IRISH CATTLE BREEDING FEDERATION

Evaluation of maternal cow traits and the complex nature of an overall female replacement index

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National Development Plan
Transforming Ireland

Background

- 1.1 million suckler cows
- 10% pedigree registered
- 90% crossbred
    I. 20% dairy-beef cross
    II. 80% Natural service sires
- Low levels of weight recording
    ✓ larger quantity of calving and carcass data
- Traditionally low levels of Sire recording in commercial herd (35% currently)

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History of Genetic improvement

- **Pre 2005 – linear scoring on pedigrees (4 breeds, Muscle, Skeletal and docility)**
- **2005-2007: calving, carcass using commercial crossbred data**
- **2007: maternal traits: fertility & milk**
- **Single overall index (SBV) launched in 2007 for beef breeding (€ value)**
- **2012: Terminal index (€)**
  Maternal index (€)

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Genetic Differences in the Sucker herd (PTAs)

	Index/trait	records in genetic evaluation	h2	PTA difference Btm 1% to Top 1%
Terminal traits	Calving Difficulty (% 3 & 4)	5,223,471	0.09	-14
	Gestation (days)	646,061	0.36	-6
	Mortality (%)	6,645,674	0.04	-2.3
	Docility (1-5 scale)	1,097,014	0.35	0.5
	Feed Intake (kg DMintake/day)	4,199	0.43	-1.3
	Carcass Weight (kg)	3,090,430	0.38	44
	Carcass Conformation (1-15 scale)	3,090,430	0.33	2.4
	Carcass Fat (1-15 scale)	3,090,430	0.30	1.9
Maternal cow traits	Daughter Age 1st Calving (days)	622,646	0.31	-58
	Daughter Calving Difficulty (%3 & 4)	629,783	0.02	-13
	Daughter Milk (kgs)	214,563	0.25	29
	Daughter Calving Interval (days)	1,870,468	0.02	-14
	Cow Survival (%)	750,087	0.02	7
	Cull Cow Carcass Weight (kgs)	210,138	0.29	67

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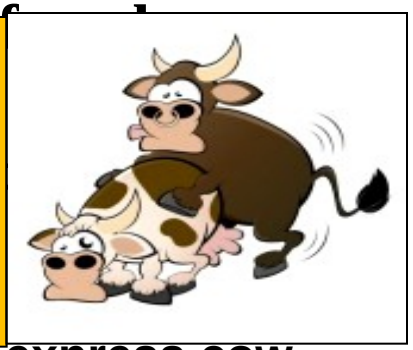
ICBF.com

Basis of Maternal index

Example: Maternal sire producing 100 calves

Breeding Decision to produce a replacement female is made at conception of the female and not at point of insemination of the female herself



50 progeny express slaughter traits (2 females not bred)

46 female progeny express cow traits: ma

161 grandprogeny (3.5 calves per co
express Calving, Gestation & Mortali

DGEs account for multiple (lifetime) expression in replacement females and later generations

82 grand-progeny express slaughter traits

72 grand progeny express cow traits: maternal calving, milk, fertility

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Maternal index

Genetic sd

Economic Value

DGE

Trait type	Trait	Relative emphasis %
Calving traits	Calving difficulty (direct and maternal), gestation, mortality	19.7%
Docility	Weanling and cow docility	4.2%
Feed intake	Weanling, replacement heifer and cow intake	23.0%
Beef	Carcass weight, conformation and fat, cull cow carcass weight	23.7%
Milk	Daughter Milkability	12.4%
Fertility	Age 1st Calving, calving interval, survival	17.0%

