Developing Markets for Heritage Malts

Chris Ridout
John Innes Centre

New Heritage Barley

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What is Heritage?

- Old barley cultivars
- Plant breeder’s rights expired
- Landraces

Why Heritage?

- Genetically diverse
- Useful breeding traits
- Suited to location
- Unique flavours, processing & brewing characteristics
- Story and provenance


Germplasm Resources Unit at JIC holds 10,000 barley accessions
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Traits

Quantitative disease resistance in heritage barley varieties

Amal Muhammed (PhD 2007-2010)
Keith Thomas
University of Sunderland

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Chevallier and Armelle are very resistant to *Fusarium* Head Blight

Fusarium DNA by QPCR

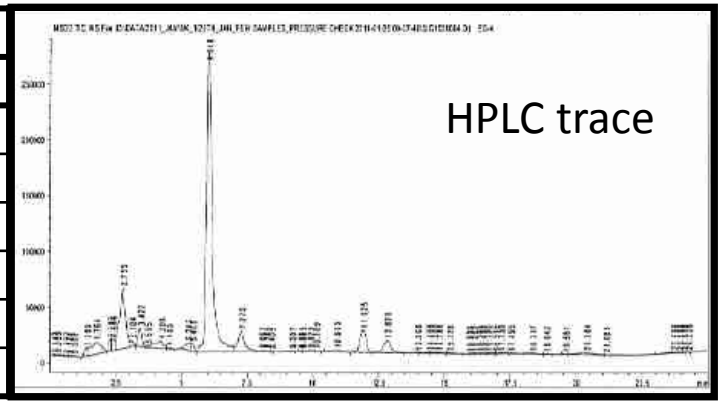
Barley varieties	Pg per 100 Ng DNA
Armelle	0.0068
Chevallier	0.0051
Oderbrucker	0.7369
Tipple	0.7304
Vellavia	0.4186
Westminster	0.3546

Westminster

Chevallier

DON Mycotoxin Analysis

HPLC-MS		
Variety		DON (ppb)** P.000
Chevallier	a	1555.20
Armelle	ab	5602.50
Westminster	abc	6845.80
Oderbrucker	bcd	13514.40
Tipple	cd	14534.40
Vellavia	d	15561.20



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Chevallier x Tipple cross

Chevallier♀ crossed to Tipple♂.
Andy Steed, Paul Nicholson

Genetics of:

FHB and other resistances

Malting quality

PhD CASE with Paul Nicholson (Brewlab)
Rachel Goddard

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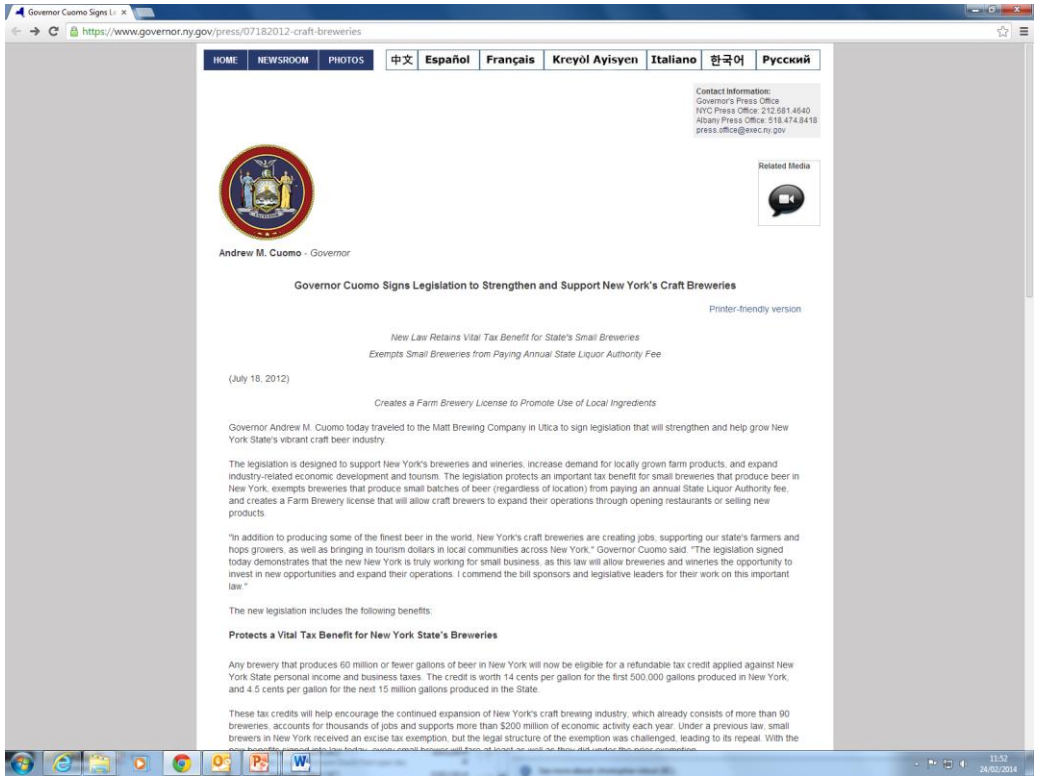
USA: New Legislation - tax breaks for using locally sourced ingredients



