Salad Potato Technology Project

Storage Workshop 2016 (Workshop 4)

Results for 2016, fundamentals of good storage, storage of salad potatoes, assessing stores suitability, workshop on potato disorders

11/28/2016

Teagasc, Bord Bia, IFA and Salad Potato Technology Project

Context

The imports of salad potatoes are estimated at 20,000 tonnes per year. It is estimated up to 15 Irish growers have been supplying approx. 10-15% to this market each year. There is huge scope to increase the volume of home produced salad potatoes to the domestic market. Increasing the area grown to salad potatoes can thereby displace imported salad potatoes and will also help potato growers diversify existing ware production into a premium market. The production of salad potatoes requires considerable skill and a change of practice if changing from traditional ware potato production. Grower diversification into salad production cannot be taken likely as the supply chain (from seed supply, agronomy, to final sale) need to be secure.

Coping with an expansion of salad potato will be challenging. Potato farmers will require the knowledge and support to enable them to make the necessary changes for a profitable and sustainable future. It is within this context this initiative between Teagasc, Bord Bia, IFA and industry has been agreed.

Purpose

The overall purpose of the program is to increase the level of information to existing growers and ultimately increase the quantity of salad potatoes grown in Ireland. This will involve equipping the industry with the necessary skills and knowledge to sustainably develop their potato enterprises

Objective

The program has five objectives

- Improve existing growers knowledge in all areas (agronomy/storage) of growing salad potatoes
- Increase the total quantity of salad potatoes grown in Ireland
- Grow the market for indigenously grown salad potatoes to keep pace with increased production
- Increase the number of growers supply salad potatoes
- Upskill the industry on storage of salad potatoes
- Leave a legacy of information for growers to use after the program is finished

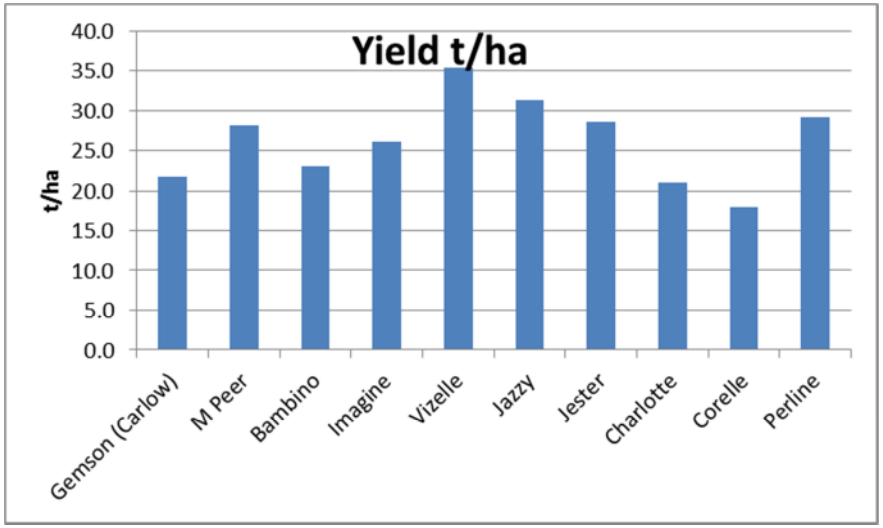
Methodology

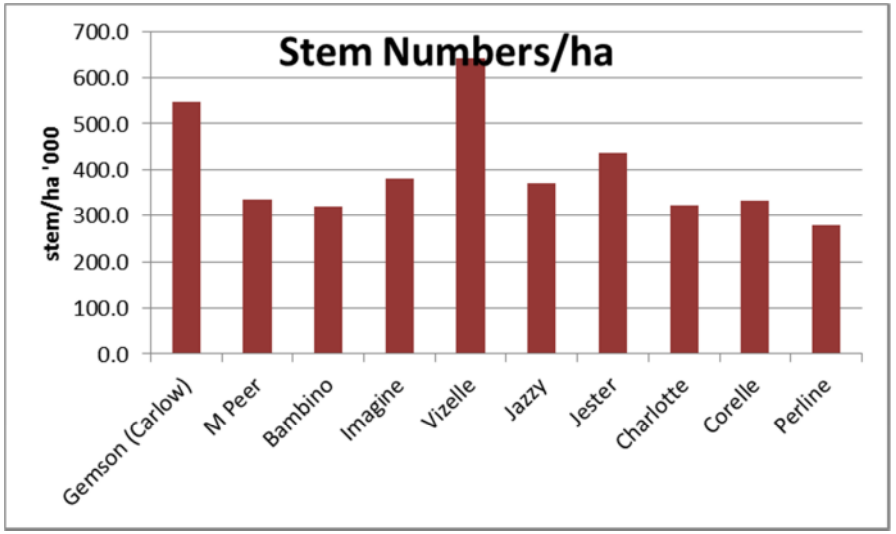
1. Run a Technology transfer project over the next 3 years
2. Regularly meet existing growers through each season at critical times
3. Develop markets and solutions to prolong window where salad potatoes are delivered
4. Provide up to date agronomy notes for growers at each meeting , building to a substantial volume of information over the three years which can be used in the future

