

Efficiency of selection indices for milk flow, production and conformation traits in Holsteins

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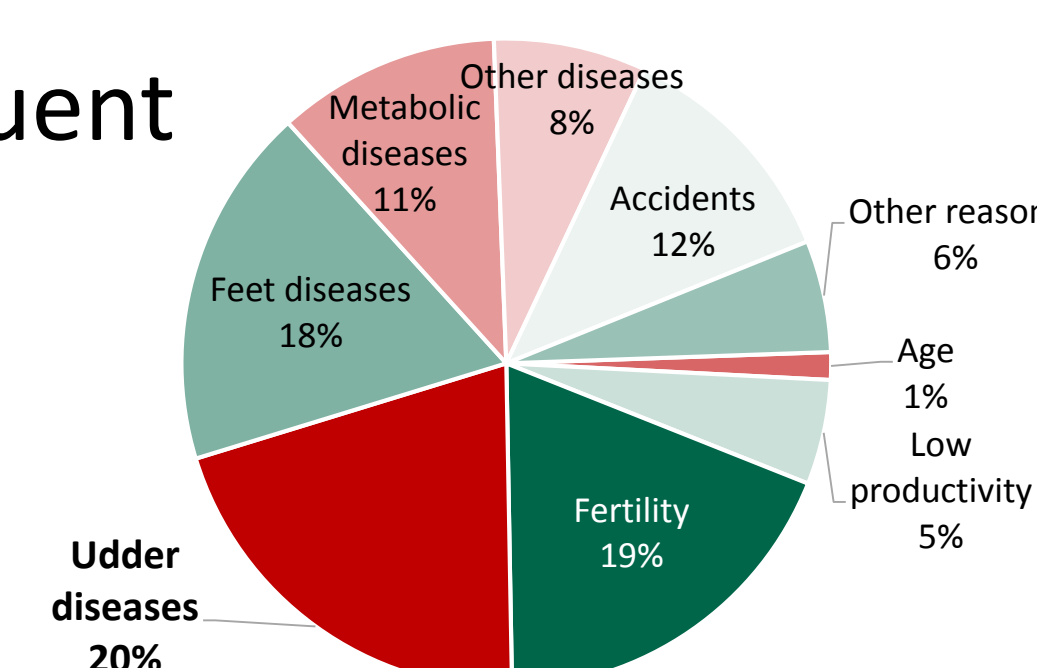
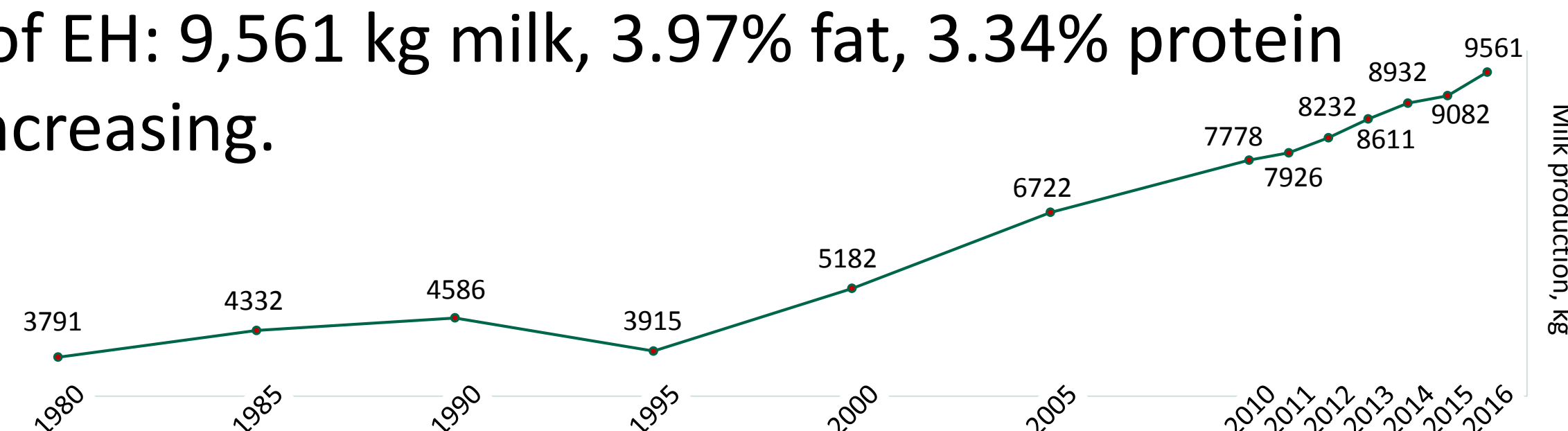
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THE AIM

To estimate the annual genetic response for average milk flow (AMF), milk yield (MY), milk components and somatic cell score (SCS) and udder conformation traits (UCT) in Estonian Holstein (EH) population under different selection indices.

