THE MAIZE VARIETY
SELECTION GUIDE

BSPB/NIAB DESCRIPTIVE LISTS 2023
MAIZE FOR GRAIN, FORAGE AND ANAEROBIC DIGESTION

Limagrain

INDEPENDENT DATA TO AID VARIETY CHOICE

Independent data from BSPB/NIAB

This guide uses the Descriptive List data which is created from independent trials jointly carried out by NIAB and the British Society of Plant Breeders (BSPB). Varieties usually complete five years of testing, at up to nine locations within the UK. The data represents a varying range of growing and seasonal conditions, giving a very good indication of each varieties' potential.

We hope you will find this guide useful in helping you make an informed decision as to which maize varieties best suit both your growing conditions and expected feeding value of the resulting crop.

Maize variety choice simplified

Getting maize variety choice wrong can be costly in terms of missed opportunity to produce the maximum feed energy from the crop. The LG Variety Selection Guide aims to make it easier for you to interpret the valuable independent data available to help you make the correct variety choice.

This guide includes data on the new varieties added to the 2023 BSPB/NIAB Descriptive Lists for Forage Maize and Anaerobic Digestion, allowing comparison to those already established in the market.

The Maize Manager App

Do you want an easy way to evaluate your maize crops' performance? Then try out our Maize Manager App. The Feed Manager section gives a useful overview of the feed potential in terms of both MJ of energy and the financial value in terms of output.

Download from the Apple or Google store.

Download on the App Store Google play

WHAT DO YOU WANT FROM YOUR MAIZE?

GET THE BASICS RIGHT - MATURITY CHOICE THAT SUITS YOU

Avoiding soil compaction issues at harvest

Having to wait for later maturing maize varieties to be ready to harvest can cause serious problems with soil compaction, which results in surface water run-off and erosion in wet autumn conditions. This can be avoided by choosing a suitably early maturing variety to harvest in September, allowing time for field work to be carried out, or to establish a follow-on crop.

Use the Maturity Manager section in the new app!

It is critical to choose the right maturity range for your situation. You must avoid harvesting in unpredictable conditions in October that could lead to compaction and damage soil structure.

The Maturity Manager section of the app can provide you with the recommended FAO range for your farm by simply inputting your postcode. Further advice on suitable varieties to use within this maturity range is also available.

Download from the Apple or Google store.

Download on the App Store

ANDROID APP ON Google play

Using the LG Heat Map Tool

The LG Heat Map Tool has been developed by Limagrain, in conjunction with The Met Office to provide quick and easy advice for selection of appropriate maturing varieties.

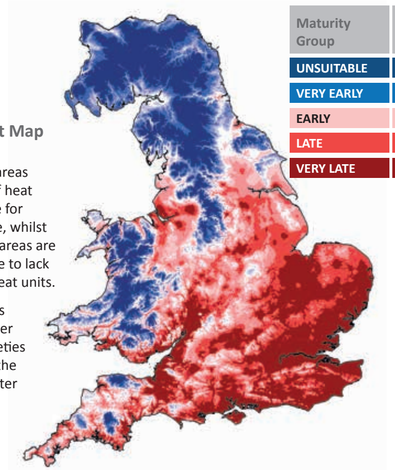
The tool uses the internationally recognised Ontario Heat Unit (OHU) system to show the average heat units available for maize to be grown in a location. Maize varieties differ in the number of heat units required to reach maturity and this affects their suitability to be grown in different locations. As a guide:

Maturity Group	FAO Range
UNSUITABLE	<2500 OHU
VERY EARLY	FAO 140-170
EARLY	FAO 170-200
LATE	FAO 200-220
VERY LATE	FAO 220-250

The LG Heat Map

The dark red areas have plenty of heat units available for growing maize, whilst the dark blue areas are unsuitable due to lack of sufficient heat units.

Marginal areas requiring earlier maturing varieties are shown in the bordering lighter colours.



VARIETY DATA IN TABLE AND CHART FORMAT

Tables provide the full set of trials data

FIRST CHOICE VARIETIES - RANKED BY EARLINESS

MATURITY GROUP	VARIETY	MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	YIELD DATA DM YIELD (t/ha)	YIELD DATA RELATIVE DM YIELD (%)	AGRONOMIC DATA EARLY VIGOUR (9=good, 1=poor)	AGRONOMIC DATA STANDING (at harvest 9=good, 1=poor)	AGRONOMIC DATA LODGING (%)	AGRONOMIC DATA LEAF SENESCENCE (at harvest 9=good, 1=poor)	AGRONOMIC DATA EYESPOT RATING (9=good, 1=poor)	YEAR LISTED
Mean of the year 4 & 5 varieties				*34.4*		*17.7*	*100*	*6.8*	*7.3*	*2.1*	*6.7*	*5.5*	
VERY EARLY	CITO KWS	12	140	38.9	16	16.6	94	6.8	7.1	2.6	5.1	5.4	2018
VERY EARLY	GEMA	12	150	37.0	10	17.1	97	6.7	6.8	3.1	5.8	6.4	2021
VERY EARLY	KWS ARTIKUS	11	150	36.7	9	17.5	99	6.8	6.0	4.8	5.6	7.8	2020
VERY EARLY	AUGUSTUS KWS	11	150	36.6	8	16.5	93	6.9	6.4	3.9	5.4	6.3	2015
VERY EARLY	TROOPER	10	160	36.0	6	17.2	97	7.0	7.9	0.8	6.4	1.0	2020
VERY EARLY	KWS CALVINI	10	170	35.4	4	17.6	100	7.1	7.2	2.3	5.9	6.9	2019
VERY EARLY	DIGNITY NEW	10	170	35.1	3	18.7	106	7.0	7.3	2.0	6.8	3.1	2022
EARLY	PROSPECT	9	170	34.8	2	18.0	102	7.1	7.2	2.3	7.3	7.7	2019
EARLY	RGT OXXGOOD	9	180	34.8	2	17.8	101	6.6	7.0	2.6	6.3	6.1	2016
EARLY	AMBITION	9	180	34.2	0	17.9	101	6.9	7.8	1.1	7.1	6.3	2012
EARLY	RODRIGUEZ KWS	8	180	34.0	-1	17.6	99	6.5	7.9	0.8	6.8	4.1	2015
EARLY	LIROYAL	8	180	34.0	-1	17.7	100	6.7	7.6	1.5	6.6	6.1	2019
EARLY	SAXON NEW	8	180	34.0	-1	18.9	107	7.2	5.9	4.9	6.7	3.5	2022
EARLY	MADONIAS	8	180	33.9	-1	17.8	100	6.7	6.9	2.8	6.2	5.5	2018
EARLY	PINNACLE	8	180	33.8	-1	17.6	100	6.8	6.1	4.5	7.3	6.5	2018
EARLY	FIELDSTAR	8	180	33.8	-2	17.8	101	6.9	7.7	1.3	7.2	6.4	2013
EARLY	KWS PASCO NEW	8	180	33.4	-3	19.0	107	7.0	6.6	3.5	6.7	7.8	2022
EARLY	CONCLUSION	7	190	32.8	-5	18.4	104	7.1	7.1	2.6	7.6	4.3	2020
EARLY	RESOLUTE	7	190	32.8	-5	19.1	108	7.1	7.5	1.6	7.7	3.1	2020
EARLY	GATSBY	7	190	32.7	-5	18.3	103	7.2	7.7	1.3	7.4	5.6	2017
EARLY	SY NORDICSTAR	7	190	32.5	-6	17.8	101	6.8	6.7	3.4	7.3	7.8	2016
EARLY	BONNIE	7	190	32.3	-7	18.4	104	7.2	7.4	1.9	7.9	5.9	2017
LATE	FARMUNOX	6	200	31.7	-9	18.7	106	6.6	6.0	4.9	7.7	7.4	2020

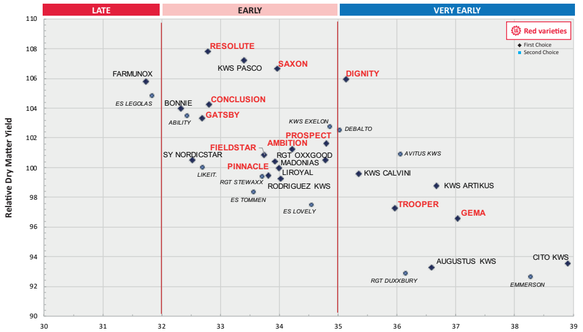
NEW = New in 2023 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB early control variety

Tabular data to aid your variety decision

The tables provide useful independent data on both agronomics and feed quality for maize. Agronomy information is included for yield, early vigour and disease resistance.

Feed quality information includes detail on both starch, energy yield and content. In addition, digestibility of maize is shown by the CWD scores.

Charts visually show maturity and yield data



Varieties are split into maturity segments

Varieties are divided into groups of similar maturity to enable easy comparison.

The main three groups are:

Very Early Suitable for early harvest or marginal sites

Early For mainstream good sites targeting feed quality and yield

Late For only the best sites and targeting high yield potential

RELATIVE DRY MATTER YIELD AND AGRONOMIC CHARACTERISTICS

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites

FIRST CHOICE VARIETIES - RANKED BY EARLINESS

MATURITY GROUP	VARIETY	MATURITY				YIELD DATA		AGRONOMIC DATA					YEAR LISTED
		MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	DM YIELD (t/ha)	RELATIVE DM YIELD (%)	EARLY VIGOUR (9=good, 1=poor)	STANDING (at harvest 9=good, 1=poor)	LODGING (%)	LEAF SENESCENCE (at harvest 9=good, 1=poor)	EYESPOT RATING (9=good, 1=poor)	
Mean of the year 4 & 5 varieties				*34.4*		*17.7*	*100*	*6.8*	*7.3*	*2.1*	*6.7*	*5.5*	
VERY EARLY	CITO KWS	12	140	38.9	16	16.6	94	6.8	7.1	2.6	5.1	5.4	2018
	GEMA	**12**	**150**	**37.0**	**10**	**17.1**	**97**	**6.7**	**6.8**	**3.1**	**5.8**	**6.4**	**2021**
	KWS ARTIKUS	11	150	36.7	9	17.5	99	6.8	6.0	4.8	5.6	7.8	2020
	AUGUSTUS KWS	11	150	36.6	8	16.5	93	6.9	6.4	3.9	5.4	6.3	2015
	TROOPER	**10**	**160**	**36.0**	**6**	**17.2**	**97**	**7.0**	**7.9**	**0.8**	**6.4**	**1.0**	**2020**
	KWS CALVINI	10	170	35.4	4	17.6	100	7.1	7.2	2.3	5.9	6.9	2019
	DIGNITY NEW	**10**	**170**	**35.1**	**3**	**18.7**	**106**	**7.0**	**7.3**	**2.0**	**6.8**	**3.1**	**2022**
EARLY	**PROSPECT**	**9**	**170**	**34.8**	**2**	**18.0**	**102**	**7.1**	**7.2**	**2.3**	**7.3**	**7.7**	**2019**
	RGT OXXGOOD	9	180	34.8	2	17.8	101	6.6	7.0	2.6	6.3	6.1	2016
	AMBITION	**9**	**180**	**34.2**	**0**	**17.9**	**101**	**6.9**	**7.8**	**1.1**	**7.1**	**6.3**	**2012**
	RODRIGUEZ KWS	8	180	34.0	-1	17.6	99	6.5	7.9	0.8	6.8	4.1	2015
	LIROYAL	8	180	34.0	-1	17.7	100	6.7	7.6	1.5	6.6	6.1	2019
	SAXON NEW	**8**	**180**	**34.0**	**-1**	**18.9**	**107**	**7.2**	**5.9**	**4.9**	**6.7**	**3.5**	**2022**
	MADONIAS	8	180	33.9	-1	17.8	100	6.7	6.9	2.8	6.2	5.5	2018
	PINNACLE	**8**	**180**	**33.8**	**-1**	**17.6**	**100**	**6.8**	**6.1**	**4.5**	**7.3**	**6.5**	**2018**
	FIELDSTAR	**8**	**180**	**33.8**	**-2**	**17.8**	**101**	**6.9**	**7.7**	**1.3**	**7.2**	**6.4**	**2013**
	KWS PASCO NEW	8	180	33.4	-3	19.0	107	7.0	6.6	3.5	6.7	7.8	2022
	CONCLUSION	**7**	**190**	**32.8**	**-5**	**18.4**	**104**	**7.1**	**7.1**	**2.6**	**7.6**	**4.3**	**2020**
	RESOLUTE	**7**	**190**	**32.8**	**-5**	**19.1**	**108**	**7.1**	**7.5**	**1.6**	**7.7**	**3.1**	**2020**
	GATSBY	**7**	**190**	**32.7**	**-5**	**18.3**	**103**	**7.2**	**7.7**	**1.3**	**7.4**	**5.6**	**2017**
	SY NORDICSTAR	7	190	32.5	-6	17.8	101	6.8	6.7	3.4	7.3	7.8	2016
	BONNIE	7	190	32.3	-7	18.4	104	7.2	7.4	1.9	7.9	5.9	2017
LATE	FARMUNOX	6	200	31.7	-9	18.7	106	6.6	6.0	4.9	7.7	7.4	2020

NEW New in 2023 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB early control variety

Selecting varieties by yield may result in a significantly later harvest. Don't rule out earlier varieties with a lower yield but excellent feeding quality.