Results from Oak Park Salad demo trial 2016

		<25mm				25-40mm (45mm)				>40mm(45mm)								
Variety	Spacing (inches)	Tuber no.	Tuber no/ha 000s	Wt (kg)	Yield (t/ha)	Tuber no.	Tuber no/ha 000s	Wt (kg)	Yield (t/ha)	Tuber no.	Tuber no/ha 000s	Wt (kg)	Yield (t/ha)	Total tuber no./ha 000's	Total yield t/ha	Stem number/ m	Stems/h a 000's	Tubers/ stem
Gemson (Louth)		160	444	0.44	1.2	348	967	7.48	**20.8**	20	55.6	1.41	3.92	1466.7	25.92	36	400.0	3.67
Gemson (Cork)		21	58	0.15	0.4	183	508	3.9	**10.8**	33	91.7	2.25	6.25	658.3	17.50	96	1066.7	0.62
Gemson (Wexford)		74	206		0.0	598	1661		**28.9**	4	11.1			1877.8	28.90	56	622.2	3.02
Gemson (Donegal)						320	889							888.9		40		
Gemson (Carlow)	6	91	253	0.6	1.7	240	667	7.55	**21.7**	21	58.3	1.35	3.9	977.8	27.30	49.25	547.2	1.79
M Peer	6	39	108	0.25	0.7	250	694	9.8	**28.2**	28	77.8	3.15	9.1	880.5	37.93	30.25	336.1	2.62
Bambino	6	11	31	0.1	0.3	196	544	8	**23.0**	40	111.1	3.7	10.6	686.1	33.91	28.75	319.4	2.15
Imagine	6	25	69	0.15	0.4	227	631	9.1	**26.1**	34	94.4	2.85	8.2	794.4	34.77	34.25	380.6	2.09
Vizelle	5	157	436	2.05	5.9	315	875	12.3	**35.3**	0	0.0	0	0.0	1311.1	41.23	57.75	641.7	2.04
Jazzy	7	49	136	0.35	1.0	240	667	10.9	**31.3**	9	25.0	0.95	2.7	827.8	35.06	33.25	369.4	2.24
Jester	7	164	456	1.2	3.4	337	936	9.95	**28.6**	25	69.4	2.05	5.9	1461.1	37.93	39.25	436.1	3.35
Charlotte	6	23	64	0.2	0.6	169	469	7.3	**21.0**	37	102.8	4.65	13.4	636.1	34.91	29	322.2	1.97
Corelle	6	23	64	0.15	0.4	115	319	6.25	**18.0**	92	255.6	11	31.6	638.9	50.00	30	333.3	1.92
Perline	9	49	136	0.4	1.1	300	833	10.15	**29.2**	42	116.7	3.1	8.9	1086.1	39.22	25	277.8	3.91
M Peer(Donegal)			0		0.0	280	778		**0.0**		0.0		0.0	777.8		51	566.7	1.37
M Peer (Cork)		45	125	0.4	1.1	89	247	3.8	**10.6**		0.0		0.0	372.2		67	744.4	0.50
Bambino(Donegal)			0		0.0	294	817		**0.0**		0.0		0.0	816.7		51	566.7	1.44
Jester (Cork)		120	333	1.9	5.3	175	486	4.2	**11.7**	3	8.3	0.25	0.7	827.8		122	1355.5	0.61

