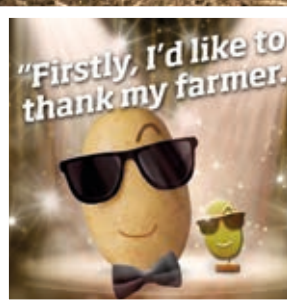


Potatoes – What's Under The Skin?



National Potato Conference & Trade Show **2018**

Red Cow Hotel, Naas Road, Dublin
Tuesday 20th February 2018

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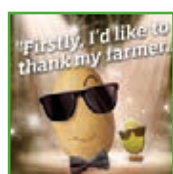
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Thomas McKeown
IFA Potato Chairman



Michael Hennessy
Head of Knowledge Transfer Crops, Teagasc

IFA/Teagasc National Potato Conference 2018

Welcome to this year's National Potato Conference organised by the Irish Farmers' Association and Teagasc in association with Bord Bia.

Irish potato growers are currently facing a challenging marketing season. The area of potatoes planted in 2017 was similar to 2016 however the increase in production in the UK and Europe has undermined the Irish domestic market particularly in the peeling and processing sectors.

Farmers continue to be the poor relation within the supply chain. Despite the producer carrying the most risk within the potato industry, it is the retailers and facilitators who take the lion share of the margin. Many producers are currently receiving farm gate potato prices which are below the costs of production and as storage costs increase into the spring this will only exacerbate the income crisis on potato farms.

The morning session of this year's conference will focus on the success of the EU Potato promotion campaign, "*More Than A Bit on the Side*" and the health benefits of potatoes. The first speaker from Kantar Worldpanel will present a comprehensive market analysis of consumer trends and this will be followed by presentations reviewing the promotion campaign. The final speakers will explain the importance of potatoes as part of a healthy balanced diet.

The afternoon session will focus on storage, the threat of PCN and an analysis of salad potato production in Ireland. We will hear presentations from international experts in Sutton Bridge, ADHB and SRUC, Scotland along with Teagasc specialists and the views of a potato producer.

IFA and Teagasc acknowledge the presence and valued support today of industry associated exhibitors and conference sponsors.

We hope that you find this year's conference proceedings of benefit to you as you make decisions going forward in your business.

Thomas McKeown
IFA Potato Chairman

Michael Hennessy
Head of Knowledge Transfer Crops, Teagasc



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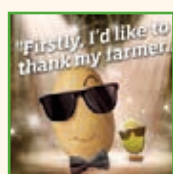
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Tel: +353 (0)46 905 3198

Email: info@meadepotato.com

Web: www.meadepotato.com





Conference Programme

9:00am Registration / Tea & Coffee

Chairman: Thomas McKeown, IFA Potato Chairman

10:00am

Messages from Conference Hosts:

Joe Healy, IFA President

Gerry Boyle, Director, Teagasc

Opening address:

Andrew Doyle TD, Minister of State, Department of Agriculture, Food & the Marine

Session 1:

10:30am

Chairman: Thomas McKeown, IFA Potato Chairman

Potato trends in a modern market

Cliona Lynch, Client Manager, Kantar Worldpanel

Review of EU Potato Promotion Campaign

Chris Linsell, Client Service Director, Kindred

Lorcan Bourke, Horticulture Division, Bord Bia

Health benefits of potatoes

Aoife Hearne, Dietitian

Fiona Crispie, Teagasc & APC Microbiome Institute

12:30pm –

Lunch – Experience potato.ie recipes from EU Potato Promotion Campaign

Session 2:

2:00pm

Chairman: Andy Doyle, Tillage Specialist, Irish Farmers' Journal

Getting the Best From Potato Storage

Adrian Cunningham, Sutton Bridge, ADHB

PCN "The Hidden Threat"

Shane Kennedy, Teagasc Potato Advisor

Salad Potatoes "A Growing Opportunity"

Stuart Wale, SRUC, Scotland

Ed Tobin, Farm Manager Slaney Farms, Wexford

3:30pm –

Workshops with main speakers

4:30pm

to run concurrently (15 minutes each)

1. **Adrian Cunningham** – Potato Storage "Tweaking your store"

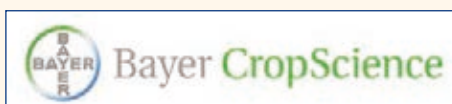
2. **Shane Kennedy** – PCN "Avoid and control strategies"

3. **Stuart Wale & Ed Tobin** – Salad Potatoes "Are they suitable for my farm"

Trade show ongoing throughout the afternoon from 12:30pm

Tea / Coffee at trade show in the afternoon

Tea & Coffee sponsored by





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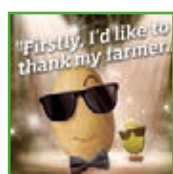
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National Potato Committee – 2018



COUNTY	CONTACT	MOBILE
CHAIRMAN	Thomas McKeown, Laggagh, Castletown, Navan	087 262 5831
VICE-CHAIRMAN	Nora Sheehan, Lisnagourneen, Castletownroche	087 653 4787
CORK (C)	John Griffin, Boycetown, Carrigaline	087 687 6293
DONEGAL	Jimmy Rankin, Cloon, Carrigans, Lifford	086 257 1835
DONEGAL	William Monagle, Kildrum, Carrigans, Lifford	086 852 5137
DUBLIN	David Garrigan, Baldurgan Farm, Ballyboughal	086 855 3581
GALWAY	Barry Stephens, Corofin, Tuam	087 941 6363
KERRY	Bridget O'Connor, Kilbaha, Moyvane	087 268 0258
KILDARE	Bart Maertens, Loughanure, Clane	087 678 0990
KILKENNY	John Doody, Ballincur, Mooncoin	086 190 3350
LOUTH	Brendan Lynch, Oberstown, Ardee	086 839 5494
MEATH	Thomas Sheridan, Hollybrook House, Carlanstown, Kells	086 246 4018
MEATH	Paddy Reynolds, Gerrardstown, Garlow Cross, Navan	086 831 5636
OFFALY	Shane Howell, Killurin, Killeigh, Tullamore	086 301 8525
TIPP.NORTH	Michael Healy, Coolcroe, Two-Mile-Borris, Thurles	087 260 4271
WEXFORD	Sean Ryan, Ballinadoney, Ballywilliam, Enniscorthy	087 237 9748
WICKLOW	Tom Delahunt, Ballinaclough	087 987 8428
CO-OP	Eddie Doyle, Luffany, Mooncoin	087 278 7472



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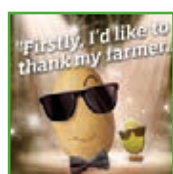
- Quality Programmes
- Business Development
- Market Insight
- Industry Development
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Contact: Lorcan Bourke, Bord Bia

Clanwilliam Court, Lower Mount Street, Dublin 2, Ireland

T: 00 353 1 6142263 F: 00 353 1 6687521 E: lorcan.bourke@bordbia.ie

www.bordbia.ie



Bord Bia Contacts

Name	Title	Telephone	Email
Horticulture Division	Bord Bia, Clanwilliam Court, Lower Mount Street, Dublin 2	01 6685155 HQ	info@bordbia.ie
Mike Neary	Director of Meet and Horticulture	01 - 6142219	mike.neary@bordbia.ie
Gary Graham	Bloom Project Manager	01 - 6142289	gary.graham@bordbia.ie
Carol Marks	Sector Manager Horticulture	01 - 6142266	carol.marks@bordbia.ie
Lorcan Bourke	Sector Manager Fresh Produce and Potatoes	01 - 6142263	lorcan.bourke@bordbia.ie
Michal Slawski	Sector Manager Horticulture	01 - 6142274	michal.slawski@bordbia.ie
Andrew Mahon	Quality Programme	01 - 6142249	andrew.mahon@bordbia.ie

Teagasc Potato Advisory service

Michael Hennessy	Head of Crops Knowledge Transfer, Teagasc, Oak Park, Carlow.	059 918 3427
Shane Kennedy	Teagasc, Slane Road, Drogheda, Co. Louth.	041 983 3006
Shay Phelan	Potato Specialist, Teagasc, Kinsealy Centre, Malahide Road, Dublin 17.	059 917 0200
John Pettit	Teagasc, Advisory Centre, Johnstown Castle, Wexford.	053 917 1350
Michael McCarthy	Teagasc, Advisory Centre, Moorepark, Fermoy, Co Cork.	025 42244
Martin McCullough	Teagasc, Carnamuggagh, Letterkenny, Co Donegal.	074 912 1555
Conor Dobson	Teagasc, Slane Road, Drogheda, Co. Louth.	041 983 3006



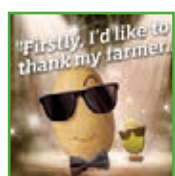
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Department of Agriculture, Food and the Marine



Potato Seed Certification

Crop Policy, Production and Safety Division

Department of Agriculture, Food and the Marine
Administration Building
Backweston Campus
Celbridge
Co Kildare
W23 X3PH

Tel: +353 1 5058895

Email: potatoonline@agriculture.gov.ie

Website: <http://www.agriculture.gov.ie/farmingsectors/crops/potatoes/seedpotatocertificationscheme/>

Ware Potato quality, labelling and associated plant health issues

The Department has a team of Inspectors based in its Horticulture & Plant Health Division that are involved in controls relating to the quality and labelling of ware potatoes as well as dealing with plant health issues that may arise in relation to the crop. In the event of concerns, queries or complaints regarding these matters please contact:

Horticulture & Plant Health Division

Department of Agriculture, Food and the Marine
Administration Building
Backweston Campus
Celbridge
Co Kildare
W23 X3PH

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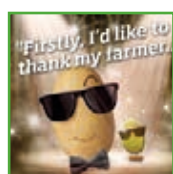
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Irish Potato Federation Contacts

Name	Address	Contact Details
Joseph Dennigan	Sam Dennigan & Co Palmerstown, Old Town, North Co Dublin	joe@samdennigan.ie Tel: 01 801 0500
Michael Kennedy	K&K Packs Limited Broughan Lane, The Ward, Co Dublin	kkpack@eircom.net Tel: 01 834 7586
Mark Beatty	Gold City Produce 13/17 Little Britain Street, Dublin 7	mbeatty@totalproduce.com Tel: 01 873 0581 / 01 872 1100
Colm McDonnell	Irish Potato Marketing Ltd. Unit 412, Q House, Sandyford Industrial Estate, Dublin 18	colm@ipm.ie Tel: 01 213 5410
Colm McDonnell	Donegal Potatoes Limited Colehill, Newtowncunningham, Co Donegal	colm@ipm.ie Tel: 01 213 5410
Michael Hoey	Country Crest Ltd. Rathmooney, Lusk, Co Dublin	Michael@countrycrest.ie Tel: 01 843 7061
Maurice Matthews	Seed Potato Company of Ireland Unit E3, Ballymun Industrial Estate, Dublin 11	mauricematthews@eircom.net Tel: 01 842 5431
Peter Keogh	Peter Keogh & Sons Ltd. Westpalstown, Old Town, Co Dublin	Peter@keoghs.ie Tel: 01 843 3175
Philip Meade	Meade Potato Company Limited Braystown, Lobbinstown, Navan, Co Meath	philipmeadejr@meadepotato.com Tel: 046 905 3198
John O'Shea	O'Shea Farms Limited Piltown, Co Kilkenny	marie@osheabros.ie Tel: 051 643 733
Edward English	Castlecor Potatoes Mallow, Co Cork	nedenglish02@hotmail.com Tel: 022 48228

