Country	Switzerland

Trait category:	*Individual trait(s):*
Reproduction-calving	**Dystocia (direct)**
	Stillbirth (direct)
	Birth weight (direct)
	Gestation length (direct)
Reproduction-fertility	**Days open (female)**
	Non-return rate 75 (male)
Workability	**Milking speed**
	Percentage milk in fore quarter
	Residual milk
Conformation	**Udder**
	Locomotion
	Other

Brown Swiss:
Swiss Braunvieh Association
Chamerstrasse 56
CH-6300 Zug, Switzerland
Telephone +41 41 729 33 11
Facsimile +41 41 729 33 77
E-mail lcsbzv@wawona.vmsmail.ethz.ch

Holstein:
Holstein Association of Switzerland
Grangeneuve
CH-1725 Posieux, Switzerland
Telephone +41 37 25 59 00
+41 26 305 59 00 (after November 2, 1996)
Facsimile +41 37 25 59 04
+41 26 305 59 04 (after November 2, 1996)
E-mail fsho@com.mcnet.ch

Red & White (Simmental) Cattle:
Swiss Simmental Association
Rüttistrasse
CH-3052 Zollikofen
Telephone +41 31 910 61 11
Facsimile +41 31 910 61 99
E-mail sfvfs@wawona.vmsmail.ethz.ch

Reproduction calving traits	**Dystocia (direct)** **Stillbirth (direct)** **Birth weight (direct)** **Gestation length (direct)**
Breed(s)	[B] Brown Swiss [H] Holstein [R] Red & White (Simmental) Cattle
Trait definition and unit(s) of measuring	[B,H,R] Dystocia is scored in 4 categories; no help (1), one person help (2), several persons or veterinary (3), caesarean (section) (4). In the analysis only 2 categories are used; 1 (= categories 1 + 2), 0 (= categories 3 + 4) Stillbirth is scored in 2 categories; dead within 24 hours after birth (0), alive (1) Birthweight is measured or estimated in kilograms Gestation length is the number of days between insemination and calving
Method of measuring and collecting data	[B,H,R] Farmers fill in a questionnaire
Time period for data inclusion	[B,R] Since 1992 [H] Data from one year
Age groups	[B,H,R] All
Genetic parameters	[B] $h^2_{\text{calving performance (direct)}} = 0.018$ $h^2_{\text{stillbirth (direct)}} = 0.010$ $h^2_{\text{birthweight (direct)}} = 0.113$ $h^2_{\text{gestation length (direct)}} = 0.387$ $r_{g(\text{calving performance (direct)}, \text{stillbirth (direct)})} = 0.11$ $r_{g(\text{calving performance (direct)}, \text{birthweight (direct)})} = -0.17$ $r_{g(\text{calving performance (direct)}, \text{gestation length (direct)})} = -0.07$ $r_{g(\text{stillbirth (direct)}, \text{birthweight (direct)})} = 0.01$ $r_{g(\text{stillbirth (direct)}, \text{gestation length (direct)})} = 0.06$ $r_{g(\text{birthweight (direct)}, \text{gestation length (direct)})} = 0.25$ [H] $h^2_{\text{calving performance (direct)}} = 0.046$ $h^2_{\text{stillbirth (direct)}} = 0.016$ $h^2_{\text{birthweight (direct)}} = 0.146$ $h^2_{\text{gestation length (direct)}} = 0.407$ [R] $h^2_{\text{percentage normal calving (direct)}} = 0.059$ $h^2_{\text{percentage calves born alive (direct)}} = 0.012$ $h^2_{\text{birthweight (direct)}} = 0.147$ $h^2_{\text{gestation length (direct)}} = 0.533$ $r_{g(\text{calving performance (direct)}, \text{stillbirth (direct)})} = 0.11$ $r_{g(\text{calving performance(direct)}, \text{birthweight (direct)})} = -0.17$ $r_{g(\text{calving performance (direct)}, \text{gestation length (direct)})} = -0.07$ $r_{g(\text{stillbirth (direct)}, \text{birthweight (direct)})} = 0.01$ $r_{g(\text{stillbirth (direct)}, \text{gestation length (direct)})} = 0.06$ $r_{g(\text{birthweight, gestation length (direct)})} = 0.25$
Sire categories	[B,H,R] Test bulls

Reproduction	**Dystocia (direct)**
calving traits *continued*	**Stillbirth (direct)**
	Birth weight (direct)
	Gestation length (direct)