Maturity

Choose varieties with an appropriate maturity. The lower the FAO rating, the earlier the variety will mature.

Yield Data

Dry matter yield

Earlier varieties ensure crop maturity, but may have lower yields.

Agronomic Data

Early vigour

Strong, vigorous plants quickly establish roots and leaf canopy.

Standing

Ability to remain upright at harvest.

Lodging

% Plants leaning > 30° at harvest.

Leaf senescence

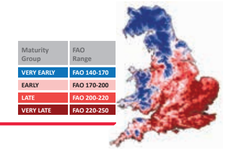
A higher score means plants remain green and healthy up to harvest. Lower scoring varieties may suffer from diseases like Fusarium.

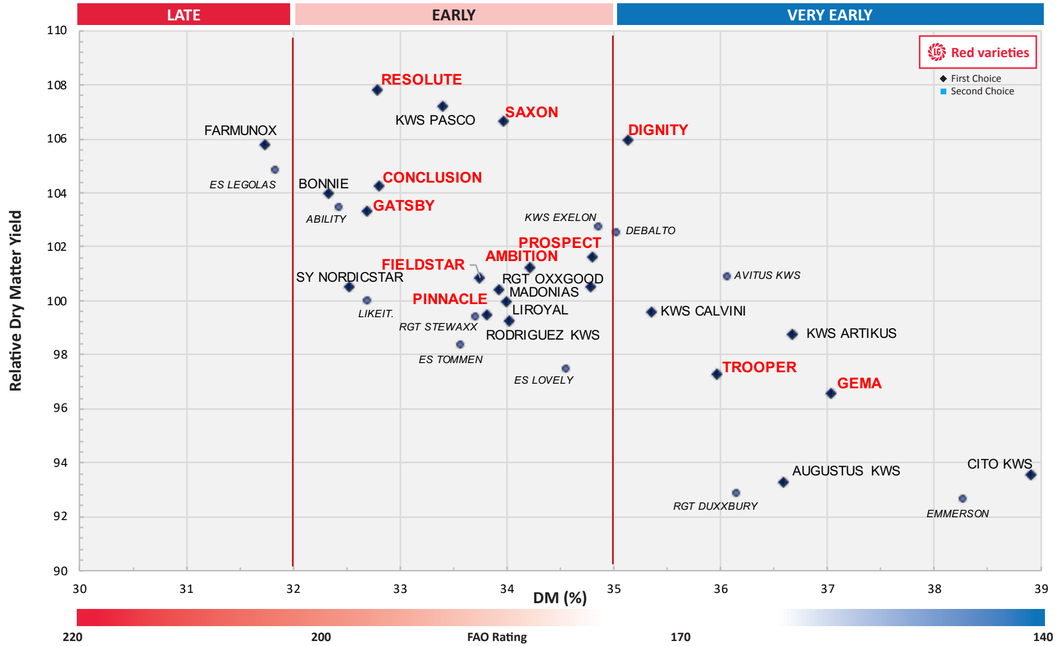
Eyespot rating

Select varieties with a score above 5.5 when eyespot is expected to be a problem. Fungicide sprays can control the disease for varieties with a low score.

RELATIVE DRY MATTER YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites





RELATIVE STARCH YIELD AND CONTENT

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites

FIRST CHOICE VARIETIES - RANKED BY STARCH YIELD

MATURITY GROUP	VARIETY	MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	STARCH YIELD (t/ha)	RELATIVE STARCH YIELD (%)	STARCH (% at harvest)	YEAR LISTED
	Mean of the year 4 & 5 varieties			*34.4*		*6.1*	*100*	*32.8*	
VERY EARLY	CITO KWS	12	140	38.9	16	6.5	106	39.2	2018
	KWS ARTIKUS	11	150	36.7	9	6.2	104	36.4	2020
	GEMA	12	150	37.0	10	6.3	103	36.9	2021
	DIGNITY NEW	10	170	35.1	3	6.3	103	33.6	2022
	KWS CALVINI	10	170	35.4	4	6.2	102	35.3	2019
	AUGUSTUS KWS	11	150	36.6	8	6.2	102	37.7	2015
	TROOPER	10	160	36.0	6	6.1	100	35.4	2020
EARLY	KWS PASCO NEW	8	180	33.4	-2	6.6	107	34.6	2022
	RODRIGUEZ KWS	8	180	34.0	-2	6.4	105	36.4	2015
	RESOLUTE	9	170	32.8	1	6.3	104	33.2	2020
	SAXON NEW	7	190	34.0	-5	6.3	103	33.4	2022
	LIROYAL	7	200	34.0	-6	6.3	103	35.6	2019
	BONNIE	8	180	32.3	-2	6.3	103	34.1	2017
	PROSPECT	8	190	34.8	-2	6.3	102	34.8	2019
	MADONIAS	8	180	33.9	-2	6.3	102	35.2	2018
	RGT OXXGOOD	8	180	34.8	-2	6.3	102	35.2	2016
	PINNACLE	8	190	33.8	-2	6.2	101	35.2	2018
	CONCLUSION	9	180	32.8	0	6.2	101	33.6	2020
	GATSBY	8	190	32.7	-2	6.2	101	33.7	2017
	FIELDSTAR	9	180	33.8	0	6.1	100	34.3	2013
	AMBITION	9	180	34.2	0	6.1	100	34.0	2012
	SY NORDICSTAR	7	190	32.5	-6	5.6	96	32.9	2016
LATE	FARMUNOX	6	200	31.7	-9	6.1	100	32.8	2020

NEW New in 2023 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB early control variety

Starch

Starch yield

Varieties are ranked within maturity groups by total starch yield/Ha.

Starch % at harvest

Indicates cob maturity at harvest.

Starch in livestock rations

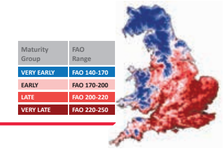
Starch is a fundamental component of forage maize, providing 'rumen fermentable energy' fuelling the microbial population in the rumen. A proportion of starch, known as bypass starch, is absorbed directly by the animal as glucose. Maize starch is a 'safer' source of energy than feed ingredients such as cereals, as fermentation rates can be slower, reducing the risk of acidosis. Varieties with a high starch content are especially important in forage rations with <50% maize content. Starch from maize balances the rapidly available energy and higher protein levels found in the grass silage.

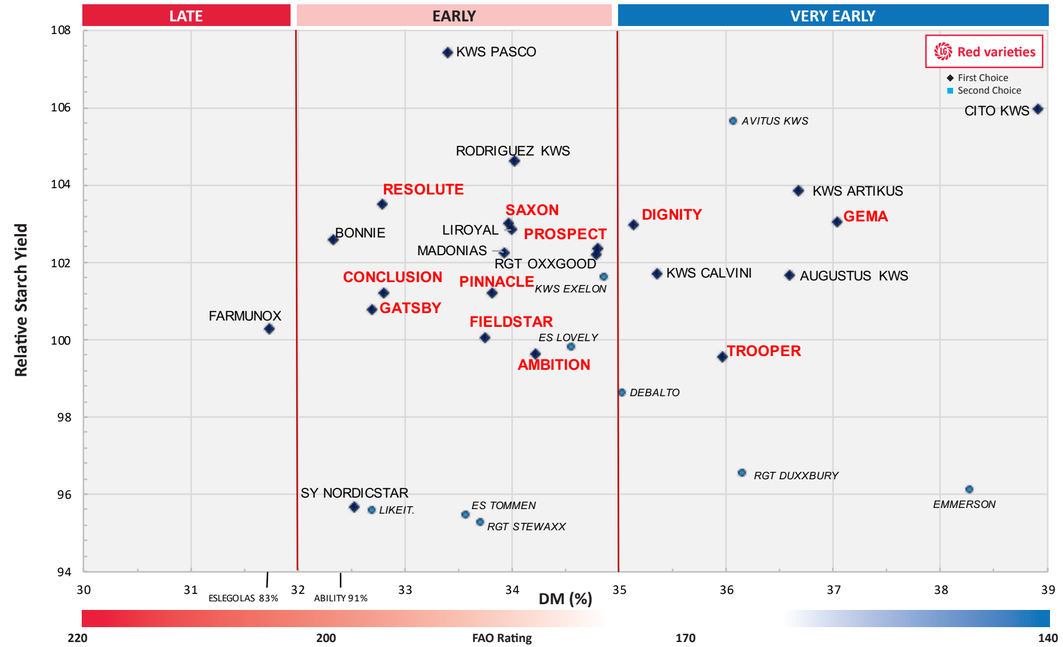
Starch and anaerobic digestion

Starch is the major contributor to the total feedstock energy value of maize. Unlike soluble carbohydrates, starch remains stable in the ensiling process, preserving the energy potential of the crop for improved gas production.

RELATIVE STARCH YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites





ME YIELD AND CELL WALL DIGESTIBILITY

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites

FIRST CHOICE VARIETIES - RANKED BY ME YIELD

MATURITY GROUP	VARIETY	MATURITY				ENERGY DATA			DIGESTIBILITY	
		MATURITY CLASS *	FAO RATING *	DM% (At harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	ME YIELD (MJ/ha at harvest)	RELATIVE ME YIELD (%)	ME (MJ/kg DM of fresh plant at harvest)	CELL WALL DIGESTIBILITY **	YEAR LISTED
Mean of the year 4 & 5 varieties				*34.4*		*205,929*	*100*	*11.6*	*8.2*	
VERY EARLY	DIGNITY NEW	10	170	35.1	3	217,778	106	11.6	8.7	2022
	KWS CALVINI	10	170	35.4	4	205,396	100	11.7	7.9	2019
	KWS ARTIKUS	11	150	36.7	9	204,958	100	11.7	8.2	2020
	TROOPER	10	160	36.0	6	202,011	98	11.7	8.7	2020
	CITO KWS	12	140	38.9	16	198,269	96	12.0	9.1	2018
	GEMA	12	150	37.0	10	198,094	96	11.6	7.3	2021
	AUGUSTUS KWS	11	150	36.6	8	194,651	95	11.8	8.3	2015
EARLY	RESOLUTE	7	190	32.8	-5	222,185	108	11.7	8.6	2020
	KWS PASCO NEW	8	180	33.4	-3	220,925	107	11.7	7.9	2022
	SAXON NEW	8	180	34.0	-1	219,571	107	11.6	8.3	2022
	CONCLUSION	7	190	32.8	-5	218,201	106	11.8	10.1	2020
	BONNIE	7	190	32.3	-7	215,476	105	11.7	9.0	2017
	GATSBY	7	190	32.7	-5	213,401	104	11.7	8.6	2017
	PROSPECT	9	170	34.8	2	211,984	103	11.8	9.3	2019
	RGT OXXGOOD	9	180	34.8	2	208,471	101	11.7	8.8	2016
	LIROYAL	8	180	34.0	-1	207,988	101	11.8	8.7	2019
	FIELDSTAR	8	180	33.8	-2	207,729	101	11.6	8.2	2013
	AMBITION	9	180	34.2	0	206,646	100	11.5	7.6	2012
	MADONIAS	8	180	33.9	-1	206,318	100	11.6	7.6	2018
	RODRIGUEZ KWS	8	180	34.0	-1	205,698	100	11.7	8.2	2015
	SY NORDICSTAR	7	190	32.5	-6	205,181	100	11.5	8.7	2016
	PINNACLE	8	180	33.8	-1	205,075	100	11.7	7.9	2018
LATE	FARMUNOX	6	200	31.7	-9	217,676	106	11.6	8.0	2020

NEW New in 2023 ** Cell Wall Digestibility (%) minus 50 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB early control variety

Varieties high in energy density (MJ/kg) usually display both a high starch and cell wall digestible content. In livestock rations selecting high ME content varieties will improve dry matter intakes and animal performance at feeding. Used as an AD feedstock, efficiency of gas output is increased.

Energy Data

ME yield

Indicates total potential energy available. Varieties are ranked within maturity groups by ME yield.

ME (MJ/kg)

Feeding performance and gas output is improved using varieties with higher energy density. ME content is directly influenced by the starch content and fibre digestibility (CWD) of the plant.

Digestibility Data

Cell wall digestibility (CWD)

CWD measures the digestibility of fibre from the non starch part (leaves and stem) of the maize plant. CWD values have been converted from percentage, to a 1-10 range, each unit representing 1% increase.

CWD in livestock rations

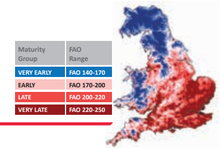
Improved CWD is beneficial to feed intake with each 1% increase in CWD increasing dry matter intake by 0.17kg per day. This can result in increased milk yield by 0.25kg per day (Oba and Allen, 1999).

