

## INTERBULL breeding values calculated August 2014

This newsletter is primarily written for VikingGenetics staff and breeding advisors in Denmark, Sweden and Finland, but can also be of interest for some dairy farmers.

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International breeding values for the traits and breeds shown in Table 1 have been published 12.8.2014.

#### Current evaluation

Yield

Conformation

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Table 1. Traits and breeds for which international breeding values are published.

Trait:	International breeding values for the breeds:
Yield	Red breeds, Holstein and Jersey
Conformation	Red breeds, Holstein and Jersey
Udder health	Red breeds, Holstein and Jersey
Longevity	Red breeds, Holstein and Jersey
Calving – maternal and direct	Red breeds and Holstein
Female fertility	Red breeds, Holstein and Jersey
Milking speed	Red breeds, Holstein and Jersey
Temperament	Red breeds and Holstein

You can find Interbull breeding values for all bulls with international breeding values from the following web sites:

Denmark: [www.landbrugsinfo.dk/INTERBULL](http://www.landbrugsinfo.dk/INTERBULL) (→ "Søgning på Interbull indekser")

Sweden: <http://www.sweebv.info> (→ Interbullresultat)

Finland: [www.faba.fi](http://www.faba.fi) (Sonnihaut → Interbull-arvostelut)

On the page you can search within breed or country. You can also search with the herdbook number or the name of the bull. Click on the herdbook number of the bull and view a graphical representation of the bulls breeding values.

You can sort the bulls by different breeding values by clicking on the top line of the table.

### Yield

In tables 2-5 is a comparison of the genetic level of yield for bulls from different countries. The analysis includes bulls born in 2008 or later, that have more than 60 daughters (Tables 2, 3 and 4) or 40 daughters (Table 5) in the genetic evaluation.

Table 2. Genetic level for yield traits, Red breeds. Bulls born in 2008 or later.

Country	No. of bulls	Milkindex	Fatindex	Proteinindex	Y-index	Y-index STD
Australia	31	94,5	96,6	92,8	94,0	9,0
Canada	23	90,7	90,4	86,7	87,5	7,5
Germany	18	99,3	104,4	99,7	101,6	8,4
Denmark	99	99,4	104,9	102,3	103,8	8,1
Estonia	25	104,2	98,8	99,4	98,3	9,2
Finland	256	104,1	102,0	102,9	102,3	8,4
Norway	196	95,7	94,4	96,2	95,6	8,9
New Zealand	28	91,2	95,8	90,9	92,7	6,1
Sweden	176	98,4	101,2	100,7	101,4	7,8
USA	14	85,6	80,6	77,9	77,4	14,3

Table 3. Genetic level for yield traits, Holstein. Bulls born in 2008 or later.

Country	No. of bulls	Milkindex	Fatindex	Proteinindex	Y-index	Y-index STD
Australia	61	96,7	97,7	97,1	97,5	7,0
Belgium	14	109,3	110,1	110,4	110,4	7,3
Canada	344	105,6	104,0	100,8	101,1	8,2
Switzerland	25	100,0	99,2	96,7	97,0	10,1
Czech Republic	37	105,4	100,7	102,0	100,8	9,5
Germany	738	104,3	101,7	101,8	101,3	8,7
Denmark	390	103,6	103,6	105,3	105,0	9,2
Spain	120	104,1	99,5	99,1	98,3	9,3
Estonia	45	100,5	103,5	99,0	100,6	7,9
Finland	78	102,6	103,1	103,2	103,3	6,1
France	560	107,9	102,5	106,1	104,3	7,5
UK	108	104,0	103,0	100,8	101,1	10,1
Hungary	7	103,7	102,3	102,7	102,4	7,6
Ireland	83	79,4	93,0	85,1	89,4	11,2
Israel	68	94,3	97,7	93,5	95,1	8,5
Italy	516	102,6	99,0	97,9	97,4	8,3
Japan	45	114,2	108,1	109,8	108,3	7,6
Lithuania	8	89,4	91,5	86,9	88,4	10,3
Luxembourg	7	96,4	103,0	97,1	99,7	6,4
Holland	581	103,6	103,3	104,1	103,9	9,4
New Zealand	328	81,8	96,1	90,0	94,1	9,2
Poland	320	98,2	97,8	97,7	97,6	7,9
Slovenia	10	92,1	91,2	84,7	85,8	5,0
Sweden	93	102,9	104,0	104,9	104,8	8,3
USA	2063	106,3	104,3	102,1	102,1	8,5

Table 4. Genetic level for yield traits, Jersey. Bulls born in 2008 or later.

