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DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEMS

Country (or countries)	United States of America
Main trait group	Conformation (type)
Breed(s)	RDC (AYR), BSW, GUE, JER
Trait definition(s) and unit(s) of measurement	Stature, strength, body depth (RDC, GUE), dairy form, rump angle, thurl width, rear leg (side view), rear legs (rear view) (GUE), foot angle, fore udder attachment, rear udder height, rear udder width, udder cleft, udder depth, teat placement, teat length, rear teat placement (JER) and final score
Method of measuring and collecting data	Traits scored visually on a 9-point scale (RDC), on a 50-point linear scale by breed association classifiers (BWS, GUE, JER except stature), and on an 80-point scale for stature (JER)
Time period for data inclusion	Appraisals from 1980 and later (RDC, GUE, JER) or 1982 and later (BSW); pedigree from birth years 1970 and later
Age groups (e.g. parities) included	≤60 months old (RDC); ≤68 months old (BSW); parities 1–3 (GUE); parities 1–2 (JER)
Other criteria (data edits) for inclusion of records	Valid sire identification required; appraisal during first (RDC, JER) or second (RDC) lactation required
Criteria for extension of records (if applicable)	Not applicable
Sire categories	All sires (AI and NS) evaluated together
Environmental effects, pre-adjustments	Age, lactation stage
Method (model) of genetic evaluation	MT BLUP RP AM
Environmental effects[3] in the genetic evaluation model	Herd-appraisal date-parity (F), herd × sire (R), PE (R)
Adjustment for heterogeneous variance in evaluation model	Pre-adjustments applied
Use of genetic groups and relationships	A single unknown parents group (RDC, BSW, GUE) 10 groups (JER) based on birth year
Blending of foreign/Interbull information in evaluation	None
Genetic parameters in the evaluation	For h2 and genetic variance estimates, see Appendix CO for RDC, JER, and GUE and Appendix BCO for BSW
System validation	Means and SDs for all variables calculated and examined overall; means for new bulls, changes for high bulls, largest changes, and key statistics for recent AI bulls checked
Expression of genetic evaluations	PTA
Definition of genetic reference base **Next base change**	Cows born in 2015 (stepwise, 5 years) April 2025 (when base will be cows born in 2020)
Calculation of reliability	Iterative method that estimates contributions from parents, records, and progeny
Criteria for official	At least 5 daughters with a usable classification record;

publication of evaluations	Interbull evaluations reported as official in the U.S. if they include data on udder support from an additional country, the U.S. has no evaluation, or Interbull excludes U.S. data and Interbull evaluation has higher REL
Number of evaluations/ publications per year	3 (April, August, December)
Use in total merit index[4]	Included as Udder composite, Feet/Legs composite and Body size composite and used in Lifetime net merit dollars (**NM$**), Cheese Merit dollars (CM$), Fluid Merit dollars (FM$) and Grazing Merit dollars (GM$) with variable relative weighting. Latest merit information is available at: https://aipl.arsusda.gov/reference/nmcalc-2018.htm
Anticipated changes in the near future	None
Key reference on methodology applied	Gengler, N., G.R. Wiggans, and J.R. Wright. 1999. Animal model genetic evaluation of type traits for five dairy cattle breeds. J. Dairy Sci. 82 (June). Online. VanRaden, P.M., Tooker, M.E., Wright, J.R., Sun, C., and Hutchison, J.L. Comparison of single-trait to multi-trait national evaluations for yield, health, and fertility. J. Dairy Sci. 97(12):7952-7962. 2014.
Key rganization: name, address, phone, fax, e-mail, web site	**Evaluation calculation and distribution:** Council on Dairy Cattle Breeding One Town Center 4201 Northview Drive, Suite 302Bowie, MD 20716 Ph: 240 334 4164 e-mail: joao.durr@uscdcb.com web site: https://www.uscdcb.com **Evaluation methodology:** Animal Improvement Program Animal Genomics and Improvement Laboratory Agricultural Research Service, U.S. Dept. of Agriculture 10300 Baltimore Ave. Bldg. 005, Room 306, BARC-West Beltsville, Maryland 20705-2350, USA voice: 301-504-8334; fax: 301-504-8092 e-mail: john.cole@usda.gov web site: http://aipl.arsusda.gov

Parameters for national genetic evaluations for conformation traits as provided to Interbull (all breeds except Brown Swiss)

Country (or countries): United States of America
Main trait group: Conformation (type)
Breed(s): RDC, GUE, JER