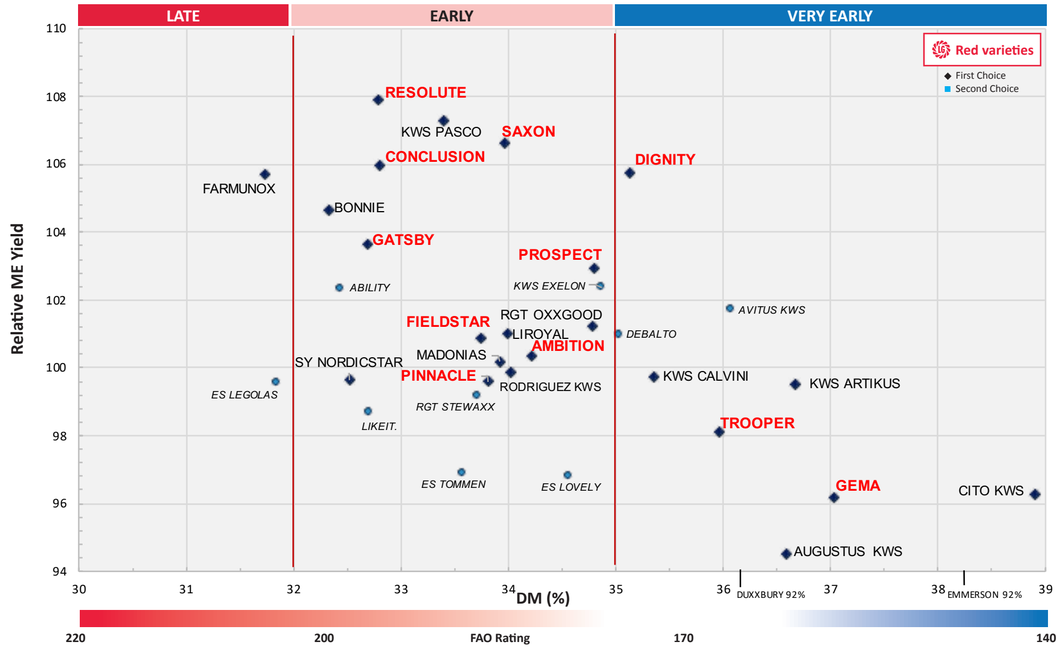
CWD and anaerobic digestion

Improved digestibility of fibre increases the energy available for gas production, improving efficiency and reducing digestate output.

RELATIVE ME YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites



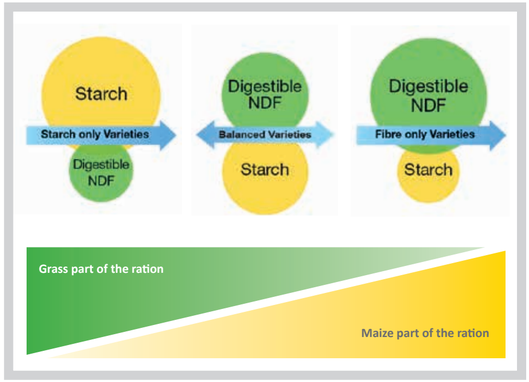


VARIETIES FOR LESS FAVOURABLE SITES

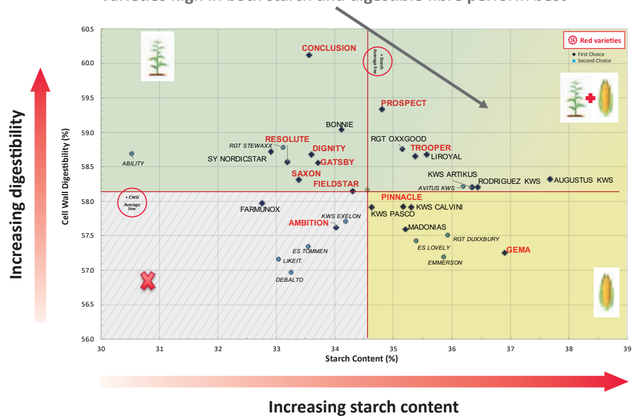
Limagrain

FEEDING QUALITY EXPLAINED

Where to use starch or digestible fibre type varieties in the ration



Varieties high in both starch and digestible fibre perform best

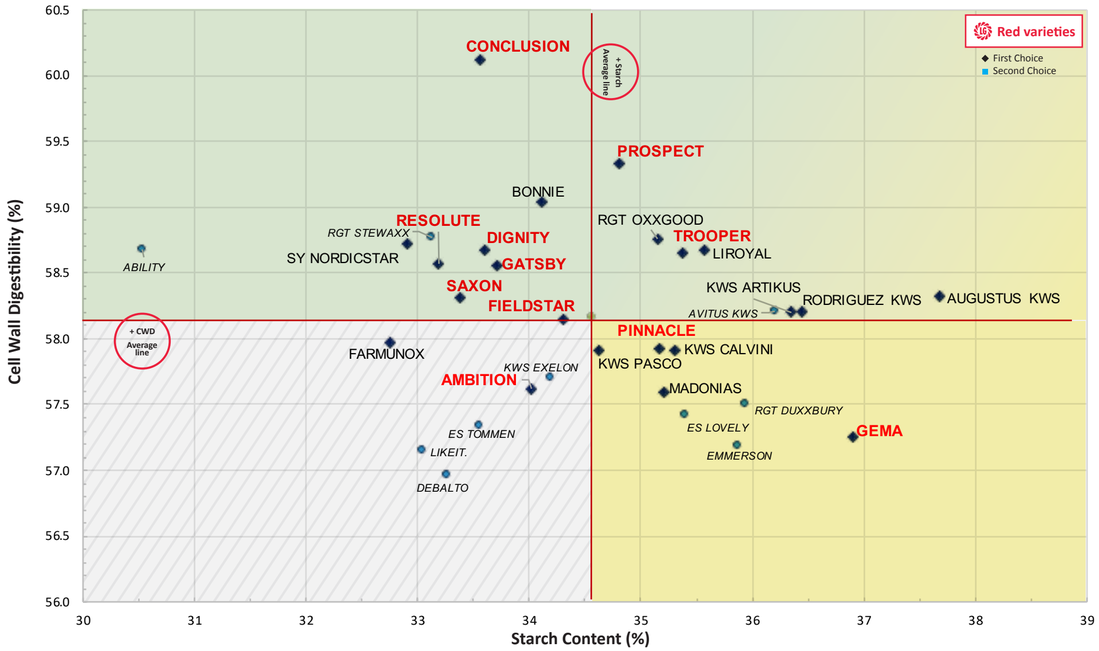


Choose varieties with both increased digestibility and high starch content to maximize energy production:

- Higher energy content
- A more productive and balanced feed
- Improved dry matter intake
- Better feed efficiency
- Better for animal health
- Improved gas yield for AD

FEEDING QUALITY: CELL WALL DIGESTIBILITY v STARCH CONTENT

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites



RELATIVE DRY MATTER YIELD AND AGRONOMIC CHARACTERISTICS

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites

VARIETIES FOR FAVOURABLE SITES

FIRST CHOICE VARIETIES – RANKED BY EARLINESS

MATURITY GROUP	VARIETY	MATURITY				YIELD DATA		AGRONOMIC DATA					YEAR LISTED
		MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	DM YIELD (t/ha)	RELATIVE DM YIELD (%)	EARLY VIGOUR (9=good, 1=poor)	STANDING (at harvest 9=good, 1=poor)	LODGING (%)	LEAF SENESCENCE (at harvest 9=good, 1=poor)	EYESPOT RATING (9=good, 1=poor)	
Mean of the 4 & 5 year varieties				*33.6*		*18.4*	*100*	*7.0*	*7.6*	*1.4*	*6.7*	*5.9*	
VERY EARLY	CITO KWS	12	140	37.4	10	16.9	91	7.0	7.7	1.3	5.6	5.4	2018
	KWS ARTIKUS	11	150	36.8	8	18.4	100	6.8	6.5	3.8	5.6	7.8	2020
	GEMA	11	150	36.4	7	18.0	98	6.7	7.2	2.2	6.1	6.4	2021
	TROOPER	10	160	35.5	3	18.0	98	7.2	8.1	0.4	6.7	1.0	2020
	AVITUS KWS	10	160	35.4	3	18.4	100	7.0	6.2	4.3	6.0	5.7	2018
	PROSPECT	10	170	35.2	2	18.8	102	7.2	7.8	1.1	7.2	7.7	2019
	KWS CALVINI	10	170	35.0	2	18.3	100	7.3	7.6	1.5	6.0	6.9	2019
EARLY	DIGNITY NEW	9	170	34.7	1	19.3	105	7.2	7.2	2.4	6.8	3.1	2022
	PINNACLE	9	180	34.6	0	18.4	100	7.1	7.1	2.6	7.0	6.5	2018
	AMBITION	9	180	34.5	0	18.6	101	7.2	8.0	0.6	6.9	6.3	2012
	SAXON NEW	9	180	34.4	0	19.8	107	7.7	6.7	3.4	6.8	3.5	2022
	KWS EXELON	9	170	34.4	-1	18.9	103	7.1	6.9	2.9	6.8	8.3	2021
	LIROYAL	8	180	34.0	-2	18.0	98	6.6	7.8	1.0	6.3	6.1	2019
	FIELDSTAR	8	180	33.8	-2	18.5	100	7.0	8.0	0.5	7.0	6.4	2013
	RODRIGUEZ KWS	8	180	33.6	-3	18.2	99	6.6	8.2	0.2	7.0	4.1	2015
	MADONIAS	8	180	33.6	-3	18.2	99	6.7	7.6	1.5	6.2	5.5	2018
	KWS PASCO NEW	8	180	33.2	-5	19.3	105	7.2	7.4	1.9	6.9	7.8	2022
	CONCLUSION	8	190	33.0	-5	19.0	103	7.4	7.4	1.8	7.2	4.3	2020
	ABILITY	8	190	33.0	-5	18.9	103	7.2	8.0	0.6	7.2	5.9	2020
	RESOLUTE	8	190	32.8	-6	19.3	105	7.3	7.7	1.3	7.4	3.1	2020
	BONNIE	7	190	32.7	-6	19.0	103	7.4	7.7	1.3	7.6	5.9	2017
	KWS ANASTASIO NEW	7	190	32.6	-7	19.6	106	7.4	7.6	1.5	7.4	7.4	2022
	GATSBY	7	190	32.4	-7	19.0	103	7.3	7.8	1.1	7.2	5.6	2017
LATE	FARMUNOX	6	200	31.9	-9	19.3	105	6.7	6.7	3.4	7.6	7.4	2020
	ABRISSE	6	200	31.7	-10	19.0	103	6.7	7.9	0.8	7.1	8.1	2019
	EXPEDIA	5	210	31.1	-12	18.6	101	6.8	7.3	2.2	7.3	5.7	2018
	CATHY	5	210	30.9	-13	19.3	105	7.3	7.9	0.9	7.6	5.1	2015
	CRANBERRI CS	5	210	30.8	-13	19.3	105	6.8	6.3	4.1	7.4	6.5	2018
	SMOOTHI CS	4	220	29.4	-18	19.3	105	6.6	7.3	2.1	7.3	7.4	2019

NEW New in 2023 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB control variety

Maturity

Choose varieties with an appropriate maturity. The lower the FAO rating, the earlier the variety will mature.

Yield Data

Dry matter yield

Earlier varieties ensure crop maturity, but may have lower yields.

Agronomic Data

Early vigour

Strong, vigorous plants quickly establish roots and leaf canopy.

Standing

Ability to remain upright at harvest.

Lodging

% Plants leaning > 30° at harvest.

Leaf senescence

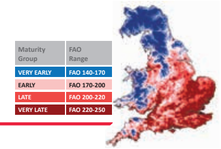
A higher score means plants remain green and healthy up to harvest. Lower scoring varieties may suffer from diseases like Fusarium.

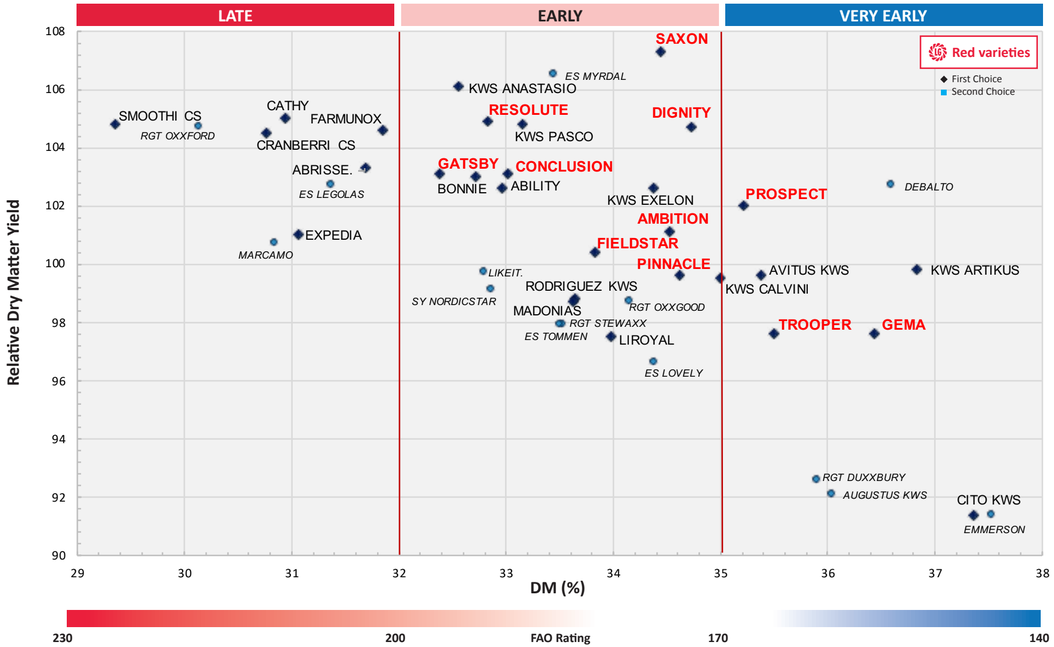
Eyespot rating

Select varieties with a score above 5.5 when eyespot is expected to be a problem. Fungicide sprays can control the disease for varieties with a low score.

