

DESCRIPTION OF NATIONAL GENETIC EVALUATION SYSTEMS

Country (or countries)	United States of America
Main trait group	Cow Livability
Breed(s)	AYS (RDC), BSW, GUE, HOL (B&W, R&W), JER, MSH (RDC); all breeds and crossbred cows evaluated together in a multibreed AM
Trait definition(s) and unit(s) of measurement	Probability of a lactation not ending in death or on-farm euthanasia. Trait is then multiplied by 2.8 average lactations to obtain a lifetime value
Method of measuring and collecting data	Reasons for disposal and lactation dates and lengths from data collected by Dairy Herd Information Affiliates
Time period for data inclusion	All calvings from 1970 and later; pedigree from birth years 1950 and later
Age groups (e.g. parities) included	All parities included
Other criteria (data edits) for inclusion of records	Valid sire identification;
Criteria for extension of records (if applicable)	Not applicable
Sire categories	All sires (AI and NS) evaluated together
Environmental effects, pre-adjustments	Genetic variance pre-adjusted for time period (5 year) and lactation group (lactation 1,2,3,4,5 or ,6 and greater)
Method (model) of genetic evaluation	Multitrait, multibreed BLUP AM; all breeds and crossbreds evaluated. Culling rate per lactation is used as a correlated trait because deaths are not coded in some herds
Environmental effects³ in the genetic evaluation model	Management group [flexible based on herd of first lactation and birth date (and registry status for HOL)] (F), regression on inbreeding (F), regression on general heterosis (F), herd × sire interaction (R); model produces PTA adjusted to 0 inbreeding, but released PTA includes regression coefficient multiplied by expected future inbreeding and coefficient of heterosis when mated to purebred as a post-processing step
Adjustment for heterogeneous variance in evaluation model	Pre-adjustments applied
Use of genetic groups and relationships	Unknown parents grouped by birth year, breed, and, for HOL, separately for U.S. and foreign animals; unknown sires and dams of cows grouped separately, but unknown parents of bulls in a combined group; relationship matrix accounts for effects of inbreeding on Mendelian sampling variance
Blending of foreign/Interbull information in evaluation	Not applicable

Genetic parameters in the evaluation	Heritability=0.013; genetic variance SD =4.2; PE=0.02
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, percent cow is likely to die over lifetime; all-breed PTAs adjusted to within-breed bases as within-breed PTA = (all-breed PTA – breed mean)
Definition of genetic reference base	Cows born in 2010 (stepwise, 5 years)
Next base change	December 2019 (when base will be cows born in 2015)
Calculation of reliability	Daughter equivalents from progeny, parents, and own records combined using the same methods as for yield traits
Criteria for official publication of evaluations	At least 10 daughters with usable livability data
Number of evaluations/publications per year	3 (April, August, December)
Use in total merit index⁴	Anticipated in future
Anticipated changes in the near future	Inclusion in lifetime net merit index
Key reference on methodology applied	Miller, R.H., Kuhn, M.T., Norman, H.D., and Wright, J.R. Death losses for lactating cows in herds enrolled in Dairy Herd Improvement test plans . J. Dairy Sci. 91(9):3710–3715. 2008. Wright, J.R., and VanRaden, P.M. Genetic evaluation of dairy cow livability . J. Dairy Sci. 99(E–Suppl. 1)/J. Anim. Sci. 94(E–Suppl. 5):174(abstr. 0368). 2016.
Key organisation: name, address, phone, fax, e-mail, web site	<p>Evaluation calculation and distribution: Council on Dairy Cattle Breeding 10300 Baltimore Ave. Bldg. 005, Room 304, BARC-West Beltsville, Maryland 20705-2350, USDA voice: 301-525-2006; no fax e-mail: duane.norman@cdcb.us web site: https://www.cdcb.us</p> <p>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: aipl.inquiry@ars.usda.gov web site: http://aipl.arsusda.gov</p>