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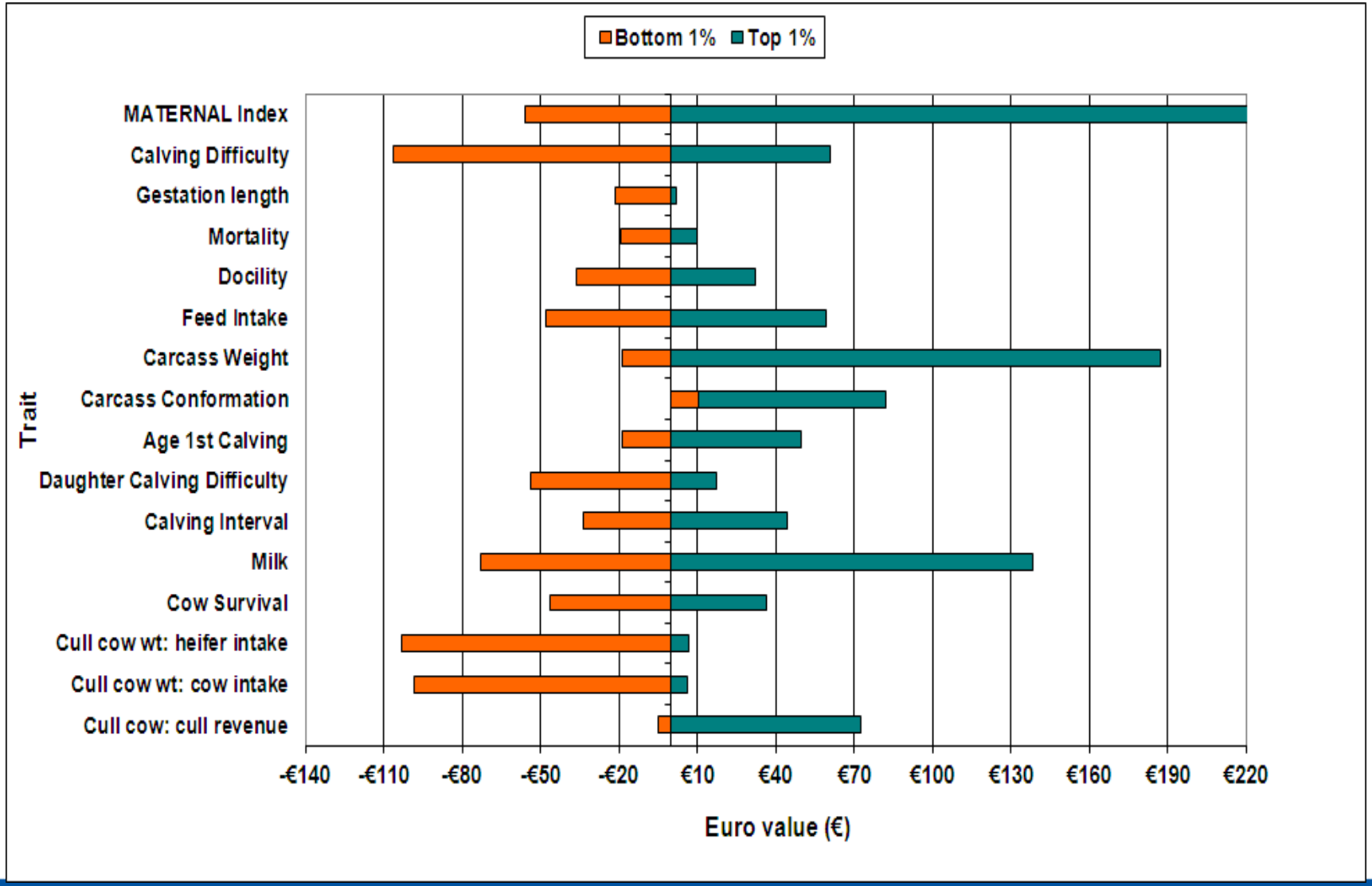
Influence in the Maternal Index based on distribution of PTAs



