

# Estimation of genetic parameters for carcass traits for Simmental cattle in Croatia

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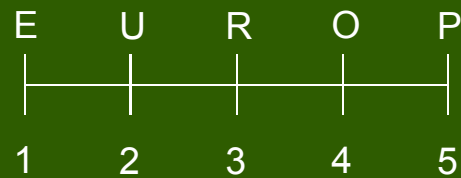
# Testing scheme

- Performance and progeny
- Past
  - Station test
  - Contemporary comparison method
- Present
  - Field test
  - (MME methodology)

# Objective

- To develop an animal model for estimation of genetic parameters for traits:
  - Net gain
  - Carcass weight

- Conformation



- Fatness class



# Material

- Young bulls: age 12 - 24 months → 90401 rec.
- 177 abattoirs for years 2005 - 2006
- Data editing:
  - Animals without birthdate
  - Unknown slaughter age
  - Carcass conformation (? - M, N)
  - Carcass weight ( <150 and > 550 kg )
  - Regions and abattoirs with small number of rec.
  - Net gain (carcass weight/ slaughter age)

Deleted  
11%

# 3 Data sets (DS)

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DS	Records	Age (months)	Parents		
			unknown	one	both
DS1	80462	12-24	+	+	+
DS2	26245	12-24		+	+
DS3	6272	12-14			+

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# Descriptive statistics

Trait	DS1	DS2	DS3
	$\bar{x} \pm sd$	$\bar{x} \pm sd$	$\bar{x} \pm sd$
Net gain (g/day)	600 $\pm$ 127	601 $\pm$ 136	696 $\pm$ 110
Carcass weight (kg)	301.8 $\pm$ 47.9	289.7 $\pm$ 52.5	283.1 $\pm$ 42.7
Conformation	2.3 $\pm$ 0.8	2.4 $\pm$ 0.8	2.4 $\pm$ 0.8
Fatness class	2.6 $\pm$ 0.7	2.5 $\pm$ 0.7	2.4 $\pm$ 0.7