BACKGROUND

- Total number of dairy cows 86,300 (about 0.4% of EU dairy cows), of which 95.3% are in milk recording. 79.6% of cows are Estonian Holstein (EH) and 19.5% Estonian Red. Average herd size is 135 cows.
- Productivity of EH: 9,561 kg milk, 3.97% fat, 3.34% protein and rapidly increasing.
- Udder diseases are the most frequent culling reasons among EH cows.



GENETIC PARAMETERS

		Phenotypic correlations												Genetic SD (σ_A)		h^2
		MY	FY	PY	F%	P%	SCS	AMF	TL	FUA	UD	RUH	UC			
Genetic correlations	MY	Milk yield, kg/lact		0.74	0.92	-0.33	-0.18	-0.12	0.18	0.03	-0.10	-0.12	0.09	0.03	875.40	0.31
	FY	Fat yield, kg/lact	0.49		0.81	0.37	0.08	-0.09	0.11	0.01	-0.05	-0.10	0.06	0.01	33.74	0.29
	PY	Protein yield, kg/lact	0.83	0.66		-0.12	0.10	-0.05	0.15	0.02	-0.08	-0.11	0.07	0.03	27.14	0.30
	F%	Fat content, %	-0.65	0.51	-0.16		0.25	0.12	-0.06	-0.03	0.06	0.02	-0.04	-0.02	0.30	0.19
	P%	Protein content, %	-0.51	0.20	0.15	0.49		0.16	-0.10	-0.01	0.07	0.03	-0.07	-0.03	0.13	0.28
	SCS	SCS	0.12	0.07	0.22	-0.05	-0.02		0.06	-0.01	-0.03	-0.08	-0.03	-0.04	0.42	0.05
	AMF	AMF, kg/min	0.52	0.44	0.49	-0.18	-0.25	0.33		-0.13	-0.05	0.04	0.13	0.05	0.52	0.50
	TL	Teat length	0.11	0.03	0.10	-0.10	-0.04	-0.07	-0.30		0.07	0.00	0.01	0.01	0.57	0.39
	FUA	Fore udder attachment	-0.47	-0.30	-0.44	0.26	0.25	-0.20	-0.13	0.18		0.27	0.14	0.01	0.52	0.22
	UD	Udder depth	-0.39	-0.43	-0.42	0.07	0.08	-0.42	0.08	0.04	0.57		0.24	0.10	0.95	0.47
	RUH	Rear udder height	0.39	0.31	0.34	-0.16	-0.24	-0.21	0.33	-0.10	0.27	0.47		0.08	0.49	0.29
	UC	Udder cleft	0.17	0.07	0.16	-0.12	-0.11	-0.32	0.17	0.01	-0.14	0.05	0.18		0.50	0.19

Sources: multivariate animal model applied to AMF (19,316 single records), milk production traits (302,629 repeated records) and udder conformation traits (11,143 single records) collected by Estonian Livestock Performance Recording Ltd from July 2010 to January 2016; Castillo-Juarez et al, 2002; Vallas et al, 2010.

SELECTION INDEXES AND GENETIC GAIN

Five different selection indexes were compared:

- SPAV, relative breeding value of milk production: $SPAV = 93.7 + 0.12 \cdot BV_{FY} + 0.48 \cdot BV_{PY}$, currently basic selection index in Estonia
- 75% SPAV + 25% $-BV_{AMF}$
- 75% SPAV + 25% BV_{AMF}
- 75% SPAV + 25% $-BV_{SCS}$
- 75% SPAV + 25% BV_{UCT}

BV – Breeding Value
Methodology: Preto et al, 2012.