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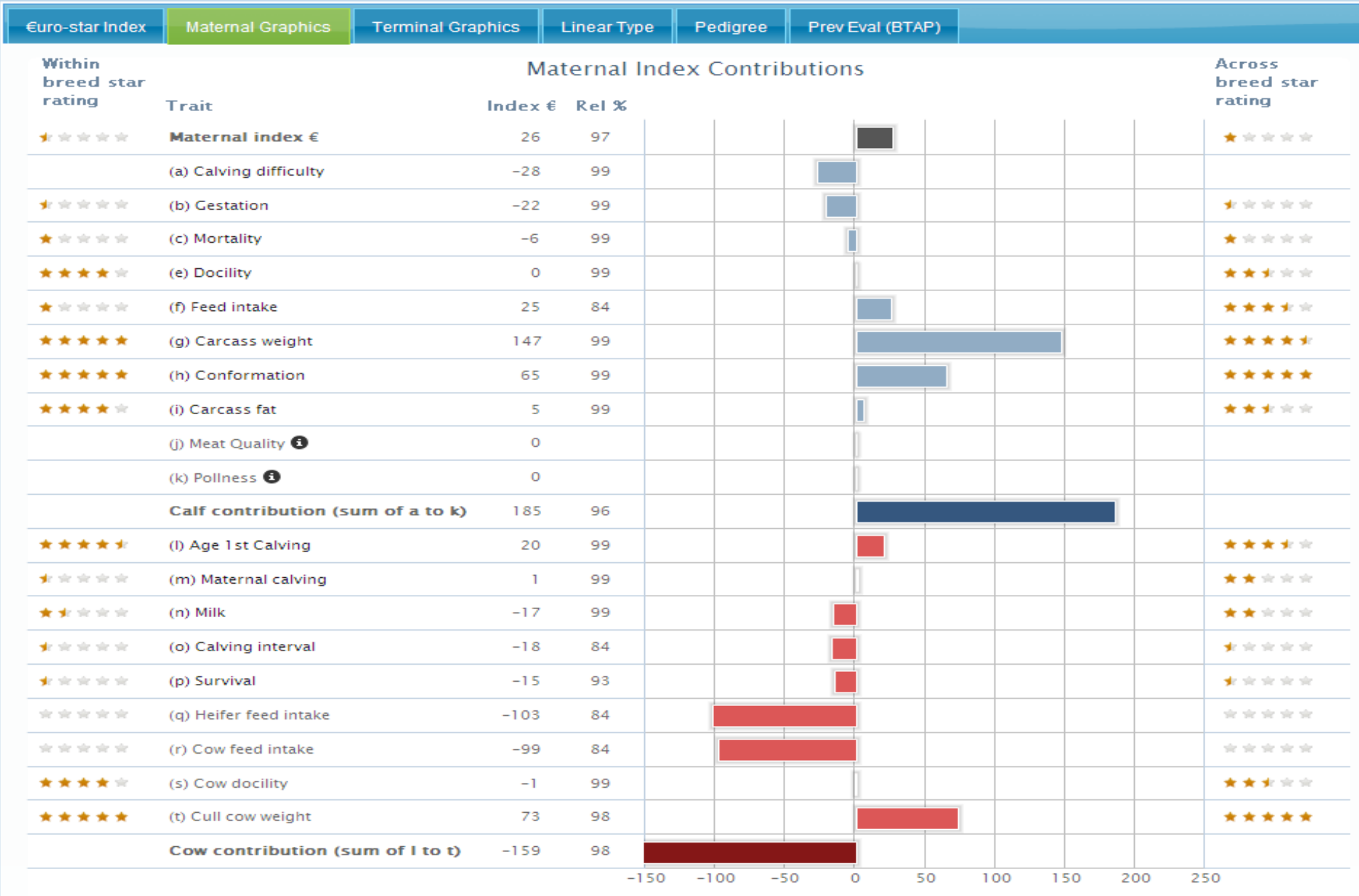
Presentation of indexes (1)

€uro-star Index | Maternal Graphics | Terminal Graphics | Linear Type | Pedigree | Prev Eval (BTAP)

