



IRISH CATTLE BREEDING
FEDERATION

Swedish University of Agriculture



Department of Animal Breeding & Genetics

Using Digital Images to Predict Meat Yields

Beef Consultation Meeting

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Objective

- Using the carcass digital images taken after slaughter to predict meat yields

- ▶ Allow Irish farmers to select cattle on meat cut weight repartition
- ▶ Improve carcass payment to Irish farmers

Mechanical Grading

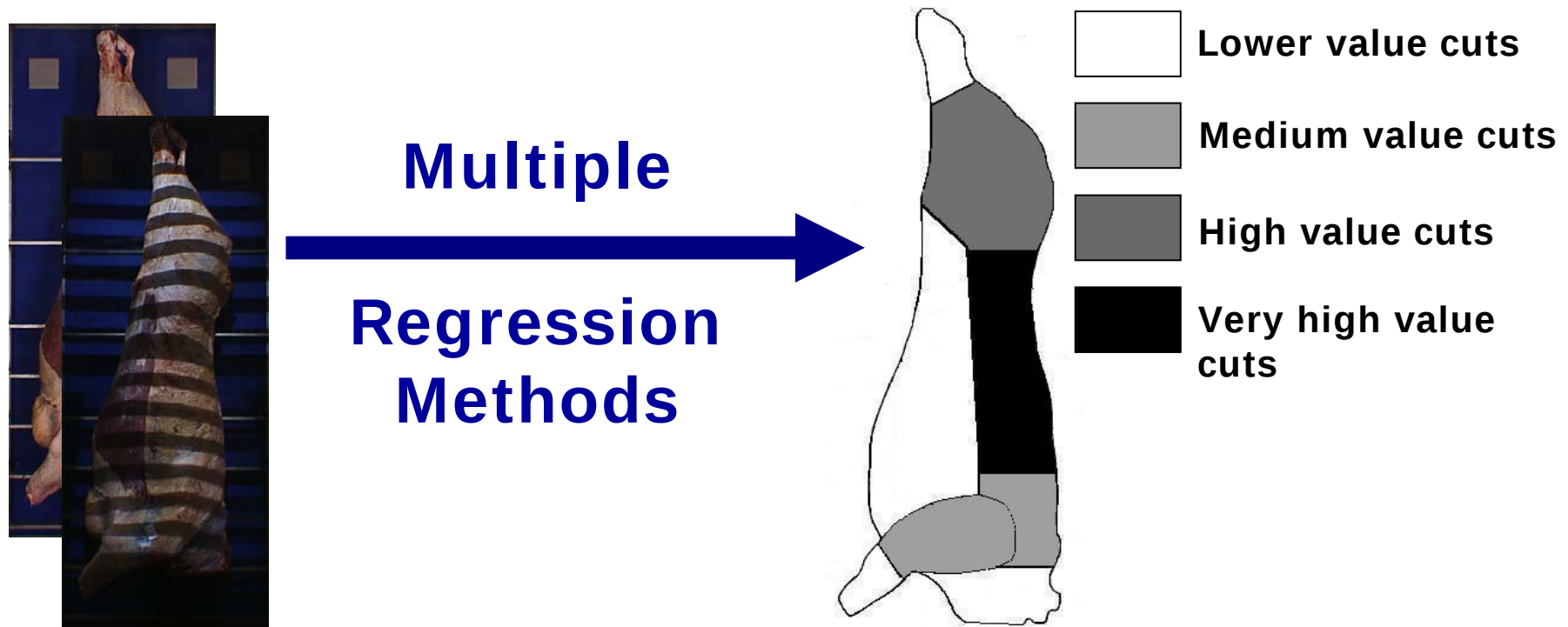
VBS2000 (E+V, Germany)

- Approved since 2001 for EUROP beef grading in Ireland
 - fat Carcass conformation
 - Carcass
- 2D & 3D images / carcass
- Used in 26 slaughter houses across Ireland
- Images stored at ICBF since July 2005

► Mechanical grading used for +80% cattle slaughtered in Ireland



Multiple Regressions



► Prediction of 4 groups of cuts based on retail value

Two Datasets

- Experimental
 - 346 crossbred steers
 - 4 Wholesale cuts
 - LVC, MVC, HVC, VHVC
 - 3 Overall weights
 - Total meat
 - Total fat
 - Total bone
- Commercial
 - 281 crossbred heifers
 - 4 Wholesale cuts
 - LVC, MVC, HVC, VHVC
 - 1 Overall weights
 - Total meat

► Steer & heifers = +70% slaughtered animals in Ireland

Calibration / Validation

For each trait

- **Calibration file** (67%) : to built up the regressions equations
- **Validation file** (33%) : to assess regression accuracy & fit

► Based on similar distribution of the trait (mean, SD)