RELATIVE DRY MATTER YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites





VARIETIES FOR FAVOURABLE SITES

Limagrain

RELATIVE STARCH YIELD AND CONTENT

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites

FIRST CHOICE VARIETIES – RANKED BY STARCH YIELD

MATURITY GROUP	VARIETY	MATURITY CLASS *	FAO RATING *	DM% (At harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	STARCH YIELD (t/ha)	RELATIVE STARCH YIELD (%)	STARCH (% at harvest)	YEAR LISTED
	Mean of the 4 & 5 year varieties			*33.6*		*6.2*	*100*	*33.7*	
VERY EARLY	KWS ARTIKUS	11	150	36.8	8	6.8	109	36.9	2020
	AVITUS KWS	10	160	35.4	3	6.6	107	36.1	2018
	PROSPECT	10	170	35.2	2	6.6	107	35.2	2019
	GEMA	11	150	36.4	7	6.6	106	36.6	2021
	KWS CALVINI	10	170	35.0	2	6.4	103	34.9	2019
	TROOPER	10	160	35.5	3	6.4	103	35.6	2020
	CITO KWS	12	140	37.4	10	6.4	103	37.8	2018
EARLY	KWS PASCO NEW	8	180	33.2	-5	6.7	107	34.5	2022
	KWS EXELON	9	170	34.4	-1	6.6	105	34.6	2021
	RODRIGUEZ KWS	8	180	33.6	-3	6.5	105	35.9	2015
	PINNACLE	9	180	34.6	0	6.5	105	35.6	2018
	RESOLUTE	8	190	32.8	-6	6.5	105	33.6	2020
	MADONIAS	8	180	33.6	-3	6.5	105	35.7	2018
	SAXON NEW	9	180	34.4	0	6.5	105	32.9	2022
	BONNIE	7	190	32.7	-6	6.5	104	34.1	2017
	CONCLUSION	8	190	33.0	-5	6.5	104	34.1	2020
	DIGNITY NEW	9	170	34.7	1	6.4	104	33.3	2022
	AMBITION	9	180	34.5	0	6.4	103	34.3	2012
	LIROYAL	8	180	34.0	-2	6.4	103	35.5	2019
	FIELDSTAR	8	180	33.8	-2	6.3	102	34.2	2013
	GATSBY	7	190	32.4	-7	6.3	101	33.0	2017
	KWS ANASTASIO NEW	7	190	32.6	-7	6.3	101	32.0	2022
	ABILITY	8	190	33.0	-5	5.9	96	31.4	2020
LATE	FARMUNOX	6	200	31.9	-9	6.4	103	33.3	2020
	EXPEDIA	5	210	31.1	-12	6.2	101	33.5	2018
	ABRISSE	6	200	31.7	-10	5.9	96	31.3	2019
	CRANBERRI CS	5	210	30.8	-13	5.9	95	30.6	2018
	SMOOTHI CS	4	220	29.4	-18	5.7	92	29.7	2019
	CATHY	5	210	30.9	-13	5.6	90	29.0	2015

NEW New in 2023 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB control variety

Starch

Starch yield

Varieties are ranked within maturity groups by total starch yield/Ha.

Starch % at harvest

Indicates cob maturity at harvest.

Starch in livestock rations

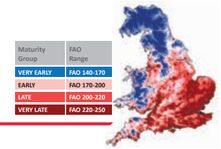
Starch is a fundamental component of forage maize, providing 'rumen fermentable energy' fueling the microbial population in the rumen. A proportion of starch, known as bypass starch, is absorbed directly by the animal as glucose. Maize starch is a 'safer' source of energy than feed ingredients such as cereals, as fermentation rates can be slower, reducing the risk of acidosis. Varieties with a high starch content are especially important in forage rations with <50% maize content. Starch from maize balances the rapidly available energy and higher protein levels found in the grass silage.

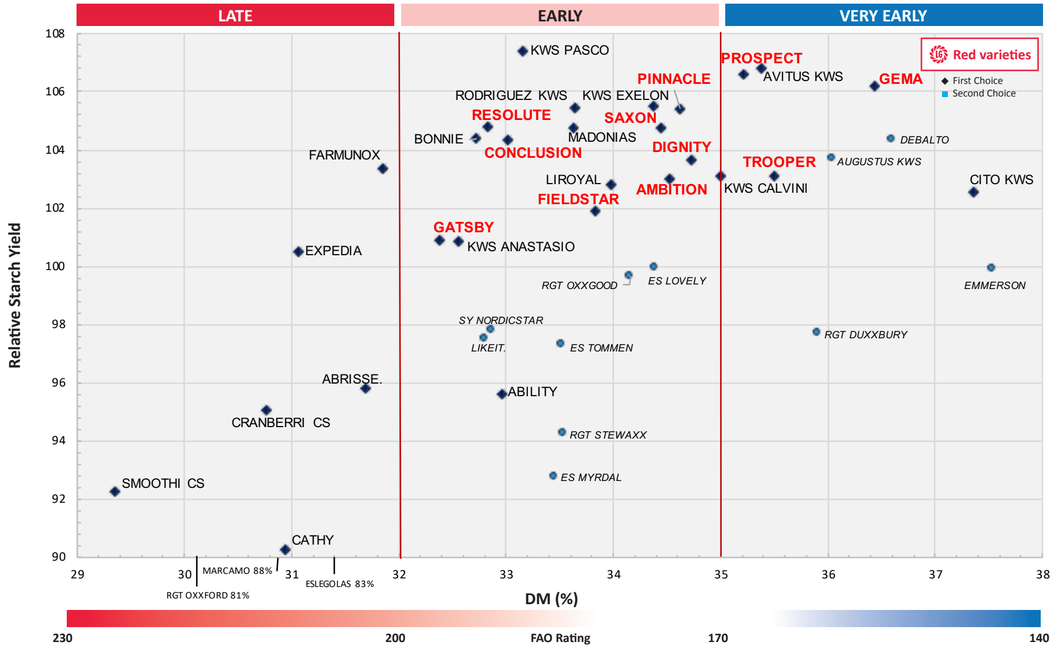
Starch and anaerobic digestion

Starch is the major contributor to the total feedstock energy value of maize. Unlike soluble carbohydrates, starch remains stable in the ensiling process, preserving the energy potential of the crop for improved gas production.

RELATIVE STARCH YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites





VARIETIES FOR FAVOURABLE SITES

ME YIELD AND CELL WALL DIGESTIBILITY

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites

FIRST CHOICE VARIETIES - RANKED BY ME YIELD

MATURITY GROUP	VARIETY	MATURITY				ENERGY DATA			DIGESTIBILITY	
		MATURITY CLASS *	FAO RATING *	DM% (At harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	ME YIELD (MJ/ha at harvest)	RELATIVE ME YIELD (%)	ME (MJ/kg DM of fresh plant at harvest)	CELL WALL DIGESTIBILITY **	YEAR LISTED
	Mean of the 4 & 5 year varieties			*33.6*		*214.906*	*100*	*11.7*	*8.6*	
VERY EARLY	**PROSPECT**	**10**	**170**	**35.2**	**2**	**223,388**	**104**	**11.9**	**10.0**	**2019**
VERY EARLY	KWS ARTIKUS	11	150	36.8	8	217,738	101	11.8	8.8	2020
VERY EARLY	AVITUS KWS	10	160	35.4	3	216,714	101	11.8	8.8	2018
VERY EARLY	KWS CALVINI	10	170	35.0	2	214,417	100	11.7	8.4	2019
VERY EARLY	**TROOPER**	**10**	**160**	**35.5**	**3**	**212,174**	**99**	**11.8**	**9.1**	**2020**
VERY EARLY	**GEMA**	**11**	**150**	**36.4**	**7**	**209,709**	**98**	**11.7**	**7.7**	**2021**
VERY EARLY	CITO KWS	12	140	37.4	10	201,290	94	11.9	9.3	2018
EARLY	**SAXON** NEW	**9**	**180**	**34.4**	**0**	**230,813**	**107**	**11.7**	**8.6**	**2022**
EARLY	KWS PASCO NEW	8	180	33.2	-5	227,161	106	11.8	8.8	2022
EARLY	KWS ANASTASIO NEW	7	190	32.6	-7	226,194	105	11.6	8.2	2022
EARLY	**RESOLUTE**	**8**	**190**	**32.8**	**-6**	**226,180**	**105**	**11.7**	**8.8**	**2020**
EARLY	**CONCLUSION**	**8**	**190**	**33.0**	**-5**	**226,095**	**105**	**11.9**	**10.5**	**2020**
EARLY	**DIGNITY** NEW	**9**	**170**	**34.7**	**1**	**225,809**	**105**	**11.7**	**9.3**	**2022**
EARLY	BONNIE	7	190	32.7	-6	223,926	104	11.8	9.6	2017
EARLY	KWS EXELON	9	170	34.4	-1	221,848	103	11.7	8.3	2021
EARLY	**GATSBY**	**7**	**190**	**32.4**	**-7**	**221,101**	**103**	**11.6**	**8.5**	**2017**
EARLY	ABILITY	8	190	33.0	-5	220,604	103	11.7	9.5	2020
EARLY	**AMBITION**	**9**	**180**	**34.5**	**0**	**216,718**	**101**	**11.6**	**8.1**	**2012**
EARLY	**FIELDSTAR**	**8**	**180**	**33.8**	**-2**	**216,691**	**101**	**11.7**	**8.7**	**2013**
EARLY	**PINNACLE**	**9**	**180**	**34.6**	**0**	**216,016**	**101**	**11.8**	**8.6**	**2018**
EARLY	RODRIGUEZ KWS	8	180	33.6	-3	214,778	100	11.8	9.1	2015
EARLY	MADONIAS	8	180	33.6	-3	214,187	100	11.8	8.5	2018
EARLY	LIROYAL	8	180	34.0	-2	212,664	99	11.8	9.2	2019
LATE	FARMUNOX	6	200	31.9	-9	225,537	105	11.7	8.3	2020
LATE	CRANBERRI CS	5	210	30.8	-13	223,300	104	11.6	9.8	2018
LATE	CATHY	5	210	30.9	-13	221,733	103	11.5	8.7	2015
LATE	EXPEDIA	5	210	31.1	-12	220,856	103	11.9	10.2	2018
LATE	SMOOTHI CS	4	220	29.4	-18	219,072	102	11.4	7.8	2019
LATE	ABRISSE	6	200	31.7	-10	218,825	102	11.5	8.5	2019

NEW New in 2023 ** Cell Wall Digestibility (%) minus 50 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB control variety

Energy Data

ME yield

Indicates total potential energy available. Varieties are ranked within maturity groups by ME yield.

ME (MJ/kg)

Feeding performance and gas output is improved using varieties with higher energy density. ME content is directly influenced by the starch content and fibre digestibility (CWD) of the plant.

Digestibility Data

Cell wall digestibility (CWD)

CWD measures the digestibility of fibre from the non starch part (leaves and stem) of the maize plant. CWD values have been converted from percentage, to a 1-10 range, each unit representing 1% increase.

CWD in livestock rations

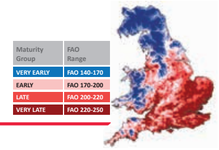
Improved CWD is beneficial to feed intake with each 1% increase in CWD increasing dry matter intake by 0.17kg per day. This can result in increased milk yield by 0.25kg per day (Oba and Allen, 1999).