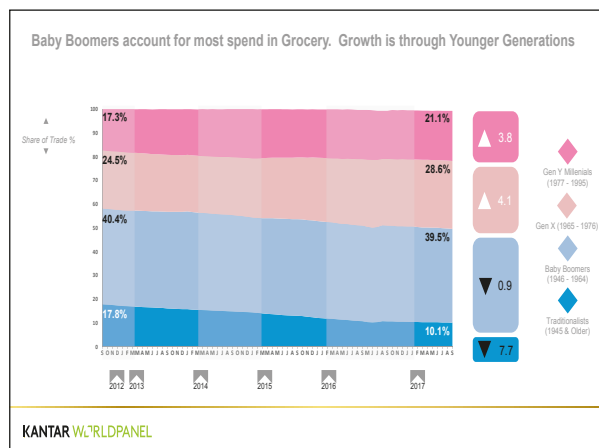
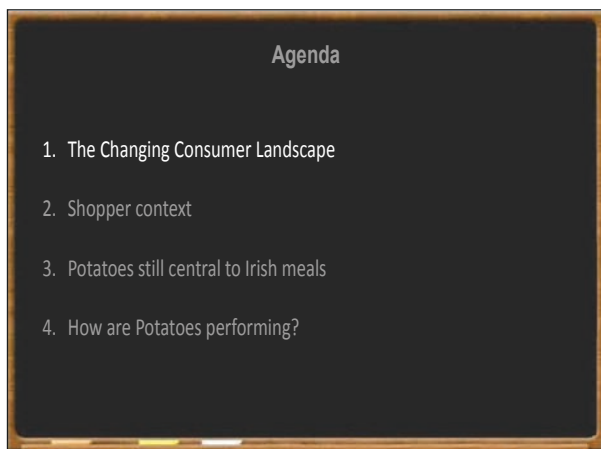


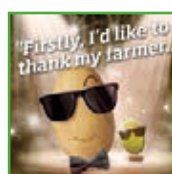
Conference Presentations

Session 1

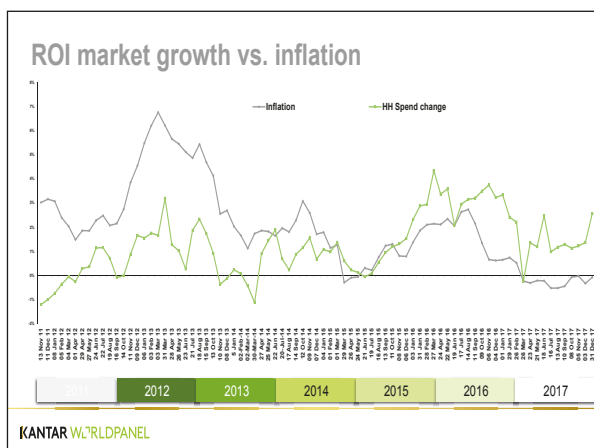
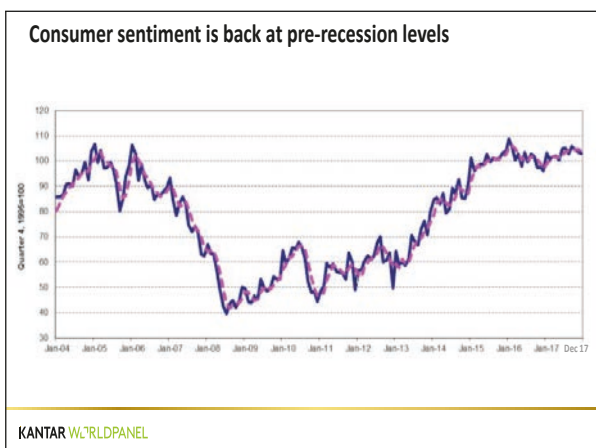
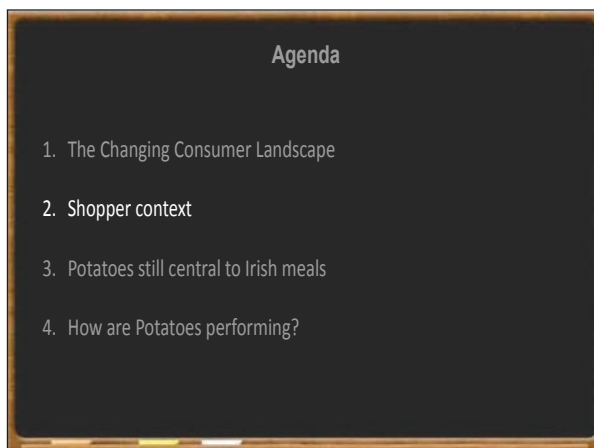
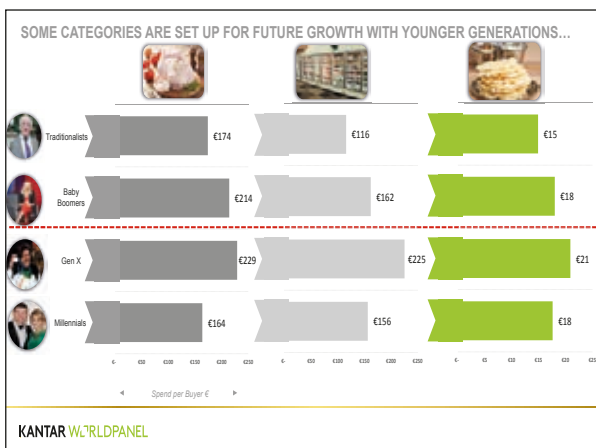
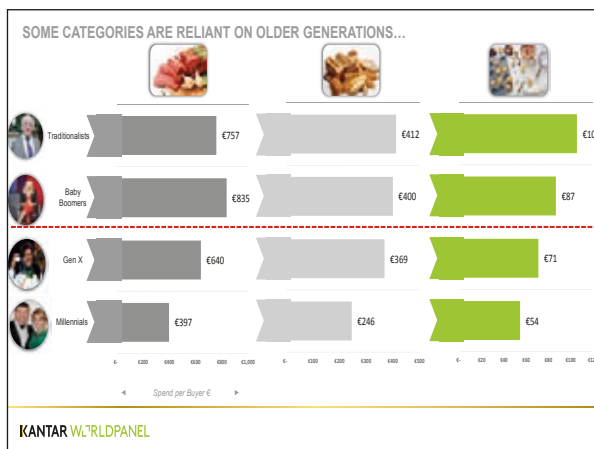
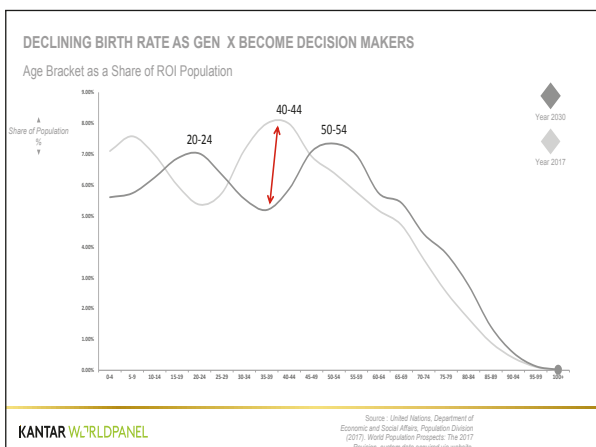
Potato Trends in a Modern Market

Cliona Lynch, Client Manager, Kantar Worldpanel

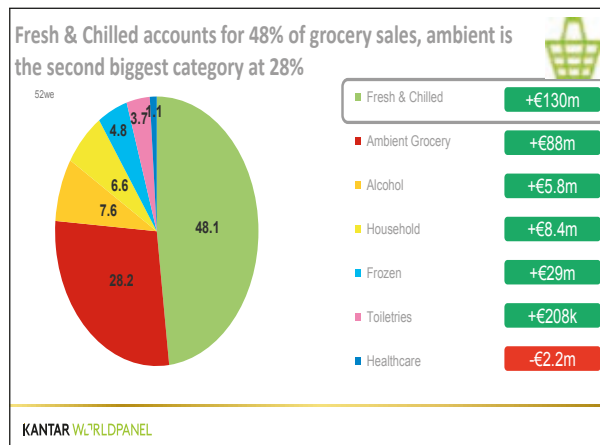
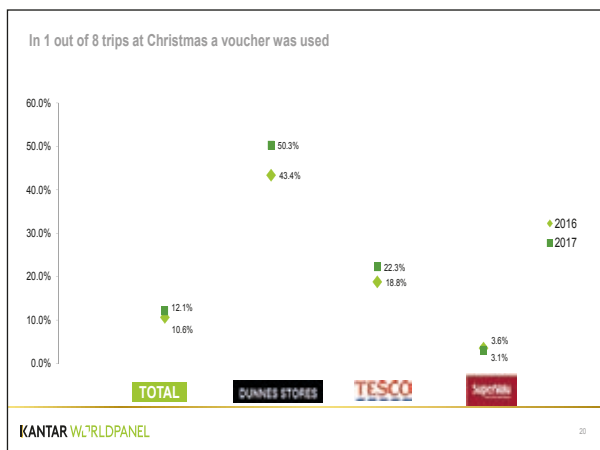
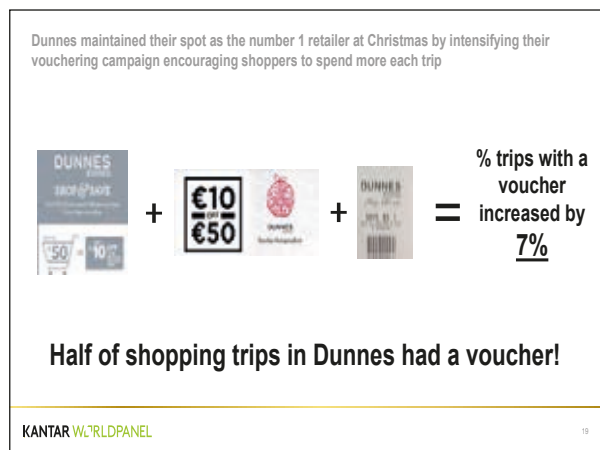
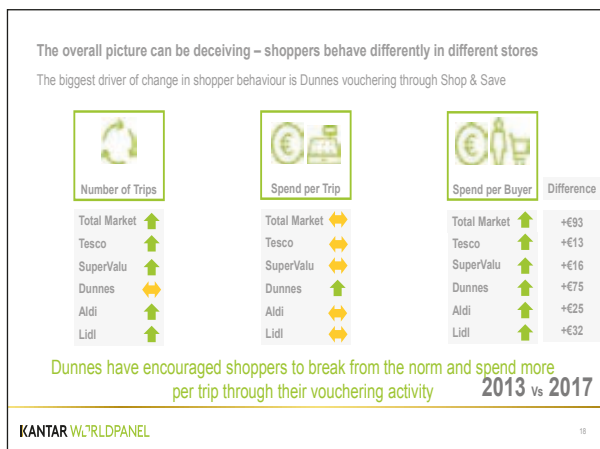
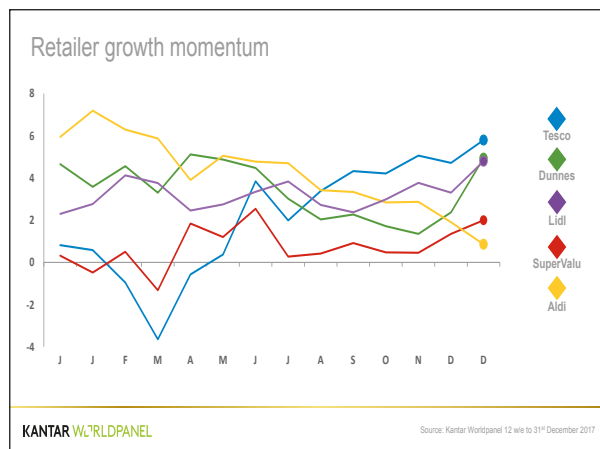
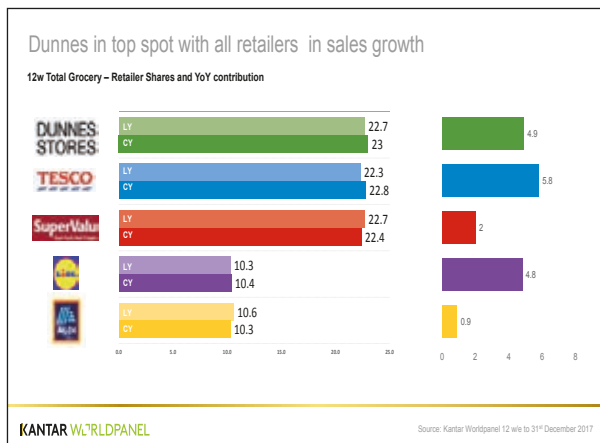
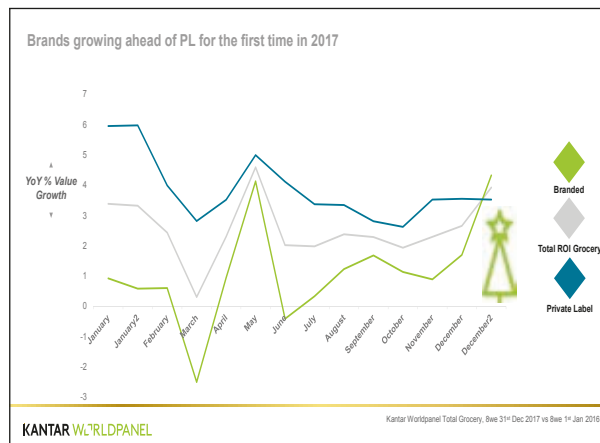


Potatoes – What's Under The Skin?