Country	No. of bulls	Milkindex	Fatindex	Proteinindex	Y-index	Y-index STD
Australia	18	104,9	89,6	103,3	95,9	7,1
Canada	8	102,0	89,5	98,6	93,0	8,0
Denmark	89	99,6	103,7	102,7	104,2	7,5
New Zealand	252	95,5	91,6	96,7	94,6	7,5
USA	226	114,7	101,0	109,7	103,9	9,6

In table 5 bulls are divided according to whether they are marked as Red Holstein or Holstein in Interbull.

In the Nordic test day model Red Holstein and Holstein are calculated simultaneously, but when published in Denmark, Red Holstein is on a separate base. To translate breeding values for bulls from NAV's Holstein base to Red Holstein base approximately 12, 6, 11 and 11 units should be added to Milk, Fat, Protein and Y- index.

Table 5. Genetic level of yield traits in NAV index units on Red Holstein base. Bulls born in 2008 or later.

Country	No. of bulls	Milkindex	Fatindex	Proteinindex	Y-index	Y-index STD
<i>Holstein on Red Holstein base</i>						
Canada	609	117,0	108,9	110,8	111,0	8,3
Germany	1389	114,7	106,4	110,9	110,6	9,0
Denmark	658	114,9	108,7	115,1	114,7	9,0
Holland	1053	114,9	107,5	113,8	113,2	9,4
USA	3430	117,9	109,1	112,3	112,1	8,5
<i>Red Holstein on Red Holstein base</i>						
Belgium	12	108,8	104,8	114,2	111,8	8,0
Switzerland	113	99,3	93,0	97,2	95,5	9,3
Czech Republic	9	103,6	96,0	103,6	101,0	5,0
Germany	259	107,8	97,7	104,8	101,8	8,5
Denmark	13	110,1	101,1	110,4	107,0	9,7
Spain	5	111,4	98,6	104,8	101,6	5,5
Italy	36	107,6	96,6	102,9	99,9	10,3
Holland	212	104,9	100,0	107,8	105,6	9,0

International comparison for yield among most important countries shows that:

- Red breeds: Denmark, Finland and Sweden have similar genetic level, while the genetic levels of Norway and Canada is much lower
- Holstein: Denmark, Sweden, Finland, France and Holland have the highest genetic level
- Jersey: Denmark has similar genetic level as USA and higher genetic level than New Zealand
- Red Holstein: Denmark and Holland has higher genetic level for yield than the red and white in Germany. As expected the genetic level for yield for Red Holstein is significantly lower than for the Holstein populations that Red Holstein is normally compared to.

## Conformation

The international genetic evaluation is done for 16 linear traits for Holstein, Red breeds and Jersey. In addition, body condition score and locomotion is included in this trait group.

### Breeding values for body

EBV for body is calculated from the 6 linear traits that are part of the international genetic evaluation. The composite NAV breeding value for body also includes topline. There is no international genetic evaluation of topline.

We calculate international breeding value for body based on a regression of NAV breeding values for the 6 linear international traits on NAV EBV for body for Danish, Swedish and Finnish bulls born in 2004-05. The estimated regression coefficients are used to calculate international breeding value for body for foreign bulls. This method is used to ensure the same relative weight between traits in NAV and international composite traits.

### Breeding values for feet and legs

EBV for feet and legs is calculated from the 3 linear traits that are part of the international genetic evaluation. The composite NAV breeding values for feet and legs also includes hock quality and bone quality. There is no international genetic evaluation for these two traits.

