DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEM AND TREND VALIDATION FOR MILK SOMATIC CELL AND CLINICAL MASTITIS

Country (or countries):	Germany, Austria and Luxembourg
Main trait group:	Health
Breed(s):	**HOL**stein (Black & White, Red & White), Red cattle (**AYS**), **JER**sey
Trait definition(s) and unit(s) of measurement Attach an appendix if needed	Somatic cell score (SCS) is defined as the trait and is calculated from somatic cell count (SCC) using: $SCS = \log_2(SCC/100000) + 3$
Method of measuring and collecting data	All data collected by official milk recording agencies using ICAR certified milk recording methods
Time period for data inclusion	All test day records from 1990 onwards are used.
Age groups (e.g. parities) included	First three lactations
Other criteria (data edits) for inclusion of records	Allowed ranges of age of calving for first three lactations are 20-40, 30-56 and 44-75 months, respectively. Test day records recorded between 5 and 365 days in milk from first three lactations are used.
Sire categories	All categories of bulls are evaluated jointly.
Environmental effects[a], pre-adjustments	No pre-adjustments for environmental effects
Method (model) of genetic evaluation[a]	ST – ML – RR – TD – BLUP – AM
Environmental effects[a] in the genetic evaluation model	Fixed herd-test-date-parity-milking-frequency effects, fixed lactation curve effects nested within parity x region x breed x calving year x calving age x calving season classes (1245 lactation curves in total), random genetic and permanent environmental effects for each of the first three lactations
Adjustment for heterogeneous variance in evaluation model	No adjustment for heterogeneous variance
Use of genetic groups and relationships	Genetic groups are defined for unknown parents of animals based on breed, sex, year of birth and country of origin of the animal. At least six generations of pedigree are traced back from the cows in test day data set.
Blending of foreign/Interbull information in evaluation	No
Genetic parameters in the evaluation	see PART 3 for heritability/genetic variance estimates; for multiple-trait genetic evaluations, provide genetic correlation estimates between traits separately
System validation	- checks on data quality (raw data, pedigree information, etc.) - checks on results: changes in EBV between evaluations, genetic trends, stability of EBV over time, lactation curve analysis, residual analysis, analysis of Mendelian sampling effects, etc. - Interbull validation methods II and III to be done
Expression of genetic evaluations If standardised (e.g. RBV), give standardisation formula in PART 3	$EBV = 0.26\ EBV_1 + 0.37\ EBV_2 + 0.37\ EBV_3$ RZS (relative breeding values for SCS) with mean of 100 and standard deviation of 12
Definition of genetic reference base **Next base change**	EBV: stepwise 5 year cow base including all cows born in 1995 separately for each breed RZS: yearly rolling bull base with all AI-bulls born in 1992-1994 by breed EBV: August 2005 with the base population including all cows born in 2000

	by breed
	RZS: August 2003 with the base population including all AI bulls born in 1993-1995 by breed
Calculation of reliability	Using multiple trait effective daughter contribution method
Criteria for official publication of evaluations	At least 20 daughters with test day records passed DIM 90 distributed in at least 10 herds, reliability > 50 %
Number of evaluations / publications per year	3 / February, May and August
Use in total merit index[b]	5% weight on SCS in total merit index (RZG)
Anticipated changes in the near future	Implementation of the random regression test day model expected in May 2003
Key reference on methodology applied	Liu, Z., Reinhardt, F., and Reents, R. 2000. Estimating parameters of a random regression test day model for first three lactation milk production traits using the covariance function approach. *Interbull Bulletin* 25:74-80.
	Liu, Z., Reinhardt, F., and Reents, R. 2000. Parameter estimates of a random regression test day model for first three lactation somatic cell scores. *Interbull Bulletin* 26:61-65.
	Liu, Z., Reinhardt, F., Bünger, A., Dopp, L., and Reents, R. 2001. Application of a random regression model to genetic evaluations of test day yields and somatic cell scores in dairy cattle. *Interbull Bulletin*: 27:159-166.
	Liu, Z., Reinhardt, F., and Reents, R. 2001. The effective daughter contribution concept applied to multiple trait models for approximating reliability of estimated breeding values. *Interbull Bulletin*: 27:41-47.
	Reinhardt, F., Liu, Z., Bünger, A., Dopp, L., and Reents, R. 2002 Impact of application of a random regression test day model to production trait genetic evaluations in dairy cattle. *Interbull Bulletin*: 29:103-107.
Key organization: name, address, phone, fax, e-mail, web site	Vereinigte Informationssysteme Tierhaltung w. V. (VIT) Genetic Evaluation Unit Heideweg 1, D-27283 Verden/Aller GERMANY Telefon: 0049 - 4231 - 955 10 Fax: 0049 - 4231 - 955 166
	e-mail: vitzws@vit.de or info@vit.de, web site: http://www.vit.de

[a]   Use abbreviations for most common effects (see document with list of abbreviations at http://www-interbull.slu.se/service_documentation/General/framesida-general.htm) and indicate random (R) or fixed (F)

[b]   Please give economic weights and indicate how they are expressed (preferably in genetic standard deviation units).

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Trait	h^{2a}	genetic variance[a]	official proof standardisation formula[b]
Milk Somatic Cell:	0.23	0.147	
Clinical Mastitis:			

[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 1: Genetic parameters[§] for somatic cell scores on daily basis with heritabilities on diagonal, genetic correlations above diagonal and phenotypic correlations below diagonal

Trait	Lactation	Genetic variance	Lactation 1	2	3	Combined
	1	.132	**.16**	.95	.89	
Somatic cell	2	.148	.34	**.16**	.97	
scores	3	.173	.28	.42	**.17**	
	Combined	.147				**.23**

[§]Note that the parameters were estimated based on data from supervised tests of Holstein cows.