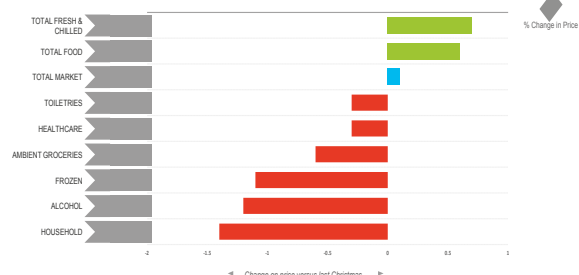
Potatoes – What's Under The Skin?





Potatoes – What's Under The Skin?

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Agenda

1. The Changing Consumer Landscape
2. Shopper context
3. Potatoes still central to Irish meals
4. How are Potatoes performing?

208K Tonnes of potatoes sold in 2017

Potatoes are bought once every 1 second in Irish Retailers



1.67 million households purchasing annually

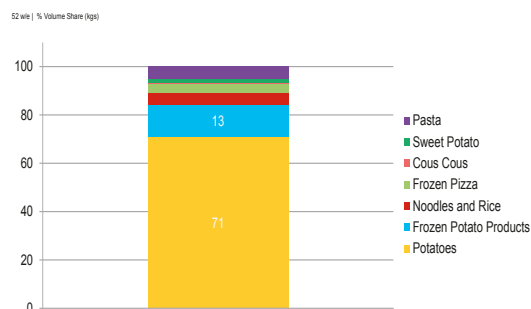
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11% of all shopping trips feature potatoes. These trips contribute 23% of all sales. When potatoes are included in the basket, these grocery trips are worth €27.90 more than the average, highlighting the importance of the potato category to retailers



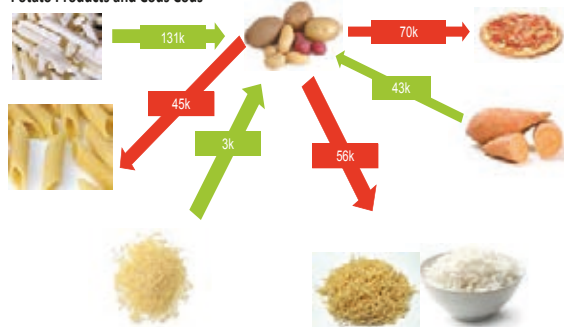
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Potatoes and Frozen Potato Products together account for 84% of main meal carbs



KANTAR W^oRLDPANEL

Volume switches show shoppers moving to Potatoes from Sweet Potato, Frozen Potato Products and Cous Cous



KANTAR W^oRLDPANEL

Agenda

1. The Changing Consumer Landscape
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Potato sales are down slightly this year as consumers are buying less volume at a lower price

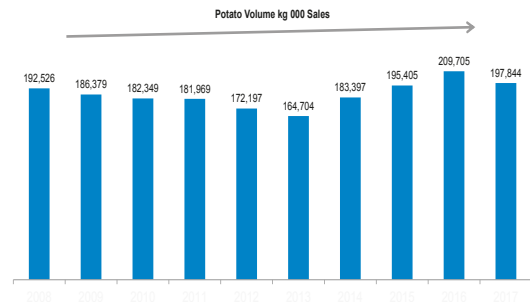


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Potatoes – What's Under The Skin?

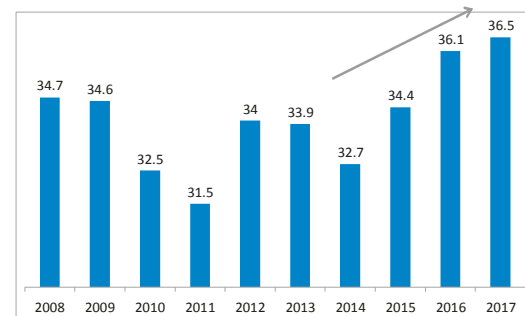


In volume terms, Potatoes are back remain ahead of 2008 levels with a strong recovery since 2013

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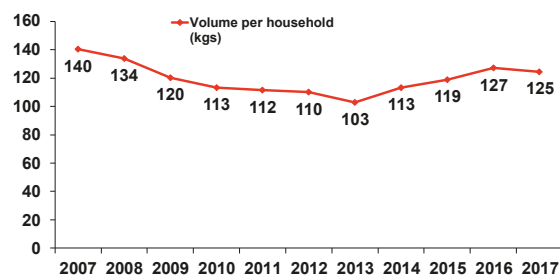
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Frequency of purchase has recovered since lows of 2011 and 2014 with shoppers now buying Potatoes more than 36 times a year – higher than 2008/9 levels

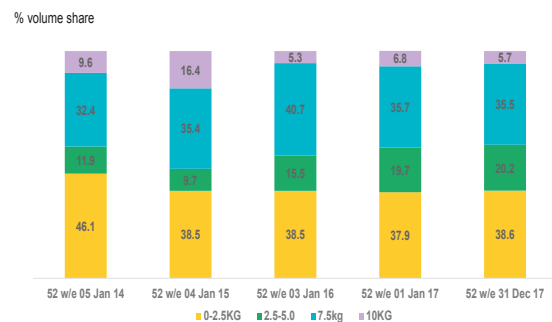
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Volume per household has been in recovery since 2013 – as consumers are willing to purchase more potatoes compared to 2009

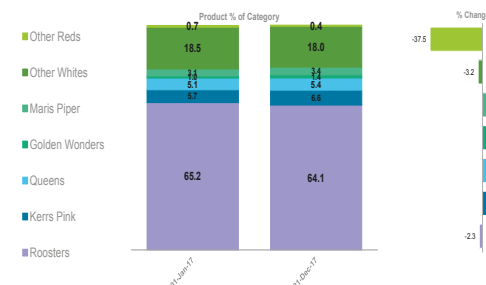
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2.5Kg – 5Kg have become increasingly popular over the past 3 years, while larger 5Kg-7.5Kg have seen a decline in share since 2016

KANTAR W^oRLDPANEL

Roosters remain the dominant type of potato, but are losing share, while Golden Wonders see the strongest growth (+38.2% YoY)

Product % of Category Volume | Actual | Total Outlets | 52 w/e

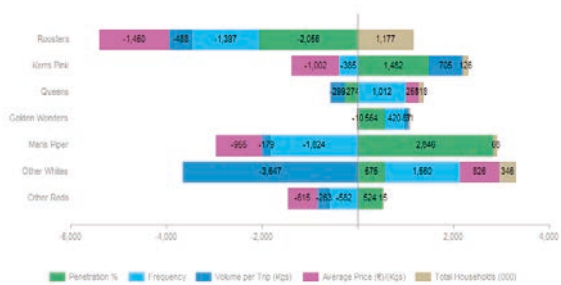
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38

Golden Wonders growth is being driven mainly through more shoppers purchasing, but also growth in frequency

31-Dec-17 vs. Previous Year

Total Outlets | 52 w/e | Previous Year

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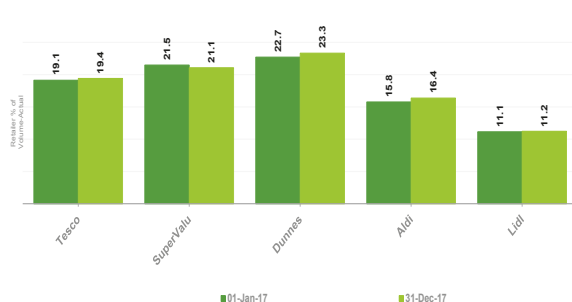
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Where are the retailer opportunities?

KANTAR W^oRLDPANEL

Dunnes remain the number one retailer in Potatoes, and are growing share YoY

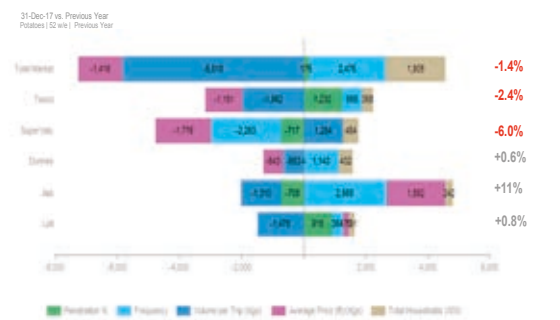
Retailer % of Volume | Actual | Potatoes | 52 w/e

KANTAR W^oRLDPANEL



Potatoes – What’s Under The Skin?

Aldi have seen the strongest performance, as their consumers are returning more often to purchase Potatoes and Pay a higher Price.