Carlow Yields and stem numbers





Results from Grower Demonstration sites

<table>
<tr><th></th><th>John Stafford (Ed Tobin)
Wexford</th><th>John Griffin
Cork</th><th>Jamie Rankin
Donegal</th><th>Gerard Tuite</th></tr>
<tr><td>Varieties planted</td><td>Gemson</td><td>Gemson
Jester
Maris Peer</td><td>Gemson
Maris Peer
Bambino</td><td>Gemson</td></tr>
<tr><td>Seed</td><td></td><td>Gemson - seed sprouted and hot split graded
Jester – small seed (25-30mm)
Maris Peer – least preferred seed</td><td>No issues</td><td>No Issues</td></tr>
<tr><td>Agronomy issues</td><td>None
The canopy burnt down quite well and as we had sowed early meant the burn date was brought forward allowing extra time for skin set before harvesting.</td><td>None</td><td>Gemson - slow to emerge compared to the other two. It was the finest run of the three
Maris Peer - Best eating quality Numbers slightly lower and sample should prob have been dessicated a week earlier as the sample was a little bold
Bambino - Once again a very nice sample. The variety did everything well with out being outstanding.</td><td>No real issues</td></tr>
<tr><td>Skin Finish</td><td>Small ammounts of scab Scurfing or scab was magnified by the very bright white shade of the skin</td><td>Gemson - Skin Finish - Best variety out of the 3
Jester - Some Jelly end-rot
Maris Peer - Little bit of common scab</td><td>All had Excellent skin finish very bright sample with no scurfing</td><td>Some scab present</td></tr>
<tr><td>Yield (t/ha)</td><td>Total 40t/ha- 22% tare
Sold 30 t/ha
3.9t/ha (13%) 22-35 mm
26.1 t/ha (87%)35-45mm</td><td>Gemson – 22.5t/ha sold
Jester – 38t/ha in store
Maris Peer – 38t/ha in store</td><td>
<table>
<tr><th></th><th>total</th><th>28/45,</th><th>45/50</th></tr>
<tr><td>Gemson</td><td>37t/ha</td><td>23t/ha (72%)</td><td>8.8t/ha</td></tr>
<tr><td>Maris Peer</td><td>32t/ha,</td><td>18.5t/ha (57%)</td><td>7.8t/ha (24%)</td></tr>
<tr><td>Bambino – total. Sold</td><td>37 t/ha</td><td>22.4t/ha (60%)</td><td>9.9t/ha (26%)</td></tr>
</table>
</td><td>Total 48.5 t/ha
Sold 24.3t/ha (28/42)
18.1 t/ha (42+)</td></tr>
</table>

Salad Potato Economics

Profitability

Main Crop versus Salad Production (Demonstration Plots)

Cost	Main Crop* €/ha	Salad (demo) €/ha
Seed	1250	2565
Fertilisers	600	529
Other Variable inputs	770	680
Machinery	2360	1786
Misc. Costs	135	130
Irrigation		500
Total Costs	**5115**	**6190**

** Teagasc Costs and Returns 2016*

teagasc Agriculture and Food Development Authority

The Irish Agriculture and Food Development Authority

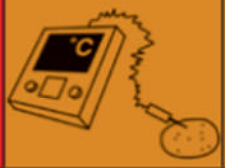
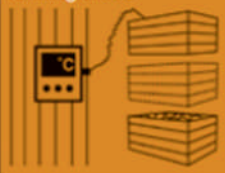
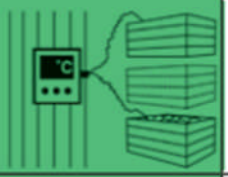
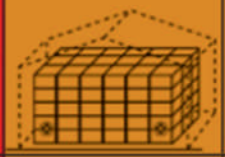
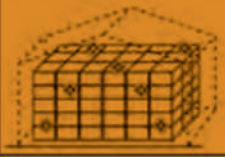
Profitability

Main Crop versus Salad Production (Demonstration Plots)

Cost	Main Crop	Salad
Total Costs (€/ha)	**5115**	**6190**
Price €/t	200	350
Yield t/ha	40	30
Gross Margin €/ha	2885	4310
Average Yield t/ha		25
Gross Margin €/ha		2560
Low Yield t/ha & low price (€250/t)		25
Gross Margin €/ha		60

teagasc Agriculture and Food Development Authority

The Irish Agriculture and Food Development Authority

STORE FEATURE	POOR PRACTICE 1	2	3	BEST PRACTICE 4	REFER TO SECTION
MONITORING AND TRACEABILTY **Temperature sensors**	**LACK OF CONTROL** No sensors in store	In air only: crop condition unknown	1 or 2 sensors in crop: no measure of temperature variation	**FULL CAPABILITY** 1 sensor per 100 tonnes	Loading the store & Store monitoring and quality assurance
Bulk stack sensor placement	As above	Top surface only - prone to influence by air above	Top and base of stack to measure pile temperature gradient	As column 3 but also 300mm down to anticipate condensation	
Condensation control	As above	Control of temperature differentials	Relative humidity measurement for dew-point control	Skin resistance sensing to measure any wetting	
Stock control	Chemical records only; legal minimum	Chemical use plus stock location in store recorded	Chemical use, stock details labelled on each box	Box records include location - feedback on storage problems	
Store recording	As above 	Occasional manual recording of store temperatures 	Regular manual recording of store temperatures and fan running times 	Automatic logging of store temperatures and fan running times 	
QC SAMPLING	Single point sampling 	Multi-point sampling on one level 	Multi-point sampling on more than one level 	Comprehensive sampling throughout the store 	Storage for markets
SEED GRADING	**CONDENSATION RISK** In store	Next door but no airlock	Next door with strip curtain	**STORE ISOLATED** Next door with high speed door	Condensation on the crop