Accuracy of Predictions

Carcass weight + VIA variables : R ²		
Weight (kg)	Commercial (Heifer)	Experimental (Steer)
Total meat	0.84	0.98
Total fat	-	0.77
Total bone	-	0.81
Lower value cuts	0.65	0.92
Medium value cuts	0.70	0.86
High value cuts	0.85	0.93
Very high value cuts	0.72	0.84

- Models also tested : i) carcass weight
ii) carcass weight + EUROP classifications

Converting Images into Meat Yields

- Image stock
 - From mid-2005 to present
 - 5 million 2x images = 2.5 million carcasses
 - Around 50% match the genetic database
- Using E+V software
 - Installation Jul. 2009 on 1 ICBF PC
 - 1st tests Aug. 2009
 - New version of E+V software Oct. 2009 – Tests
 - ‘Routine’ conversions started end Dec. 2009
- 1st Objective : Genetic parameters for cuts

Converting Images : Principles

Image file + Daily calibration files + Input file



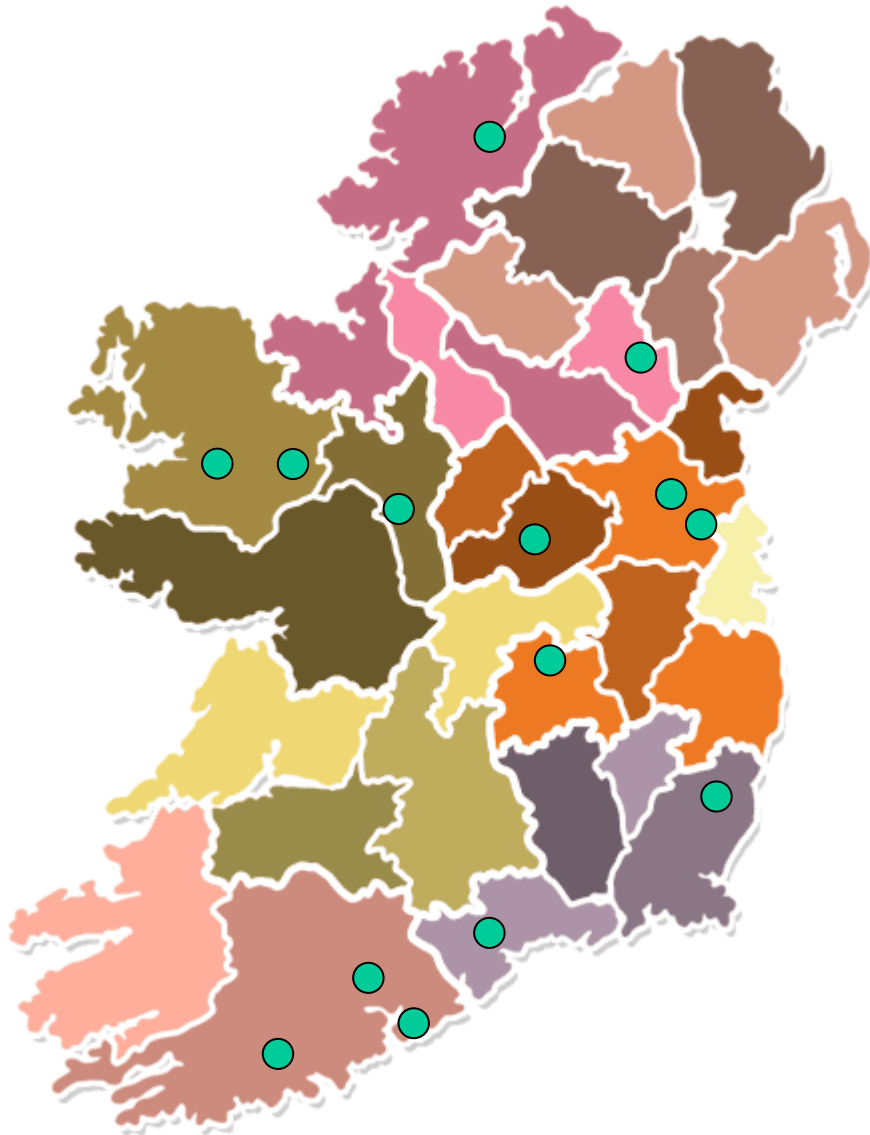
Carcass ID	Sex	CC W
0801252D0001	C	300
...	...	...



**Within
factory**

Carcass ID	Sex	CCW	LVC	MVC	HVC	VHVC
0801252D0001	C	300	95	40	60	25
...	...	...	...	...	...	...