https://www.governor.ny.gov/press/07182012-craft-breweries

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Related Media

Andrew M. Cuomo - *Governor*

Governor Cuomo Signs Legislation to Strengthen and Support New York's Craft Breweries

Printer-friendly version

New Law Retains Vital Tax Benefit for State's Small Breweries
Exempts Small Breweries from Paying Annual State Liquor Authority Fee

(July 18, 2012)

Creates a Farm Brewery License to Promote Use of Local Ingredients

Governor Andrew M. Cuomo today traveled to the Matt Brewing Company in Utica to sign legislation that will strengthen and help grow New York State's vibrant craft beer industry.

The legislation is designed to support New York's breweries and wineries, increase demand for locally grown farm products, and expand industry-related economic development and tourism. The legislation protects an important tax benefit for small breweries that produce beer in New York, exempts breweries that produce small batches of beer (regardless of location) from paying an annual State Liquor Authority fee, and creates a Farm Brewery license that will allow craft brewers to expand their operations through opening restaurants or selling new products.

"In addition to producing some of the finest beer in the world, New York's craft breweries are creating jobs, supporting our state's farmers and hops growers, as well as bringing in tourism dollars in local communities across New York," Governor Cuomo said. "The legislation signed today demonstrates that the new New York is truly working for small business, as this law will allow breweries and wineries the opportunity to invest in new opportunities and expand their operations. I commend the bill sponsors and legislative leaders for their work on this important law."

The new legislation includes the following benefits:

Protects a Vital Tax Benefit for New York State's Breweries

Any brewery that produces 60 million or fewer gallons of beer in New York will now be eligible for a refundable tax credit applied against New York State personal income and business taxes. The credit is worth 14 cents per gallon for the first 500,000 gallons produced in New York, and 4.5 cents per gallon for the next 15 million gallons produced in the State.

These tax credits will help encourage the continued expansion of New York's craft brewing industry, which already consists of more than 90 breweries, accounts for thousands of jobs and supports more than $200 million of economic activity each year. Under a previous law, small brewers in New York received an excise tax exemption, but the legal structure of the exemption was challenged, leading to its repeal. With the

First started working with Michigan State University

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FHB & its impact in N America

Contamination with Mycotoxin (DON) leads rejection by maltsters.

