DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEMS

Country (or countries)	BELGIUM (Walloon Region)
Main trait group[1] **NOTE!** Only one trait group per form!	Production
Breed(s)	All dairy and dual-purpose breeds
Trait definition(s) and unit(s) of measurement[2] Attach an appendix if needed	1. Milk 2. Fat 3. Protein Records are kg of yield produced within a 24-hours test-day period and EBV are average 305-d yields (kg) across lactation 1,2 and 3 4. Fat percentage 5. Protein percentage $EBV_\% = (EBV_{Yi}*100) - (EBV_M*\%B_i)/(EBV_M + B_M)$, where $EBV_\%$ = estimated breeding value for fat or protein percentage EBV_{Yi} = estimated breeding value for fat or protein yield EBV_M = estimated breeding value for milk yield $\%B_i$ = average fat or protein percentage of the base animals B_M = average milk yield of the base animals
Method of measuring and collecting data	Milk recording
Time period for data inclusion	Data since 1973 (included, calving date)
Age groups (e.g. parities) included	3 parities
Other criteria (data edits) for inclusion of records	Valid birth date, time frame
Criteria for extension of records (if applicable)	No extension
Sire categories	All sires
Environmental effects[3], pre-adjustments	Age inside lactation-stage-breed, additive
Method (model) of genetic evaluation[3]	ML-MT-TDM-RR-AM (multi-lactation-multi-trait)
Environmental effects[3] in the genetic evaluation model	Herd-test-day (F), Minor stage of lactation (F), Major stage of lactation x Age x Season (F), Stage of lactation x Days carried calf (F), Herd x year RR (R), PE (R)
Adjustment for heterogeneous variance in evaluation model	No
Use of genetic groups and relationships	Yes, genetics groups based on selection path, type of breed, degree of Holsteinisation, origin (North-America vs Europe) and time
Blending of foreign/Interbull information in evaluation	No before INTERBULL, yes after
Genetic parameters in the evaluation	See appendices GE and PR
System validation	Trend Validation (method III)

Expression of genetic evaluations If standardised (e.g. RBV), give standardisation formula in the appendix	EBV defined as mean EBV of the three lactations for milk, fat and protein yields, respectively
Definition of genetic reference base	All cows with production born in 2010
Next base change	In 2020 cows born in 2015
Calculation of reliability	Based on INTERBULL EDC computations
Criteria for official publication of evaluations	REL $\geq$ 50% for: • young sires • imported sires if only domestic results • imported sires with INTERBULL results
Number of evaluations / publications per year	3
Use in total merit index[4]	V€G= V€L + V€F + V€T V€G= V€L + V€F + V€T V€L= -0.064 EBV_{milk} + 1.75 EBV_{fat} + 6.25 EBV_{prot} V€F ~ 0.71 * RBV_{SCS} + 4.30 RBV_{long} + 0.40 * RBV_{fert} + 0.20 * RBV_{CEd} + 0.24 * RBV_{CEm} - all functional traits expressed on a 10 unit scale, means of 100 subtracted - coefficients only approximate as computations done using selection index procedure estimating jointly V€F, combined RBV_{long} and combined RBV_{fert} from EBVs for direct longevity, indirect longevity, SCS, indirect fertility and calving ease traits. V€T= V€M + V€C + V€P V€M= -4.11 $RBV_{rear\ leg\ set}$ + (2.06 $RBV_{rear\ leg\ rear\ view}$) + (10.54 $RBV_{bone\ quality}$) + (9.00 $RBV_{feet\&legs}$) V€C=-4.32 $RBV_{overall\ development}$ + 11.11 $RBV_{udder\ corrected\ final\ conformation}$ V€P= 8.64 $RBV_{fore\ udder}$ + 14.19 $RBV_{rear\ udder\ height}$ + 5.55 $RBV_{udder\ support}$ + 14.19 $RBV_{udder\ depth}$ + 2.47 $RBV_{front\ teat\ placement}$ + (-11.11 $RBV_{rear\ teat\ placement}$) + (-5.55 $RBV_{teat\ length}$)
Anticipated changes in the near future	Heterogeneous variance adjustement Multi-lactation (>3)