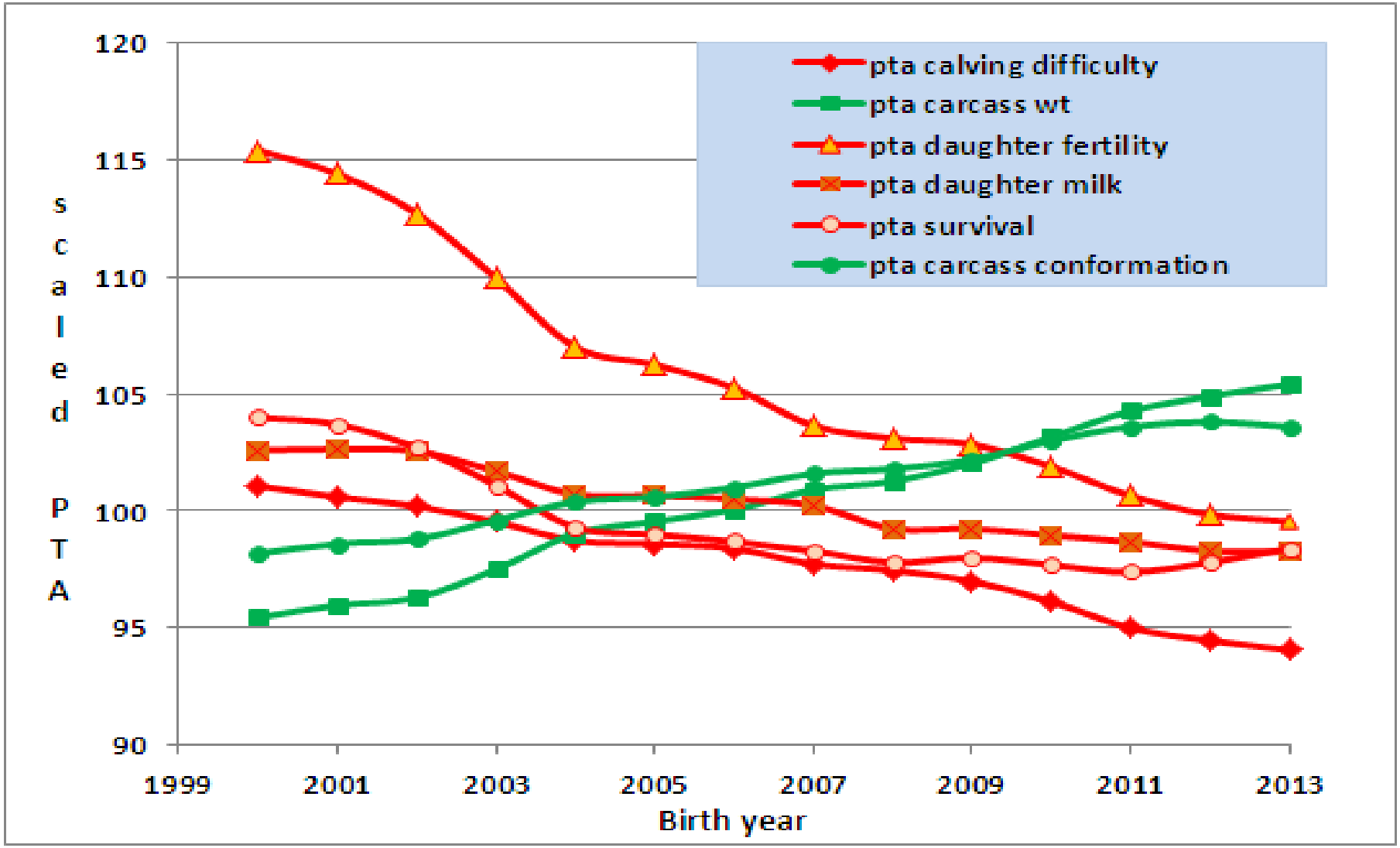
Star Rating (within Limousin breed)	Economic Indexes	€uro value per progeny	Index reliability	Star Rating (across all beef breeds)
★½☆☆☆	Maternal	€26	97% (V High)	★☆☆☆☆
★★★★½	Terminal	€125	96% (V High)	★★★★½
☆☆☆☆☆	Dairy Beef	€	% (N/A)	☆☆☆☆☆

Star Rating (within Limousin breed)	Key profit traits	Index value	Trait reliability	Star Rating (across all beef breeds)
	Expected progeny performance			
	Calving difficulty (% 3 & 4) ⓘ Breed ave: 4.87%, All breeds ave: 4.99%	8.20%	99% (V High)	
★★★★☆	Docility (1-5 scale) Breed ave: -0.07, All breeds ave: 0.00	-0.01 scale	99% (V High)	★★½☆☆
★★★★★	Carcass weight (kg) Breed ave: 22.88kg, All breeds ave: 21.98kg	32kg	99% (V High)	★★★★½
★★★★★	Carcass conformation (1-15 scale) Breed ave: 2.05, All breeds ave: 1.83	2.55 scale	99% (V High)	★★★★★
	Expected daughter breeding performance			
	Daughter calving difficulty (% 3 & 4) Breed ave: 4.68%, All breeds ave: 5.19%	5.8%	99% (V High)	
★½☆☆☆	Daughter milk (kg) Breed ave: -0.28kg, All breeds ave: -0.01kg	-2.67kg	99% (V High)	★★☆☆☆
★½☆☆☆	Daughter calving interval (days) Breed ave: 0.78 days, All breeds ave: -0.53 days	3days	97% (V High)	★½☆☆☆