KANTAR W^{ORLD}PANEL

42

Potato trends in a Modern Market

Cliona Lynch - Kantar Worldpanel



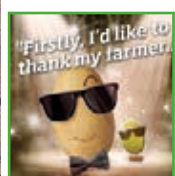
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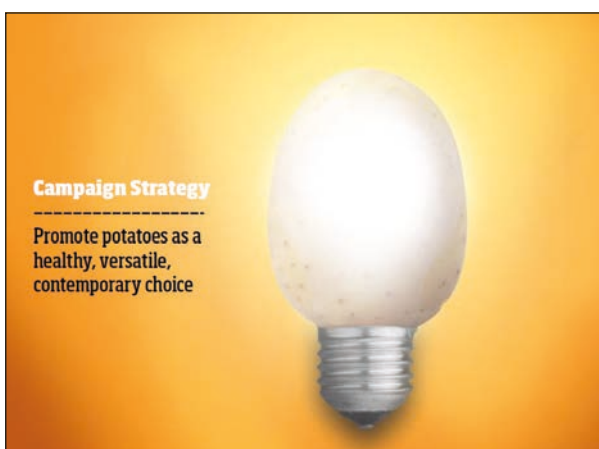
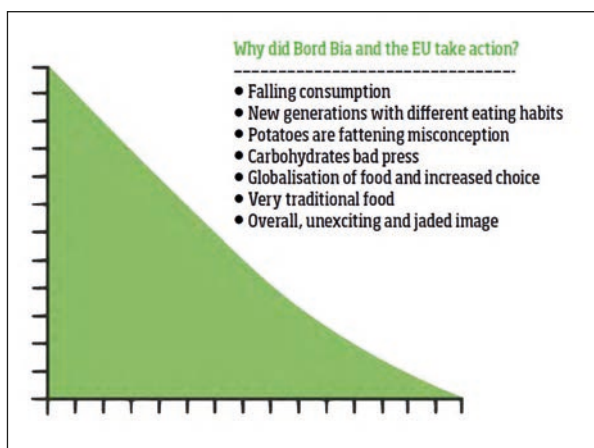
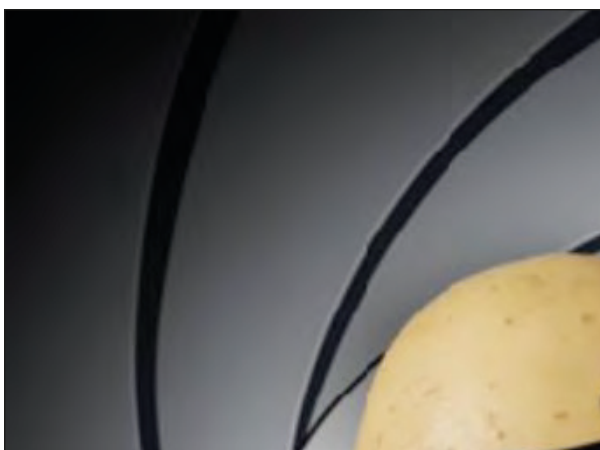
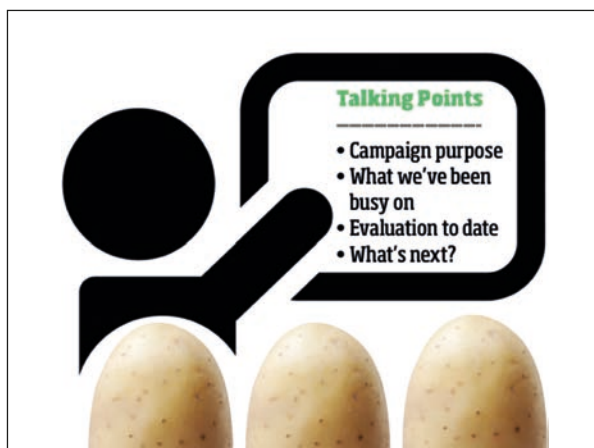
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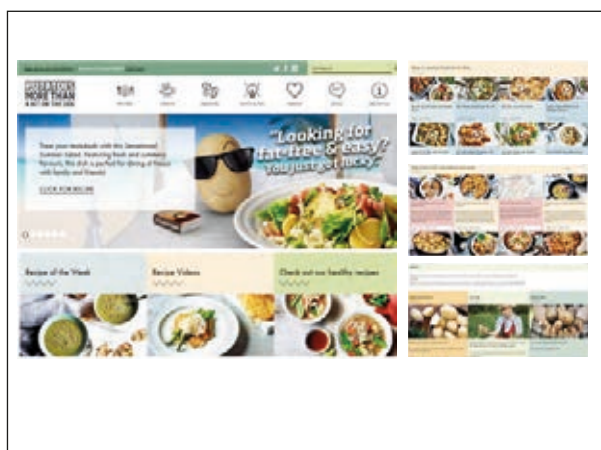
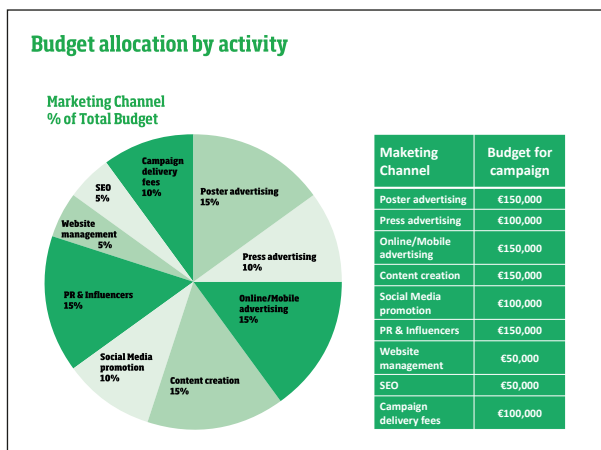
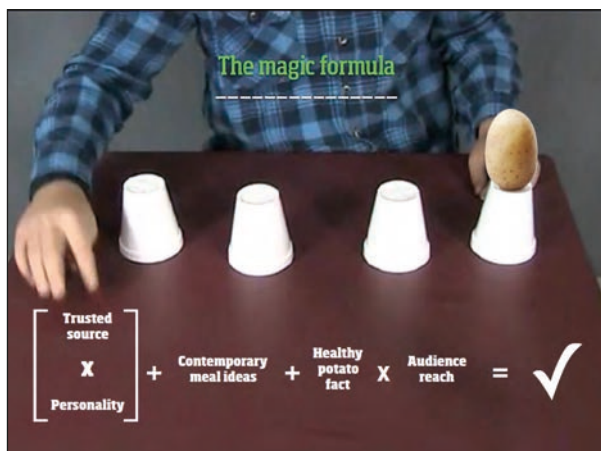


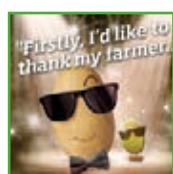
Review of EU Potato Promotion Campaign

Chris Linsell, Client Service Director, Kindred



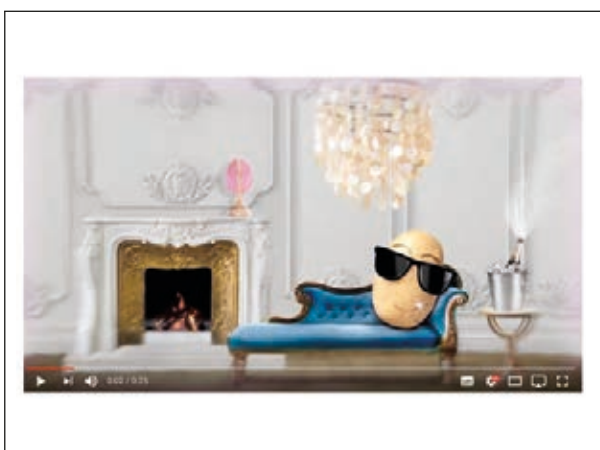
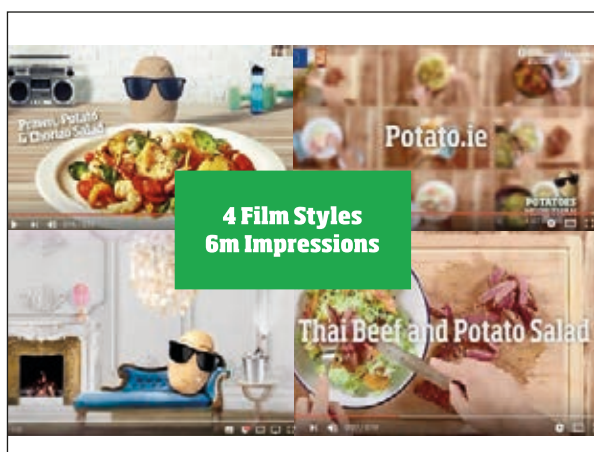
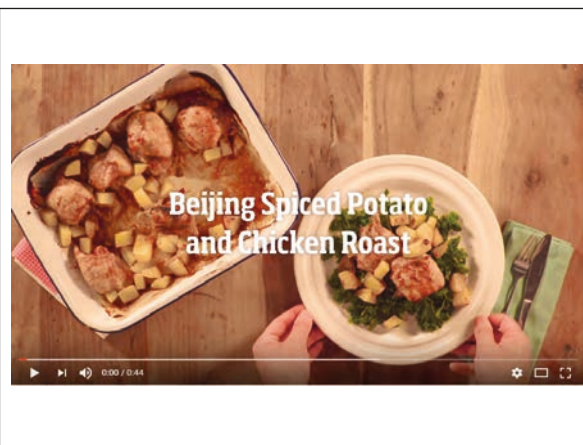
Potatoes – What's Under The Skin?





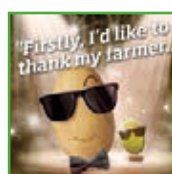
National Potato Conference & Trade Show 2018

Potatoes – What's Under The Skin?

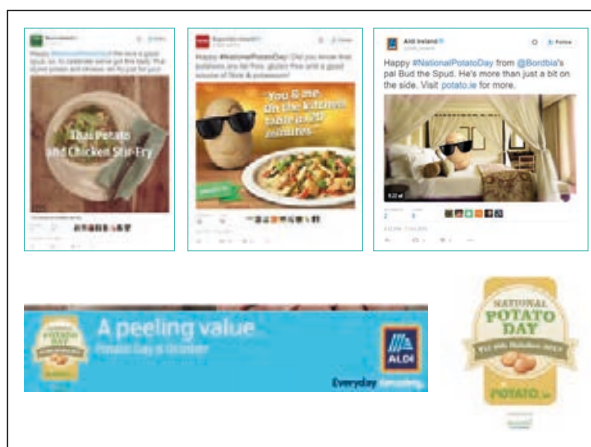


Potatoes – What's Under The Skin?





Potatoes – What's Under The Skin?



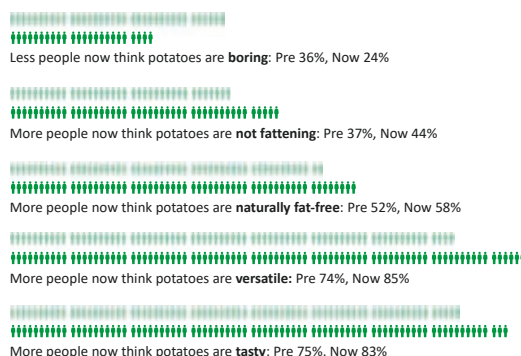
EU targets & campaign measurement

- **Over three years:**
 - Increase of 28,000 tonnes
 - Increase frequency of purchase by 6%
 - Increase health perceptions by 8%
- **Campaign measurements**
 - Kantar (sales and behaviour)
 - Independent tracking of attitudes, awareness, behaviour
 - Communication KPIs: media publishers reporting data; Google Analytics; Gorkana; Social Media (Pulsar)

Independent tracking by Public Knowledge



Independent tracking by Public Knowledge



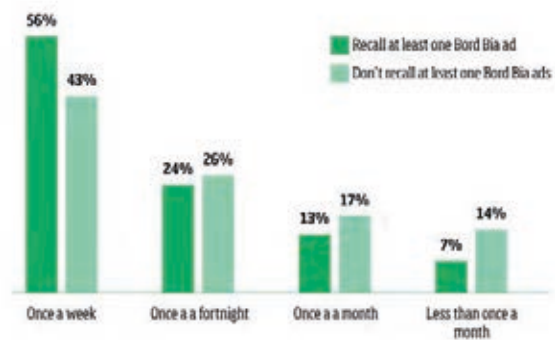
Campaign communication KPIs to date

KPIs	Campaign targets	Campaign running total
Poster advertising - Impacts (Ireland)	18,000,000	28,000,000
Press advertising - Impacts (times seen by audience) (Ireland)	7,800,000	9,100,000
Press advertising - Insertions (Ireland)	26	26
Digital advertising - Impressions (Ireland)	6,400,000	9,700,000
Digital advertising - Clicks to website (Ireland)	64,000	103,000
PR - Coverage pieces (Ireland)	213	182
PR - Estimated AVE (Ireland)	€770,000	€850,000
Website - Visits (Ireland)	375,386	401,623
YouTube - Views (Ireland)	60,000	860,000
Facebook - Likes (Ireland)	32,600	57,140
Facebook - Monthly interactions (GB & Ireland)	10,000	64,222
Twitter followers (GB & Ireland)	10,000	27,800
Instagram followers (GB & Ireland)	10,000	29,800

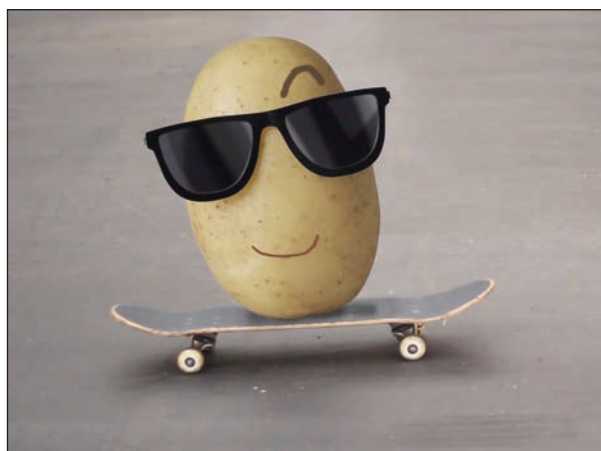
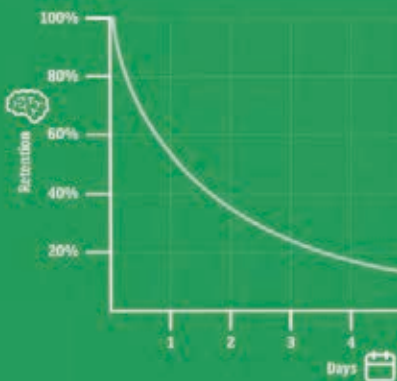
Potatoes – What's Under The Skin?