We calculate international breeding value for feet and legs based on a regression of NAV breeding values for the 3 linear international traits on NAV EBV for feet and legs for Danish, Swedish and Finnish bulls born in 2004-05. The estimated regression coefficients are used to calculate international breeding value for feet and legs for foreign bulls.

### Breeding values for udder

The international genetic evaluation for udder includes 7 traits. The Nordic genetic evaluation for udder also includes teat thickness and udder balance. There is no international evaluation for these two traits.

We calculate international breeding value for udder based on a regression of NAV breeding values for the 7 linear international traits on NAV EBV for udder for Danish, Swedish and Finnish bulls born in 2004-05. The estimated regression coefficients are used to calculate international breeding value for udder for foreign bulls.

### Genetic level of composite conformation traits

In tables 6-8 is a comparison of genetic level of composite conformation traits for bulls from different countries. The calculation includes bulls that have at least 25 daughters in genetic evaluation.

Table 6. Genetic level for conformation traits, Red breeds. Bulls born in 2008 or later.

Country	No. of bulls	Body		Feet&legs		Udder	
		Average	STD	Average	STD	Average	STD
Canada	33	106,5	5,8	103,0	3,6	111,3	7,3
Germany	14	105,4	7,4	105,0	3,5	105,7	9,7
Denmark	80	103,0	7,6	103,0	4,6	102,4	8,1
Finland	160	98,7	7,5	97,6	4,6	102,3	7,7
Norway	88			99,9	3,6	90,2	9,2
Sweden	101	97,2	7,7	99,1	4,7	100,9	8,5

Table 7. Genetic level of conformation traits, Holstein. Bulls born in 2008 or later.

Country	No	Body		Feet&legs		Udder	
		Average	STD	Average	STD	Average	STD
Australia	63	106,8	7,6	98,6	4,7	98,4	9,5
Belgium	19	115,3	10,0	100,4	5,8	101,2	11,9
Canada	584	116,2	9,6	101,5	5,7	107,1	10,8
Switzerland	75	115,5	9,1	98,9	6,1	104,0	8,9
Czech Republic	133	110,2	8,7	101,6	4,6	102,1	9,0
Germany	1310	109,8	10,4	100,9	6,1	102,5	9,8
Denmark	627	103,7	10,9	100,8	6,1	102,8	9,9
Spain	244	115,5	9,8	101,0	5,6	105,9	8,4
Estonia	46	104,3	8,2	99,2	5,8	92,7	8,4
Finland	120	100,9	8,7	99,2	5,7	104,7	7,6
France	1121	113,2	10,4	99,7	5,6	102,2	9,6
UK	234	110,5	11,6	100,6	4,4	104,3	10,6
Hungary	28	113,4	11,7	101,5	6,1	103,9	8,8
Ireland	52	99,8	12,1	96,0	3,4	88,8	11,7
Italy	902	113,6	10,7	101,1	5,4	106,9	10,1
Japan	460	112,8	10,2	100,8	5,1	103,2	10,9
Luxembourg	7	104,0	5,4	98,7	8,1	97,4	6,9
Holland	940	109,6	10,7	101,7	6,0	103,7	10,1
New Zealand	365	91,2	10,7	99,0	8,2	95,7	11,9
Poland	510	105,9	10,5	99,5	5,9	97,8	10,4
Sweden	132	99,9	9,8	100,2	6,1	101,4	8,4
USA	2403	111,6	10,3	102,0	5,4	108,9	9,2

Table 8. Genetic level of conformation traits, Jersey. Bulls born in 2008 or later.

Country	No	Body		Feet&legs		Udder	
		Average	STD	Average	STD	Average	STD
Australia	7	104,6	6,9	103,1	11,0	90,7	7,0
Canada	24	112,1	5,4	112,8	7,1	104,8	5,9
Denmark	92	98,3	9,7	100,7	8,4	100,0	9,6
USA	228	112,4	9,0	101,2	6,6	98,6	8,3

International comparison for conformation traits among most important countries show that:

- **Red breeds:** Denmark has a higher genetic level for body and feet&legs than Sweden and Finland. For udder, Denmark and Finland have a higher level than Sweden. Canada has highest level for body and udder. Norway has the lowest level for udder.
- **Holstein:** Denmark, Sweden and Finland have lower genetic level for body than most other countries. North America, Spain and Italy have the highest genetic level for body. Countries with grass based dairy farming like Ireland and New Zealand has considerably lower genetic level for body. For feet&legs there are only small differences between countries. Denmark, Sweden and Finland have an average genetic level for udder. North America, Spain and Italy have the highest genetic level for udder.
- **Jersey:** Denmark has lower genetic level for the body than USA, but higher for udders

## Somatic cell count and udder health

Interbull does two international genetic evaluations – one for somatic cell count and one for udder health. In the first one only somatic cell count is included for all countries. NAV sends breeding values for somatic cell count to Interbull, so Nordic bulls get official breeding values for somatic cell count in countries where this trait is official. In the second evaluation breeding values based on mastitis diagnoses are included. NAV's official breeding value for udder health is used. For countries that do not record mastitis diagnoses, somatic cell count is included in this evaluation.

Index for udder health is published in the Nordic countries, when reliability is 40% or higher. In tables 9-11 is a comparison of genetic level of udder health for bulls from different countries.

Table 9. Genetic level for udder health, Red breeds. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Canada	11	100,8	6,7
Germany	8	97,0	12,5
Denmark	68	97,3	11,0
Estonia	6	94,7	10,5
Finland	187	100,6	8,5
Norway	88	96,1	7,1
New Zealand	27	93,4	5,7
Sweden	96	101,4	7,5
USA	6	94,6	11,2

Table 10. Genetic level for udder health, Holstein. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Australia	121	96,9	6,6
Belgium	15	95,1	8,7
Canada	361	94,4	6,9
Switzerland	40	97,0	6,2
Czech Republic	59	94,3	7,9
Germany	790	95,8	7,8
Denmark	386	101,5	8,1
Spain	141	93,9	7,6
Estonia	41	95,6	8,1
Finland	77	100,8	7,7
France	499	95,1	6,5
UK	123	96,6	8,1
Hungary	14	95,7	5,2
Ireland	95	98,3	7,7
Israel	68	101,6	6,1
Italy	543	95,7	7,4
Japan	244	91,8	7,3
Korea	6	95,7	4,7
Lithuania	8	101,5	11,2
Luxembourg	8	99,4	5,8
Holland	632	97,0	7,6
New Zealand	355	95,9	6,0
Poland	372	94,9	8,4
Slovenia	10	96,5	9,1
Sweden	82	102,3	8,2

USA	2175	99,1	7,7
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Table 11. Genetic level for udder health, Jersey. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Canada	7	91,0	6,6
Denmark	87	101,4	8,0
USA	248	89,5	7,2

International comparison for udder health among most important countries show that:

- Red breeds: Sweden and Finland have higher genetic level than Norway and Denmark
- Holstein: Denmark, Sweden and Finland have higher genetic level than other major European countries and Canada
- Jersey: Denmark is substantially better than USA

## Longevity

In tables 12-14 is a comparison of genetic level of longevity for bulls from different countries. Bulls are included if they have at least 40 daughters in the genetic evaluation.

Table 12. Genetic level for longevity, Red breeds. Bulls born in 2006 or later.

Country	No. of bulls	Average	STD
Australia	44	90,4	7,9
Canada	75	90,7	8,6
Germany	22	93,8	7,4
Denmark	67	94,3	6,8
Finland	247	92,3	13,1
UK	15	84,9	5,5
New Zealand	87	88,6	5,6
Sweden	143	97,3	10,5
USA	39	83,9	8,6

Table 13. Genetic level for longevity, Holstein. Bulls born in 2006 or later.