Presentation of indexes (2)



Trends in the commercial herd: Traits



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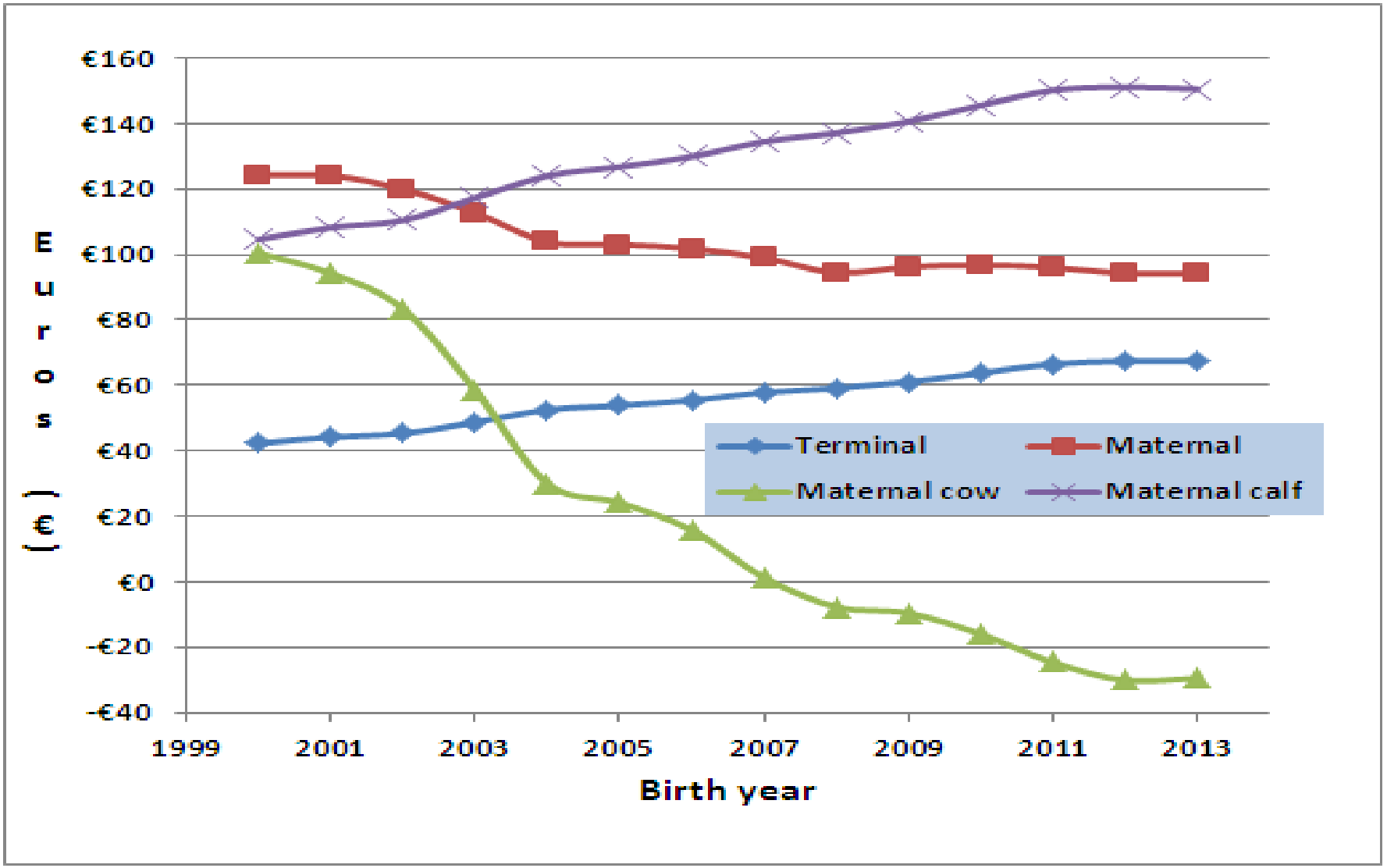