Environmental effects		
pre-adjustment	[B,H,R]	None
evaluation model	[B]	Sex of calf, parity of dam, calving year x calving season, geographical region, genetic group of dam
	[H]	Parity, sex of calf, season
	[R]	Sex of calf, parity of dam, calving year x season, mountain zone, genetic group of dam, genetic group of sire
Base for age adjustment	[B,R]	None
	[H]	Actual population average
Use of genetic groups and/or relationships	[B]	Relationships among sires
	[H]	None
	[R]	Genetic groups according to percentage of Red Holstein blood of the parents. Relationships among sires
Method (model) of genetic evaluation	[B,R]	MT BLUP SM, traits evaluated simultaneously
	[H]	ST BLUP SM
System validation	[B,H,R]	Very comprehensive data quality control, models were selected after variance analyses with different models
Expression of proof	[B,R]	EBV with M = 0, higher values are more desirable
	[H]	EBV with M = 0, on same scale as recorded
Genetic (reference) base	[B,R]	Rolling base: the last three age classes of AI young bulls
	[H]	Rolling base
Criteria for official publication of sire proofs	[B,H]	≥ 150 calvings per bull
	[R]	≥ 100 calvings per bull
Number of evaluations/ publications per year	[B]	One; October
	[H]	One; July
	[R]	One; September or October
Use in total merit index	[B,H,R]	No
Key reference on methodology applied	[B,R]	Casanova, L., F. Schmitz-Hsu & Y. Schleppi, 1995. Geburtseigenschaften beim Braunvieh und Fleckvieh. Agragforschung 1995: Band 2 (11/12)
	[H]	Chavaz, W., 1988. Zuchtwerte für Abkalbeigenschaften. Weiterbildungskurs SVIAL 1 to 2 September 1988

Reproduction fertility traits	a) b)	Days open (female) Non-return rate 75 (male)
Breed(s)	a) b)	Brown Swiss Brown Swiss, Holstein, Red & White (Simmental) Cattle
Trait definition and unit(s) of measuring	a) b)	Number of days between calving and successful insemination Scored as not re-inseminated (0) or re-inseminated (1) within 75 days after first insemination
Method of measuring and collecting data	a,b)	Calculated from milk recording records and from AI data
Time period for data inclusion	a) b)	Since 1988 Data from one year
Age groups	a,b) b)	1st lactation (for Brown Swiss and Red & White (Simmental) Cattle Heifers and cows (for Holstein)
Genetic parameters	a) b)	$h^2_{\text{days open}} = 0.10$ Phenotypically evaluated
Sire categories	a,b) b)	AI young bulls (for Brown Swiss and Red & White (Simmental) Cattle All AI bulls (for Holstein)
Environmental effects		
pre-adjustment	a) b)	None Parity x month
evaluation model	a) b)	Management group Phenotypically evaluated
Base for age adjustment	a) b)	None Average of current year = 0
Use of genetic groups and/or relationships	a) b)	Group definition according to birth year and percentage of Brown Swiss genes None
Method (model) of genetic evaluation	a) b)	ST BLUP SM Phenotypically evaluated, as corrected averages
System validation	a,b)	Very comprehensive data quality control, models were selected after variance analyses with different models
Expression of proof	a) b)	EBV with M = 0, lower values are more desirable Adjusted phenotypic mean on original scale
Genetic (reference) base	a) b)	Fixed base: AI bulls born 1985 Average of the year = 0
Criteria for official publication of sire proofs	a) b)	≥ 30 daughters ≥ 100 inseminations
Number of evaluations/ publications per year	a) b)	Three; January, May, September One; August; not published systematically
Use in total merit index	a,b)	No
Key reference	a,b)	-

Workability traits	Milking speed Percentage milk in fore quarter Residual milk
Breed(s)	Brown Swiss, Holstein, Red & White (Simmental) Cattle
Trait definition and unit(s) of measuring	Milking speed is kilogram milk flow per minute Percentage milk in fore quarter is quantity of milk flown from the front teats in relation with total milk Residual milk is the milk that remains in the udder after milking
Method of measuring and collecting data	Measured by professional technicians with transportable milking machines and pumps
Time period for data inclusion	Since 1965 (for Brown Swiss) Data from one year (for Holstein and Red & White (Simmental) Cattle)
Age groups	1st lactation
Genetic parameters	Phenotypic evaluation
Sire categories	All AI young bulls
Environmental effects **pre-adjustment** **evaluation model**	 Daily milk production, lactation stage None
Base for age adjustment	None
Use of genetic groups and/or relationships	None
Method (model) of genetic evaluation	No breeding values estimation, but phenotypic averages. Holstein and Red & White (Simmental) Cattle are evaluated together
System validation	-
Expression of proof	No breeding value, but expressed as averages
Genetic (reference) base	None
Criteria for official publication of sire proofs	≥ 10 daughters (for Brown Swiss) ≥ 20 daughters (for Holstein and Red & White (Simmental) Cattle)
Number of evaluations/ publications per year	Three; January, May, September (for Brown Swiss) Two; June, December (for Holstein and Red & White (Simmental) Cattle)
Use in total merit index	No
Key reference on methodology applied	-