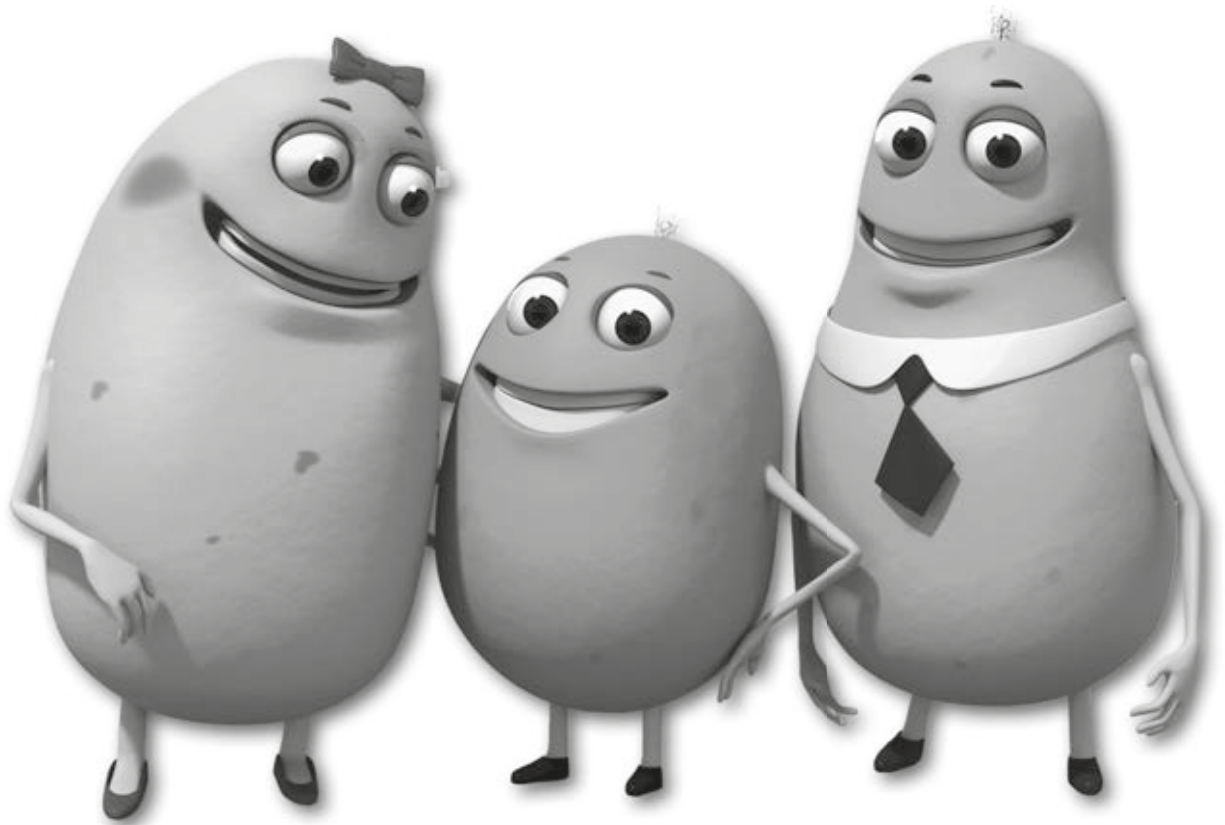
Burst 5 Potato Consumption



The Ebbinghaus Forgetting Curve



**wilson's
country**



Potatoes are our passion!

Proud to support the
2018 National Potato Conference

www.wilsonscountry.com



Health Benefits of Potatoes

Aoife Hearne, Dietitian




...making good nutrition simple

Give Me One Reason to Eat Spuds
Aoife Hearne RD




Background

- Sales of potatoes decreasing
- Fear of Carbohydrates



Backlash to carbohydrates?



Almost half of food in Irish shopping baskets is ultra-processed
Future generations will look at today's food consumption in the same way we view sending children up chimneys, says obesity expert


© The Irish Times, 17 Feb 2018, 10:00 | Updated: 17 Feb 2018, 09:47

Catherine Cowley
Nutritionist



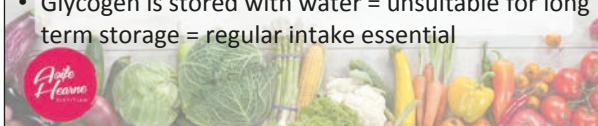
The increasing use of ultra-processed foods like cereals, soups and instant meals, highly processed bread and meat products and sweetened, acid-flavoured 'soft drinks' is the main culprit, says leading expert Prof David Bellisle.

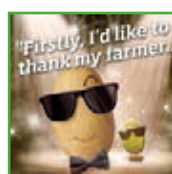
What are carbohydrates?



A little bit of science: The Facts

- Carbohydrates (glucose/sugars)
- Essential for energy
- Glycogen = stored form of carbohydrate
- Glycogen is stored with water = unsuitable for long term storage = regular intake essential





Potatoes – What's Under The Skin?

A little bit of science: The Facts

- Glucose = required for brain function
- At rest, the brain and CNS utilise most of the blood glucose
- Carbohydrate recommendations: 45 - 65% of total calories consumed (Institute of medicine)



In field of sports nutrition

"When the going gets tough, the tough get carbohydrates"

Louise Burke, PhD Sports Dietitian



Why has there been a backlash to carbohydrates?



WHO Obese Model Study 2014

- Ireland is on track to become the fattest country in Europe by 2030
- Estimate by 2030: 85% women overweight
57% obese
: 89% men overweight
48% obese



Carbo-phobia strikes

- Weight loss is a BIG business
- There needs to be a 'bad' guy
- Perception that carbohydrates are a 'problem' food in our diet



Carbo-phobia strikes

- Low carbohydrate diets are trendy
- The Paleo diet was the most googled diet in 2013
- Evidence?



But...do diets work?

- The evidence tells us:
- A resounding..... **NO**
- Only 2% of people are successful losing weight when following a diet!



Potatoes – What's Under The Skin?



Spectrum of Carbohydrates



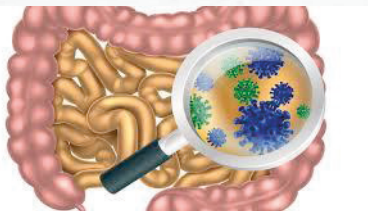
The Risks Associated with a Low Carb / No Carb Diet?

- Negative impact on gut health
- Impact on immunity?

THE FACTS ABOUT CARBOHYDRATES?

Why do we need Carbohydrates?

- Essential
- Favorable
- Part of exercise



Source of?

Potassium
Vitamin C
B vitamins

Contribution to the Irish Diet?

Vitamin C
Folate
Iron



Dietary Fibre

IUNA DATA 2001 Vs 2011

Category	1946 -1948 Irish national nutrition survey	2001	2011
Mean Daily intake fibre		20.2g/day	19g
Contribution of potatoes to fibre intake		20%	13%
did not meet nutritional goal for dietary fibre		75%	81%
Mean Daily Intake of potatoes	549g	158g	125g
Contribution of potatoes to energy intake		11%	7%

Best Choices of Carbohydrates?

Source of Fibre
Source of Fibre

Low in Saturated Fat
Low in Sugar

Potatoes

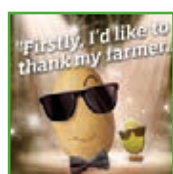


Why is Fibre important?

- Many reasons
- Gut health
 - fibre provides the food the good bacteria in our gut need to survive

Variety of Fibre for Diversity

- info on how we achieve this
- fibre containing foods
- fruit and veg



Potatoes – What's Under The Skin?

Fibre?

Food	Fibre Content
potatoes (2 medium in skin)	14.3
White rice (65g)	0.72g
Brown Rice (65g)	3.3g
white pasta (65g)	3.2g
brown pasta	6.1g
porridge	3.1g
wholemeal bread (2 slices)	7.6g
white bread (2 slices)	2.1g

A tale of two very different days

	Day 1	day 2
Breakfast	Corn Flakes	porridge
Lunch	white bread sandwich	Brown bread Sandwich
Dinner	white rice	Potatoes
Total Fibre	4g	25g

What is best for mental / physical energy?

Best Foods For Energy

- Carbohydrate (fibre) + protein



Did you know?

An average baked potato in its skin has MORE fibre than 2 slices of wholemeal bread!



Did you know?

A medium sized potato has 3 times MORE potassium than a banana!



Nutrition & the Potato: What you may not know

- Naturally gluten free - suitable for people with coeliac disease
- Suitable for vegetarian and vegan diets



Nutrition & the Potato: What you may not know

- A friend to people with IBS following the Low FODMAP diet



Potatoes – What's Under The Skin?



Nutrition & the Potato: What you may not know

- Grown in practically every culture on the planet



My Top Tips: Tip # 1

- Preparation is key
- Planning meals for the week
- Food shopping
- Go to produce section first in the supermarket
- Be sure to fill 1/3 of your shopping trolley / basket with fruits & vegetables



My Top Tips: Tip # 2

- Watch your portions



My Top Tips: Tip # 3

- Don't peel it!



My Top Tips: Tip # 4

- Limit the addition of high saturated fats



My Top Tips: Tip # 5

- Variety is the spice of life!



How does the potato fit into health eating guidelines?

- Important part in a healthy balanced way of eating
- Need to get back to our roots
- Use potatoes as an ingredient in a meal
- This joint Bord Bia & Potato industry potato campaign can empower Irish people to do just this!

How to put it into Action



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Email: jmkehoe@iol.ie

Potatoes – What's Under The Skin?



Health Benefits of Potatoes

Fiona Crispie, Teagasc & APC Microbiome Institute



<http://apc.ucc.ie>



Spuds and good bugs!


(how potatoes help our microbiome)

Fiona Crispie Ph. D.
Teagasc Sequencing Centre






Teagasc



<http://apc.ucc.ie>


Our microbes - Some impressive facts

- Microbes are a part of human life, living on all the surfaces and cavities of the human body.
- More microbes than human cells
- Microbe genes : human genes (regarded as the 'other' genome)
- Majority of these microbes are found in the gut (but those located at other sites can also have significant roles)
- Many of these can't be grown in the lab but thanks to DNA sequencing technologies we have a much better understanding of the composition and role of our microbes



Unlike our human genome, our microbial genome can change....contributing to health or disease


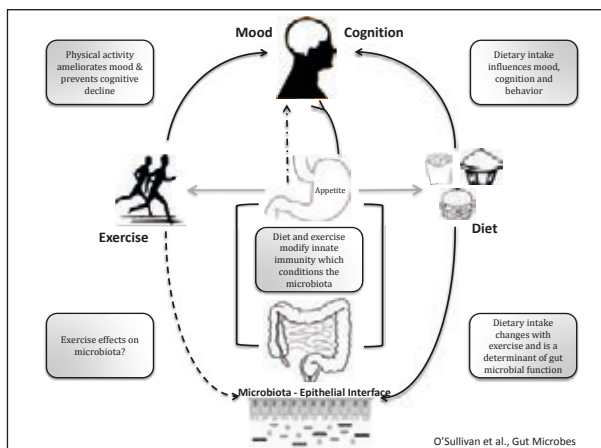
Some things that alter our gut microbes (gut microbiota) include diet (+ or -), probiotics (+), prebiotics (+), antibiotics (usually -)




Teagasc


THE PLATE COUNT ANOMALY

Culturable fraction < 30%







AthMet




Elite Athletes n=40
Control BMI <25 n=23
Control BMI >28 n=23




Data collected

- Fasting
- Clinical
- Diet (FFI)
- Body co
- Faeces (microbial sequencing)



Teagasc




Low to desirable allergen

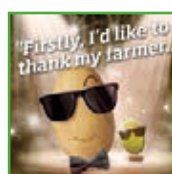
micro in ch BS at

as less able to others)






Teagasc



Potatoes – What's Under The Skin?



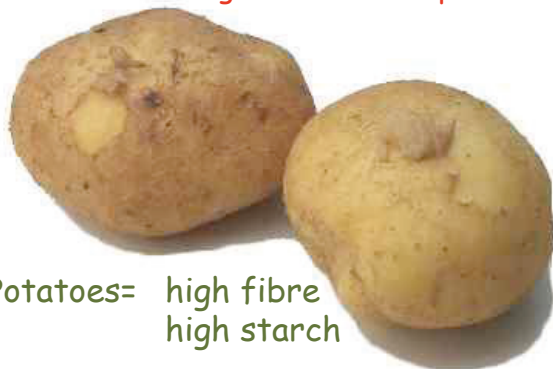
- Higher diversity of gut microbiota in athletes
- Clear separation of microbial communities between athletes and controls – there were different microbes present in the rugby players to the controls
- Increased fibre and protein intake as well as increased lean mass correlated with levels of specific short-chain fatty acids



Gut feeling???



So what's it got to do with spuds?



Potatoes= high fibre
high starch

And now for the science!

Digestibility and prebiotic properties of potato rhamnogalacturonan I polysaccharide and its galactose-rich oligosaccharides/oligomers.
Khodaei N¹, Fernandez B², Fliss P³, Karboune S⁴.
Carbohydr Polym. 2016 Jan 20;136:1074-84. doi: 10.1016/j.carbpol.2015.09.106. Epub 2015 Oct 23.

