

DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEMS

Country (or countries)	BELGIUM (Walloon Region)
Main trait group¹ NOTE! Only one trait group per form!	Female Fertility – Pregnancy Rate
Breed(s)	All dairy and dual-purpose breeds
Trait definition(s) and unit(s) of measurement² Attach an appendix if needed	Pregnancy Rate (PR) is defined as the percentage of nonpregnant cows that become pregnant during each 21-day period. PR is derived from DO according to : $PR = 21 / (DO - 45 + 11)$ where 45 represents the voluntary waiting period in our production circumstances and 11 half of reproductive cycle.
Method of measuring and collecting data	Milk recording
Time period for data inclusion	Data since 1980 included
Age groups (e.g. parities) included	First ten parities are included
Other criteria (data edits) for inclusion of records	DO < 21 and DO > 355 were eliminated
Criteria for extension of records (if applicable)	No extension
Sire categories	All sires
Environmental effects³, pre-adjustments	
Method (model) of genetic evaluation³	ST-BLUP-AM
Environmental effects³ in the genetic evaluation model	F: Year x month of calving, parity group (1, 2, 3, 4, 5 and more) x age at calving (2 month classes) x season of calving (3 month seasons) and herd x parity group (1; 2 and more) R: Herd x year of calving and PE
Adjustment for heterogeneous variance in evaluation model	N/A
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 blending
Genetic parameters in the evaluation	See Appendix GE
System validation	Trend validation (method III)
Expression of genetic evaluations If standardised (e.g. RBV), give standardisation formula in the appendix	Expressed as PR in percentage Transformed to RBV (average 100, SD 10)

Definition of genetic reference base	SD for all cows with production born in 2010 used to standardize to 10 points– mean adjusted to 100 for average active sire use in 2014
Next base change	In 2020 cows born in 2015, sires used in 2019
Calculation of reliability	Based on INTERBULL EDC computations
Criteria for official publication of evaluations	First sire need to have production evaluation REL \geq 30 % for : <ul style="list-style-type: none"> • young sires • imported sires if domestic results • imported sires with INTERBULL results
Number of evaluations / publications per year	3
Use in total merit index⁴	$V_{\epsilon G} = V_{\epsilon L} + V_{\epsilon F} + V_{\epsilon T}$ $V_{\epsilon G} = V_{\epsilon L} + V_{\epsilon F} + V_{\epsilon T}$ $V_{\epsilon L} = -0.064 EBV_{\text{milk}} + 1.75 EBV_{\text{fat}} + 6.25 EBV_{\text{prot}}$ $V_{\epsilon F} \sim 0.71 * RBV_{\text{SCS}} + 4.30 RBV_{\text{long}} + 0.40 * RBV_{\text{fert}} + 0.20 * RBV_{\text{CEd}} + 0.24 * RBV_{\text{CEm}}$ <p>- all functional traits expressed on a 10 unit scale, means of 100 subtracted</p> <p>- coefficients only approximate as computations done using selection index procedure estimating jointly $V_{\epsilon F}$, combined RBV_{long} and combined RBV_{fert} from EBVs for direct longevity, indirect longevity, SCS, indirect fertility and calving ease traits.</p> $V_{\epsilon T} = V_{\epsilon M} + V_{\epsilon C} + V_{\epsilon P}$ $V_{\epsilon M} = -4.11 RBV_{\text{rear leg set}} + (2.06 RBV_{\text{rear leg rear view}}) + (10.54 RBV_{\text{bone quality}}) + (9.00 RBV_{\text{feet\&legs}})$ $V_{\epsilon C} = -4.32 RBV_{\text{overall development}} + 11.11 RBV_{\text{udder corrected final conformation}}$ $V_{\epsilon P} = 8.64 RBV_{\text{fore udder}} + 14.19 RBV_{\text{rear udder height}} + 5.55 RBV_{\text{udder support}} + 14.19 RBV_{\text{udder depth}} + 2.47 RBV_{\text{front teat placement}} + (-11.11 RBV_{\text{rear teat placement}}) + (-5.55 RBV_{\text{teat length}})$
Anticipated changes in the near future	
Key reference on methodology applied	Mayeres P., S. Vanderick, C. Croquet, H. Soyeurt, H. Hammami and N. Gengler. (2006). Genetic evaluation of female fertility for Walloon dairy and dual purpose cows using a parity random regression model: first results. Interbull Bulletin n°34: 42-46. Vanderick S., C. Bastin and N.Gengler. (2009). Expressing Female Fertility in the Walloon Region of Belgium : How to do ? INTERBULL Bulletin n°40 : 10-16.

**Key organisation: name, address,
phone, fax, e-mail, web site**

Organisation responsible for genetic evaluations:
Association Wallonne de l'Élevage Asbl (awé)
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

Phone: + 32/81/622206

Fax: + 32/81/622115

E-mail : nicolas.gengler@ulg.ac.be

WEB site for publication of sire breeding values:

<http://www.elinfo.be>

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: Female Fertility – Pregnancy Rate
Breed (repeat as necessary): All dairy and dual-purpose breeds

Trait	Definition	ITB ^a	h ^{2b}	genetic variance ^b	official proof standardisation formula ^c
Pregnancy Rate	PR= 21/(DO - 45 + 11)	X	0.039	24.532	

^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 female fertility traits as provided to Interbull

Country (or countries): BELGIUM (Walloon Region)
Main trait group: Female Fertility – Pregnancy Rate
Breed (repeat as necessary): All dairy and dual-purpose breeds

Trait	h^2	Genetic Variance	official proof standardisation formula ^a
Maiden heifer's ability to conceive:			
Lactating cow's ability to start cycling:	0.039	24.532	EBV
Lactating cow's ability to conceive 1:			
Lactating cow's ability to conceive 2:	0.039	24.532	EBV
Lactating cow's interval calving-conception:	0.039	24.532	EBV

^a 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.