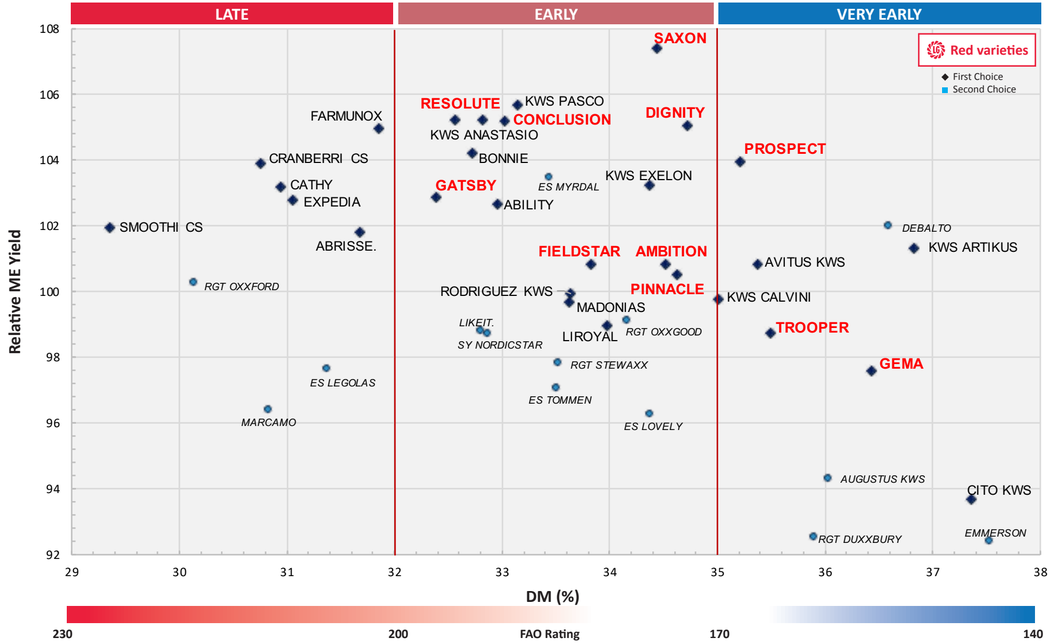
CWD and anaerobic digestion

Improved digestibility of fibre increases the energy available for gas production, improving efficiency and reducing digestate output.

RELATIVE ME YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites

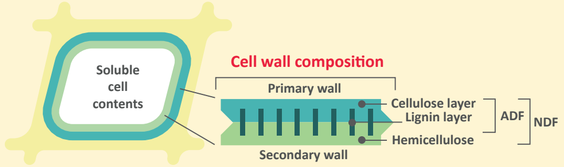




VARIETIES FOR FAVOURABLE SITES

FEEDING QUALITY

The impact of fibre digestibility



Cell walls impact directly on the digestibility of maize

Cell wall fibres are composed of cellulose, hemicellulose and lignin and account for around 40% of total plant dry matter found in the stem, leaves and husk. Lignin is present in relatively small quantities, but gives structural strength to the plant. Lignin is indigestible by the animal and is produced in greater quantities as the plant develops and matures.

Both cellulose and hemicellulose make up the majority of cell wall content and are potentially completely digestible by animals.

Digestible fibre (dNDF)- the key to improved performance

Dairy cows need to maximise dry matter intake (DMI) if they are to absorb sufficient energy to maintain high levels of milk production.

AD plants can improve efficiency of gas production by increasing the highly degradable fibre content of maize silage to help speed passage through the digester.

To maximise feed quality, select maize varieties with both high starch content and cell wall digestibility. More information on the difference in CWD between varieties can be found on pages 10 and 18.

Is cell wall digestibility the same as fibre digestibility?

The digestibility of fibre (dNDF) in maize is measured by cell wall digestibility (CWD). CWD measures the extent to which animals can digest maize plant fibre. As lignin content increases, cell wall digestibility declines.

The higher the cell wall digestibility, the better the potential feed value of the plant.

Cell wall digestibility and diet formulation

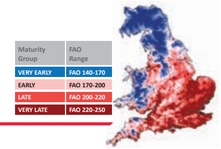
The greater the proportion of maize silage in the diet, the more important the cell wall digestibility becomes.

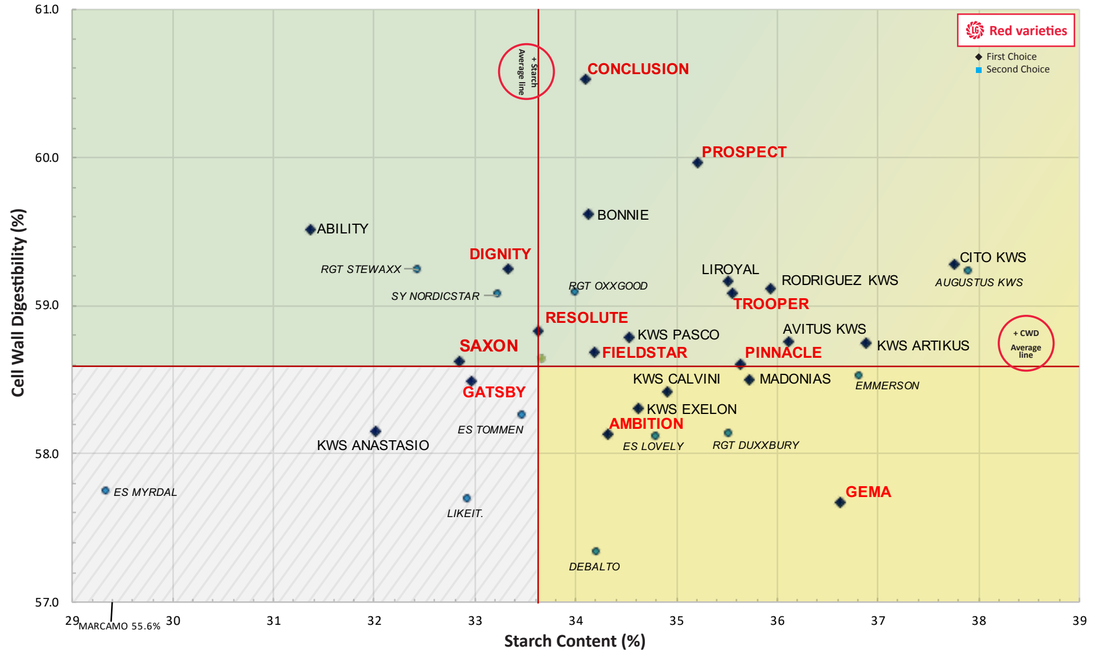
The lower the digestibility of cell wall, the slower the rate of forage digestion. Varieties with poor cell wall digestibility impact feed intakes with slower digestion and reduced production.

A maize variety with improved cell wall digestibility can be formulated into the diet at a higher level than one with a lower cell wall digestibility, saving money on purchased concentrates.

STARCH CONTENT v CELL WALL DIGESTIBILITY

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites





VARIETIES FOR FAVOURABLE SITES

VARIETIES FOR VERY FAVOURABLE SITES

BSPB/NIAB Descriptive List for Forage Maize 2023: Very Favourable Sites

RANKED BY ME YIELD

		MATURITY				YIELD DATA		AGRONOMIC DATA					STARCH DATA			ENERGY DATA			DIGESTIBILITY	
MATURITY GROUP	VARIETY	MATURITY CLASS *	FAO RATING *	DM% (At harvest)	EARLIER/ LATER TO HARVEST (# Days +/- SMOOTHI CS)	DM YIELD (t/ha)	REL DM YIELD (%)	EARLY VIGOUR (9=good, 1=poor)	STANDING (At harvest 9=good, 1=poor)	LODGING (%)	LEAF SENESCENCE (At harvest 9=good, 1=poor)	EYESPOT RATING (9=good, 1=poor)	STARCH YIELD (t/ha)	REL STARCH YIELD %	STARCH (% at harvest)	ME YIELD (MJ/ha at harvest)	REL ME YIELD %	ME MJ/kg DM of fresh plant at harvest	CELL WALL DIGESTIBILITY **	YEAR LISTED
Mean of All Varieties				*33.4*		*19.0*	*100*	*7.3*	*7.6*	*1.5*	*5.8*	*7.0*		*6.2*	*32.4*	*219,963*		*11.6*	*8.1*	
LATE	MANTILLA	5	210	34.0	7	19.8	103	7.4	7.7	1.3	6.2	7.4	103	6.4	32.1	227,748	104	11.5	7.4	2021
LATE	LG31.205	6	200	34.4	8	19.4	101	7.5	7.6	1.5	6.0	8.6	105	6.5	33.3	225,193	102	11.6	7.6	2018
LATE	CRANBERRI CS NEW	6	210	34.4	8	19.2	100	7.0	7.3	2.1	5.7	6.5	102	6.3	32.8	223,406	102	11.7	9.1	2022
LATE	SPYCI CS	6	220	34.3	8	18.6	97	7.3	7.9	0.9	4.4	4.3	104	6.4	34.4	218,444	99	11.7	8.9	2021
LATE	ABRISSE NEW	7	200	35.5	12	18.6	97	7.1	8.1	0.5	4.3	8.1	104	6.4	34.3	217,590	99	11.7	8.9	2022
LATE	SY KARTHOUN	6	210	34.6	9	19.3	100	7.3	7.0	2.8	6.1	7.7	102	6.3	32.6	216,996	99	11.3	5.7	2018
LATE	ACTUAL	7	200	36.0	14	18.1	94	7.1	7.8	1.0	4.6	6.4	104	6.4	35.3	211,636	96	11.7	8.3	2018
LATE	MARCAMO	6	210	34.3	8	18.8	98	7.0	6.5	3.8	3.4	7.2	98	6.0	32.0	211,256	96	11.2	4.7	2018
VERY LATE	ES METRONOM	4	220	31.8	-1	20.1	105	7.1	8.1	0.5	6.5	8.0	94	5.8	28.8	223,582	102	11.1	5.8	2018
VERY LATE	SMOOTHI CS NEW	4	230	32.1	0	19.5	102	7.0	7.7	1.2	5.5	7.4	102	6.2	32.0	222,918	101	11.4	7.0	2022
VERY LATE	PETROSCHKA	4	220	32.3	1	19.7	103	6.6	7.4	1.8	5.8	5.6	99	6.1	31.0	221,836	101	11.3	5.8	2018
VERY LATE	AGAGOLD	4	220	32.8	3	19.0	99	7.2	7.8	1.1	6.1	6.9	103	6.3	33.1	221,645	101	11.6	8.1	2018

NEW New in 2023 ** Cell Wall Digestibility (%) minus 50 * MC = Limagrain Estimation of Maturity class and FAO rating # Limagrain estimate of days earlier to harvest than Smoothi CS

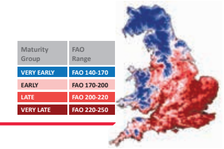
Data on later maturing varieties suitable for sites with very high heat unit potential

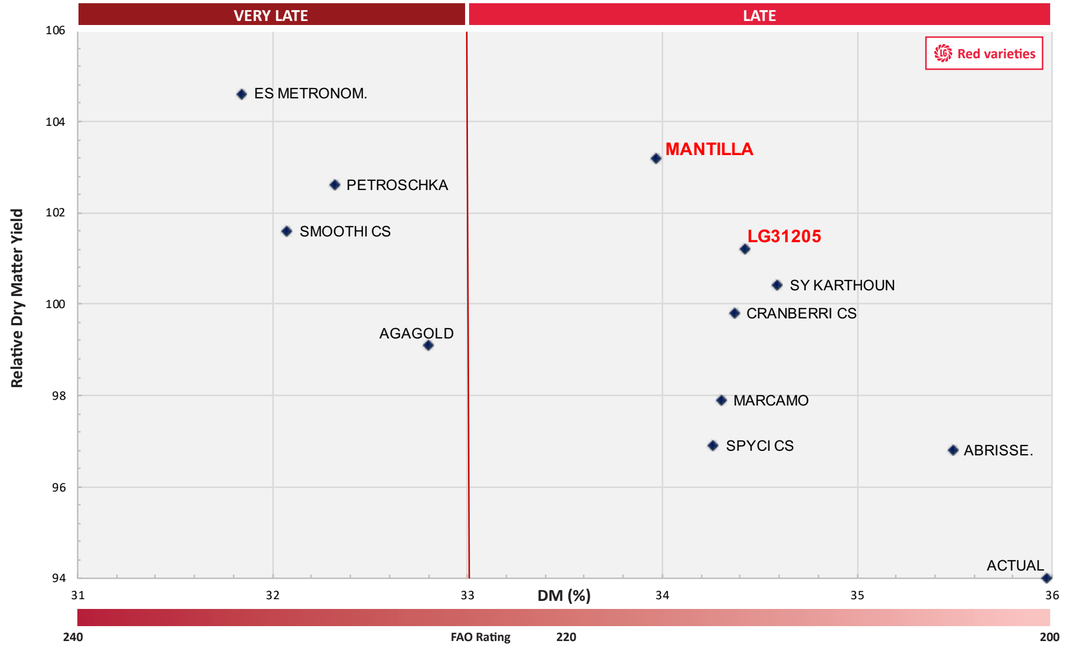
Growers on sites which receive an exceptionally high level of heat units (OHU's) during the season, can utilise maize varieties of FAO210 or above. Geographically, this tends to be in the East and South East of England.

New data from independent trials is now available that shows the potential performance of varieties grown in these areas.

