Factors affecting performance and economic traits of intensively managed beef cattle in Italy

G. Cesaro, M. Berton, L. Gallo, E. Sturaro
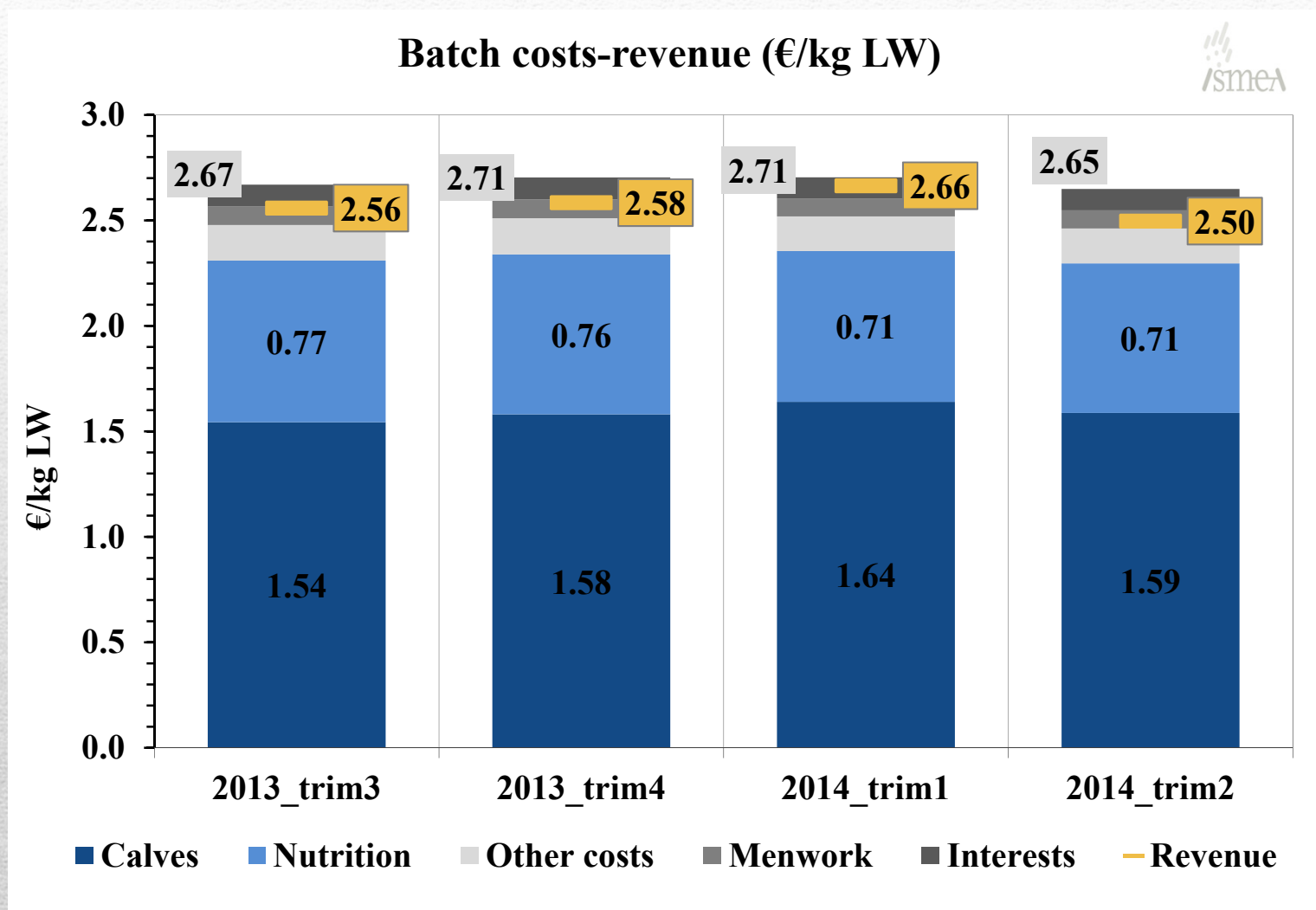
giacomo.cesaro@unipd.it

In Italy 2/3 of the beef cattle are reared in northern regions by **intensive fatteners** that import calves, mainly from France, and feed until slaughter with TMR based on **maize silage and concentrates**.

➢ Growing requirements for **environmental sustainability** and the expected detrimental changes in CAP for intensive systems.

Introduction

➢ **Increase of feed and animal purchase costs.**

Batch costs-revenue (€/kg LW)

ismea

	2013_trim3	2013_trim4	2014_trim1	2014_trim2
Total	2.67	2.71	2.71	2.65
Revenue	2.56	2.58	2.66	2.50
Nutrition	0.77	0.76	0.71	0.71
Calves	1.54	1.58	1.64	1.59

■ **Calves** ■ **Nutrition** ■ **Other costs** ■ **Menwork** ■ **Interests** — **Revenue**

➢ This study aimed to analyse the effects of management factors on performance traits, nutrient excretion and net sale gain of beef bulls managed under intensive conditions in specialized fattening herds of northern Italy.