Conformation traits	Udder:	[B]	Fore udder, rear udder, rear udder attachment width, rear udder attachment height, fore udder attachment, udder depth, suspensory ligament, teat shape, teat length, teat front placement, teat rear placement, teat angle rear view
		[H]	Fore udder length, fore udder attachment, rear udder attachment height, rear udder attachment width, suspensory ligament, udder depth, udder texture, teat length, teat front placement, teat rear placement, teat orientation, mammary system overall
		[R]	Fore udder, fore udder attachment, rear udder, rear udder attachment, central ligament, udder texture, teat shape, teat length, fore teat orientation, fore teat placement
	Locomotion:	[B]	Hock angle, hock joint, pastern, hooves (depth at heel)
		[H]	Set of rear legs, pastern, depth of heel, rear legs-rear view, feet & legs overall
		[R]	Rear leg angle, rear leg, feet, claw
	Other:	[B]	Height at withers, chest girth, rump length, length, rump angle, depth, width, muscling
		[H]	Stature (height at withers), chest girth, strength (front end), body depth, loin strength, frame & capacity overall, rump length, pin setting, rump width, rump overall, angularity, dairy form overall
		[R]	Wither height, sacrum height, chest girth, chest width, capacity, pelvis length, pelvis slope, width, muscularity, expression

Conformation traits *continued*	**Udder** **Locomotion** **Other**	
Breed(s)	[B]	Brown Swiss
	[H]	Holstein
	[R]	Red & White (Simmental) Cattle
Trait definition and unit(s) of measuring	[B,H,R]	Most traits are scored on a linear 1-9 point scale, except for wither height, sacrum height and chest girth, which are measured in cm
Method of measuring and collecting data	[B,H,R]	Scored by classifier
Time period for data inclusion	[B,H,R]	Since 1992
Age groups	[B,H,R]	1st lactation
Genetic parameters	[B]	$h^2_{\text{udder traits}}$ = 0.17 to 0.32 $r_{g(\text{between udder traits})}$ = -0.06 to 0.68 $h^2_{\text{teat traits}}$ = 0.24 to 0.36 $r_{g(\text{between teat traits})}$ = 0.03 to 0.48 $h^2_{\text{locomotion traits}}$ = 0.12 to 0.23 $r_{g(\text{between locomotion traits})}$ = -0.15 to 0.33 $h^2_{\text{other traits}}$ = 0.17 to 0.50 $r_{g(\text{between other traits})}$ = 0.01 to 0.71
	[H]	$h^2_{\text{udder traits}}$ = 0.24 to 0.45 $r_{g(\text{between udder traits})}$ = -0.21 to 0.63 $h^2_{\text{locomotion traits}}$ = 0.25 to 0.30 $r_{g(\text{between locomotion traits})}$ = -0.25 to 0.52 $h^2_{\text{other traits}}$ = 0.26 to 0.71 $r_{g(\text{between other traits})}$ = -0.14 to 0.94
	[R]	$h^2_{\text{udder traits}}$ = 0.17 to 0.51 $h^2_{\text{locomotion traits}}$ = 0.12 to 0.24 $h^2_{\text{other traits}}$ = 0.24 to 0.44 $r_{g(\text{between traits})}$ = -0.41 to 0.94
Sire categories	[B,H,R]	AI test bulls
Environmental effects pre-adjustment evaluation model	[B,H,R]	None
	[B,H]	Classifier, management group (calving year, calving season, geographical region and herd production level), age at inspection, stage of lactation, proportion of US Brown Swiss genes of cows dam (only for Brown Swiss)
	[R]	Group of the sire (percentage Red Holstein), group of the dam, group of farms, year x season of the linear description, grader, daytime of the description, age of calving, stage of lactation, pasture (yes or no), housing system (tied or loose)

Conformation traits *continued*	Udder Locomotion Other	
Base for age adjustment	[B,H]	Regression on mean age at inspection (only 1st lactation)
	[R]	Effect in evaluation model
Use of genetic groups and/or relationships	[B,H]	Relationships among sires
	[R]	Genetic group according to percentage Red Holstein blood of the parents. Relationships among sires
Method (model) of genetic evaluation	[B,H,R]	MT BLUP SM
System validation	[B,H,R]	Very comprehensive data quality control, models were selected after variance analyses with different models
Expression of proof	[B,H,R]	Standardized RBV, with M = 100 and SD = 10
Genetic (reference) base	[B,H,R]	Rolling base: the last three age classes of AI young bulls
Criteria for official publication of sire proofs	[B,H]	≥ 30 daughters per bull
	[R]	≥ 20 daughters in the analysis
Number of evaluations/ publications per year	[B]	Three; January, May, September
	[H]	Two; January, July
	[R]	Three; February, June, October
Use in total merit index	[B,H,R]	No
Key reference on methodology applied	[B]	Casanova, L., 1993. Genetic evaluation of linear type traits for Swiss Braunvieh (Interbull Meeting, Aarhus 1993)
	[R]	Schmitz-Hsu, F., 1994. Description linéaire: estimation de la valeur d'élevage et interprétation de résultats. Tachétée Rouge Swiss 1994/4:62-71