Converted so far



- Images from 14 factories
- Period Feb. 07 – May 09
- 500,000+ carcasses

Stats on Breeds

Carcass Breed		
Breed	N	%
CH	135,557	25
HO	128,601	24
LM	100,542	18
AA	48,082	9
HE	38,351	7
SI	31,732	6
BB	20,168	4
FR	12,847	2
SH	4,742	1
MO	4,057	1
BA	2,878	1

Carcass Breed		
Breed	N	%
SA	2,138	
RB	852	
AU	783	
JE	622	
MY	548	
PI	301	
NR	247	
RW	228	
...		
VO	1	
TOTAL	534,657	100%

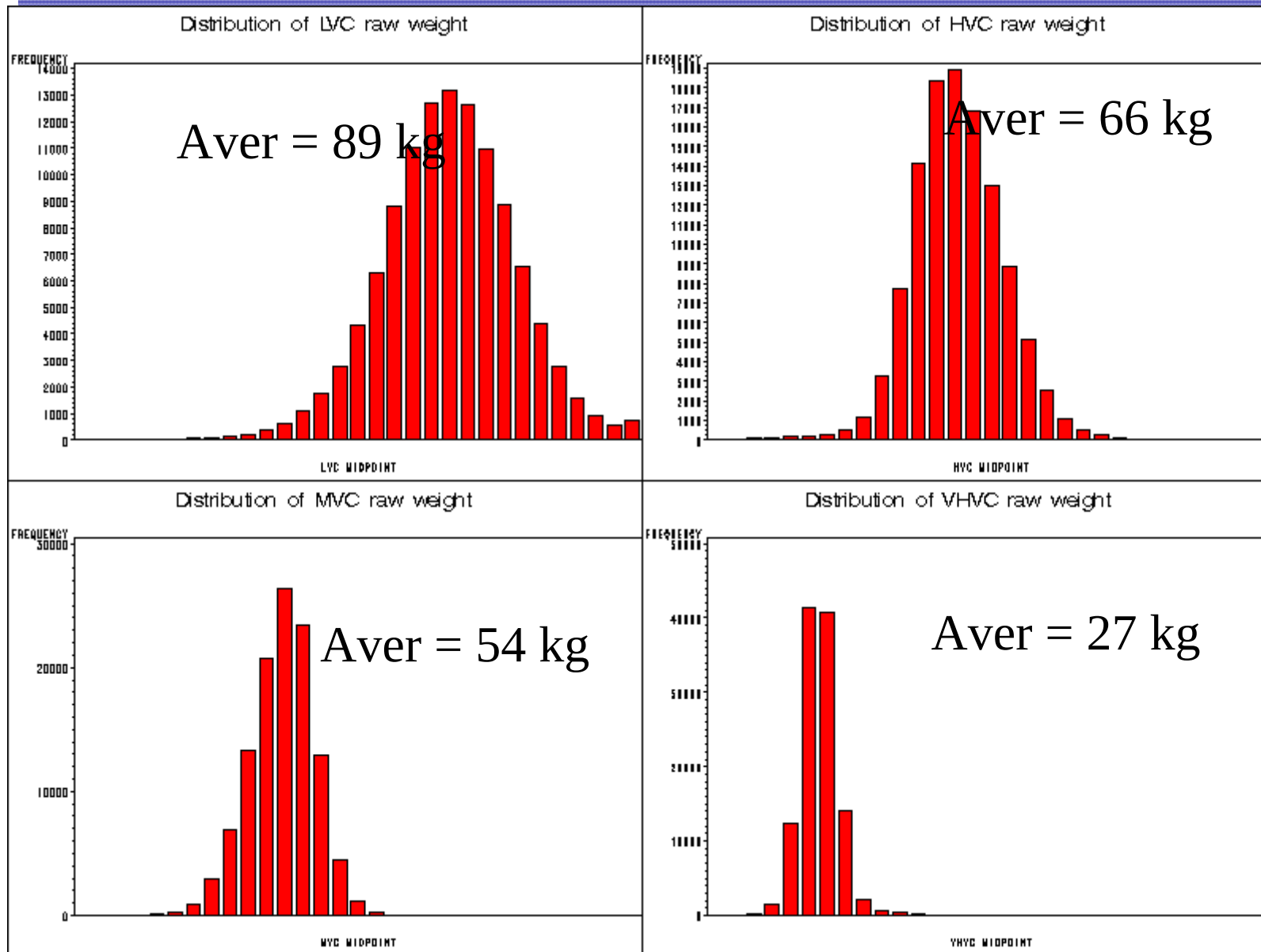
Stats on Sex Category

534,657 Carcasses			
Bulls	Steers	Heifers	Cows
140,707	113,675	151,544	128,731
26%	22%	28%	24%

Stats on Ancestry

534,657 Carcasses			
Parents Unknown	Dam Known only	Sire Known only	Dam + Sire Known
12,774	377,404	751	143,728
2%	71%	0%	27%

Stats on Variability (steers)



Conclusion

- Genetic Parameter study to start in the coming days
- Complete conversion for all images stored at ICBF
 - More calibration files
- Prototype Breeding values => summer 2010