Source: ADHB Store Managers Guide

Common storage diseases in Ireland

	Silver scurf	Gangrene	Dry rot
Seed-borne	✓✓✓	✓✓✓	✓✓✓
Soil-borne	No	No	✓
Infection conditions	>5oC & moisture on tuber surface	Wounds and moisture on tuber surface Low temperature slows curing and increases disease risk	Wounds and moisture on tuber surface Low temperature slows curing and increases disease risk
Time to symptom expression	Present in a few weeks	At least 2 months	At least 2 months
Effect of delayed harvest on infection	Increased disease through spore build up in soil	Increased disease through spore build up in soil	Less disease as fungus prefers warmer conditions
Control options			
1. Store hygiene	Removing dust and debris from previous season in store and on grader reduces contamination on new crop		
2. Harvest date	Earlier is better Prioritise if seed shows infection	Earlier is better Prioritise if seed shows infection	Later is better
3. Plant healthy seed	Check seed quality before planting. If rots are present ensure they are accurately identified.		
4. Minimise damage at harvest	✓	✓✓✓	✓✓✓
5. Curing		Dry curing is essential to reduce ingress of diseases into wounds	
6. Dry rapidly into store and avoid condensation in early storage	✓✓✓	✓✓✓	✓✓✓
7. Fungicide application			
a. Seed tubers	Apply to seed tubers pre-planting if disease present in seed		
b. Harvest	For seed (and ware if fungicide approved on protocol) – apply fungicide at harvest or into store if disease risk considered high		

Bambino

Scottish Seed Stocks
English Seed Stocks

Tubers have poor resistance to splitting and some resistance to bruising. Trials have found good resistance powdery scab.. This variety has low resistance to silver scurf. Tests for resistance to potato cyst nematode demonstrated resistance to *Globodera rostochiensis* Ro1 and susceptibility to *Globodera pallida* Pa 2/3, 1.

Parentage	**Navan x Boxer**
Breeder	Cygnet PB Ltd
Breeder Agent	Cygnet PB Ltd
Breeder Rights (expiry)	not set

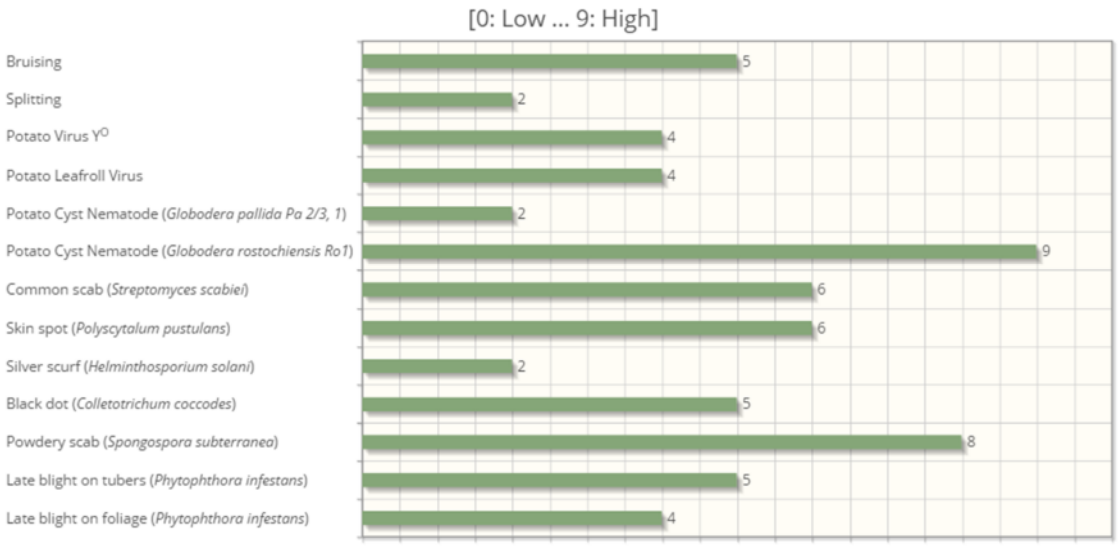
Images

Characters

Tuber Characteristics	
Shape of tuber	Short - oval
Colour of skin	White
Colour of flesh	Cream
Depth of eyes	Shallow - medium
Smoothness of skin	Smooth

Botanical Description	
Colour of base of lightsprout	Absent
Maturity	Maincrop
Height of plants	Medium
Frequency of berries	Absent

Resistance to Damage, Pests and Diseases.



Results of National List or AHDB Potatoes Independent Variety Trials

Maris Peer

Scottish Seed Stocks
English Seed Stocks

Second early maturity producing moderate yields of very uniform sample. Good resistance to powdery scab, gangrene, damage, bruising and skin spot. Moderately susceptible to drought, potato virus Yo, spraing and slug damage. Susceptible to potato cyst nematode *Globodera rostochiensis* Ro1 and *Globodera pallida* Pa2/3,1. Medium/low dry matter, firm cooked texture, good boiling quality.