➢ Production performance data and diets formulation were acquired;

➢ Monthly, diets sampled at the manger have been analysed for proximate composition.

Materials and Methods

➤ **17** fattening herds were visited monthly during 1 year.

➤ Only batch with at least <u>4 control</u> visits have been considered. After data editing 15,281 animals, 232 batches of bulls and heifers, have been analyzed.

STATISTICAL ANALYSIS

PROC MIXED according to the following model:

$$y_{ijklm} = \mu + H_i + B_j + BW(B_j)_k + S_l + e_{ijklm}$$

H = herd (17 herds, random effect);

B = genotype (6 breeds);

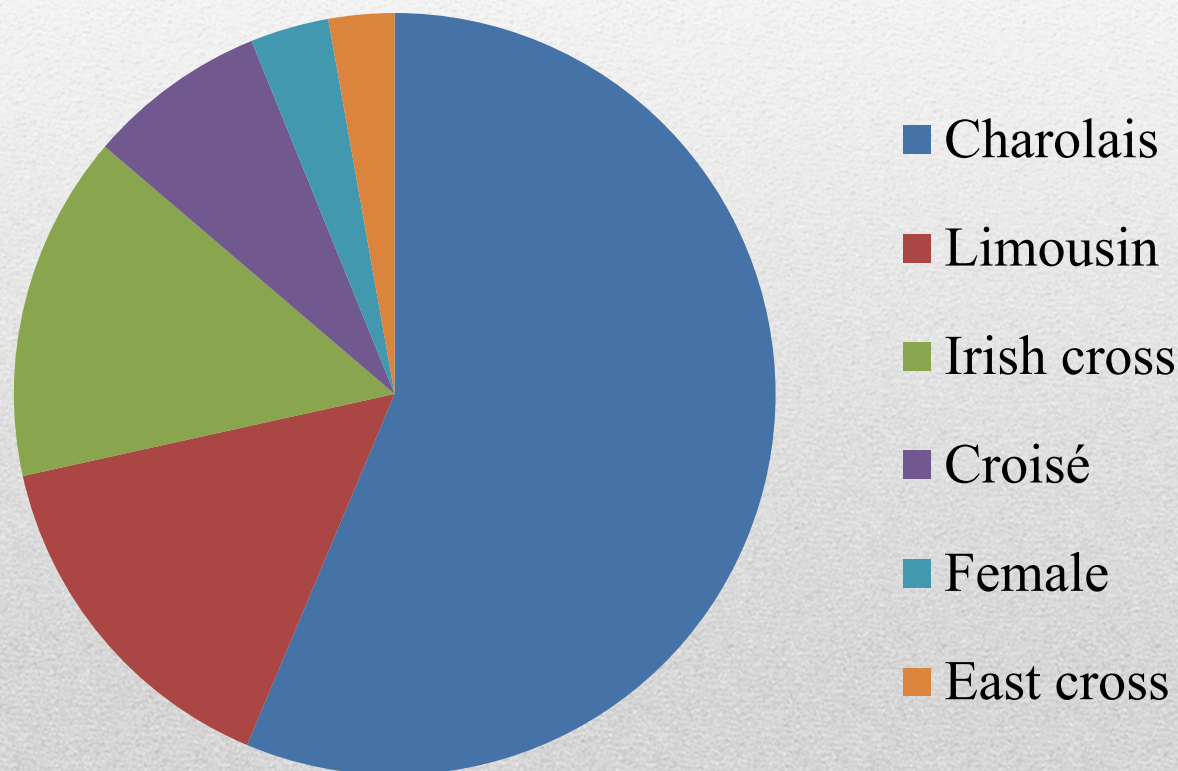**BW(B)** = body weight class within breed (3 classes);

S = arrival season (4 seasons).

Results

➢ Charolais and Limousin breeds represented about the 70% of the total calves purchased and reared.

Origin of purchased calves (%)

- Charolais
- Limousin
- Irish cross
- Croisé
- Female
- East cross

Results

➤ Descriptive statistics of the sampled farms.

	Mean	SD
Place/farm, n.	890	419
Initial BW, kg	369.9	42.7
Final BW, kg	670.9	77.6
ADG, kg/d	1.3	0.2
Fattening length, d	228.5	20.6
Rounds/year, n.	1.6	0.1
DM gain to feed ratio, kg/kg	7.5	0.9
DMI, kg	9.7	1.1
N concentration of rations, % DM	2.3	0.2
Net sale gain, €/d	2.4	0.4

Results

➢ Mean diet formulation and frequency of NOT inclusion of some main ingredients in the diets.

FEED	Kg (fresh)	% ABSENCE
Protein supplements (by products)	0.5	0
Soybean meal	0.6	0.9
Corn silage	7.6	3.0
Corn grain, ground	1.8	10.3
By products (sugar beet pulp)	2.4	15.9
Wheat straw	0.3	28.0

Results

➤ Mean diet chemical composition among farms and across batches.