Issue in the East due to hot, humid environment

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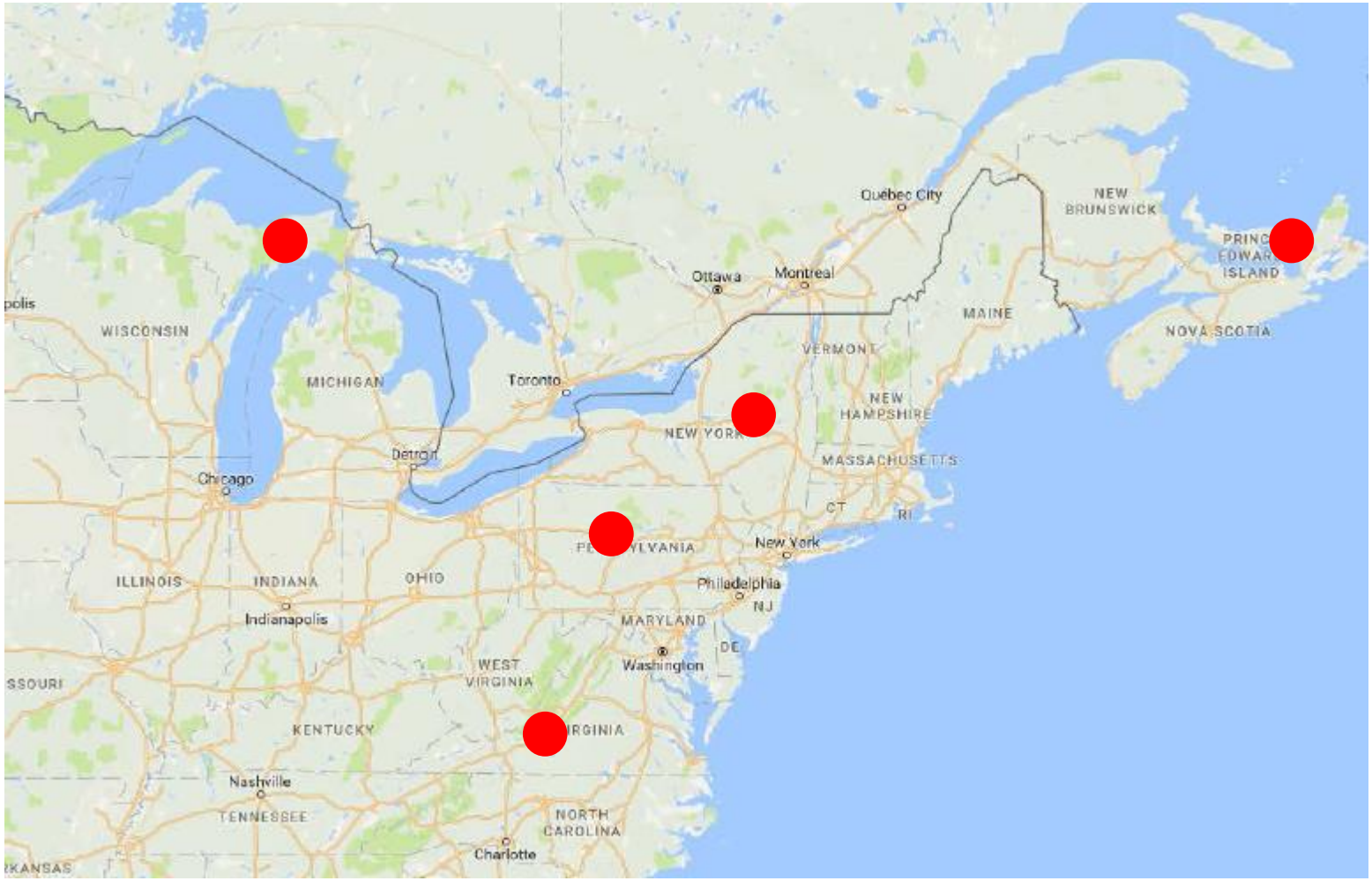
Heritage barley trials for malting quality and Fusarium resistance in N America



BBSRC partnering awards with USA (BB/M02718X/1) and Canada (BB/M027198/1)

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Heritage barley trials 2016

Prince Edward Island, Canada, 2016

Typical yields on PEI
Are 1.5 t/Ha for elite
Cultivars!

At Penn State
Yields of heritage barleys compare well to modern elite cultivars

General: protein content can be higher in heritage barleys

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Case study: developing markets for Chevallier malt

Selected 1824, widely cultivated for nearly 100 years, obsolete by about 1930

Intriguing anecdotes from the past

‘Grows well without manure’

‘Resistant against drought’

‘Fullness of starch which support the malting process’.

‘Superior quality being more required by maltsters and commanded the highest price’

Milburn, 1843; Wood 1845; Wickson, 2004

We registered Chevallier for marketing as a conservation variety in April 2013 (EU directive 2008/62/EC)

Crisp registered trademark

CHEVALLIER HERITAGE MALT

We are now evaluating other heritage barleys

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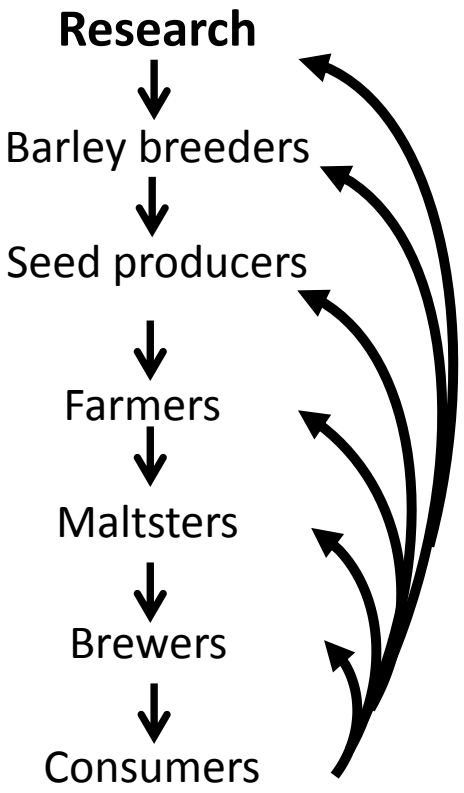
Connecting the supply chain