Country	No. of bulls	Average	STD
Australia	303	88,5	7,7
Østrig	5	83,6	14,9
Belgium	31	95,3	7,2
Canada	1122	90,8	8,4
Switzerland	138	88,1	7,8
Czech Republic	259	92,2	8,5
Germany	2218	92,0	8,7
Denmark	705	96,8	9,3
Spain	389	94,0	6,7
Finland	95	92,5	8,8
France	2118	89,2	7,5
UK	288	94,9	7,3
Hungary	70	91,8	8,7
Ireland	235	92,9	7,1
Israel	201	95,9	7,0
Italy	1268	94,0	7,2
Luxembourg	11	92,9	7,6
Holland	1644	92,7	8,9
New Zealand	1025	91,9	5,8
Slovenia	42	88,2	7,4
Sweden	139	98,7	9,1
USA	5380	96,6	9,4
South Africa	14	90,7	10,5

Table 14. Genetic level for longevity, Jersey. Bulls born in 2006 or later.

Country	No	Average	STD
Australia	79	87,8	5,8
Canada	59	86,5	7,3
Denmark	101	98,2	8,0
UK	7	82,6	5,9
Ireland	12	89,8	5,8
New Zealand	815	89,6	5,3
USA	589	87,7	6,5
South Africa	14	88,1	4,8

International comparison for longevity among most important countries shows that:

- Red breeds: Denmark, Finland and Sweden have higher level than the other countries
- Holstein: The genetic level is very similar across countries. Canada and France have the lowest level
- Jersey: Denmark has higher genetic level than other populations



## Calving – maternal and direct

For Red breeds Canada, Denmark, Finland, Norway, Sweden and the United States send data to this evaluation. It has not been possible to obtain sufficient high correlations between countries for still birth so the international evaluation only includes calving ease (maternal and direct) for Red breeds.

In the Holstein group there are international breeding values for both still birth (maternal and direct) and calving ease (maternal and direct), but only for first lactation. In the Nordic countries also information from later lactations and from birth weight is included in calving, maternal and calving, direct.

We have calculated international indices for calving, maternal and calving, direct by performing a regression between NAV breeding values for still birth and calving ease and NAV breeding value for calving for Nordic bulls born in 2001-2006. The calculated regression coefficients are used to calculate a calving index for foreign bulls - same method is used for calving, maternal and calving, direct.

In Tables 15 and 16 the average genetic level for Red breed and Holstein bulls is shown for different countries. Only bulls born in 2008 or later are included. Bulls need to have breeding values for yield to be included.

Table 15. Genetic level for calving, maternal and calving, direct, Red breeds. Bulls born in 2008 or later.

Country	Calving, direct			Calving, maternal		
	No. of bulls	Average	STD	No. of bulls	Average	STD
Canada	34	97,0	5,9	13	97,8	5,9
Denmark	69	98,6	7,7	77	98,6	8,8
Finland	168	100,5	8,6	168	99,1	8,6
Norway	88	100,5	6,8	88	93,1	7,6
Sweden	107	101,1	7,0	104	103,5	7,0

Table 16. Genetic level for calving, maternal and calving, direct, Holstein. Bulls born in 2008 or later.

Country	Calving, direct			Calving, maternal		
	No. of bulls	Average	STD	No. of bulls	Average	STD
Australia	129	94,7	6,4	4	106,8	4,4
Belgium	15	100,9	10,3	15	99,3	9,5
Canada	377	94,1	7,7	340	96,5	9,2
Switzerland	42	93,8	7,4	13	100,5	9,1
Germany	825	94,4	7,8	785	98,5	7,8
Denmark	384	100,4	8,0	371	101,4	8,8
Finland	80	101,2	9,5	80	100,7	8,3
France	652	96,1	8,5	539	98,6	8,3
UK	94	95,9	7,8	39	96,5	8,9
Hungary	14	95,1	6,1	8	100,9	7,2
Ireland	98	101,5	6,8	2	110,0	1,4
Israel	7	98,9	5,4	73	100,1	5,8
Italy	543	94,1	8,1	172	100,1	7,0
Luxembourg	8	99,9	3,1	8	102,5	4,6
Holland	622	97,7	7,2	528	98,2	8,5
New Zealand	36	102,8	4,0	9	96,0	10,7
Sweden	79	101,5	9,6	85	102,0	7,2
USA	2318	96,7	6,4	2005	101,7	7,1

International comparison for calving traits among most important countries shows that:

- **Red breeds:** The Nordic countries and Norway have similar genetic level for calving, direct. For calving, maternal Denmark, Sweden and Finland have a similar level, while Norway is at a lower level
- **Holstein:** Denmark, Sweden and Finland are among the best countries for both calving, direct and calving, maternal.

