Form GE

Status as of: : 2016-01-31

DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEMS

Country (or countries)	NZL				
Main trait group ¹	Female Fertility				
Breed(s)	BSW, GUE, HOL, JER, RDC				
Trait definition(s) and unit(s) of measurement ² Attach an appendix if needed	 (2) Lactating cow's ability to start cycling a binary trait called PM21, representing success/failure at being presented for mating in the first 21 days of the herd's mating period. (3), & (4) Lactating cow's ability to conceive a binary trait called CR42, representing success/failure for recalving in the first 42 days of the herd's calving period. (5) Lactating cow's interval calving-conception calving interval (CI), in days, from Parity 1 to Parity 2 				
Method of measuring and collecting data	Mating, calving, and culling records collected as part of the milk recording system				
Time period for data inclusion	Mating and calving records since 1990				
Age groups (e.g. parities) included	Mating records for first, second and third parity cows; Calving records for second, third and fourth parity cows. Calving interval from parity 1 to 2.				
Other criteria (data edits) for	Raw Data Data for BV Estima				
inclusion of records	PM21	CR42	Culling Information	PM21	CR42
	missing	fail	none	fail	fail
	missing	success	none	missing	success
	fail or success	missing	none	fail or success	missing
	fail or success	missing	fertility related	fail or success	fail
	missing	missing	fertility related	fail	fail
	missing	missing	none	missing	missing
Criteria for extension of records (if applicable)	Not applicable				
Sire categories	All bulls including domestic and foreign AI bulls plus natural service herd sires				
Environmental effects ³ , pre- adjustments	Not applicable				
Method (model) of genetic evaluation ³	MT-ML-BLUP-AM				
Environmental effects ³ in the genetic evaluation model	F: HYS; Age at calving; heterosis				
Adjustment for heterogeneous variance in evaluation model	Not applicable				

Use of genetic groups and relationships	Genetic groups were assigned by breed, gender of missing parent, birth year and country of origin. Four breed classes were assigned genetic grouping, namely, Holstein-Friesian, Jersey, Ayrshire-Red, and other breeds. Genetic groups were assigned in 5-year intervals from 1960 to 1980 then yearly, with the first birth year group being prior to 1960. Country of origin was defined as NZ, North American and Other. Gender of missing parent was defined as female or male. If a genetic group had less than 200 animals per group birth years were clustered. No clustering occured across breed, origin or gender genetic groups.
Blending of foreign/Interbull information in evaluation	
Genetic parameters in the evaluation	h ² PM21 (Parity 1) 0.05 h ² CR42 (Parity 2) 0.03 h ² CI (Parity 1 to 2) 0.036
System validation	Interbull trend validation test III
Expression of genetic evaluations	Evaluation is expressed as EBV for percentage likelihood of a second parity cow re-calving in the first 42 days of the herd's calving period.
Definition of genetic reference base	2000 born cows of all breeds and crosses with records for each of milk, fat, protein and 17 traits other than production in 2002.
Next base change	June 2016
Calculation of reliability	Information source method. Harris, B.L. and Johnson, D.L (1998) <i>J Dairy Sci</i> 81 :2723-2728; the method is extended for multi-trait evaluation in 12 May 2005 Multiple Trait Fertility Model for National Genetic Evaluation <i>www.aeu.org.nz/page.cfm?id=59</i>
Criteria for official publication of evaluations	EBV for CR42 for second parity cows is official for bulls enrolled for the evaluation system
Number of evaluations / publications per year	3 – February, May and November
Use in total merit index ⁴	The total merit index is called Breeding Worth (BW). In 2013, relative emphasis in percentage terms (VanRaden, 2002, 7 th World Congress on Genetics Applied to Livestock Production, Communication No 01- 21) was respectively 9.3, 31.8, 11.4, 11.8, 14.7, 6.4, 14.7 for Milkfat, Protein, Milk (-), Liveweight (-), Cow Fertility, Somatic Cell Score (-) and Residual Survival not genetically associated with other traits in the index.
Anticipated changes in the near future	Not applicable
Key reference on methodology applied	Harris BL et al. 2006. Development of new fertility breeding values for the dairy industry. <i>Proceedings of the New Zealand Society of Animal Production</i> 66 : 107-112
	12 May 2005 Multiple Trait Fertility Model for National Genetic Evaluation www.aeu.org.nz/page.cfm?id=59
Key organisation: name, address, phone, fax, e-mail, web site	DairyNZ Jeremy Bryant Private Bag 3016 Hamilton NEW ZEALAND Phone: +64 (0)21 814 163 jeremy.bryant@dairynz.co.nz Website: http://www.dairynz.co.nz/animal/animal-evaluation/

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).

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Appendix GE

Parameters used in genetic evaluation

Country (or countries):	NZL			
Main trait group:	Female Fertility			
Breed (repeat as necessary):	BSW, GUE, HOL, JER, RDC			

Trait	Definition	ITB ^a	h ^{2b}	genetic variance ^b	official proof standardisation formula ^c
Interbull Trait 2 NZL: PM21 (1)	Binary success/failure at being presented for mating in the first 21 days of the herd's mating period (parity 1)	Х	0.05	59.3	
Interbull Trait 3 NZL: CR42 (1)	Binary success/failure at re-calving in the first 42 days of the herd's calving period (parity 2)	Х	0.03	32.5	
Interbull Trait 4 NZL: CR42 (1)	Binary success/failure at re-calving in the first 42 days of the herd's calving period (parity 2)	Х	0.03	32.5	
Interbull Trait 5 NZL: CI (days)	Calving interval from parity 1 to 2	X	0.036	84.9	

^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.

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.

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Appendix FF

Parameters for national genetic evaluations for female fertility traits as provided to Interbull

Country (or countries):	NZL
Main trait group:	Female Fertility
Breed(s):	BSW, GUE, HOL, JER, RDC

Trait name	h ²	genetic variance	official proof standardisation formula ^a
Maiden heifer's ability to conceive:	Not applicable	Not applicable	
Lactating cow's ability to start cycling:	0.05	59.3	
Lactating cow's ability to conceive 1:	0.03	32.5	
Lactating cow's ability to conceive 2:	0.03	32.5	
Lactating cow's interval calving-conception:	0.036	84.9	

^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.

Genetic and residual covariances for countries with national multiple trait evaluations. Genetic covariances on upper diagonals, residual covariances on lower diagonals.

Trait name	Trait 1:	Trait 2:	Trait 3:	Trait 4:	Trait 5:
Trait 1: Maiden heifer's ability to conceive					
Trait 2: Lactating cow's ability to start cycling			36.1	36.1	
Trait 3: Lactating cow's ability to conceive 1		128.4		1	
Trait 4: Lactating cow's ability to conceive 2		128.4			
Trait 5: : Lactating cow's interval calving-conception					