Effects of Potato Fiber and Potato-Resistant Starch on Biomarkers of Colonic Health in Rats Fed Diets Containing Red Meat.
Paturi, G., Nyanhanda, T., Butts, C. A., Herath, T. D., Monro, J. A. and Ansell, J. (2012), *Journal of Food Science*, 77: H216–H223. doi:10.1111/j.1750-3841.2012.02911.x

In Situ Prebiotics for Weaning Piglets: In Vitro Production and Fermentation of Potato Galacto-Rhamnogalacturonan.
Strube, Mikael Lenz et al Ed. G. T. Macfarlane.
Applied and Environmental Microbiology 81.5 (2015): 1668–1678. PMC. Web. 1 Feb. 2018.



Take home message!



and love (eat) potatoes....

Acknowledgements



All athletes both elite and non



Vision 1 group



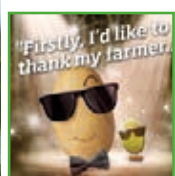


FARMING IS IN OUR ROOTS

Country Crest has a great, true story. One that really is about local heritage, dedication and ultimately, a leading Agri-Food business. With sustainability at our core, we respect the power and purity of the land, and through this, we deliver the best produce to the Irish market.

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True to nature



Conference Presentations

Session 2

Optimising Storage

Adrian Cunnington, *Head of Crop Storage Research*

AHDB Sutton Bridge, East Bank, Sutton Bridge, Spalding, Lincs. PE12 9YD. UK

adrian.cunnington@ahdb.org.uk

When storing any type of potatoes, it is growers and store managers who deliver the quality the markets demand in a timely, consistent, cost-effective and, as much as possible, in a predictable way who are most successful.

In reality, most are still on a journey towards meeting all of those objectives in full. But, in recent years, it has been noticeable that storage is a part of potato production which has been neglected in comparison with other facets such as planting, harvesting and grading. Progress in research has not been sufficiently rapid and on-farm performance has been quite static. Many stores have not been upgraded to any significant degree and this means that quality from storage is frequently coming up short, fuelling a vicious circle of decline.

However, there are a range of relatively low cost improvements that can still be made to even quite old stores to substantially improve their performance:

Fan control has been hugely improved over the past 15-20 years with the availability of affordable speed control. Inverters (a.k.a. variable frequency drives) allow fans to be run at a range of speeds which can be tailored for specific tasks. Run the fan flat out for drying but, when the temperature has been stabilised for holding, it can be slowed down. At 80% capacity, it will cost half as much to run. The speed control can also be used to improve CIPC distribution too.

In 'overhead-throw' style box stores, the addition of air divider curtains or the construction of a plenum chamber around the fridge can make an enormous difference to the quality of air circulation in the store by eliminating short-circuiting. Work by AHDB has indicated that over double the airflow can be achieved at the front of the store. This means there's more air to do the cooling required and fans will run for less time helping to cut weight loss. And there is more that can still be done to improve the lateral uniformity of the airflow to help eliminate warm corners in the store; trials with a 60% mesh in front of the fridge gave a significantly improved air distribution.

Other changes that can be undertaken include installation of more complex ventilation to provide positive ventilation; insulation upgrades; fridge efficiency improvements; energy monitoring and air leakage analysis. All have their part to play in improving potato store performance.

Finally, there is scope to enhance stores further by installing humidification which can cut dehydration and, with appropriate controls, can offer improved ambient cooling. This will only be beneficial if the points listed above are attended to first. Increasing humidity raises the risk of condensation in any store where steps to eliminate significant temperature variation haven't been successfully applied.

Potatoes – What's Under The Skin?



Optimising storage

Adrian Cunningham
Head of Crop Storage Research
AHDB Sutton Bridge
UK

Requirements for storage

✓ Deliver quality markets demand

- Timely
- Consistent
- Cost-effective
- Predictable



2

Progress in storage over last 10 years

- ◆ Ventilation: use of frequency drives/inverters
- ◆ Storage efficiency ► airflow/CIPC
- ◆ Air leakage measurement
- ◆ Energy saving/renewables/sustainable refrigeration systems
- ◆ Alternative, residue-free sprout suppressants
- ◆ Humidification & environmental control
- ◆ Cold temperature management
- ◆ Agronomy & seed management: impact on storage
- ◆ Disease forecasting, diagnostics and control
- ◆ Decision support systems
- ◆ Factors affecting crop maturity
- ◆ Store decontamination
- ◆ Lack of engineering expertise
- ◆ Few new building developments



3

Problem for many

✗ Deliver quality markets demand

- Old stores struggling to deliver
- Rebuilding is not an option
- Run-down structures & equipment
- Not very efficient: costly to run
- Expensive to maintain



4



Raise awareness of the need for affordable storage improvement

- ◆ In GB, campaign called *Storage 2020* - target date for significant change across the industry
- ◆ No magic, one-size-fits-all solutions: recognise that every store is different
- ◆ Basic principles to be followed, such as providing uniform airflow throughout the store
- ◆ Simple upgrades can be very cost-effective
- ◆ In each case must maximise capability for storage task required - this also includes training!



5



But there are things we can do!

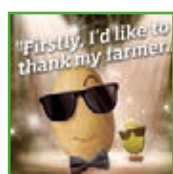
- Fan and ventilation system enhancement
- Better uniformity of airflow in box stores
- Improved application of CIPC suppressant
- Insulation upgrades
- Store conversions
- Energy monitoring
- Fridge efficiency optimisation
- Air leakage reduction
- Humidification etc etc...



7



8



Potatoes – What's Under The Skin?

Driving change in storage: fans

- Size for worst case conditions and energy savings are then possible from speed control using inverters

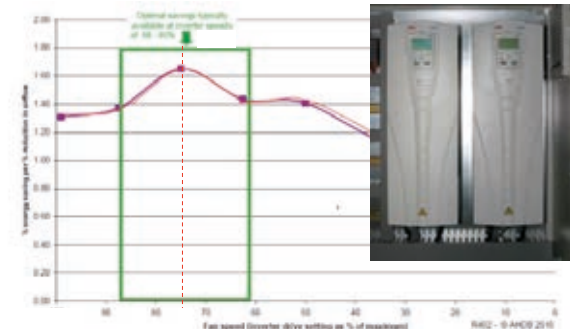


100%
1€
↓
80%
50¢



9

Inverters/VFDs



SBCSR/FEC Energy data



10

CIPC

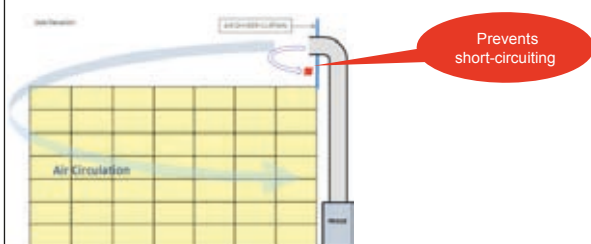
- UK label now has requirement for **active recirculation** in all stores: achieved using slow speed fans



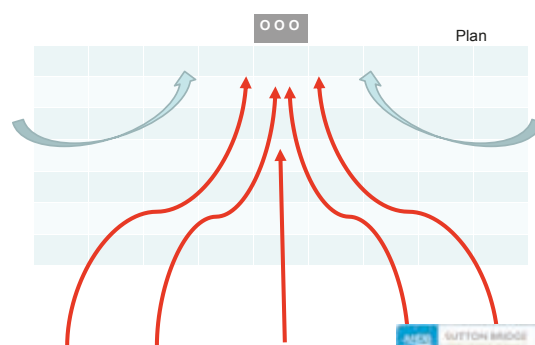
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Driving change in storage - airflow

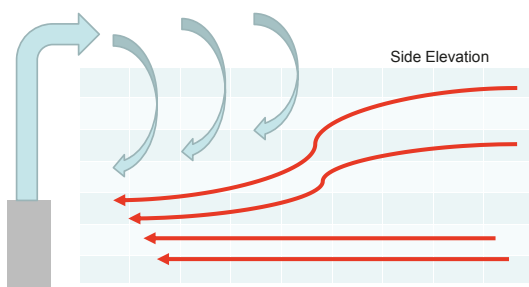
Air divider curtains can help significantly improve **temperature uniformity in OHT stores** at low cost, although further fine tuning may be needed.



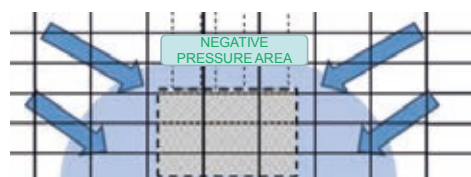
Airflow: 'Coke bottle' effect



'Coke bottle' effect



15

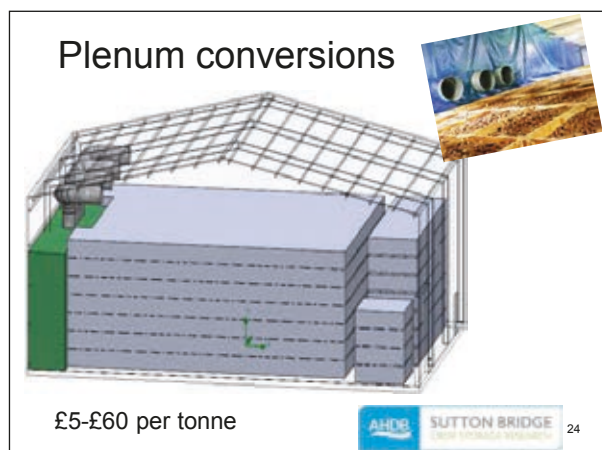
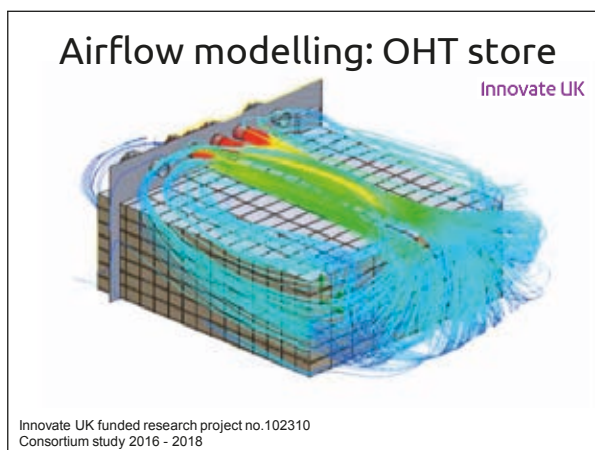
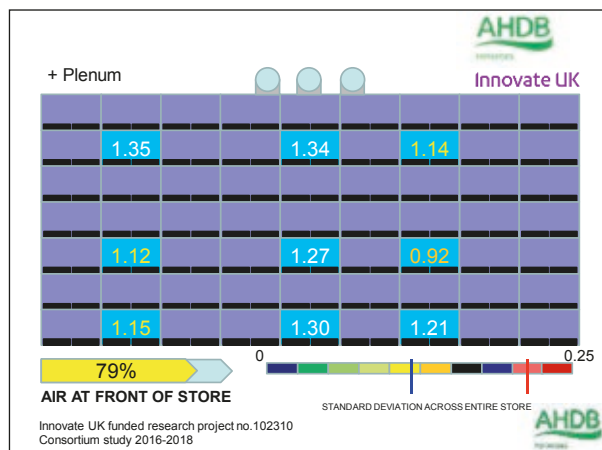
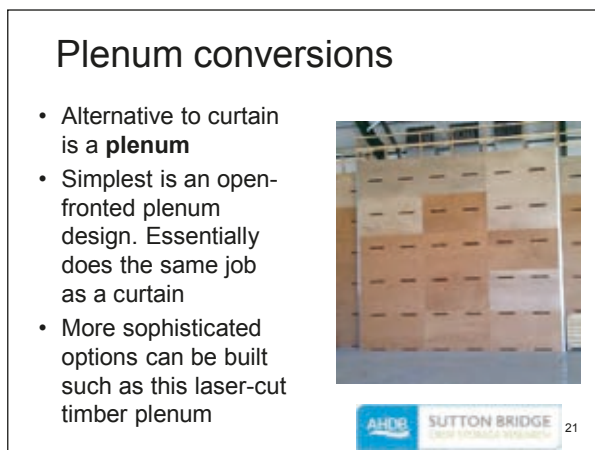
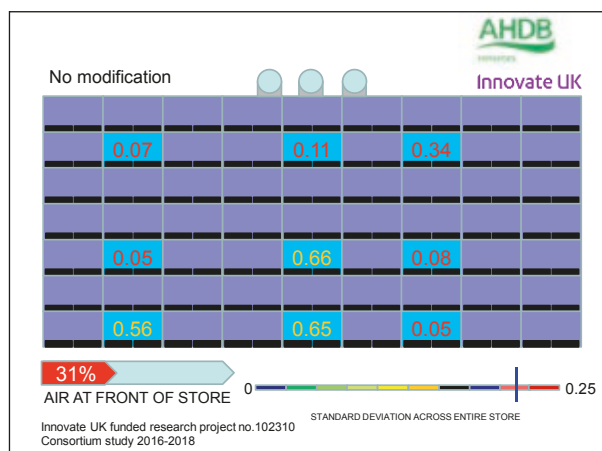
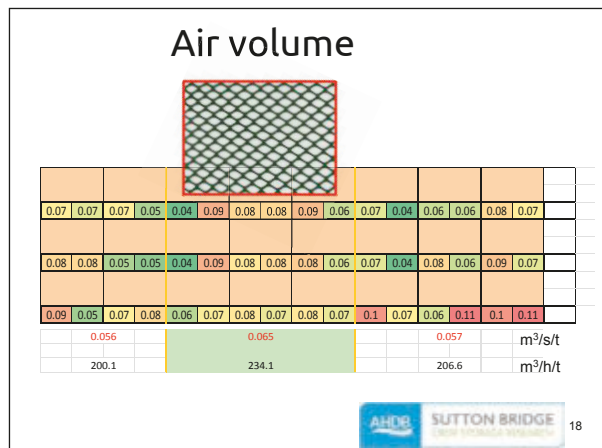
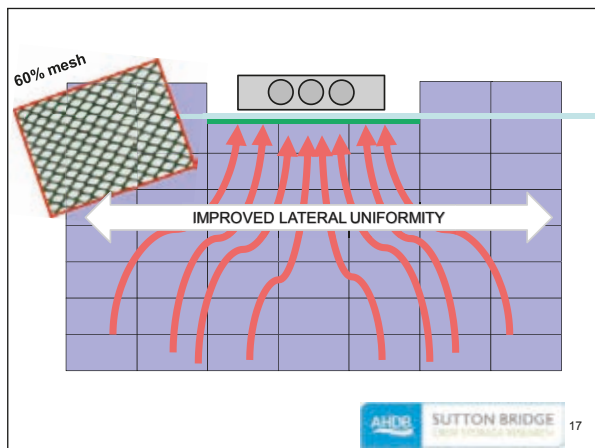