## Female fertility

NAV calculates breeding values for female fertility based on linear regression between NAV breeding values for female fertility and NAV breeding values for the sub-indices in female fertility. Basis for the regressions are Nordic bulls born in 2001-2005 – see more information below. The estimated regression coefficients are used to calculate international breeding value for female fertility for foreign bulls.

In practice 3 regressions are calculated with different explaining variables (Jersey only 2 and 3):

- 1: Female fertility = Ability to conceive ( $R^2$ , HOL = 0,05) ( $R^2$ , Red breeds = 0,35)
- 2: Female fertility = Days open ( $R^2$ , HOL = 0,87) ( $R^2$ , Red breeds = 0,85) ( $R^2$ , Jer = 0,87)
- 3: Female fertility = Ability to return to recycle after calving + ability to conceive + Days open ( $R^2$ , HOL = 0,96) ( $R^2$ , Red breeds = 0,94), ( $R^2$ , Jer = 0,94).

$R^2$  (degree of explanation) indicates the proportion of the variance of the index for female fertility, that the traits in the regression can explain. Since the regression is used on foreign bulls, and the genetic correlations between international and NAV traits are not 1, the observed degree of explanation will be lower.

For each foreign bull we use the regression with the greatest explanatory power given the international sub-indices that are available. The degree of explanation therefore depends largely of the traits being available from the different countries.

Table 17. Genetic level for female fertility, Red breeds. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Australia	10	98,6	11,5
Canada	16	95,5	5,3
Germany	8	98,4	3,4
Denmark	55	101,1	8,9
Finland	152	96,9	9,3
Norway	88	103,1	7,6
New Zealand	16	100,5	3,8
Sweden	91	103,5	9,7
USA	6	99,0	2,5

Table 18. Genetic level for female fertility, Holstein. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Australia	60	93,5	6,0
Belgium	14	97,0	7,0
Canada	332	94,8	6,5
Switzerland	22	95,2	3,1
Czech Republic	28	96,1	2,1
Germany	649	93,7	7,0
Denmark	357	100,7	9,0
Spain	15	94,5	8,9
Finland	78	103,1	8,6
France	385	95,8	3,6
UK	100	96,2	6,0
Hungary	5	97,2	4,0
Ireland	52	112,6	6,1
Israel	43	99,9	2,7
Italy	473	95,3	4,8
Luxembourg	6	96,8	3,4
Holland	531	96,5	7,1
New Zealand	328	108,3	7,1
Poland	127	96,5	5,7
Sweden	75	105,3	8,7
USA	1962	98,1	8,1

Table 19. Genetic level for female fertility, Jersey. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Australia	18	98,8	6,0
Canada	7	101,4	6,4
Denmark	84	102,6	11,4
New Zealand	252	98,3	5,8
USA	216	94,0	8,8

International comparison for female fertility among most important countries shows that:

- Red breeds: Denmark and especially Finland has lower level than Sweden. Norway is at the same level as Sweden
- Holstein: Denmark, Sweden and Finland are among the countries with the highest genetic level. However Ireland and New Zealand have by far the highest genetic levels
- Jersey: Genetic level is higher in Denmark than the other major countries

## Milking speed and temperament

In Tables 20-22, the genetic level for bulls from different countries, born in 2008 or later are shown for Holstein, Red breeds and Jersey.

Table 20. Genetic level for milking speed and temperament, Red breeds. Bulls born in 2008 or later.

Country	Milking speed			Temperament		
	No. of bulls	Average	STD	No. of bulls	Average	STD
Australia	12	95,4	3,3	12	94,9	3,8
Canada	33	94,1	5,0	33	92,4	3,9
Germany	14	106,1	3,3	14	105,1	3,5
Denmark	78	105,0	5,1	44	104,3	7,1
Finland	148	98,3	4,8	148	99,5	5,4
Norway	88	98,3	1,5	86	99,5	2,1
Sweden	91	100,1	4,9	85	102,3	6,2

Table 21. Genetic level for milking speed and temperament, Holstein. Bulls born in 2008 or later.