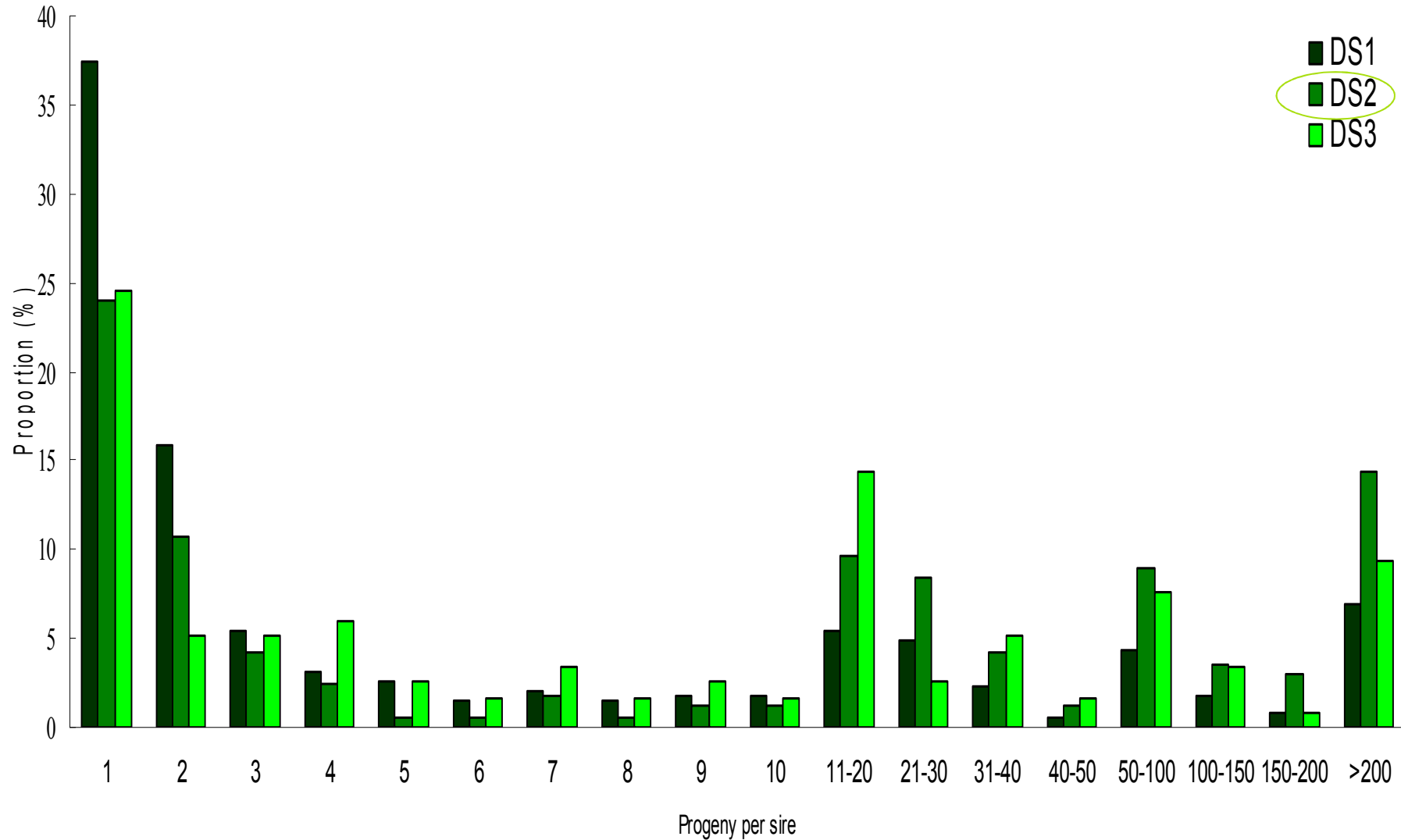
# Pedigree structure

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	DS1	DS2	DS3
Animals with records	80462	26245	6272
Non-base animals:	40304	40304	12386
-both parents known		39490	12288
-only sire known	770	770	94
-only dam known	44	44	4
Base animals	78291	24076	6933
Total number of animals	118595	64380	19319

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# Number of progeny per sire





# Method

- GLM procedure (SAS/STAT)
- Criteria for including effect into the model
  - Significance of effect (p-value)
  - Determination coefficient ( $R^2$ )
  - Degrees of freedom (df)
- Variance components estimation (VCE 5)

# Models

<u>Effect / Trait</u>	Net gain	Carcass weight	Conformation	Fatness class
<b><u>Fixed</u></b>				
Region	+	+		
Calving season	+	+	+	+
Abattoir-supervisor interaction			+	+
Slaughter age	QR*	QR	QR	QR
<b><u>Random</u></b>				
	<b>MODEL A</b>			
Additive genetic effect	+	+	+	+
	<b>MODEL B</b>			
Herd	+	+	+	+