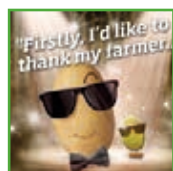
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0.03	0.03	0.02	0.03	0.04	0.07	0.08	0.08	0.081	0.06	0.03	0.03	0.03	0.03	0.04	0.03
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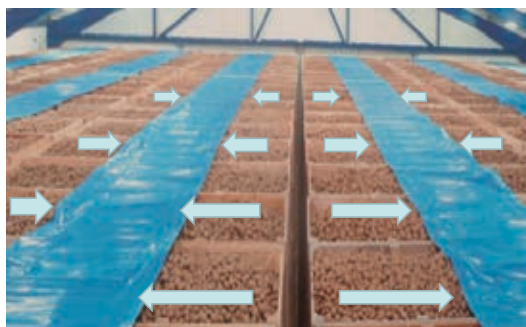
Potatoes – What's Under The Skin?





Potatoes – What's Under The Skin?

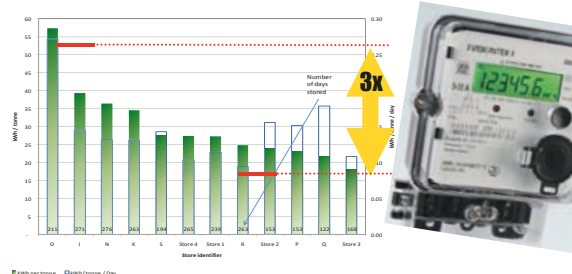
Enhanced conversion: lateral suction for positive ventilation



Driving change in storage - meters

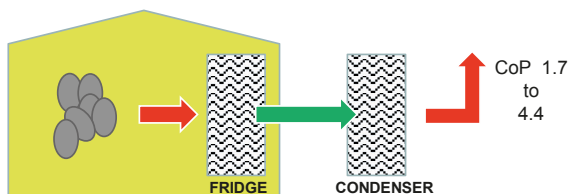
• Energy monitoring:

Metering is crucial for knowing your running costs



Driving change in store - fridge efficiency

Coefficient of Performance (CoP) : kW electricity > kW cooling



Heat transfer efficiency
Refrigerant being used
Crop > air transfer



27

Driving change in storage - insulation

- Older panel type insulation systems failing
- PU 'sprayfoam' still working well but may warrant overspray; degrades with UV and corrosion is an issue (rots metal from inside)
- Composite panels depend on quality of joints but many stores have significant leakage eg at the eaves. New panels have a PIR core
- Check gutter areas



28

Driving change in store – air leakage



29

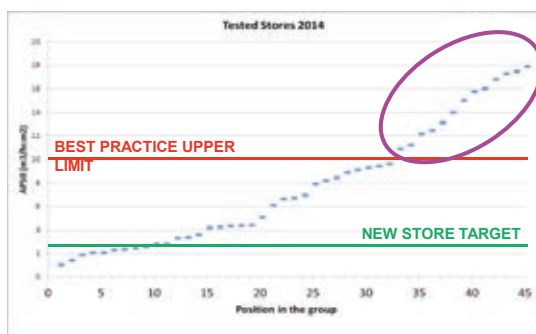
Driving change in storage - air leakage

- Potato stores work best when the environment within them is controlled
- Uncontrolled air leakage has been measured at levels up to 5.5m² equivalent per store
- Leakage can be responsible for as much as 50% of a store's energy use



30

Air leakage in commercial stores



Driving change in storage - humidity

- **Humidification** has potential to extend ambient air use (*adiabatic cooling*) and reduce weight loss. Best suited to processing stores. Use carefully as the more humidity is added the closer the air is to saturation - risk of condensation increases!



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Potatoes – What's Under The Skin?



Summary

- Fan and ventilation system enhancement
 - Better uniformity of airflow in box stores
 - Improved application of CIPC suppressant
 - Insulation upgrades
 - Store conversions
 - Energy monitoring
 - Fridge efficiency optimisation
 - Air leakage reduction
 - Humidification etc etc...
- All of the above can help to improve store performance and optimise returns



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Summary

- Lots of opportunity for optimising the storage you already have
- The extent to which you do this is your decision but information will aid this
- Makes sense to maximise the potential of existing buildings but, in some situations, there may still be a powerful case for investment in new, more efficient storage systems

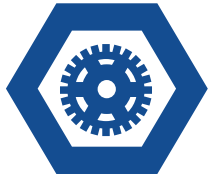


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PCN “The Hidden Threat”

Shane Kennedy, Teagasc Potato Advisor

Potato Cyst Nematode (PCN) The Hidden Threat



Shane Kennedy,
Teagasc Potato and Tillage
Advisor



The Irish Agriculture and Food Development Authority

Presentation Outline

- What is PCN?
- “A Pest That Requires Your Undivided Attention”
- PCN Testing
- The Current State of Play
- Avoid and Control Strategies
- Testing for PCN
- Summary



The Irish Agriculture and Food Development Authority

What is PCN?

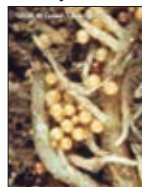
- A parasite that invades root tissues of potato crops
- Commonly known as eelworm
- Eggs can hatch and multiply rapidly in the presence of a suitable host
- Can result in severe yield loss
- A shovel full of soil can contain 1,000,000 nematode species



The Irish Agriculture and Food Development Authority

Two PCN Species

Globodera rostochiensis
(yellow cyst nematode)



Globodera pallida
(white cyst nematode)



Images from AHDB Encyclopaedia of pests and natural enemies in field crops; copyright of SASA



The Irish Agriculture and Food Development Authority

PCN in the Field



Images from Netherlands Food and Consumer Product and Safety Authority; Department of Agriculture, Food and the Marine; AHDB; Nematology Lab, Ontario Plant Laboratories, CFIA



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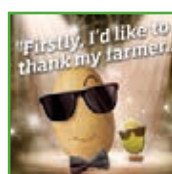
“A Pest That Requires Your Undivided Attention”

Dr. Matthew Back, Harper Adams University

- 9% of annual global yield loss
- Not just quality loss – complete loss
- High cost of chemical control
- Legacy effect
- Eggs can lay dormant in soil for up to 25 years



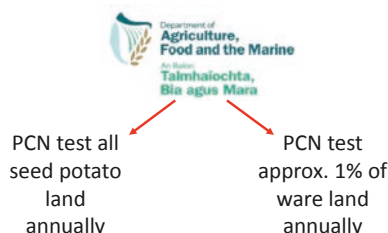
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Potatoes – What's Under The Skin?

PCN Testing

- EU PCN Directive 2007/33/EC



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Current Legislation

- If land found positive for PCN landowner is issued with a 'Potato Cyst Nematode Prevention Notice'
- Prohibited from growing potatoes or other host crops
- Must wait a minimum of 6 years before retesting



The Irish Agriculture and Food Development Authority

Ware Land Sampling 2013-2016

	Ware Area Sampled (ha)	PCN Infested Area (ha)	G. p (ha)	G. r (ha)	G. p & G. r (ha)
2013	71.54	7.33	3.21	4.12	0.00
2014	77.25	15.70	10.73	0.00	4.97
2015	85.61	19.67	19.67	0.00	0.00
2016	64.86	17.82	0.00	15.34	2.48
4 Year Avg	74.82	15.13	8.40	4.87	1.86

- Approx. 20% of tested land infested
- Historically, *G. rostochiensis* has been the dominant species in Ireland, are things changing?



The Irish Agriculture and Food Development Authority

The Current State of Play

Have *G. rostochiensis* levels plateaued and are *G. pallida* levels are rising?

- = Bad news, because with *G. pallida*....
- Hatching period is longer
- Can survive at lower temperatures
- Less resistant varieties
- Slower rate of decline
- Nematicides are less effective



The Irish Agriculture and Food Development Authority

Avoid and Control Strategies

- Variety selection
- Rotation
- Chemical
- Trap Crops
- Biofumigants
- Hygiene



The Irish Agriculture and Food Development Authority

Resistant Varieties

- Resistance to *G. rostochiensis* is conferred by one gene
- Resistance to *G. pallida* is more complex
- Resistant varieties encourage PCN eggs to hatch but arrest PCN lifecycle and reduce PCN populations
- Planting resistant varieties can 'clean-up' field



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What are the Resistant Varieties?



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Tolerant Varieties

- Resistant varieties may not produce desired yield
- Tolerant varieties have the ability to produce high yields despite the presence of PCN
- Usually achieved through increased root mass production
- But can leave behind a greater no. of PCN cysts
- Lacking info on varietal tolerance

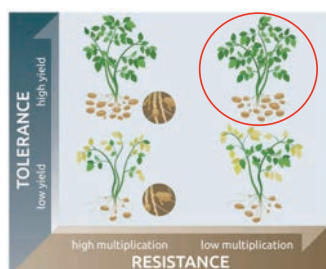


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Potatoes – What's Under The Skin?



Ideally a Resistant + Tolerant Variety



Source AHDB 2018



The Irish Agriculture and Food Development Authority

Rotation - modelling



- Crop rotation is important but not a cure

Chart produced by Dr. Brian Rigney using data extrapolated from British Potato Council



The Irish Agriculture and Food Development Authority

Nematicides



<http://www.gcs.agriculture.gov.ie/getcrop.asp>

Product Name	PCS No.	Function
Eagle Green Care	92367	Nematicide
NEMGuard DE	05368	Nematicide
Nemguard Liquid	92307	Nematicide
Nemathorin 10G	02867	Nematicide
NEMguard Granules	92306	Nematicide
Vydate 10G	03698	Nematicide
Mocap 15G	04005	Nematicide



The Irish Agriculture and Food Development Authority

Correct Nematicide Application

Information and photo courtesy of Dr. Simon Woods, Harper Adams University



- If label says 15 cm and you incorporate to 30 cm then you have effectively halved the product dose
- Tuber planting depth is also important - the first roots that form should be in the treated soil
- Select a forward speed for adequate incorporation



The Irish Agriculture and Food Development Authority

What is the Best Application Method?