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Relationships Between traits

			Genetic Correlations		
	Trait	heritability	Age 1st calving	Calving interval	Survival
Goal traits	Age 1st calving	0.31			
	Calving interval	0.02	0.18		
	Survival to next parity	0.02	0.15	-0.35	
Progeny predictor traits	dystocia	0.09	0.24	0.22	-0.07
	weaning weight	0.40	-0.09	0.37	0.38
	carcass weight	0.38	-0.07	0.23	0.31
	carcass conformation	0.33	0.01	0.22	0.16
	carcass fat	0.30	0.08	-0.41	0.09
Cow predictor traits	maternal dystocia	0.02	-0.21	0.34	-0.50
	cow milk score	0.35	-0.09	0.01	0.14
	cow docility score	0.35	0.00	0.01	0.12

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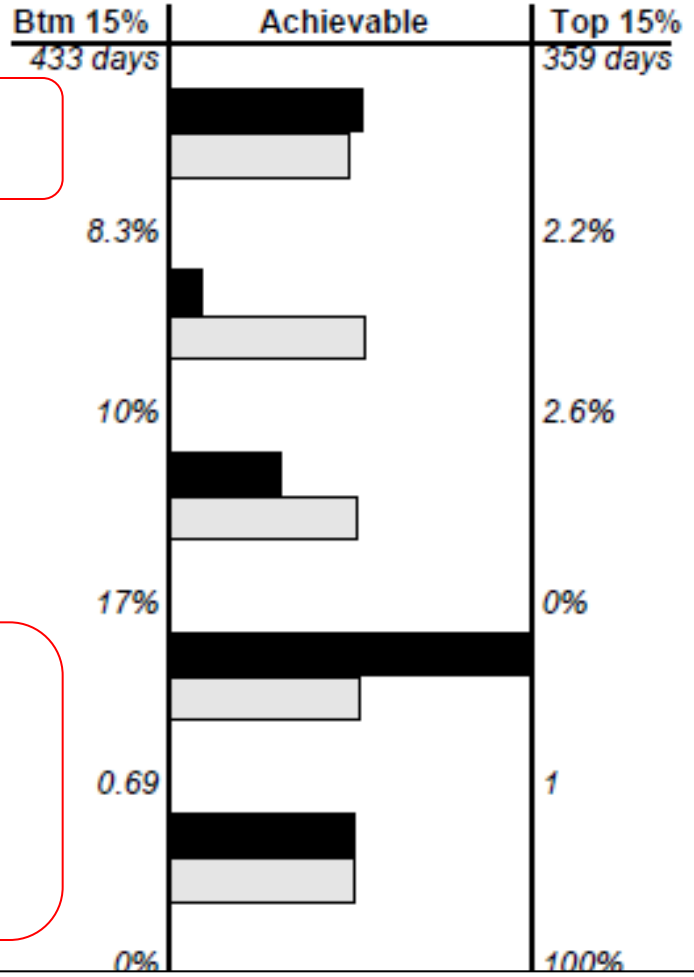
Phenotypic performance of Suckler herds

2. Performance Statistics - relative to all beef herds in the database



1. Calving Interval (days) Average number of days between successive calvings for cows calved during the period	Your Herd National Average	393 days 396 days
2. Mortality - Dead at Birth (%) Number of calves born dead **(1)** as a proportion of all births during the period **(13)**	Your Herd National Average	7.7% 5%
3. Mortality - Dead at 28 Days (%) Number of calves born dead or dead within 28 days, **(1)** as a proportion of all births recorded during the period. **(13)**	Your Herd National Average	7.7% 6.12%
4. Females not calved in Period (%) Number of females not calved during the period, **(0)** expressed as a proportion of all eligible females. **(13)**	Your Herd National Average	0% 8%
5. Calves per cow per year [2] Number of calves per cow per year, expressed as a proportion of all eligible females in the herd. **(13)**	Your Herd National Average	0.85 0.85

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Summary

- Strong genetic improvement in Terminal traits
- Evidence of adequate genetic variation in maternal cow traits
- Terminal trait selection has led to decline in maternal cow traits due to unfavourable relationship
- Maternal index recently launched but individual trait selection still important

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