News in evaluation run April 2018

- **New estimation model for longevity**
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New estimation model for longevity

With publication date of April 2018 a new model for longevity is introduced as survival (yes/no-trait) in 9 different periods, starting from first and finishing with the 4th calving:

Lactation 1, 1. Period (L 1.1) = survival of 1st calving - day 49
Lactation 1, 2. Period (L 1.2) = survival of day 50 - 249
Lactation 1, 3. Period (L 1.3) = survival of day 250 – 2nd calving
Lactation 2, 1. Period (L 2.1) = survival of 1st calving - day 49
Lactation 2, 2. Period (L 2.1) = survival of day 50 - 249
Lactation 2, 3. Period (L 2.1) = survival of day 250 – 3rd calving
Lactation 3, 1. Period (L 3.1) = survival of 1st calving - day 49
Lactation 3, 2. Period (L 3.1) = survival of day 50 - 249
Lactation 3, 3. Period (L 3.1) = survival of day 250 – 4th calving

The definition of periods (length) is based on the analysis of the main involuntary culling reasons within a lactation. For example metabolic diseases are the main reason for involuntary culling in the first period (up to 50 days), whereas mastitis or claw-diseases occur mainly in the medium section of a lactation (day 50-249). Culling at the end of a lactation (starting from day 250) is mainly caused by fertility problems, e.g. cows not getting pregnant. The estimated breeding values of 9 survival rates within each period are combined to one overall relative index, the RZN. Auxiliary traits, as used in the old estimation procedure, are no longer used. The first information about survival will be available after period 1, which means 50 days, so all bulls will receive longevity proofs at (nearly) the same time when milk production proofs are available, too. Breeding values (RZN) will be published, when observations from 10 or more herds are available.
The base for the relative EBV is compiled from cows born 2012 to 2014 within each breed. This is equivalent to all bases of all other traits.
The new model for longevity takes only survival up to the 4th calving into account, so a direct transformation to a survival based on a continuous time scale (days of longevity) is not trivial. Theoretical approaches and the direct comparison of daughter longevity of older AI-bulls show a corresponding deviation of 260 days per genetic standard deviation of 12.

RZN	≈ LONG in days	≈ LONG in months
88	-260	-8,5
100	0	0
112	+260	+8.5

Based on the RZN of bulls, the differences in daughters show half of the bulls‘ proof, 12 points difference in bulls correspond 130 days longevity in daughters. Further information can be found at www.vit.de.

The new RZN is no longer based on a combination of auxiliary traits, so the correlations of RZN to all other traits in the total merit index (RZG) were re-estimated and considered in a new calculation of the RZG.

Composite		*Genetic correlations used in RZG* RZM	RZN	RZE*	RZS	RZR
Yield	RZM					
Functional herd life	RZN	0.00				
*Conformation**	RZE*	0.00	0.30			
Somatic cell score	RZS	-0.05	0.40	0.20		
Daughter fertility	RZR	-0.25	0.45	0.10	0.20	
Calving ease mat.	RZKm	-0.05	0.20	0.00	0.10	0.25

*) only Feet&Legs and Udder

Changes in first to last insemination and calving traits (date editing)

For the trait first to last insemination (FL, heifers and cows) the source of phenotypic data was increased. From now on also animals will be considered whose FL is not (yet) confirmed by a consecutive calving event with a plausible gestation length. Multiple inseminated animals will be considered using their minimum possible FL. Animals having a consecutive calving with no plausible gestation length will be considered by a correction of the last insemination to the least possible successful insemination (calving – 281 days). The overall increment of used phenotypic data will be about 20%. As a consequence of this increased information there will be some significant changes in the daughter-fertility-index (RZR) for some bulls.

In calving traits only data from herd x year combinations will be considered, when more than 75% of the sires of calves born are known. The amount of data will decrease by about 30%, but there are large differences between regions. Known sires and thereby their breed are extremely important for the correct consideration of phenotypes. Animals/herd comparisons with unknown sire will be put into a genetic group, equivalent to a mean sire of same breed and age. Records from the I&R database (HIT) contain no information of the sire and the breed. Information derived from the breed of the dam, is wrong in many cases. For dead born calves (without own ear tag) there are no data records from I&R available, even the gender is not known. For the breeding value estimation these records need to be derived from available data of calving of the dam and their inseminations/natural matings. Unfortunately in many herds mating records are incomplete, especially data from dead born calves and beef breed crosses will not be maintained. The growing number of crossbred calves with unknown sire does not correspond with the mean calving ease and the percentage of dead born of calves with known sires. This leads to more bias. Using exclusively data from herd*years with >=75 known sires of calves will decrease the bias. Altogether this will lead to significant changes in EBVs for calving traits. Mean performances of the actual bulls will change, too (compare with ‘annual change of cow base’).