The Irish Agriculture and Food Development Authority

Trap Crops

- Members of *Solanum* family act as an alternative host for PCN but nematodes are unable to complete their lifecycle
- ADAS/AHDB Report R468:
 - Black nightshade (*Solanum nigrum*) and garden huckleberry (*Solanum melanocerasum*) showed 45-75% reduction in PCN numbers.
- Sticky nightshade (*Solanum sisymbriifolium*) has also been used (Foil-sis and DeCyst)



The Irish Agriculture and Food Development Authority

Trap Crops

- Destroy before seeds become viable
- Longer growing season = greater PCN reduction
- Optimum sowing period of April to mid-July
- May require a 'gap-year' in cropping
- Farmer suggestion: funding for Trap Crop establishment?



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Trap Crops



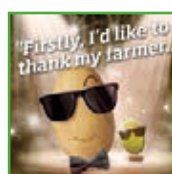
Solanum Nigrum,

Heal Farms, AHDB SPot Farm UK,
August 2017

Picture courtesy of Dr. Anne Stone,
AHDB

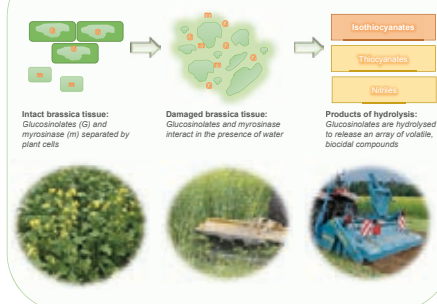


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Potatoes – What's Under The Skin?

Biofumigants



Images and information courtesy of Dr. Matthew Back, Harper Adams University



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Biofumigants

- Indian mustard and oilseed radish have performed well in Harper Adams experiments
- Planting: ideally May-August
- >50 kg/ha N & 25-50 kg/ha S
- Destruct & incorporate at green bud/early flowering
- Flail, rotovate and roll in one pass preferably in moist soil at 10-12°C

Information source: Dr. Matthew Back, Harper Adams University



The Irish Agriculture and Food Development Authority

Hygiene

- PCN can spread via soil on machinery, commercial vehicles, seed potatoes, potato boxes
- Anecdotal evidence of spread via manures
- Return tare soil to same field & segregate potatoes in storage by field
- Use certified seed
- Minimise volunteers



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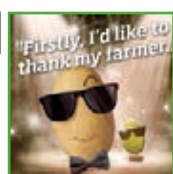
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Overview of Salad Potato Production in Ireland







Shay Phelan

National Potato Conference
20th February 2018



Introduction





- Background
- Overview of the program
- Stuart Wale - principles of growing salads
- Ed Tobin – a farmers perspective

Background



2015

- Main concerns identified by the industry
 - Drop in consumption of maincrop varieties
 - Rooster dominant
 - Increase consumption in other potato categories
 - Diversification needed
- Other market options looked at
 - Use existing machinery and building infrastructure
 - Salad Potatoes

Actions Required


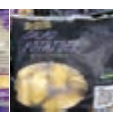

- Lack of expertise in Ireland
- Many theories about growing salads
- Identify an industry expert
 - Dr. Stuart Wale, SRUC
- Identify a host farmer
 - Slaney Farms


Industry Statistics

- Salad Potato market
 - Multiple trade 20,000-25,000t (7-8% of the Ware Market)
 - Plus restaurant & catering trade

Estimated Irish Production		
(IFA figures)	2014	2015
Area (hectares)	130	148
Irish Production (t)	3200	3650

Programme Details

- Period 2015 -2017
- 3 – 4 workshops per year
- All areas of production covered
 - Site selection – storage
- Variety comparison trials in Oak Park





Potatoes – What's Under The Skin?



Results

■ Increase in area planted

	Salat potato area (ha)	Salat potato production (tonnes)
2015	148	3764
2016	189	4257
2017	216	5400

Source: IFA

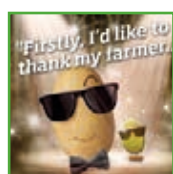
- More demand for Irish
- Irish grown - in all major outlets
- Opportunities for further growth



Acknowledgements

Dr. Stuart Wale
Slaney Farms
Keogh's Farm
Teagasc potato breeding staff
Seed suppliers





Salad Potatoes “A Growing Opportunity”

Stuart Wale, SRUC, Scotland

Salad potato production

Think QUALITY & UNIFORMITY

Stuart Wale, SAC Consulting
Ed Tobin, Slaney Farms

SAC Consulting is a Division of SRUC
Leading the way in Agriculture and Rural Research, Education and Consulting

Salad production

- Salads are a specialist crop
- QUALITY has to be at highest level
- No Quality = No Market as no other outlet
 - More attention to detail is required
- Some minor investment required (e.g. smaller web size on de-stoner and harvester)

1. Field selection – Think QUALITY

- Careful field selection is essential
 - Soil type that gives good skin finish
 - Uniform soil type
 - Freely drained field
 - Availability of irrigation
 - Reasonable humus and nutrient status

2. Seed rate – a matter of UNIFORMITY

- Target harvested tubers preferably in marketable fraction are:
 - 1 million+ (round oval)
 - 600k + (long oval)
- Use seed in narrow seed size range (e.g. 35x45mm, 35x40mm, 45x55mm)
- Plant a high seed rate according to variety
 - Space seed uniformly
 - Consider quad planting or 3 rows in a bed
 - Aim for uniformity of emergence

3. Fertiliser – Think UNIFORMITY

- Create best seed-bed possible for optimal root growth
- Ensure P applications are appropriate to encourage tuber formation
- Apply N according to variety needs – do not over-apply

4. Minimise skin disease – Think QUALITY

- Common scab is the most important disease that affects quality
 - Plan an irrigation strategy
- Use irrigation to prevent large soil moisture deficits around tuber initiation
 - But do not over-irrigate

Potatoes – What's Under The Skin?



5. Blight control – Think QUALITY



- Many salad varieties are very susceptible to foliage and tuber blight
- Plan a robust blight programme, starting early and continuing until all haulm is dead

6. Haulm destruction and harvest Think QUALITY



- Carry out test digs every few days as crops approach top riddle size in a number of locations in the crop
- Apply haulm destruction method when largest tubers are at top riddle size
 - Achieve rapid haulm destruction
- Harvest as soon as skin set is complete
- Minimise damage at all stages of harvesting

7. Storage – Think QUALITY



- Drying is a priority into store
- Once dry and field heat removed, cool down to target storage temperature (2-3°C) as quickly as possible
 - Monitor stored tubers regularly
- Avoid over ventilation during storage. Loss of excess moisture from small tubers makes them lose turgidity

POTATO HERBICIDES

DRAGOON GOLD

DIQUAT 200G/LT

Dual purpose - approved for weed control and desiccation.

MOST MICRO

PENDIMETHALIN 365G/LT

"Cleaner", micro encapsulated formulation.

Good partner for Sharmetrin.

PILOT ULTRA

QUIZALOFOP-P-ETHYL 50G/LT

For the control of grass weeds in potatoes (and other crops).

SHARMETRIN

METRIBUZIN 700G/KG

Available in a 5kg size. Bigger pack saves time and reduces waste.

Good partner for Most Micro.

LATE BLIGHT FUNGICIDES

C50 WG

CYMOXANIL 500G/KG AS A DRY FLOWABLE POWDER

Add to another fungicide to give "kickback". Do not use alone.

Applies more cymoxanil per hectare than other straight cymoxanil brands.

GRECALE

CYMOXANIL 200G/LT + FLUAZINAM 300G/LT AS A LIQUID

Protectant and curative co-formulation.

NAUTILE DG

CYMOXANIL 50G/KG + MANCOZEB 680G/KG AS A DRY FLOWABLE POWDER

Protectant and curative co-formulation. Gives a useful reduction of Early Blight (*Alternaria*) when used in the programme.

PENNCOZEB WDG

MANCOZEB 750G/KG AS A DRY FLOWABLE POWDER

Gives a useful reduction of Early Blight (*Alternaria*) when used in the programme.

PROXANIL

PROPAMOCARB 400G/LT + CYMOXANIL 50G/LT AS A LIQUID

Curative and systemic co-formulation in a handy 4 hectare pack. Use in slot 3 - 6 of the programme. If pressure is very high, adding some mancozeb gives an excellent 3-way mix.

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TTL PLUS

Fulvic Acid 23% as a liquid.

Applied around tuber initiation at 5lt/ha, it helps to increase saleable yield. Fulvic acid is also a superb chelator of trace elements. Adding 0.75lt/ha of TTL Plus to micro-nutrients will carry everything into the plant very quickly and efficiently.

UMOSTART

Micro-granular Starter fertilizer, mainly phosphate with some zinc and nitrogen, applied with the seed.

Very useful when planting into cold soils to give the crop a head-start.

WETCIT

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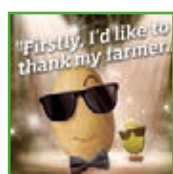
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Salad Potatoes “A Growing Opportunity”

Ed Tobin, Farm Manager Slaney Farms, Wexford



Slaney Farms team

- Located in Enniscorthy, Co. Wexford
- Variable soil types from sandy loams to heavy clays
- Produce and package full range of varieties Rooster, Golden Wonder, Kerr Pink, British Queens and Salad potatoes.
- Approached in 2015 to start project



Getting started for us



- Slaney Farms already existed in the marketplace
- The field selection process
- Variety selection year 1
- Split grading seed
- Seed inspection & tuber count per 50kg
- Fertiliser plan - found to be the most important component

Grown with passion...



Practical growing issues



- Achieving seed spacing
- Rapid growth
 - Emergence stage
 - Full canopy for blight protection
- Irrigation choices (choosing over Rooster)?
- Test digs before desiccation
 - Every 2 days once close to specification criteria
- Selecting harvest day
- Fitting harvest day with storage plan
 - i.e. changing webs

Grown with passion...



Produce in our hands

Year 1

- 5 varieties, a lot of handling
- Good feedback from customer base
- Supplied market from 1st September to 1st January

Year 2 & 3

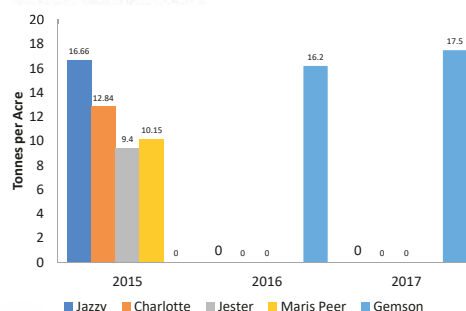
- 1 Variety - selected based on feedback and key learnings
- Supplied market from 1st September to 1st February



Grown with passion...



Varietal yields



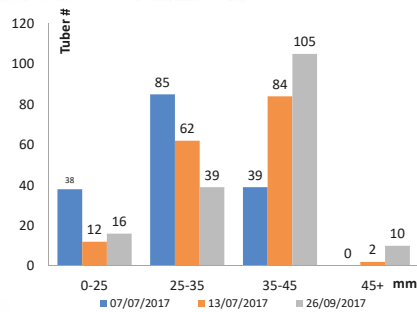
Grown with passion...



Potatoes – What's Under The Skin?



Gemson - sizing dig (2 Mtr)



Grown with passion...

Slaney Farms

Plans for 2018



Gemson

- Round shape
- High tuber numbers
- Low levels of skin blemish's
- Health stem and canopy
- Good skin set

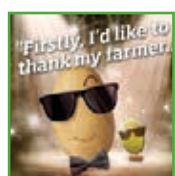
Grown with passion...

Slaney Farms

A special word of thanks ...

Grown with passion...

Slaney Farms

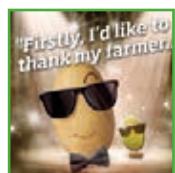


Notes

Potatoes – What's Under The Skin?



Notes



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