such as oil profiles, weed control strategies, pests and diseases tolerance

Winter oilseed rape varieties: productive hybrids for all climate conditions

AgroCover & other field crops: a portfolio of cover crops and other complementary crops such as sorghum and cereals

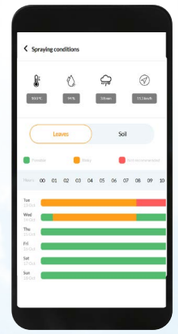
Expert Services And Tools

Our agronomic experts and tools rely on our specific R&D program combining research experimentation and farmer trials to provide services in 4 steps:

1. **Soil fertility improvement** thanks to diagnosis and cover crops.
2. Selection of the **most suitable field crop species and varieties** for your crop rotation and climate conditions.
3. **Personalized sowing recommendations** to improve field establishment and optimize yield potential.
4. **Crop operations monitoring online** using our digital tool AGROTEMPO®.

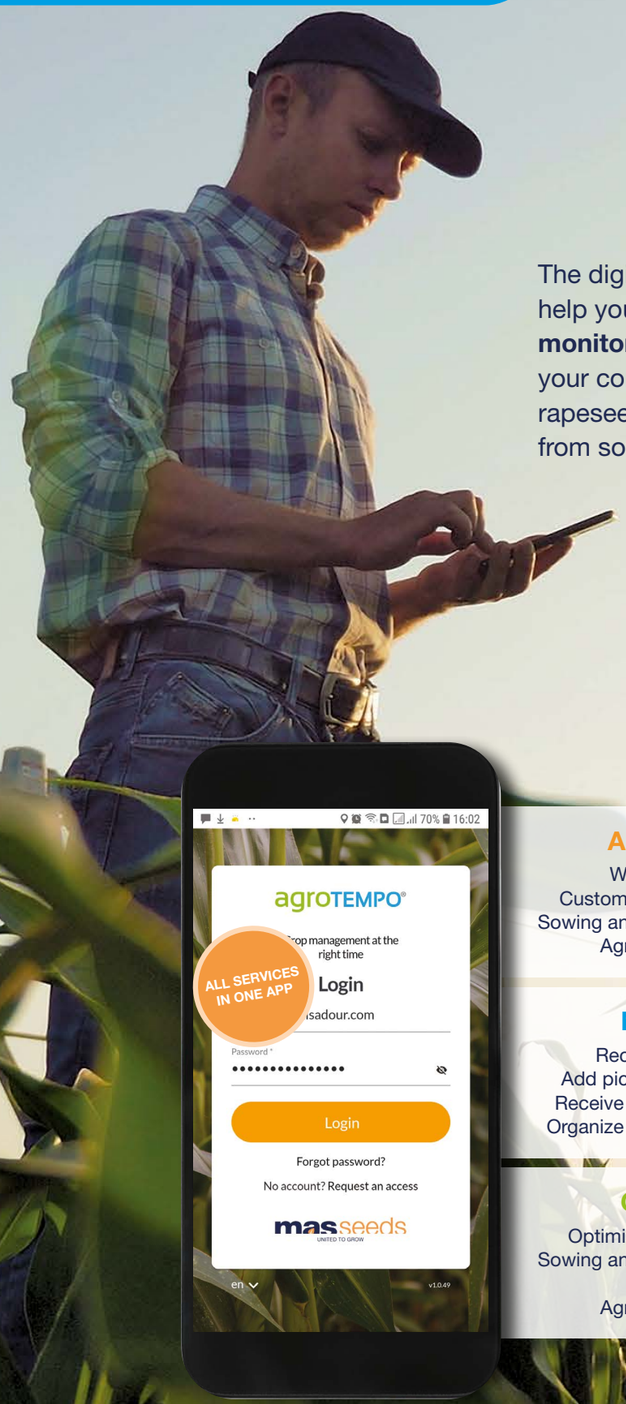
Maximize field crop efficiency at your farm

AGROPLUS® program is dedicated to help field crop producers to increase their yield in a sustainable way. Based on our offer of grain corn, sunflower, oilseed rape and our new cover crop seeds portfolio AgroCover, it integrates also a set of advices and services in 4 steps: soil fertility diagnosis, varietal advice, decision-aiding tools for the sowing and cultivation. It also includes a new digital decision-aiding tool, AGROTEMPO®, developed in partnership with Maisadour Group.



agroTEMPO®

AN AGRICULTURAL APP WITH INDIVIDUALIZED SUPPORT



The digital solution to help you to **anticipate, monitor** and **optimise** your corn, sunflower, rapeseed and alfalfa, from sowing to harvest.

ANTICIPATE

Weather forecast
Custom simulation functions
Sowing and harvest management
Agronomic advices

MONITOR

Receive visit reports
Add pictures and field notes
Receive personalized advices
Organize your work in the fields

OPTIMISE

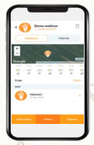
Optimization of treatments
Sowing and harvest management
Crop reports
Agronomic advices

agroTEMPO®

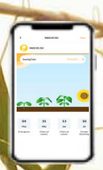
AN INDIVIDUAL SUPPORT

- **Personalised settings**
- **Information exchange and agronomic advice**
- **Visit report**

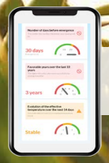
EXPERT AGRO-WEATHER FUNCTIONS



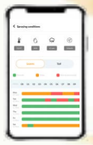
Weather forecast



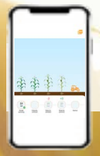
Crop simulation



Sowing conditions



Weed control window



Harvest forecast

Contact your MAS Seeds salesrep to create your AGROTEMPO® account and set your fields in your application.

GET IT ON Google Play

Download on the App Store

Notes

Notes

Contact us

Act together for a changing agriculture

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