\*Quadratic regression

# Model in matrix notation

- Model A

$$y = X\beta + Z_a a + e$$

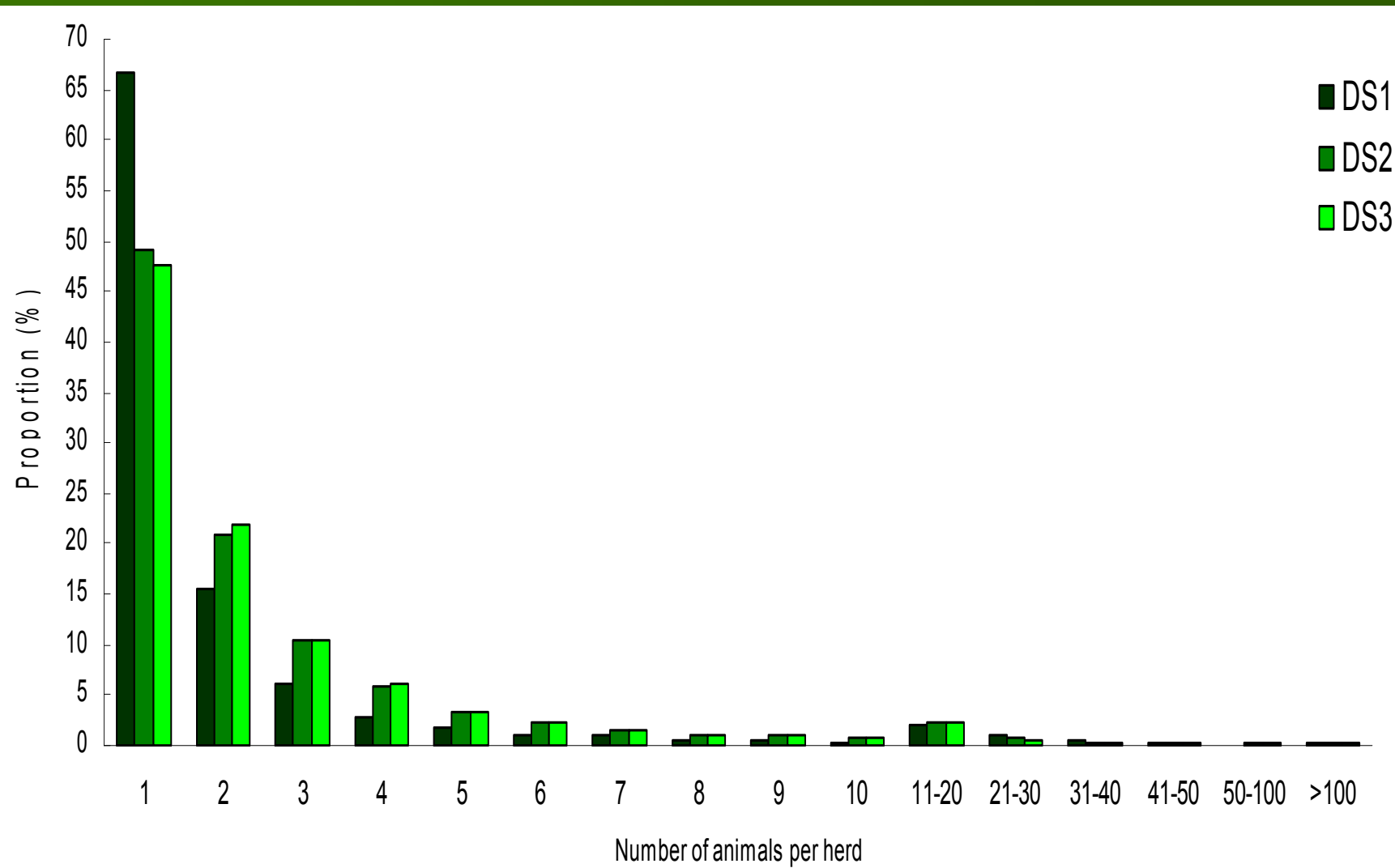
$$V = Z_a G_a Z_a' + R$$

- Model B

$$y = X\beta + Z_a a + Z_c c + e$$

$$V = Z_a G_a Z_a' + Z_c G_c Z_c' + R$$

# Data structure per herd



# Results

# Estimated ratios (%)

Trait	<u>Model A</u>			<u>Model B</u>					
	h <sup>2</sup>			h <sup>2</sup>			c <sup>2</sup>		
	DS1	DS2	DS3	DS1	DS2	DS3	DS1	DS2	DS3
Net gain	9	16	13	1	1	1	51	53	60
Carcass Weight	10	13	11	1	2	1	51	55	60
Conformation	5	3	5	41	2	3	17	20	21
Fatness Class	1	2	5	1	1	5	12	12	10

# Conclusions

- DS2
  - More informative data
  - Closer to production system as DS3
- Model A - temporary
- More records per herd needed
  - improvement in data structure
- Combination with identification
  - better pedigree quality