Annual shift of base for all traits and breeds

The actual base for all traits and breeds is defined by cows 4 to 6 years old. They represent the actual living cow population. So, the base for all EBVs published in April 2018 and later this year is defined by cows born in 2012 – 2014 and having an own performance in the resp. trait (last year: 2011-2013).
The breeding values of bulls in this evaluation do not only change due to the base change (genetic trend), they are also influenced by the changes in evaluations as described above.
The average changes in EBVs of daughter proven bulls of the last 10 birth years are shown in the following tables.

	RZM	RZS	RZE	RZN	RZR	RZKm	RZG
Holstein	-1.7	-0.8	-2.3	-4.2	-1.5	-1.6	**-3.6**
Red Hol.	-1.6	-0.4	-2.2	-1.7	-0.5	-2,1	**-2.4**
Angler	-1.5	0.1	-1.7	-1.4	-0.7	-1.9	**-1.8**
R&W d p	-0.5	0.2	0.5	-5.1	0.3	-3.0	**-2.1**

	M-kg	F-%	F-kg	P-%	P-kg
Holstein	-63	0.00	-2.5	0.00	-2.3
Red Hol.	-67	0.01	-2.0	0.00	-2.4
Angler	-50	0.01	-1.6	0.01	-1.3
R&W d p	-23	0.00	-0.9	0.00	-0.7

	D-Typ	Body	F&L	Udder	RZD
Holstein	-1.2	-0.8	-1.1	-2.3	-0.1
Red Hol.	-1.4	-0.7	-0.8	-2.4	0,0
Angler	0.1	-0.9	-1.1	-1,3	0.2
R&W d p	0.0	0.5	0.5	0.7	0.2

	CEm	SBm	CEd	SBd	RZKd
Holstein	-1.9	-1.3	-1.8	2.5	0.4
Red Hol.	-2.2	-1.9	-1.0	3.4	1.2
Angler	-1.7	-1.7	-1.2	1.6	0.1
R&W d p	-1.8	-4.1	-0.8	4.8	2.0

Positive value = new base is lower and therefore new EBV is higher

For RZM, RZS and RZE the changes displayed are similar to the expected genetic gain. For RZN, but also for RZR and RZKm/RZKd a significant part of the shown EBV-changes are caused by the changes in the model / data editing. For RZN an additional effect occurs, as a true cow base is used for the first time. The new model is an animal model and direct solutions for females can be used for the calculation of the base values. For Holsteins the differences in RZN based on genetic gain is only about 1.8 points, whereas the change of the model causes about 2.4 points. For RZR about half of the observed change is based in genetic trend (1.5 points), for RZKm no change based on genetic gain can be observed. The average change of -1.6 RZKm is only caused by the changes in data editing.

New definition of conventional Bulls for being published and listed in top-lists

All bulls having official daughter proven EBVs in production (daughters in more than 10 herds) will be published as ‚daughter proven'. In consequence transition bulls, these are bulls being daughter proven in production, but not yet in one or many other traits of RZG (only genomic), will also be published as 'daughter proven'. Transition bulls cannot be listed in the daughter proven top-lists, as they have no daughter proven RZG, because for this daughter proven indices RZM, RZS, RZE, RZN and RZR are needed. RZN derived from the new model will be available a bit later than before (no auxiliary traits are used anymore), so the number of daughter proven bulls in the top-list will be uniquely smaller this time.