Country	Milking speed			Temperament		
	No. of bulls	Average	STD	No. of bulls	Average	STD
Australia	111	104,0	3,7	111	103,1	3,7
Belgium	14	92,3	6,4	14	97,8	5,5
Canada	309	95,7	5,1	306	103,5	4,7
Switzerland	36	95,7	5,7	36	102,7	4,1
Germany	583	95,9	5,6	451	101,2	7,5
Denmark	364	99,0	9,2	299	100,8	8,5
Finland	68	100,0	5,3	68	100,9	5,8
France	489	95,5	6,3	472	107,1	6,8
UK	122	96,9	10,4	122	102,8	7,6
Italy	19	95,7	7,3	13	99,1	6,8
Luxembourg	5	86,6	3,4			
Holland	452	97,1	9,3	416	101,3	7,2
New Zealand	10	97,6	3,3	10	101,6	3,4
Slovenia	11	96,3	7,3	77	100,0	8,6
Sweden	83	97,0	5,9	295	103,9	5,8
USA	304	95,9	6,3	111	103,1	3,7

Table 22. Genetic level for milking speed, Jersey. Bulls born in 2007 or later.

Country	No. of bulls	Average	STD
Australia	31	102,4	7,4
Canada	21	93,3	9,1
Denmark	92	103,5	10,7
USA	12	93,1	7,9

International comparison for milking speed and temperament among most important countries show that:

- Red breeds: Denmark has higher genetic level than Sweden, Finland and Norway.
- Holstein: Denmark and Finland are on the top for milking speed. Sweden is average for milking speed. For temperament Denmark, Sweden and Finland are on the same level as other major countries
- Jersey: Denmark has considerably better milking speed than USA and Canada

## NTM for Nordic and foreign bulls

NTM index is calculated for all bulls (Nordic and others) that have official breeding values (NAV breeding values or international EBVs) for yield, udder health and conformation.

Interbull NTM is calculated by weighing the Interbull / NAV breeding values for yield, female fertility, calving (maternal and direct), udder health, longevity, feet&legs, udder, milking speed and temperament. The same economic weight factors are used as for NAV breeding values.

Rules for calculation of NTM based partly or entirely on international breeding values are stated below in order of priority.

**1. Bull has NAV breeding value for a trait**

If the bull has NAV breeding value for a specific trait, this is used in the calculation of NTM - no matter if the bull also has international breeding value for that trait.

**2. Bull has no NAV breeding value, but has an international breeding value for a trait**

If the bull does not have NAV breeding value for the trait, the international breeding value is used, provided that Interbull calculates international breeding values for that trait and the bull comes from a country which provides data for that trait.

**3. Bull has no NAV or no international breeding value for a trait**

For traits where no Interbull EBV is available or the bull has no Interbull EBV, and at the same time it is not tested in the Nordic countries, a pedigree index is used. Pedigree index is calculated as  $\frac{1}{2} (EBV_{\text{sire}} - 100) + \frac{1}{4} (EBV_{\text{maternal grand sire}} - 100) + 100$ . The contributions from the sire and maternal grand sire can be based on either NAV breeding values or international breeding values. If  $EBV_{\text{sire}}$  or  $EBV_{\text{maternal grand sire}}$  are unofficial the pedigree index is set to 100.

**Publication rules for NTM**

All foreign and Nordic bulls that have Interbull breeding values for yield, udder health and udder get a public Interbull NTM. This NTM is calculated with a lower reliability than an NTM for Nordic proven bulls, where information for all traits is always available.

**Genetic level for Interbull NTM**

In tables 23-25 genetic level for Interbull NTM for Jersey, Red breeds and Holstein are shown. Bulls included are born in 2008 or later.

Table 23. Genetic level for NTM, Red breeds. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Canada	21	-9,1	7,5
Germany	18	2,3	6,6
Denmark	99	3,0	13,1
Finland	256	1,7	9,0
Norway	196	-8,3	8,7
Sweden	176	4,0	8,3
USA	8	-15,8	8,1

Table 24. Genetic level for NTM, Holstein. Bulls born in 2007 or later.