RELATIVE DRY MATTER YIELD V DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Very Favourable Sites

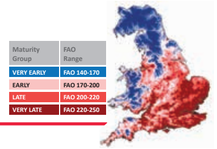


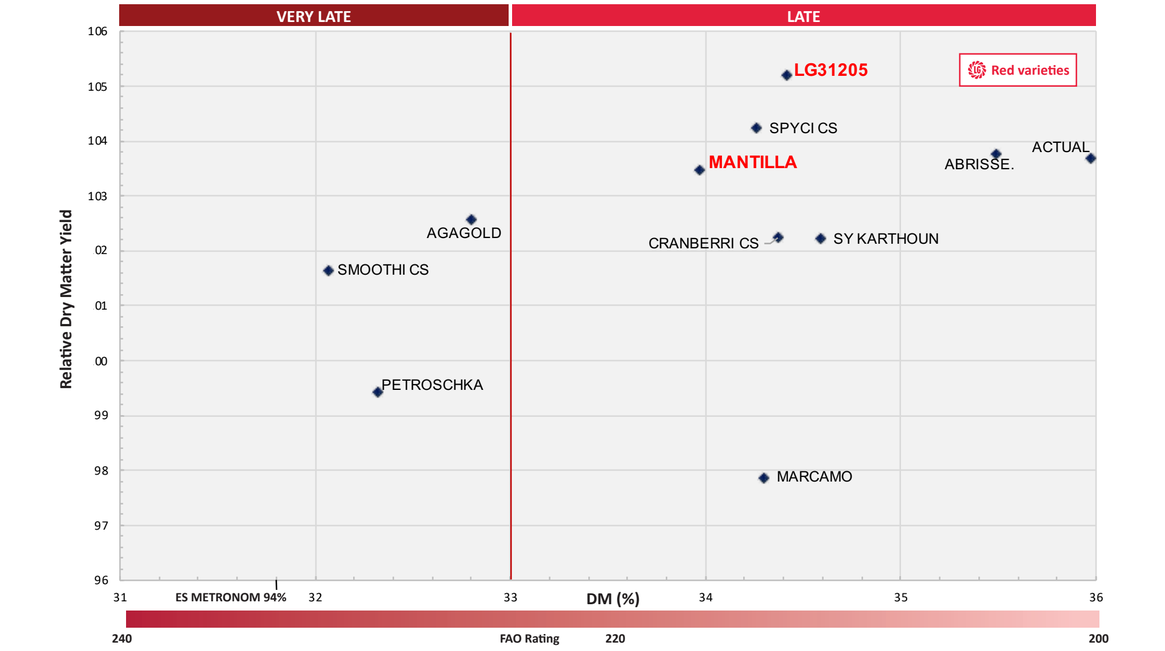


MAIZE FOR VERY FAVOURABLE SITES

RELATIVE STARCH YIELD v DM%

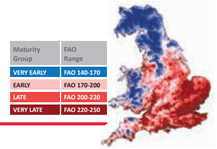
BSPB/NIAB Descriptive List for Forage Maize 2023: Very Favourable Sites

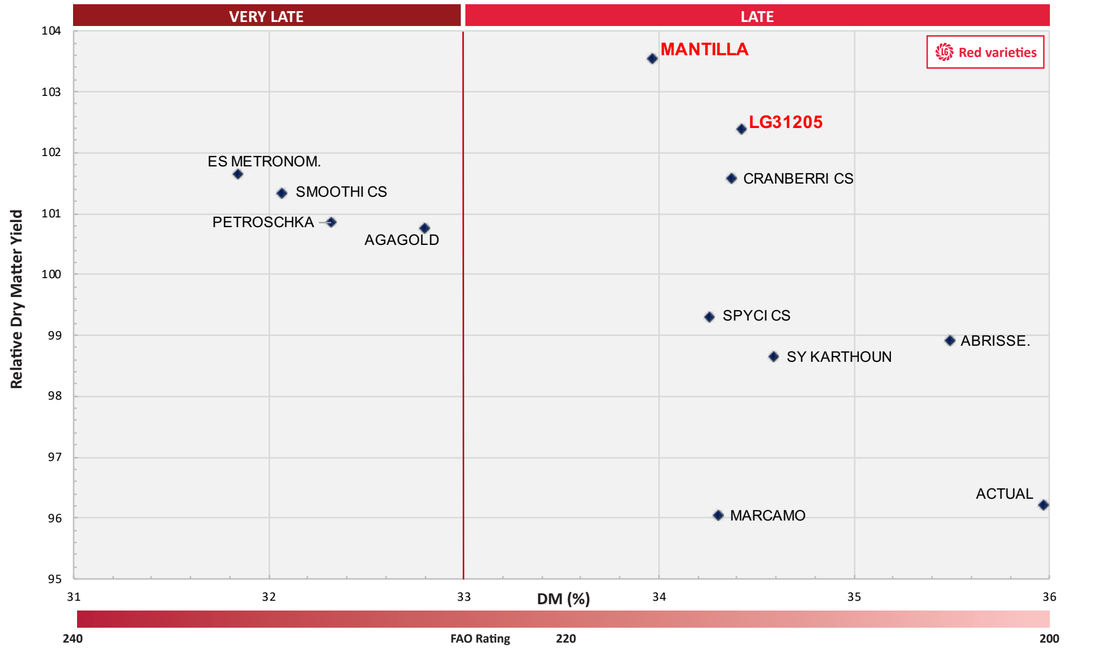




RELATIVE ME YIELD v DM%

BSPB/NIAB Descriptive List for Forage Maize 2023: Very Favourable Sites





MAIZE FOR VERY FAVOURABLE SITES

MAIZE VARIETIES FOR ANAEROBIC DIGESTION (AD)

Maize variety selection for AD production

Maize can be successfully grown in most areas of the UK, but it is important to choose varieties suited to the growing conditions of your farm and can achieve a dry matter content of 30-32%.

As large areas of maize are needed to feed an AD plant, a range of varieties with different maturities should be sown. This enables harvesting before wet weather sets in and helps to avoid soil structure damage.

Recommended LG maize varieties

The extensive UK-based LG research programme has tested potential new varieties against current commercial ones at trial sites across the country and on working AD plants, for over five years.

LG have used a vigorous selection process to ensure that only the very best varieties are available to growers.

Check out the Feed Manager section of our Maize Manager App, available from the Apple and Google Play stores.

Download on the App Store | ANDROID APP ON Google play

Independent data on high yielding varieties suitable for very favourable sites

Independent data on late maturing and exceptionally high yielding varieties can be found on the newly published BSPB/NIAB 'Varieties for Very Favourable Sites'. Data can be found on pages 22 to 25.

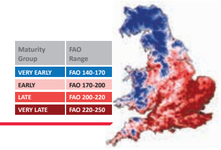
Some varieties used for AD do not appear on this list, but have been thoroughly tested in LG trials. Performance for these varieties can found in the LG AD trials charts on pages 27-29.

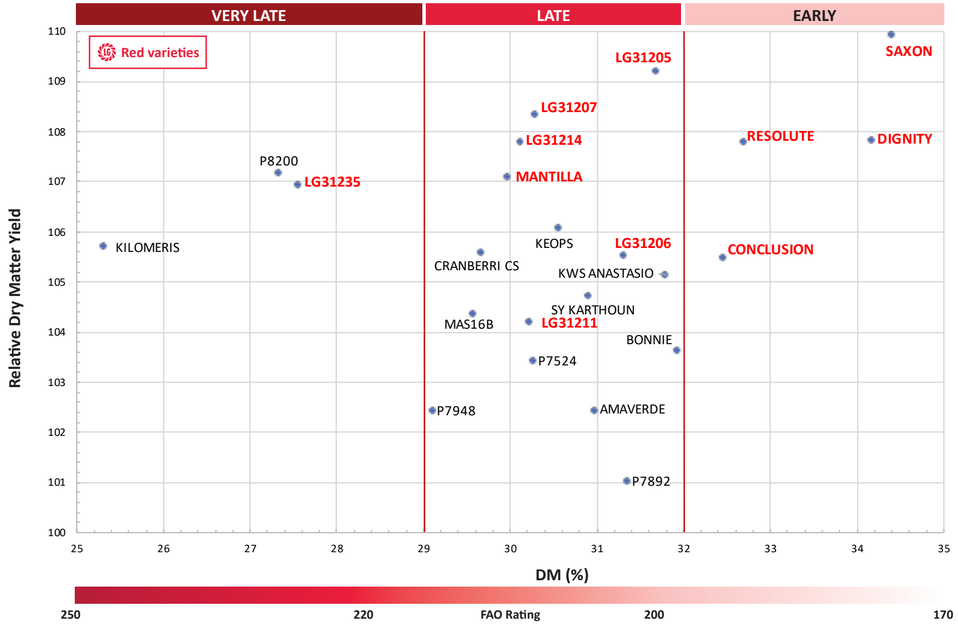
Recommended for AD

MATURITY	VARIETY	DESCRIPTION	FAO
EARLY	Dignity NEW	Early, high quality with excellent yields	170
	Saxon NEW	Impressive yield and impressive quality	180
	Conclusion	Vigorous with high energy yield	190
	Resolute	Very high yielding with high energy values	190
LATE	LG31.205	Top ME yield from an early harvest	200
	LG31.206 NEW	Super quality from mainstream harvest	200
	LG31.207 NEW	Very high yielding with excellent vigour	210
	LG31.211	Highly digestible with good yield	210
	LG31.214 NEW	Very high yields with good quality	210
	Mantilla	High yielding with good agronomics	210
VERY LATE	LG31.235	Later maturing for lighter land	240

RELATIVE DRY MATTER YIELD V DM%

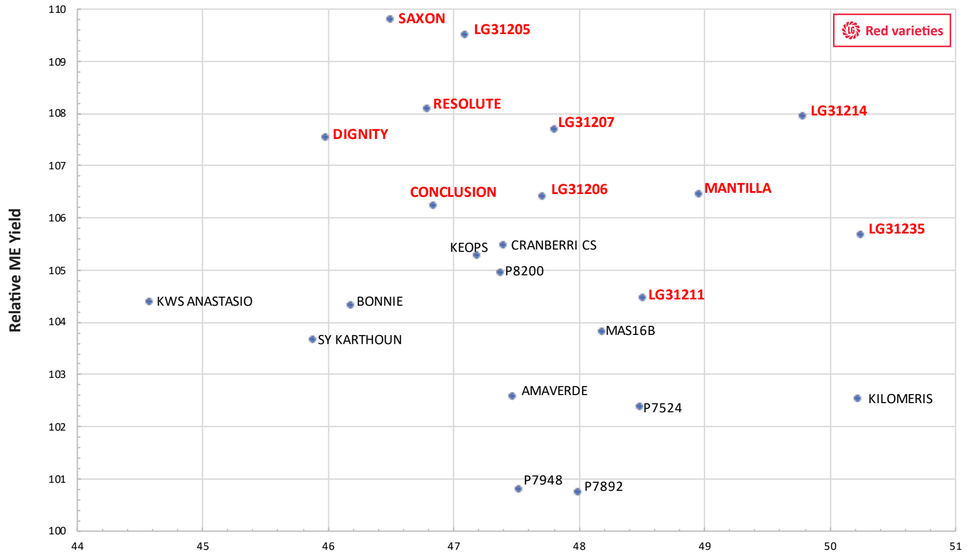
LG Variety Trials for Anaerobic Digestion (2017-2021)





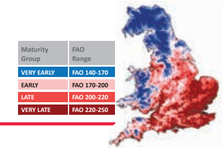
CELL WALL DIGESTIBILITY V (ME) YIELD

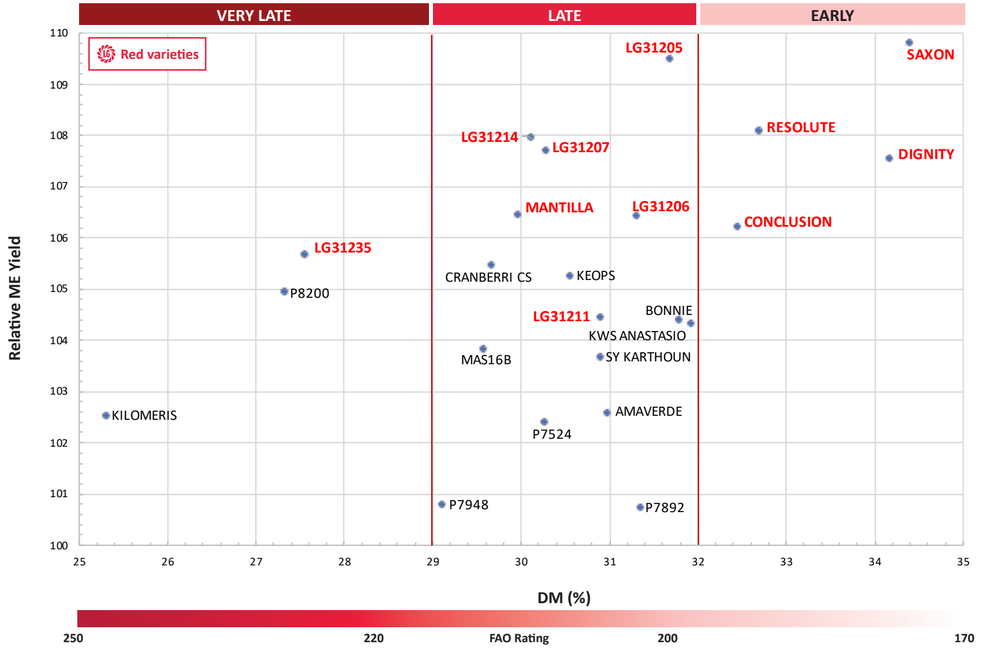
LG Variety Trials for Anaerobic Digestion (2017-2021)



RELATIVE ENERGY (ME) YIELD V DM%

LG Variety Trials for Anaerobic Digestion (2017-2021)





MAIZE FOR CRIMPING OR GRAIN

Growing maize for grain is an attractive cash crop option, and for arable farmers has the added benefit of breaking the cereals rotation, giving an opportunity to reduce blackgrass populations.