Parentage	**120/13 x Ulster Knight**
Breeder	Plant Breeding Institute
Breeder Agent	GB Seed Industry
Breeder Rights (expiry)	not set

Images

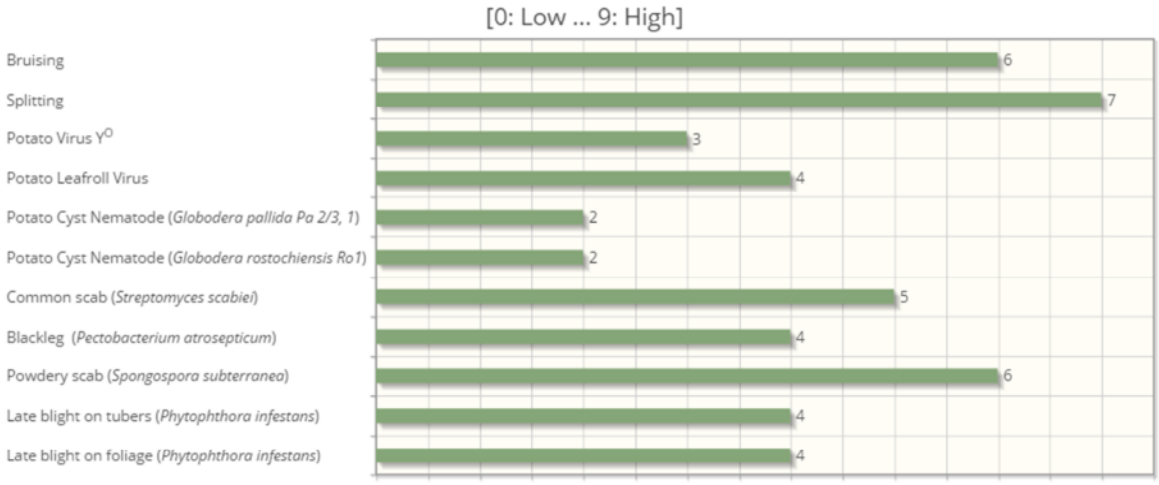



Characters

Tuber Characteristics	
Shape of tuber	Oval
Colour of skin	Cream
Colour of flesh	Cream
Depth of eyes	Shallow - medium
Smoothness of skin	Smooth

Botanical Description	
Colour of base of lightsprout	Pink
Maturity	Second Early
Height of plants	Medium
Colour of flower	Red violet
Frequency of berries	Few

Resistance to Damage, Pests and Diseases.



Results of National List or AHDB Potatoes Independent Variety Trials

JESTER

Scottish Seed Stocks
English Seed Stocks

Tubers have some resistance to splitting and good resistance to bruising. Trials have found good resistance to powdery scab, common scab and potato virus a.. This variety has low resistance to dry rot and potato leafroll virus.. Tests for resistance to potato cyst eelworm demonstrated susceptibility to both *Globodera rostochiensis* Ro1 and *Globodera pallida* Pa 2/3, 1.

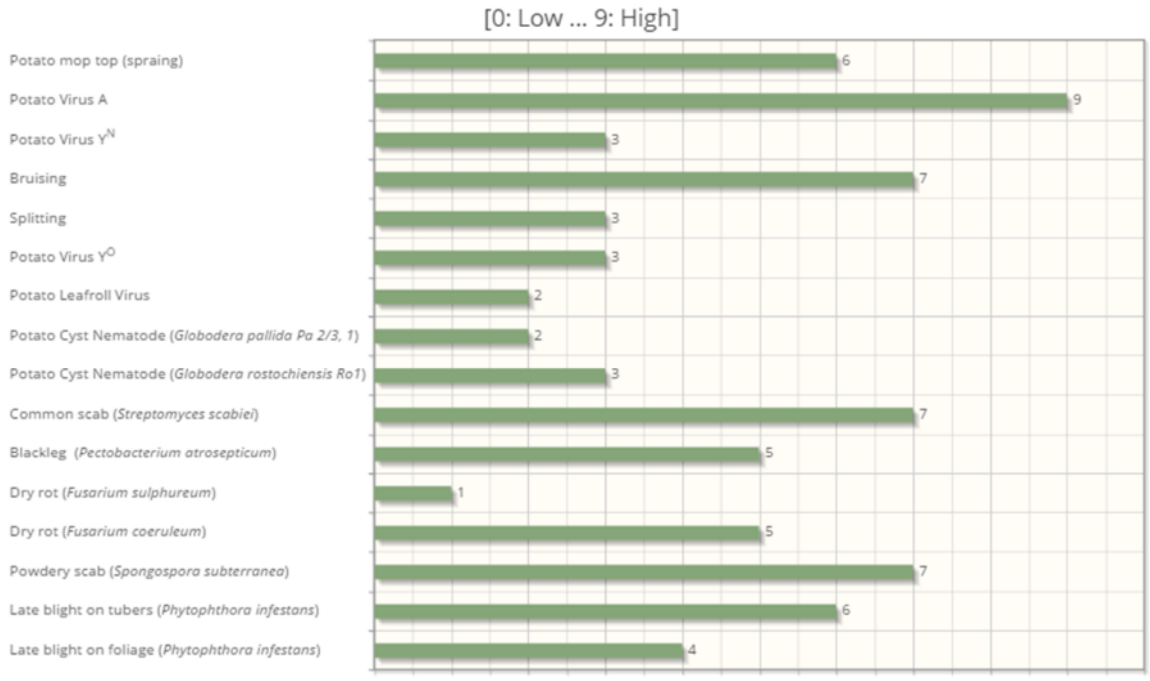
Parentage	**Vales Emerald x 1288 AF 23**
Breeder	Scottish Crop Research Institute
Breeder Agent	Greenvale AP
Breeder Rights (expiry)	not set