New RZM-Formula for RDC (Angler)

The breeding organizations for Angler (Red Dairy Cattle) have decided to adapt the composition of the milk production index RZM. From April 2018 on fat- and protein-kg will be weighted in a relationship of 1:2 (until now: only protein-kg). The RZM is now calculated using following formula:

RZM-Angler/RDC = 100 + 0.290*EBV-F-kg + 0.580*EBV-P-kg

***vit**-Verden, April 2018*

Estimated base differences other breeds to Holstein

April 2018	SBT *Hol.*	RBT *Red Hol.*	Angler *RDC.*	DN *Dual purp.*	DSN *Friesian*	Jersey
RZM	0	-8,0	n.v. *	19,7	-31,3	n.v. *
RZS	0	-1,1	-0,7	-3,6	0,1	-3,2
RZE	0	-5,5	-17,1	-32,8	- **	-
RZN	0	-0,5	1,4	-4,7	6,0	13,9
RZR	0	3,0	10,2	16,3	24,2	2,8
RZKm	0	0,5	4,8	3,6	7,6	-5,1
Milch-kg / *milk kg*	0	-494	-1006	-1023	-1576	-2288
Fett-% / *fat %*	0	0,10	0,51	0,19	0,29	1,24
Fett-kg / *fat kg*	0	-11,9	-3,3	-29,0	-48,2	-21,1
Eiweiß-% / *protein %*	0	0,06	0,17	0,09	0,13	0,48
Eiweiß-kg / *protein %*	0	-11,8	-21,9	-28,7	-45,0	-51,4
RZD / *milking speed*	0	-1,5	-4,6	-5,5	- **	-
MVH / *temperament*	0	0,4	-0,1	-3,3	- **	-
Milchtyp / *dairy type*	0	-6,0	-24,1	-24,1	- **	-
Körper / *body*	0	-3,4	-15,8	-11,5	- **	-
Fundament / *feet&legs*	0	-0,7	1,0	-7,8	- **	-
Euter / *udder*	0	-5,4	-21,8	-41,4	- **	-
Größe / *stature*	0	-5,5	-27,3	-34,4	- **	-
Milchcharakter/*angularity*	0	-5,3	-19,2	-18,2	- **	-
Körpertiefe / *body depth*	0	-2,7	-5,3	-1,7	- **	-
Stärke / *strength*	0	-0,1	3,9	21,9	- **	-
Beckenneig. / *rump angle*	0	1,6	2,1	17,8	- **	-
Beckenbreite / *rump width*	0	-0,1	-7,8	1,6	- **	-
Hinterbeinwink./ *RLSV*	0	-0,4	3,1	-4,4	- **	-
Klauenwinkel/*foot angle*	0	-0,4	-1,6	-4,3	- **	-
Sprunggelenke / *hock*	0	-1,0	1,4	-12,6	- **	-
Hinterbeinstell. / *RLRV*	0	0,2	2,2	3,0	- **	-
Bewegung / *locomotion*	0	-0,4	1,3	-3,1	- **	-
Hintereuter / *rear udder*	0	-4,6	-17,8	-39,1	- **	-
Zentralband / *ligament*	0	-4,9	-10,2	-28,3	- **	-
Strichplatz. vorne/ *TPF*	0	-3,9	-10,3	-19,2	- **	-
Vordereuter / *fore udder*	0	-1,2	-10,4	-16,8	- **	-
Eutertiefe / *udder depth*	0	-2,2	-12,7	-23,7	- **	-
Strichlänge / *teat length*	0	-2,1	-5,1	3,0	- **	-
Strichplatz.hinten / *TPR*	0	-5,1	-16,4	-30,3	- **	-
BCS	0	4,6	13,8	31,4	- **	-
Rastzeit / *CFI*	0	3,4	8,7	15,0	21,0	11,1
Konzeption / *conception*	0	1,7	7,2	11,1	17,1	-1,6
NR-Rinder / *NR heifer*	0	-0,9	1,5	6,2	6,0	-5,3
VZ-Rinder/ *1st-last heif.*	0	-0,1	5,6	6,9	11,8	-13,1
NR-Kühe / *NR cows*	0	2,0	4,8	8,9	12,5	1,5
VZ-Kühe/ *1st-last cows*	0	2,8	9,1	11,7	20,1	3,8
KV mat*./cal. ease mat.*	0	0,9	5,1	1,1	0,7	-12,7
TG mat.*/still birth mat.*	0	0,0	4,5	6,0	14,6	2,4
KV dir*./cal. ease dir.*	0	-4,6	-4,9	-6,5	-8,9	28,2
TG dir.*/still birth dir.*	0	-4,9	-7,5	-13,3	-19,7	-0,7
RZKd*/RZKd*	0	-4,8	-6,2	-9,9	-14,3	13,8

*) no fix base difference because of different relative weights of traits

**) no base difference because of separate evaluation for breed