Trait	Definition	h[a]	genetic variance[a]	official proof standardisation formula[b]
Stature	Stature	RDC,0.51 GUE,0.51 JER,0.32	RDC SD = 1.8 GUE SD = 1.7 JER SD = 1.1	
Chest Width	Strength	RDC,0.24 GUE,0.28 JER, 0.17	RDC SD = 1.1 GUE SD = 0.9 JER SD = 0.8	
Body Depth	Body Depth	RDC,0.27 GUE,0.33 JER, -	RDC SD = 1.0 GUE SD = 1.1 —	
Angularity	Dairy Form	RDC,0.17 GUE,0.33 JER, 0.17	RDC SD = 0.9 GUE SD = 1.2 JER SD = 0.9	
Rump Angle	Rump Angle	RDC,0.31 GUE,0.36 JER, 0.21	RDC SD = 0.9 GUE SD = 1.4 JER SD = 0.9	
Rump Width	Thurl width (RDC,GUE) Rump width (JER)	RDC,0.26 GUE,0.33 JER, 0.16	RDC SD = 1.2 GUE SD = 0.9 JER SD = 0.7	
Rear Leg Set	Rear legs (side view) (RDC, GUE), Rear legs (JER)	RDC,0.12 GUE,0.11 JER, 0.08	RDC SD = 0.7 GUE SD = 0.7 JER SD = 0.4	
Rear Leg Rear View	Rear legs side view (RDC) Rear legs rear view (GUE) Rear legs (JER)	RDC, - GUE,0.08 JER, -	- GUE SD = 0.7 -	
Foot Angle	Foot angle	RDC,0.11 GUE,0.08 JER, 0.09	RDC SD = 0.8 GUE SD = 0.6 JER SD = 0.6	
Fore Udder	Fore udder	RDC,0.23 GUE,0.23 JER, 0.18	RDC SD = 1.0 GUE SD = 1.3 JER SD = 0.9	
Rear Udder Height	Rear udder height	RDC,0.26 GUE,0.25 JER, 0.20	RDC SD = 1.1 GUE SD = 1.2 JER SD = 1.1	
Udder Support	Udder cleft	RDC,0.18 GUE,0.18 JER, 0.12	RDC SD = 1.0 GUE SD = 1.0 JER SD = 0.7	
Udder Depth	Udder depth	RDC,0.28 GUE,0.38 JER, 0.29	RDC SD = 1.1 GUE SD = 1.4 JER SD = 1.1	
Front Teat Placement	Teat length (RDC, GUE), Front teat placement (JER)	RDC,0.25 GUE,0.26 JER, 0.20	RDC SD = 1.1 GUE SD = 1.1 JER SD = 0.9	
Teat Length	Teat Length (RDC, GUE), Front teat length (JER)	RDC,0.30 GUE,0.39 JER, 0.21	RDC SD = 1.1 GUE SD = 1.1 JER SD = 0.7	

Rear Teat Placement	Rear teat placement rear view (JER), Front teat placement (RDC, GUE)	RDC,- GUE,- JER, 0.21	- - JER SD = 1.0
Overall Conformation Score	Final score	RDC,0.30 GUE,0.27 JER, 0.20	RDC SD = 0.5 GUE SD = 0.7 JER SD = 0.8
Overall Udder Score	Calculated from linears	RDC,0.25 GUE,0.28 JER, 0.22	RDC SD = 1.0 GUE SD = 1.2 JER SD = 1.1
Overall Feet & Leg Score	Calculated from linears	RDC,0.11 GUE,0.08 JER, 0.09	RDC SD = 0.8 GUE SD = 0.7 JER SD = 0.5
Locomotion	-	-	- -
Body Condition Score	-	-	- -

[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.

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

Country (or countries):	United States of America	
Main trait group:	Conformation	
Breed:	Brown Swiss	

Trait	Definition	h^{2a}	genetic variance^a	official proof standardisation formula^b
Stature	Stature	0.34	SD=1.3	
Chest width	Strength	0.13	SD=0.8	
Body depth	Chest width	-	-	
Angularity	Dairy Form	0.18	SD=0.9	
Rump angle	Rump angle	0.18	SD=1.0	
Rump Width	Thurl width	0.12	SD=0.7	
Rear Leg Side View	Rear legs (side view)	0.13	SD=0.7	
Pasterns/Foot Angle	Foot angle	0.09	SD=0.7	
Deep Heel (Hoof Height)	Foot angle	-	-	
Fore Udder Attachment	Fore udder attachment	0.19	SD=1.0	
Rear Udder Attachment Height	Rear udder height	0.18	SD=1.0	
Rear Udder Attachment Width	Rear udder witdth	0.15	SD=0.9	
Udder Support	Udder cleft	0.12	SD=1.0	
Udder Depth	Udder depth	0.26	SD=1.1	
Front Teat Placement	Front teat placement	0.22	SD=1.1	
Teat Length	Teat length	0.29	SD=1.2	
Rear Teat Placement	Front teat placement	-	-	
Overall Conformation Score	Final score	0.26	SD=0.5	
Overall Udder Score	Calculated from linears	0.24	SD=1.1	
Overall Feet & Leg Score	Calculated from linears	0.10	SD=0.7	
Locomotion	-	-	-	
Body Condition Score	-	-	-	
Overall frame (OFR)	Stature	-	-	
Overall rump (ORU)	Rump width	-	-	
Rump length (RLE)	Rump width	-	-	
Pin Width (PWI)	Thurl width			
Thurl position (THP)	Rump angle			

^{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.