CHARACTERS

TUBER CHARACTERISTICS	
Shape of tuber	Short - oval
Colour of skin	White
Colour of flesh	Cream
Depth of eyes	Shallow

BOTANICAL DESCRIPTION	
Colour of base of lightsprout	Violet
Maturity	Second Early
Height of plants	Short - medium
Colour of flower	Red violet

RESISTANCE TO DAMAGE, PESTS AND DISEASES.



Results of National List or AHDB Potatoes Independent Variety Trials

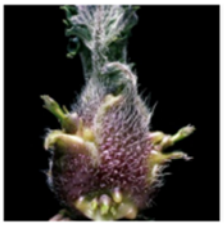
Charlotte

Scottish Seed Stocks
English Seed Stocks

Second early maturity, producing moderate yields of uniform, smooth skinned tubers. . Medium dry matter, waxy cooked texture. Susceptible to late blight on foliage, potato cyst nematode *Globodera rostochiensis* and *Globodera pallida* . Tests show resistance to Blackleg.

Parentage	**Hansa x Danae**
Breeder	Unicopa
Breeder Agent	GB Seed Industry
Breeder Rights (expiry)	not set

Images

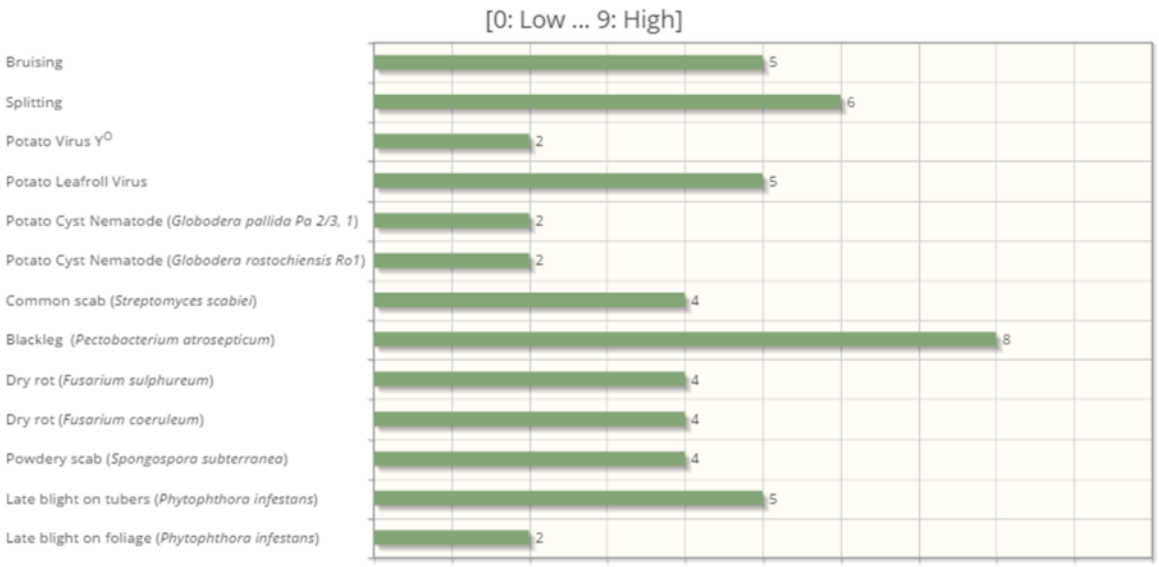




Characters

Tuber Characteristics	
Shape of tuber	Oval - long
Colour of skin	Cream
Colour of flesh	Light yellow
Depth of eyes	Shallow
Smoothness of skin	Smooth

Botanical Description	
Colour of base of lightsprout	Pink
Maturity	Second Early
Height of plants	Medium
Colour of flower	Red violet
Frequency of berries	Few

Resistance to Damage, Pests and Diseases.