	Mean	SD
DM, %	41.4	5.60
CP, % DM	14.2	1.02
EE, % DM	3.4	0.57
Ash, % DM	6.0	0.38
NDF, % DM	32.2	3.00
P, % DM	0.4	0.04
Starch, % DM	33.0	4.52
NSC, % DM	44.0	3.66
NSC to NDF ratio	1.4	0.26

Results

➢ LS means of different breeds for production performances and diet characteristics.

	LS MEANS					
	CH	**East**	**Female**	**Irish**	**Croisé**	**LIM**
Performances						
Length, d	236.6 a	231.6 a	180.0 c	236.6 a	235.8 a	223.4 b
ADG, kg/d	1.4 a	1.3 b	1.0 d	1.4 a	1.3 b	1.2 c
DMI, kg/d	10.3 a	9.3 b	9.1 b	10.2 a	10.4 a	8.4 c
Net sale gain, €/d	2.37 b	2.18 bc	2.09 c	2.73 a	2.39 b	2.15 c
Diet characteristics						
CP, % DM	13.9 b	14.7 a	14.0 b	14.0 b	13.9 b	14.4 a
P, % DM	0.37 b	0.41 a	0.39 ab	0.37 b	0.36 b	0.39 a

LS-means within row sharing a common character in their superscript are not significantly different ($P>0.05$).

Results

➤ LS means of different breeds for N intake, excretion and efficiency.

	LS MEANS					
	CH	**East**	**Female**	**Irish**	**Croisé**	**LIM**
N computations*						
N INT/place/year, kg	79.9 a	76.7 ab	71.3 bc	80.3 a	80.6 a	67.3 c
N RET/place/year, kg	12.9 a	12.3 a	8.9 c	13.0 a	12.4 a	11.2 b
N EXC/place/year, kg	67.0 a	64.4 ab	62.4 b	67.2 a	68.3 a	56.1 b
N Efficiency, %	16.4 ab	16.4 ab	12.5 c	16.4 ab	15.5 b	16.8 a

LS-means within row sharing a common character in their superscript are not significantly different ($P>0.05$). * Computed following ERM (Environmental Resources Management Institute), 2001.

Results

➢ LS means of different breeds for P intake, excretion and efficiency.

	LS MEANS					
	CH	**East**	**Female**	**Irish**	**Croisé**	**LIM**
P computations*						
P INT/place/year, kg	13.2 ab	13.6 a	12.3 bc	13.3 ab	13.0 ab	11.4 c
P RET/place/year, kg	3.6 a	3.4 a	2.6 c	3.6 a	3.4 a	3.1 b
P EXC/place/year, kg	9.6 a	10.2 a	9.7 a	9.7 a	9.5 a	8.3 b
P Efficiency, %	27.7 a	25.5 b	22.4 c	27.6 a	27.0 ab	27.8 a

LS-means within row sharing a common character in their superscript are not significantly different ($P>0.05$). * Computed following ERM (Environmental Resources Management Institute), 2001.

Results

➢ Effect of diet characteristics on Charolais breed performance.

| | CHAROLAIS BREED | | | | | | | |
| | PROTEIN LEVEL | | | | STARCH LEVEL | | | |
	High	Interm.	Low	P value	High	Interm.	Low	P value
ADG, kg	1.41	1.37	1.36	n.s.	1.41	1.37	1.36	n.s.
FCR	0.13	0.13	0.13	n.s.	0.13	0.13	0.13	n.s.
Net sale gain, €/d	2.6	2.4	2.3	*	2.4	2.5	2.4	n.s.
N_{net}/head/cycle, kg*	34.4	32.3	29.4	***	32.8	32.0	31.4	n.s.

* Computed following ERM (Environmental Resources Management Institute), 2001.

Conclusions

➢ Farm management is the most important source of variation for all traits analyzed.

➢ Diets resulted standardized to enhance animal performance but a precision phase feeding could be adopted to limit nutrient loss.

➢ Self sufficiency (33%) feed production represent a strength of this system but should be increased by including protein feeds.

➢ Further studies are needed for better defining the profitability of this system by including the ratio and cost of feedstuffs purchased outside the farm.
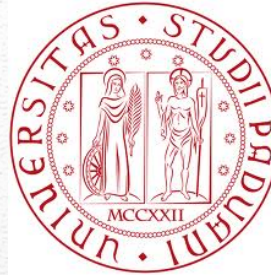
Conclusions

WORK IN PROGRESS

➢ Analysis of sustainability of North East Italian intensive beef production system with LCA approach.

➤ LS means of different arrival season for production performances and diet characteristics.

	LS MEANS			
	Autumn	Summer	Winter	Spring
Production performances				
Length, d	**223.85**	**226.79**	**223.75**	**221.66**
ADG, kg/d	**1.24 b**	**1.28 a**	**1.24 b**	**1.28 a**
DMI, kg/d	**9.89 a**	**9.31 c**	**9.74 a**	**9.59 b**
Net sale gain	**1.98 b**	**2.62 a**	**2.11 b**	**2.57 a**
Diet characteristics				
CP, % DM	**13.81 d**	**14.48 a**	**14.04 c**	**14.34 b**
P, % DM	**0.26 a**	**0.19 b**	**0.19 b**	**0.12 c**