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Chevallier
Malting and Brewing

Floor malting of 0.5 Tonne Chevallier, 2012 and 2013

Rachel Goddard
PhD CASE student

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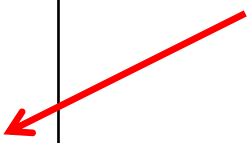
Chevallier produces good quality malt

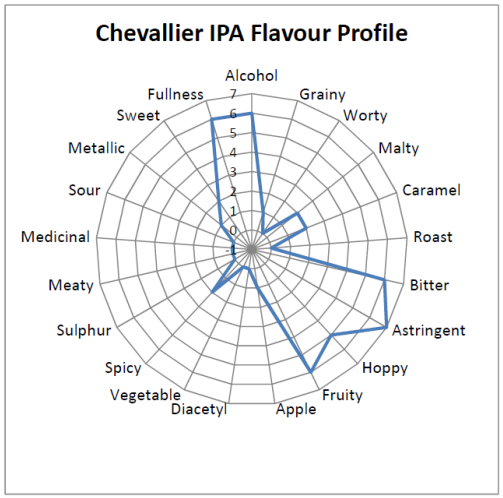
Sample Type (RELEASED?)	LAB (NO)	LAB (NO)	LAB (NO)
Origin Site	MIC	MIC	RYB
Batch Reference	3/13 505 GA+	3/13 505 GA-	
Trans Ref, Contract			
Grade Name Year	2013	2013	2013
Bin Ref/Grading			
Barley Variety	Chevallier	Chevallier	Chevallier
Quantity			
Customer Name			
Sampling Date	09/10/2013	09/10/2013	28/11/2013
Malt SKU	MM General 1	MM General 1	Basic IOB
SAMPLE CODE	**00267355**	**00267357**	**00275169**
Moisture Cast Green Malt Day 0	*44*	*44.2*	
Moisture Green Malt Day 1	*46.4*	*46.5*	
Moisture Green Malt Day 2	*46.1*	*46.7*	
Moisture Green Malt Day 3	*44.4*	*45.2*	
Moisture Green Malt Day 4	*43.7*	*44.4*	
Moisture	4.5	4.9	3.7
IOB Extract 0.7mm as is basis	288	281	296
IOB Extract 0.7mm dry basis	302	295	307
IOB Colour Visual	4.3	3.6	4.3
Total Nitrogen dry basis	1.70	1.75	1.81
IOB Total Soluble Nitrogen dry basis	0.72	0.58	0.92
IOB Soluble Nitrogen Ratio	42.6	33.2	50.8
IOB FAN in Wort	158	107	197
Friability	90	80	95
Homogeneity	97	94	99
Partly Unmodified Grains	3	6	1
Whole Glassy Corns	1.4	2.6	0.9
Alpha Amylase as is basis	69	55	64
Alpha Amylase dry basis	72	58	66
Diastatic Power as is basis	133	124	107
Diastatic Power dry basis	139	130	111
IOB Beta Glucan in Wort	121	226	41
IOB Wort Viscosity	1.53	1.57	1.55
IOB Wort pH	5.91	6.00	
Screenings 2.2mm			0.5
Corns Over 2.5mm			98.5



Total N:
2012 - 2.3 (half tonne batch)
2013 - 1.8 (and good quality)
2014 - 1.4
2015 - 1.7
2016 - 1.6

Brewing trials

Recipe formulation, Flavour, Shelf life, Yeast performance



STUMPTAIL CRAFT BREWED BEER

Brewlab

Heritage Special Bitter

'Primarily we can smell notes given by malts: cereals freshly mowed, toasted bread crust and honey. balanced hoppiness, fresh fruity hints arrive, such as peach, apricot and orange.'

'Well paired with lamb pie, mixed grilled meat or BBQ burger.'