Country	No. of bulls	Average	STD
Australia	26	-2,3	8,1
Belgium	14	4,1	8,5
Canada	336	-5,1	8,4
Switzerland	25	-8,5	8,5
Czech Republic	37	-3,1	8,6
Germany	726	-4,7	8,4
Denmark	379	6,6	9,3
Spain	120	-6,3	8,4
Estonia	37	-5,3	7,7
Finland	78	5,8	8,9
France	457	-2,1	7,5
UK	104	-2,2	8,9
Hungary	7	-1,3	7,7
Ireland	39	-5,8	10,3
Italy	514	-5,9	7,6
Japan	45	2,5	7,7
Luxembourg	7	-3,3	8,9
Holland	560	0,8	8,5
Poland	318	-6,9	7,9
Slovenia	10	-17,2	7,9
Sweden	92	3,7	15,3
USA	1688	2,1	8,1

Table 25. Genetic level for NTM, Jersey. Bulls born in 2007 or later.

Country	No. of bulls	Average	STD
Canada	7	-10,7	7,8
Denmark	89	5,3	7,6
USA	199	-5,3	8,4

International comparison of NTM among most important countries shows that:

- Red breeds: Denmark, Sweden and Finland have the similar genetic level, which is much higher than Canada and Norway
- Holstein: Denmark, Sweden and Finland have the highest level. Holstein from Canada, Italy and Germany are somewhat lower
- Jersey: Denmark's average NTM is more than 10 index points better than USA

#### Dates of publication of Interbull breeding values in 2014:

Table 26. Dates of publication in 2014

Month	Date
April	1
August	12
December	2

The indices can be found at the national databases in Denmark, Sweden and Finland 2-3 days after they have been published by Interbull.

### **Changes since last routine run**

In the routine evaluation in August 2014 the following changes are done compared to April 2014 routine evaluation:

#### Yield

- All breeds in Great Britain has changed the base
- RDC in Norway has changed base
- All breeds in New Zealand has, due to parentage verification, changes in number of herds and daughters

#### Calving

- All breeds in Great Britain has changed the base change
- RDC in Norway has changed base

#### Conformation

- All breeds in Canada has changed base
- RDC in Norway has changed base
- All breeds in New Zealand has, due to parentage verification, changes in number of herds and daughters
- Holstein in Germany has no longer a distinction nationally between 1st and 2nd crop of daughters. As consequence of genomically proven bulls there are quite a number of bulls mentioned as "missing", however most of these appear now with another (correct) ID, these are mostly Danish bulls

#### Udder health

- All breeds in NAV can have drop in information for some bulls due to checking if the herds still do registration of diseases
- All breeds in Great Britain has changed the base change
- Holstein in Germany has no longer a distinction nationally between 1st and 2nd crop of daughters. As consequence of genomically proven bulls there are quite a number of bulls mentioned as "missing", however most of these appear now with another (correct) ID, these are mostly Danish bulls

#### Longevity

- All breeds in Great Britain has changed the base change
- Holstein in Germany has no longer a distinction nationally between 1st and 2nd crop of daughters. As consequence of genomically proven bulls there are quite a number of bulls mentioned as "missing", however most of these appear now with another (correct) ID, these are mostly Danish bulls

#### Milking speed and temperament

- RDC in Norway has used more historical data
- Holstein in Germany has no longer a distinction nationally between 1st and 2nd crop of daughters. As consequence of genomically proven bulls there are quite a number of bulls mentioned as "missing", however most of these appear now with another (correct) ID, these are mostly Danish bulls

#### Fertility

- RDC in Norway can lose daughters for some bulls, due to definition of herd x year effect
- All breeds in Great Britain has changed the base change
- Holstein in Germany has no longer a distinction nationally between 1st and 2nd crop of daughters. As consequence of genomically proven bulls there are quite a number of bulls

mentioned as "missing", however most of these appear now with another (correct) ID, these are mostly Danish bulls

Regards

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