An adjusted combine can be used to harvest the maize at around 30% moisture content.

Crimping or Grain?

Mature maize crops can be combined for their grain (kernels), from which crimped maize or dried grain can be produced.

Dried Grain Maize

Use: Dried grain maize is used by feed compounders, or in the bird and pet food industry. This specialised market demands a high quality grain sample with kernels of an attractive yellow colour.

Yield: Grain yield 7-10 t/ha @ 15% MC

Recommended varieties: Conclusion, LG30.179 and Prospect

Crimped Maize

Use: Moist crimped grain maize of 25-35% MC for cattle and pig feed. For this larger market, maize grains are treated with a preservative to create a moist and digestible high energy feedstuff, with a metabolisable energy content of 14.0-14.5 MJ/kg DM.

Yield: Crimped yield 10- 12t/ha @ 65% DM.

Recommended varieties: Conclusion, LG30179, Pinnacle, Prospect and Resolute

Variety selection for grain and crimping use

To harvest maize for grain, the crop needs to reach a moisture content of 25-35% (DM of 65-75%) before being combined.

This means the crop has to be left longer in the field to dry down.

Important variety selection criteria:

• Disease resistance • Grain dry down • Standing power • High grain yield

Good cob cover will also reduce susceptibility to Fusarium infection.

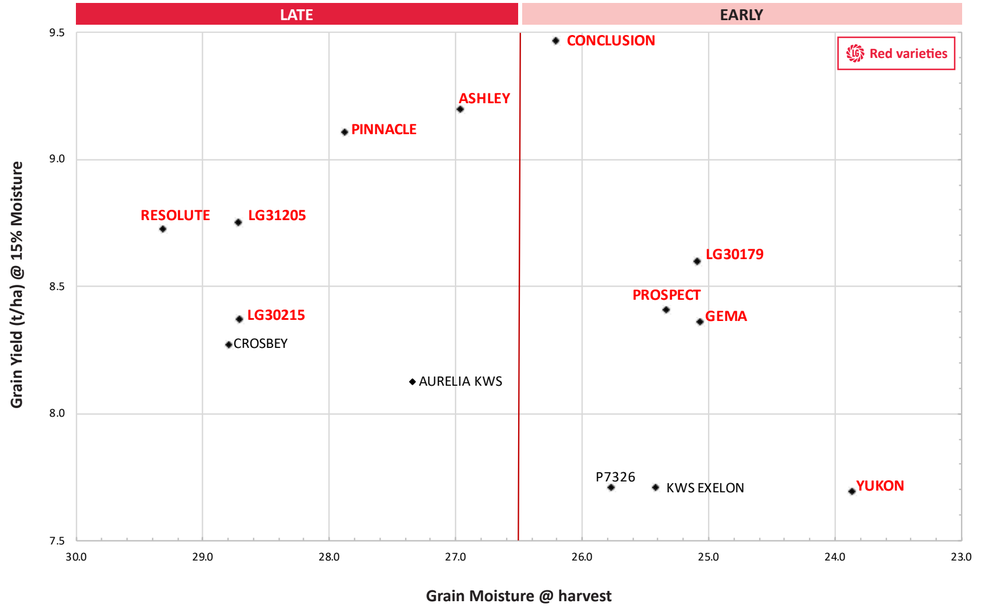
LG Grain Trials

Currently there are no official trials in the UK to test varieties for grain or crimping use. LG has established a network of three trials within recognized grain maize growing areas to assess the potential of LG varieties.

This involves establishing the trial within a commercial grain crop and harvesting at the same time using a specialist trials grain harvester. Varieties are assessed for yield and many other criteria including disease, grain colour, lodging and moisture content. Results are adjusted to 15% moisture content.

GRAIN VARIETY TRIALS

LG Trials (2022) Yield adjusted to 15% Moisture Content



ESTABLISHMENT AND BIRD CONTROL

Sowing Advice

Damage caused by birds

Maize is most vulnerable to bird damage during early emergence, up to 3-4 leaf phase. Rooks and other corvids can pick out newly sown seeds or small seedlings, working down the row and causing substantial losses.

Bird Control

Key to avoiding this issue is to ensure that no grains are left lying on the surface and that the seed is drilled to the correct depth and well covered, so as not to attract attention.

Avoid drilling an isolated crop of maize in a high risk area, such as near woodland or a rookery. It may be possible to drill seed to a deeper depth of 7-10cm to deter rooks from digging up the seed, however sowing at this depth can be problematic for the seed to germinate successfully, especially in heavier soils.

Always check that soil temperature has consistently reached 10°C at drilling depth for at least 4 consecutive days before drilling and check the medium term weather forecast will remain warm.

KORIT® PRO

The unique formulation on Korit® PRO provides protection from birds and soil-borne, damping off diseases. It also contains micronutrients to aid early plant development, assisting the plant to grow in this crucial stage.

Korit® PRO provides protection

- Bird repellent against crows, rooks and pheasants
- Fungicide protection against damping off diseases including Pythium and Fusarium

Korit® PRO improves growth:

- Increased rooting power, with plants developing a healthy and productive root system
- Better plant health and anchoring up to harvest
- Inclusion of manganese to aid chlorophyll formation and photosynthetic action
- Inclusion of zinc to aid protein formation, particularly beneficial if soils become cold or wet

Successful establishment is reliant upon 4 main factors:

- Sufficient moisture being available; ensure a fine seedbed with soil in contact to seed
- A warm and rising soil temperature for four or more days of a minimum 10˚C at drilling depth
- Drilling to an appropriate soil depth of between 5-8cm and not too deep in heavy soils
- Drilling into well aerated soils, maize will not thrive in compacted soils without oxygen

ESTABLISHMENT AND INSECT CONTROL

Sowing Advice

Insect Damage

Wireworms

Commonly found when maize is sown for the first three years after ploughing grass. The larvae are yellow, legless and up to 35mm long. They feed on the grass root debris and the new maize plants up to 5-6 leaf stage. Damage is seen in patches of the field with affected plants struggling or dying.

Frit Fly

Causes damage up to the 4 leaf stage. Common after an initially warm period encouraging egg laying by the adult fly. Larvae are pale yellow and 4mm long and eat across the leaf veins. Plants either die or become stunted with twisted leaves.

Insect Control

Cultivating early to temporarily remove the insects feed source, combined with sowing later into a warm damp seedbed can help.

Getting maize crops established in good conditions and up and away quickly, are the foundations of a successful crop.

starcover FORCE

The insecticide seed treatment Force can help limit damage, but will not provide 100% control. Adding the biological growth enhancer Starcover can help the crop to develop rapidly and grow away from the attack.

Improved Root Development

A unique plant extract in Starcover encourages the rapid development of a strong root system that enables maize to flourish during the difficult early growth phase and to continue to grow strongly throughout the season. Root structure is visibly bigger with more defined root hairs on Starcover treated maize plants, helping to increase uptake of both moisture and nutrients.

Plant Growth Promoting Rhizobacteria (PGPR)

PGPR colonise the root zone and stimulate root hair development. Through a symbiotic relationship, the bacteria increase the availability of soil nutrients phosphorus, nitrogen and other trace elements to the plant. Plants treated with Starcover tend to amass more growth in the early pre-flowering stages, leading to a better developed adult plant.

A stronger, healthier plant is more likely to withstand environmental stresses during the growing season, limiting the risk of reduced productivity. Trials have shown that Starcover treated plants have an increased starch, energy and dry matter yield.

COMMON DISEASES IN MAIZE

Diseases are most problematic after flowering and in the lead up to harvest

Eyespot (Kabatiella Zeae)

Eyespot is particularly prevalent in cooler summers with high humidity with spores spread by the wind. Infection develops early after flowering and if left unchecked it can have a devastating effect on both crop yield and quality.

Early signs are appearance of small leaf spots with a yellow halo and can lead to the entire plant dying off before filling of the cob.

Cultivation & Sprays

Eyespot can be carried over in the stubble, so ensure it is well incorporated into the soil and practice good crop rotation where possible. Timely application of an appropriate fungicide spray can control the disease.

Variety Tolerance

Varieties with good eyespot tolerance are available. See agronomy data on pages 6 and 14.


Eyespot showing on leaves

Stalk rot (Fusarium)

Occurs immediately before harvest and caused by the fungus Fusarium graminearum. Fusarium can lead to the sudden death of the plant and weakening of the stem causing lodging in the field. This is problematic as it creates difficulties at harvest and can also result in very high dry matter silage that is difficult to conserve in the clamp.


Fusarium impact on cobs

Stalk Rot Control

Fusarium cannot be controlled by using fungicide sprays. The most effective way to avoid this problem is to choose varieties that have good resistance to this disease.


Plants dying off with fusarium

VARIETIES FOR GROWING UNDER PLASTIC COVER

Using plastic cover

The 'under plastic' system was developed in Ireland to enable farmers in more marginal climates to grow maize successfully. In the UK, it can be of benefit in advancing crop maturity in very marginal areas, such as Scotland and areas of high altitude and rainfall, in England and Wales.

The plastic cover acts like a greenhouse and warms the seedbed to 8˚C sooner, thereby encouraging seeds to germinate and become established earlier in the spring. It increases the total heat accumulation of the growing crop bringing forward maturity. This facilitates either an earlier harvest or the growing of a later variety with a higher yield potential.

Agronomy

Plastic cover adds an extra growing cost of around £250/hectare. This is partially offset by the use of a lower seed rate of 100,000 seeds/ha (40,000 seeds/acre). Recently there has been a move to using more biodegradable plastic in single rows, with an increase in costs.

Good weed control prior to sowing is vital. A pre-emergence herbicide spray is applied at the time of sowing but after this, options are limited due to the plastic cover.

Variety selection for under plastic

The only source of Independent data on how maize varieties perform under plastic is DAFM (Department of Agriculture, Food and the Marine) in Ireland. The LG varieties **Ambition**, **LG31207** and **Resolute** perform exceptionally well under the plastic covered system.

DAFM Recommended varieties for Forage Maize 2021

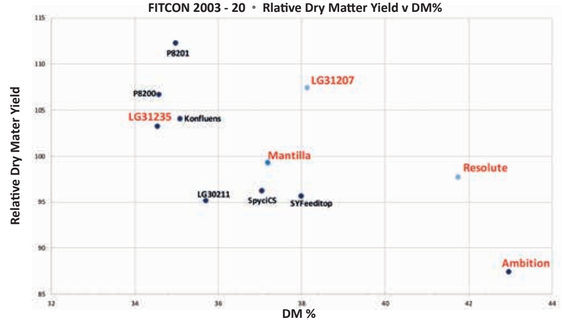
SUITABLE FOR GROWING UNDER PLASTIC COVER

VARIETY	DM% (at harvest)	YIELD DATA: DM YIELD (t/ha)	YIELD DATA: REL DM YIELD (%)	STARCH DATA: STARCH (% at harvest)	STARCH DATA: STARCH YIELD (t/ha)	STARCH DATA: REL STARCH YIELD %	ENERGY DATA: ME MJ/kg DM of fresh plant at harvest	ENERGY DATA: ME YIELD (MJ/ha at harvest)	ENERGY DATA: REL ME YIELD %
Mean of Controls		*19.2*			*5.8*			*229,522*	
AMBITION	43.0	16.7	87	33.7	5.6	97	12.1	203445	89
RESOLUTE*	41.8	18.7	98	30.9	5.8	100	12.0	223903	98
LG31207*	38.2	20.6	107	31.1	6.4	110	12.0	246939	108
SY FEEDITOP	38.0	18.3	96	31.2	5.7	99	11.9	218540	96
MANTILLA*	37.2	19.0	99	28.9	5.5	95	11.9	226989	99
SPYCI CS	37.1	18.4	96	30.8	5.7	98	12.0	220771	97
LG30211	35.7	18.2	95	29.9	5.4	94	11.9	216635	95
KONFLUENS	35.1	19.9	104	29.0	5.8	100	11.8	236049	103
P8201	35.0	21.5	112	30.6	6.6	114	12.0	257002	113
P8200	34.6	20.4	107	27.4	5.6	96	11.6	237558	104
LG31235	34.6	19.8	103	30.0	5.9	102	12.0	236907	104

*Limited data - not yet fully recommended

DAFM Plastic Covered Trials

FITCON 2003 - 20 • Rlative Dry Matter Yield v DM%



UNDERSOWING MAIZE

Grass Under Maize

Growing a crop of maize typically means sowing in April/May and harvesting in September/October. This can leave a period of up to six months where there's an opportunity to use a second crop to gain extra production.