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Chevallier: scaling up production

Considerations for starting a company

Small plots

Field production

- **Adding value throughout the supply chain**
- Cultivar registration
- Seed purity
- Seed cleaning and dressing
- Storage
- Financial arrangements!

Harvesting the valuable seed….


agrovista
CHEVALLIER
2014
MOBILE SEED CLEANING
Office Tel: 01953 454622
Mobiles: JJ : 07909 997573
Nigel : 07909 997629
Karl: 07920 576994
Cleaned, treated and stored
New Heritage Barley

The team, in a field of Chevallier

New Heritage Barley

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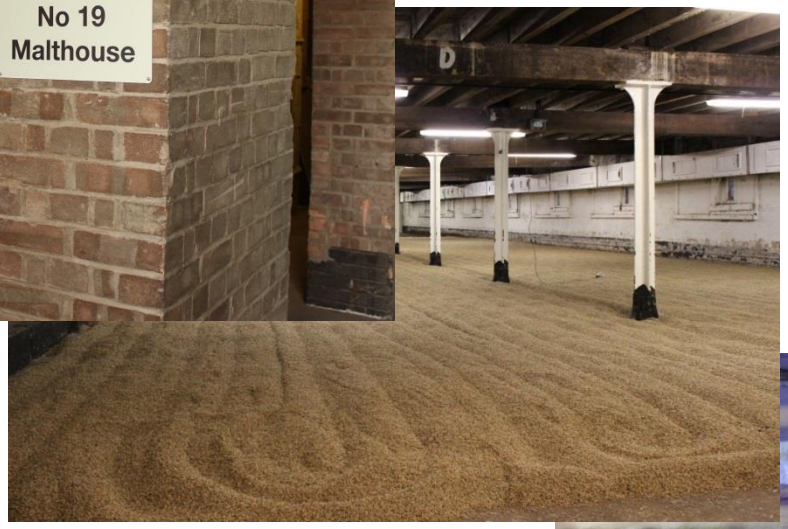
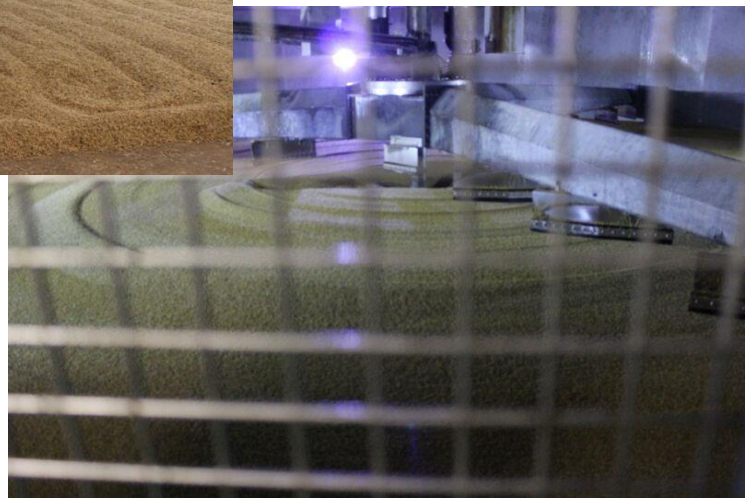
Chevallier malt produced by Crisp malting group



Floor malting

100 tonne batches



Developing new Chevallier beers with innovative brewers

Abe-san, TY Harbour, Japan

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Shane Swindells: innovative brewer at Cheshire Brewhouse

Tim R. is drinking a Govinda IPA BARREL AGED "CHEVALLIER" MALT by The Cheshire Brewhouse

Seriously malty, dried fruit and sherry flavours. Really good.

Earned the I Believe in IPA! (Level 8) badge!

19 May 16 View Detailed Check-in

John S. is drinking a Govinda IPA BARREL AGED "CHEVALLIER" MALT by The Cheshire Brewhouse at Parr

Spectacular!

Earned the I Believe in IPA! (Level 6) badge!