Results of National List or AHDB Potatoes Independent Variety Trials

Growers - Varieties - Perline

Breeding & licensing

Breeder:	KWS
Licensed Territory:	UK & EIRE

Field Characteristics

Tuber Yield:	Good
Tuber Number:	Very High
Tuber Shape:	Round Oval
Dry Matter:	Moderate
Flesh Colour:	Pale Yellow
Eye Depth:	Shallow
Dormancy:	Short (3)
Wart Disease:	Resistant
Bruising:	7*
Black Dot:	-

Disease Resistance

Foliage Blight:	4*
Tuber Blight:	6*
Blackleg:	-
Common Scab:	5*
Powdery Scab:	-
Potato Leaf-Roll Virus:	-
Virus Y:	4*
PCN RO1:	Resistant
PCN G.Pallida:	Susceptible
Spraing:	-

Perline

Perline is a high tuber number early variety delivering an exceptional new season potato experience for the consumer.

Successfully launched as the UK follow on from Jersey Royal potatoes, Perline is an attractive option for growers as well as consumers. Tuber initiation is very quick, often occurring as the plants emerge, meaning scab control needs to be prompt.

Foliage production is moderate as the variety puts its energy into bulking the high number of tubers. Perline has demonstrated consistent yields through sequential planting to meet customer's
fluffy skin supply programmes. Harvesting straight from the green top is easy compared to many varieties and has good resistance to bruising. Dormancy is short and so seed management to maximise stem production is relatively easy.

- Early New Potato
- Outstanding flavour
- Exceptional high tuber number
- Resistant to PCN RO1

GEMSON

Scottish Seed Stocks
English Seed Stocks

Tubers have good resistance to splitting. Trials have found good resistance to powdery scab, blackleg, silver scurf and potato leafroll virus. This variety has low resistance to dry rot *Fusarium sulphureum* and *Fusarium coeruleum* , Bruising and late blight on tubers. Tests for resistance to potato cyst nematode demonstrated susceptibility to both *Globodera rostochiensis* Ro1 and *Globodera pallida* Pa 2/3, 1.

Parentage	**SCRI.85.C.4d.8 x Maris Peer**
Breeder	Scottish Crop Research Institute
Breeder Agent	Grampian Growers
Breeder Rights (expiry)	2037

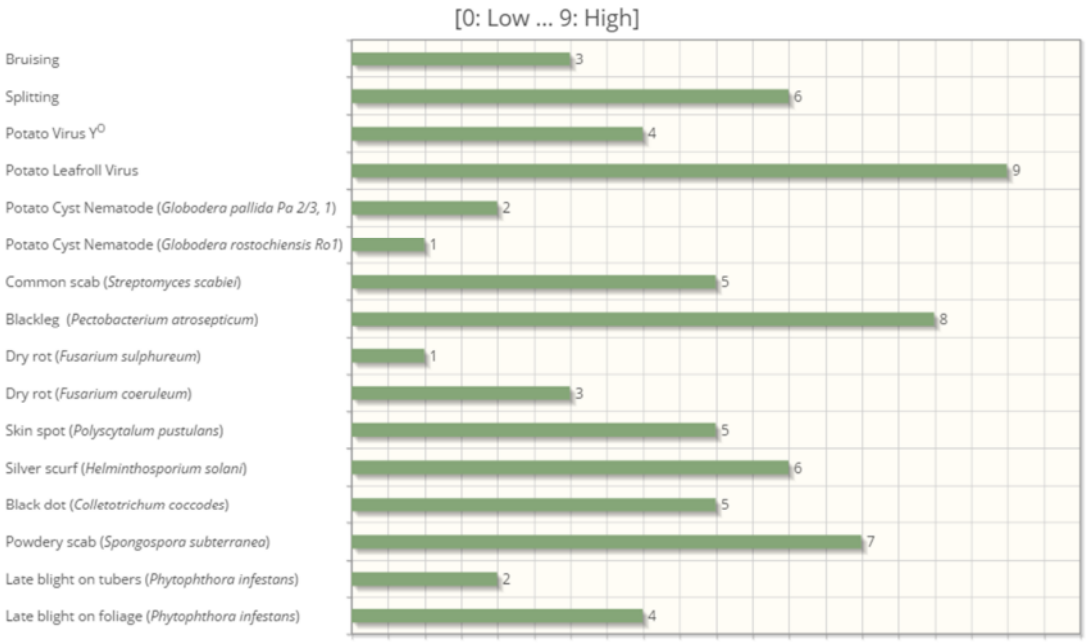
IMAGES

CHARACTERS

TUBER CHARACTERISTICS	
Shape of tuber	Short - oval
Colour of skin	White
Colour of flesh	Cream
Depth of eyes	Shallow - medium
Smoothness of skin	Smooth

BOTANICAL DESCRIPTION	
Colour of base of lightsprout	Pink
Maturity	Second Early
Height of plants	Medium
Colour of flower	Red violet
Frequency of berries	Medium

RESISTANCE TO DAMAGE, PESTS AND DISEASES.