Key reference on methodology applied	Auvray, B. and Gengler N. [2002]. Feasibility of a Walloon test day model and study of its potential as tool for selection and management. INTERBULL Bulletin 29: 123-127.
	Gengler, N. and Wiggans G. [2001]. Heterogeneity in (co)variance structure in test-day yields. INTERBULL Bulletin 27: 179-183.
	Croquet C, Mayeres P., Gillon A., Vanderick S., and Gengler N. (2006). Inbreeding Depression for Global and Partial Economic Indexes, Production, Type, and Functional Traits. J. Dairy Sci. 89: 2257-2267.
	Vanderick S., Croquet C., Soyeurt H., Hammami H., Mayeres P., Gengler N. (2006). Integration of longevity into the Walloon genetic evaluation system. INTERBULL Bulletin 35.
Key organisation: name, address, phone, fax, e-mail, web site	Organisation responsible for genetic evaluations: Association Wallonne de l'Elevage Asbl (AWE) 4, rue des Champs Elysées B-5590 Ciney
	Computing center University of Liège (ULiège) Gembloux Agro-Bio Tech (GxABT) Agriculture, Bio-engineering and Chemistry Department Animal Science Unit Numerical Genetics, Genomics and Modeling Passage des Déportés, 2 B-5030 Gembloux Belgium
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1) Either: Production (e.g. milk, fat, protein), Conformation, Health (e.g. mastitis resistance, milk somatic cell, resistance to diseases other than mastitis), Longevity, Calving (e.g. stillbirth, calving ease), Female fertility (e.g. non-return rate, interval between reproductive events, number of AI's, heat strength), Workability (e.g. milking speed, temperament), Beef production, Efficiency (e.g. body weight, energy balance, body conditioning score), or Other traits.
2) Indicate frequencies per category if the trait is categorical and specify transformation of data if practiced.
3) Use abbreviations for most common effects (see document with list of abbreviations at http://www-interbull.slu.se/service_documentation/General/list_of_abbreviations.rtf) and indicate random (R) or fixed (F).
4) Please give economic weights and indicate how they are expressed (preferably in genetic standard deviation units).

Parameters used in genetic evaluation

Country (or countries):   BELGIUM (Walloon Region)
Main trait group: Production
Breed (repeat as necessary): All dairy and dual-purpose breeds

Trait	Definition	ITB[a]	h^{2b}	genetic variance[b]	official proof standardisation formula[c]
Milk yield			0.41	301265	
			0.30	296532	
			0.31	322263	
	Pooled	X	0.38	280425	EBV
Fat yield			0.43	502.6	
			0.37	581.6	
			0.34	595.7	
	Pooled	X	0.43	522.6	EBV
Protein yield			0.40	253.1	
			0.32	283.6	
			0.32	302.5	
	Pooled	X	0.41	261.5	EBV

[a]   Indicate, with X, traits that are submitted to Interbull for international genetic evaluations.
[b]   If repeated records are treated as separate traits, provide heritability estimates and genetic variances separately for each
     trait, as well as for all traits pooled, i.e. for the trait submitted to Interbull.
[c]   Expressed as follows:
     StandEval=((eval-a)/b)*c+d where a=mean of the base adjustment, b=standard deviation of the base, c=standard
     deviation of expression (include sign if scale is reversed), and d=base of expression.

Parameters for national genetic evaluations for production traits as provided to Interbull

Country (or countries):   BELGIUM (Walloon Region)
Main trait group: Production
Breed(s):   All dairy and dual-purpose breeds

Trait		h^{2a}	genetic variance[a]	official proof standardisation formula[b]
Milk yield:		0.41	301265	
		0.30	296532	
		0.31	322263	
	Pooled	0.38	280425	EBV
Fat yield:		0.43	502.6	
		0.37	581.6	
		0.34	595.7	
	Pooled	0.43	522.6	EBV
Protein yield:		0.40	253.1	
		0.32	283.6	
		0.32	302.5	
	Pooled	0.41	261.5	EBV

[a]   If lactations, or part of lactations, are treated as separate traits, provide heritability estimates and genetic variances separately for each lactation, as well as for all lactations pooled, i.e. for the trait submitted to Interbull.

[b]   Expressed as follows:
StandEval=((eval-a)/b)*c+d where a=mean of the base adjustment, b=standard deviation of the base, c=standard deviation of expression (include sign if scale is reversed), and d=base of expression.

TABLE: Genetic correlations above, phenotypic below and heritabilities on diagonal.

	M1	F1	P1	M2	F2	P2	M3	F3	P3
M1	0.41	0.88	0.95	0.87	0.81	0.87	0.85	0.79	0.84
F1	0.80	0.43	0.91	0.82	0.89	0.85	0.79	0.88	0.82
P1	0.92	0.87	0.40	0.86	0.85	0.90	0.85	0.83	0.87
M2	0.76	0.64	0.73	0.30	0.90	0.95	0.90	0.84	0.90
F2	0.60	0.72	0.64	0.80	0.37	0.93	0.85	0.94	0.88
P2	0.66	0.64	0.68	0.90	0.89	0.32	0.90	0.87	0.94
M3	0.64	0.57	0.62	0.76	0.64	0.70	0.31	0.86	0.92
F3	0.56	0.67	0.60	0.64	0.72	0.66	0.85	0.34	0.90
P3	0.61	0.60	0.62	0.73	0.68	0.71	0.91	0.86	0.32