://untappd.com/b/the-cheshire-brewhouse-govinda-ipa-barrel-aged-chevallier-malt/923730[27/10/2016 13:36:30]

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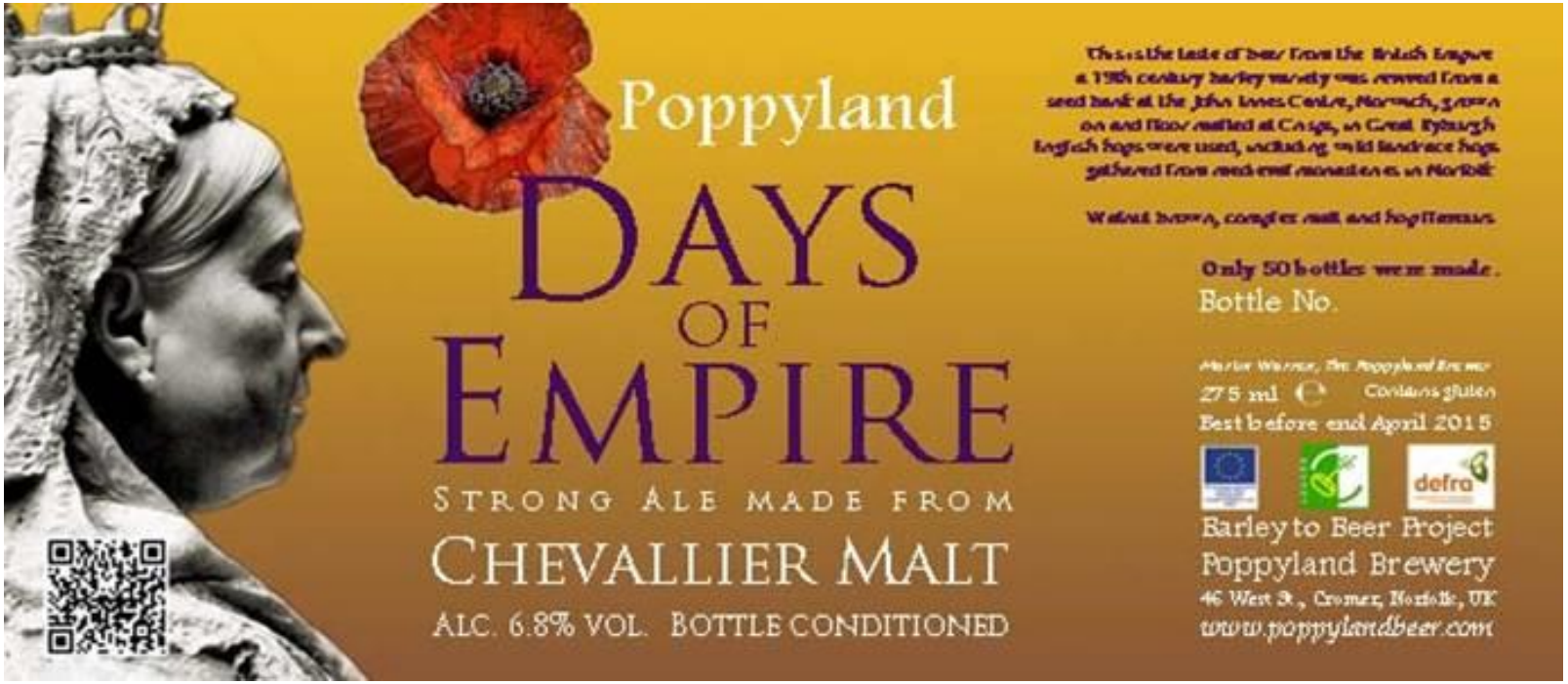
Adding value; bespoke malts for niche markets



£20/bottle (275 ml)!
An aspirational price

(Chevallier malt costs an extra 2p/pint)

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Summary of talk and lessons learnt

Developing markets for heritage barley malts

- Trait evaluation and seed multiplication add value to collections
- Research valued for quality and consistency
- All industries in the supply chain must benefit
- Partner with key innovative industries
- Customers drive supply chain economics

CRISP malting GROUP

Bob King
Dave Griggs

MORLEY FARMS LIMITED

David Jones

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Paul Nicholson
Rachel Goddard
Andy Steed
Mike Ambrose
Cathy Mumford

North American partners
Ashley MacFarland
Mark Sorrells
Wynse Brooks
Carl Griffey
Greg Roth
Aaron Mills

University of Sunderland
Brewlab

Keith Thomas
Amal Muhammed

All the craft brewers who have helped!

GRESSENHALL FARM AND WORKHOUSE

Richard Dalton

The Royal Society of Edinburgh ENTERPRISE FELLOWSHIPS

BBSRC Follow-on Fund

BBSRC bioscience for the future

PBL

Lars von Borcke

New Heritage Barley

Sarah de Vos

USA and Canada Partnering Awards