Results of National List or AHDB Potatoes Independent Variety Trials

Jazzy

TABLE STOCK POTATOES

Characteristics	
Maturity	8.0
Colour of skin *(1)	LG
Colour of flesh *(2)	6
Shape of tuber *(3)	L
Depth of the eyes	8
Tuber uniformity	7
Size of tubers	3
Grading	8
Dry matter percentage	19
Suitability for cooking	8A
Dormancy	1

Comments
9=positive ... 1=negative
*(1): L=light D=dark W=white G=yellow R=red
*(2): Colour of flesh: 8=yellow ... 4=white
*(3): Shape of tuber: R=round O=oval L=long

Description

Jazzy is very suitable as a salad potato. It is also a productive variety, in the number of tubers per plant as well as the yield per hectare. Jazzy has a cooking type A with an excellent taste and a good texture. The bruising index can be considered to be very low, which adds to the internal quality. Jazzy is easy to grow.

Storage

°C 4
6 months

Resistance	
Leaf rol	7
A-virus	7
X-virus	8
Y-virus	6
Yntn-virus	7
Foliage blight	3
Tuber blight	
Common scab	7
Spraing	8
Bruising	9
Secondary growth	7
Ro1	3
Ro2/3	
Pa2	
Pa3	
wz 1 (D1)	10
wz 2/6 (G1/O1)	9
wz 18 (T1)	

R=resistant ... 1=very susceptible
Ro/Pa(x) = Globodera rostochiensis / pallida pathotype(x)

RESISTANCE TO GOLDEN NEMATODE:
Ro1(=A), Ro2/Ro3(=BC), Pa2(=D), Pa3(=E)
(9 = high resistant; 1 = very susceptible)
WART DISEASE:
wz 1(D1), wz 2/6 (G1/O1, wz 18 (T1)
(10 = resistant, 3 = very susceptible)

Vizelle

Origin

Breeder	Cygnet PB
Parentage	Appelle x D49-1)
National List Trials	2012 and 2013
Plant Breeders Rights	2014

Botanical Features

Maturity	Maincrop
End Use	Baby/New/Salad
Haulm	
Flowers	
Tubers	Oval tubers, cream skin, light yellow flesh

Resistance to damage, pests and diseases

Foliage blight	4	TRV (Spraing)	1
Tuber blight	2	Leafroll	4
Blackleg	6	Virus Y	3
Common scab	8	Skin Spot	9
Powdery scab	6	Black Dot	5
G.Pallida Pa 2/3,1	3	Dry Rot (F. coeruleum)	5
G.Rostochiensis Ro1	9	Dry Rot (F. sulphureum)	1
PVA	4	Silver Scurf	8
Mop Top (Spraing)	9	Bruising	5
		Splitting	2

Vizelle pdf

Consumer Quality

Primarily targeted at the salad/baby market Vizelle produces oval tubers with a light yellow flesh. Vizelle has a pleasant waxy texture with good taste and no break-down after boiling.

Agronomic Features

Vizelle produces exceptionally high tuber numbers with high yields of tubers in the 20 x 42 mm size band with little over-size. Resistant to Ro1.

Corolle

Cross: Chloe x G81TT155.1

Agronomy guide

Corolle general description

- First early new/salad variety that produces good yields of uniform smooth skinned tubers
- Pale yellow skin and flesh colour
- Medium dry matter with a waxy cooked texture and a very good eating quality
- Good resistance to foliage blight and blackleg
- Good tuber numbers giving moderate yields
- Previously held the TI category with the Co-op for the past 10 years and was challenged annually but beat all competition for taste

Breeder: Germicopa, France

Field characteristics	Corolle
Tuber yield	Moderate
Tuber number	High
Tuber shape	Long oval
Dry matter	18-19%
Flesh colour	Pale Yellow
Dormancy	High
Drought resistance	Moderate
Bruising susceptibility	Moderate
Damage susceptibility	Moderate
Nitrogen group RB209	2

Disease resistance	Corolle
Foliage blight	6
Tuber blight	5
Blackleg	6
Common scab	6
Powdery scab	5
Black dot	5
Leaf roll virus	5
Virus Y	5
Cyst nematode Ro1	Resistant
Cyst nematode Pa2,3	Susceptible