This second crop can be established alongside the maize by undersowing or if early maturing varieties are used, there should be sufficient time to sow a crop into the maize stubbles (see page 37).

Benefits of Undersowing

Good Environmental Practice

Undersowing maize crops with grass helps prevent soil erosion and the loss of valuable nutrients over the winter months. Damage to soil structure by harvest machinery can also be reduced. The presence of an established understorey of grass will stabilise ground conditions in the event of a wet harvest.

Opportunity for Extra Production

An undersown crop of grass can be grazed by livestock over the winter or cut for silage the following spring giving year round production.

Recommended mixtures and sowing time and rates

The table below gives typical sowing rates and mixture types to use when undersowing. For best establishment, seed should be drilled rather than broadcast and kept 15cm away from the maize plants to avoid any detrimental yield effects.

Maize Crop Growth Stage	Sowing rate	Mixture type	Variety / mixture names
At Drilling	8kg/Ha	Tall Fescue and Festulolium	LG Under Maize mixture
At 6 leaf stage	15kg/Ha	Festulolium (grazing and cutting types)	LG Over Maize mixture

MANAGING MAIZE STUBBLES

If an early maturing maize variety has been chosen, winter crops such as cereals may be sown after harvest. Maize crops may also be undersown with grass as described on page 36.

Stubble Management and Cropping Options

It is quite common for maize stubbles to be left bare over the winter. This is not only a missed opportunity to produce more forage, but also can lead to soil related problems such as surface water run-off, soil erosion and loss of valuable soil nutrients.

Cultivating with a chisel plough across the stubble rows will help remove surface capping and prevent surface water run off and erosion. However, sowing a crop such as Humbolt forage rye or Westerwolds ryegrass offer far greater benefits.

Maize field left uncultivated over winter showing compaction issues

Humbolt Forage Rye

SOWING INFORMATION:
Seedbed needs to be firm and well consolidated. Direct drill to a depth of 3-5cm (cross drilling will promote a thicker stand).

SOWING RATE:
Between 160-185kg/ha (65-75kg/acre)

FEEDING:
Crude Protein: 12%
ME: 10 MJ/kg
Humbolt can be grazed, zero grazed or baled.

Westerwolds Ryegrass

SOWING INFORMATION:
Westerwolds offers the highest yield of any ryegrass and is ideal for sowing after maize. It has good ground cover, enabling an early spring harvest of the subsequent crop.

SOWING RATE:
37kg/ha (15kg/acre)

FEEDING:
Crude Protein: 15%
ME: 10.6 MJ/kg
Westerwolds can be grazed, cut or baled.

	Prevent run off	Build organic matter	Retention of soil nutrients	Crop output	Timing
Humbolt forage rye	✓	✓	✓	✓	Sept - Oct
Westerwolds ryegrass	✓	✓	✓	✓	Sept - Oct
Undersowing grass	✓	✓	✓	✓	June - July
Cover crop	✓	✓	✓	✗	Sept - Oct
Chisel ploughing	✓	✗	✗	✗	Sept - Nov

SECOND CHOICE VARIETIES FOR LESS FAVOURABLE SITES

BSPB/NIAB Descriptive List for Forage Maize 2023: Less Favourable Sites

RANKED BY EARLINESS

MATURITY GROUP	VARIETY	MATURITY				YIELD DATA		AGRONOMIC DATA					STARCH DATA			ENERGY DATA			DIGESTIBILITY	
		MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (#Days +/- Ambition)	DM YIELD (t / ha)	REL DM YIELD (%)	EARLY VIGOUR (9=good, 1=poor)	STANDING (at harvest 9=good, 1=poor)	LODGING (%)	LEAF SENESCENCE (at harvest 9=good, 1=poor)	EYESPOT RATING (9=good, 1=poor)	STARCH YIELD (t/ha)	REL STARCH YIELD %	STARCH (% at harvest)	ME YIELD (MJ/ha at harvest)	REL ME YIELD %	ME (MJ/kg DM of fresh plant at harvest)	Cell Wall Digestibility *	YEAR LISTED
Mean of the year 4 & 5 varieties				*34.4*		*17.7*	*100*	*6.8*	*7.3*	*2.1*	*6.7*	*5.5*	*6.1*	*100*	*34.6*	*205,929*	*100*	*11.6*	*8.2*	
VERY EARLY	EMMERSON	12	140	38.3	14	16.4	93	6.6	7.8	1.1	5.5	1.7	5.9	96	35.9	189,697	92	11.6	7.2	2015
VERY EARLY	RGT DUXXBURY	10	150	36.2	7	16.4	93	6.7	7.6	1.5	5.7	5.3	5.9	97	35.9	190,357	92	11.6	7.5	2018
VERY EARLY	AVITUS KWS	10	160	36.1	7	17.8	101	7.0	4.8	7.4	5.9	5.7	6.5	106	36.2	209,477	102	11.7	8.2	2018
VERY EARLY	DEBALTO	10	150	35.0	3	18.1	103	7.0	2.3	16.6	5.7	7.4	6.0	99	33.3	207,951	101	11.5	7.0	2022
EARLY	KWS EXELON	9	170	34.9	2	18.2	103	6.9	5.9	5.1	6.6	8.3	6.2	102	34.2	210,808	102	11.6	7.7	2021
EARLY	ES LOVELY	9	170	34.6	1	17.2	97	6.8	7.7	1.2	6.2	3.8	6.1	100	35.4	199,312	97	11.6	7.4	2016
EARLY	RGT STEWAXX	8	180	33.7	-2	17.6	99	6.4	7.5	1.8	6.6	3.8	5.8	95	33.1	204,244	99	11.6	8.8	2019
EARLY	ES TOMMEN	8	180	33.6	-2	17.4	98	7.3	7.7	1.3	6.5	3.8	5.8	95	33.6	199,463	97	11.5	7.3	2021
EARLY	LIKEIT	7	190	32.7	-5	17.7	100	6.9	8.0	0.7	7.0	4.4	5.8	96	33.1	203,196	99	11.5	7.2	2018
EARLY	ABILITY	7	190	32.4	-6	18.3	103	6.8	7.8	1.1	7.7	5.9	5.6	91	30.5	210,725	102	11.5	8.7	2020
LATE	ES LEGOLAS	6	200	31.9	-8	18.5	105	6.8	7.7	1.3	7.6	6.4	5.1	83	27.4	205,052	100	11.1	6.3	2019

NEW New in 2023 ** Cell Wall Digestibility (%) minus 50 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB early control variety

SECOND CHOICE VARIETIES FOR FAVOURABLE SITES

BSPB/NIAB Descriptive List for Forage Maize 2023: Favourable Sites

RANKED BY EARLINESS

MATURITY GROUP	VARIETY	MATURITY				YIELD DATA		AGRONOMIC DATA					STARCH DATA			ENERGY DATA			DIGESTIBILITY	
		MATURITY CLASS *	FAO RATING *	DM% (at harvest)	EARLIER/ LATER TO HARVEST (# Days +/- Ambition)	DM YIELD (t/ha)	REL DM YIELD (%)	EARLY VIGOUR (9=good, 1=poor)	STANDING (at harvest 9=good, 1=poor)	LODGING (%)	LEAF SENESCENCE (at harvest 9=good, 1=poor)	EYESPOT RATING (9=good, 1=poor)	STARCH YIELD (t/ha)	REL STARCH YIELD %	STARCH (% at harvest)	ME YIELD (MJ/ha at harvest)	REL ME YIELD %	ME MJ/kg DM of fresh plant at harvest	Cell Wall Digestibility **	YEAR LISTED
Mean of the 4 & 5 year varieties				*33.6*		*18.4*	*100*	*7.0*	*7.6*	*1.4*	*6.7*	*5.9*	*6.2*	*100*	*33.7*	*214,906*	*100*	*11.7*	*8.6*	
VERY EARLY	EMMERSON	12	140	37.5	11	16.8	91	6.6	8.2	0.3	6.0	1.7	6.2	100	36.8	198,527	92	11.8	8.5	2015
VERY EARLY	DEBALTO NEW	11	150	36.6	7	18.9	103	7.3	4.1	8.8	5.5	7.4	6.5	104	34.2	219,150	102	11.6	7.3	2022
VERY EARLY	AUGUSTUS KWS	11	150	36.0	5	17.0	92	6.9	7.3	2.1	5.8	6.3	6.4	104	37.9	202,673	94	11.9	9.2	2015
VERY EARLY	RGT DUXXBURY	11	150	35.9	5	17.1	93	6.9	8.0	0.7	5.8	5.3	6.1	98	35.5	198,868	93	11.7	8.1	2018
EARLY	ES LOVELY	9	170	34.4	0	17.8	97	7.0	8.0	0.6	6.3	3.8	6.2	100	34.8	206,863	96	11.6	8.1	2016
EARLY	RGT OXXGOOD	9	180	34.2	-1	18.2	99	6.8	7.4	1.8	6.3	6.1	6.2	100	34.0	212,979	99	11.7	9.1	2016
EARLY	RGT STEWAXX	8	180	33.5	-3	18.0	98	6.4	7.7	1.1	6.7	3.8	5.9	94	32.4	210,176	98	11.7	9.2	2019
EARLY	ES TOMMEN	8	180	33.5	-4	18.0	98	7.5	7.9	0.8	6.6	3.8	6.0	97	33.5	208,607	97	11.6	8.3	2021
EARLY	ES MYRDAL NEW	8	180	33.5	-4	19.6	107	7.2	6.8	3.2	7.3	6.7	5.8	93	29.4	222,338	103	11.3	7.7	2022
EARLY	SY NORDICSTAR	7	190	32.9	-6	18.3	99	7.0	7.4	1.9	7.1	7.8	6.1	98	33.2	212,126	99	11.6	9.1	2016
EARLY	LIKEIT	7	190	32.8	-6	18.4	100	7.2	8.1	0.4	6.8	4.4	6.1	98	32.9	212,284	99	11.6	7.7	2018
LATE	ES LEGOLAS	5	200	31.4	-11	18.9	103	6.9	7.8	1.1	7.4	6.4	5.1	83	27.1	209,823	98	11.1	6.5	2019
LATE	MARCAMO	5	210	30.8	-13	18.6	101	6.6	4.7	7.5	6.4	7.2	5.5	88	29.4	207,111	96	11.2	5.6	2019
LATE	RGT OXXFORD	4	210	30.1	-15	19.3	105	6.9	7.4	1.9	6.8	7.5	5.0	81	25.9	215,435	100	11.2	7.2	2021

NEW New in 2023 ** Cell Wall Digestibility (%) minus 50 * MC = Limagrain Estimation of Maturity Class and FAO rating # Limagrain estimate of days earlier / later to harvest than Ambition, the BSPB/NIAB control variety

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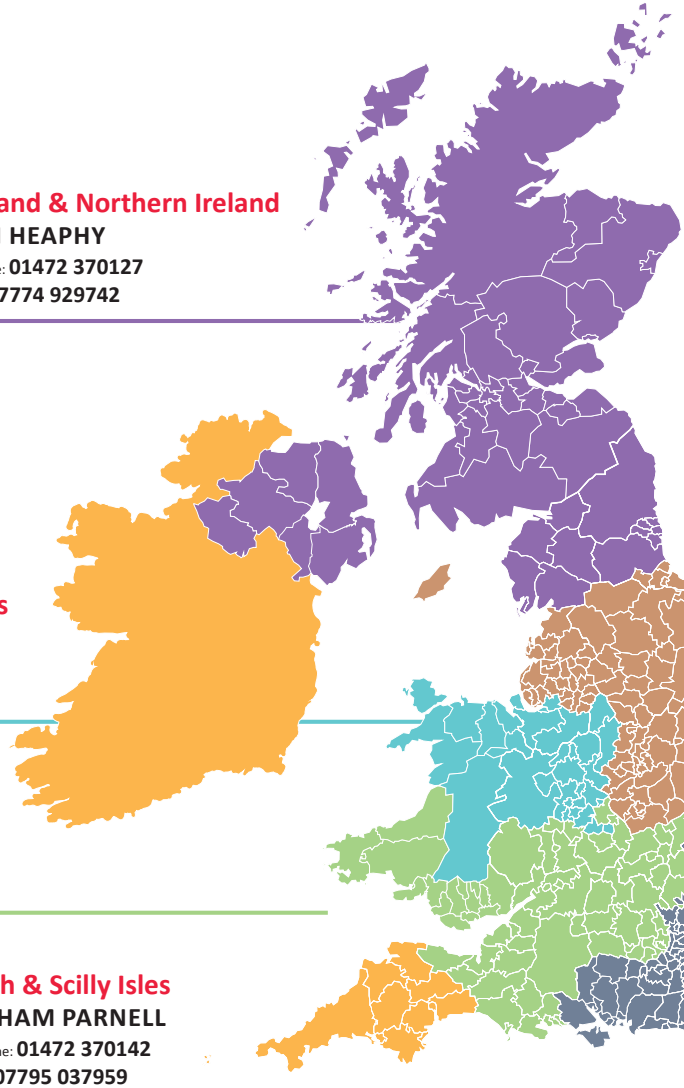

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