

## INTERBULL breeding values calculated April 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 01.4.2014.

#### Current evaluation

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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](http://www.landbrugsinfo.dk) / INTERBULL

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 3-6 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	28	96,4	98,5	94,9	95,5	9,7
Canada	17	92,8	92,9	89,1	89,2	7,9
Germany	15	98,1	104,5	99,3	101,1	8,8
Denmark	82	99,8	104,7	102,5	103,8	7,9
Estonia	18	107,5	99,6	101,6	99,8	10,2
Finland	223	104,8	102,2	103,7	103,2	8,5
Norway	178	95,3	94,6	96,3	96,2	9,1
New Zealand	28	91,4	95,9	91,2	92,5	6,8
Sweden	144	99,2	101,8	101,9	102,7	7,9
USA	9	84,9	78,9	76,7	75,2	14,4

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	64	96,9	98,0	97,9	98,3	7,0
Belgium	13	109,4	110,2	111,2	111,5	7,2
Canada	287	106,3	104,6	101,5	101,2	8,2
Switzerland	21	99,6	99,1	96,5	96,5	10,8
Czech Repu-	20	104,0	99,8	101,5	100,5	9,3
Germany	643	104,4	102,0	102,1	101,7	9,2
Denmark	315	104,0	104,2	105,9	106,1	9,5
Spain	72	102,7	99,3	99,0	98,3	8,9
Estonia	30	99,7	101,8	98,0	98,7	8,9
Finland	64	102,6	103,8	103,3	103,7	6,6
France	422	108,6	103,1	107,0	105,7	7,7
UK	74	103,1	103,1	100,9	101,0	10,1
Hungary	5	105,2	104,2	105,4	105,2	8,7
Ireland	50	81,2	93,8	87,1	90,4	11,9
Israel	47	96,2	98,6	95,7	96,4	7,7
Italy	400	103,0	99,9	98,7	98,1	9,0
Japan	31	115,2	108,6	109,9	108,4	7,6
Lithuania	8	89,9	92,0	87,8	88,4	10,6
Luxembourg	6	96,0	101,0	96,7	98,2	3,2
Holland	461	104,4	103,9	105,1	105,1	9,5
New Zealand	322	82,0	96,1	90,4	94,0	9,8
Poland	247	97,6	97,9	97,7	97,9	8,3
Slovenia	10	92,5	91,8	85,0	84,9	4,6
Sweden	72	103,4	104,3	105,6	105,9	8,7
USA	1736	106,9	104,8	102,8	102,4	9,0

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	16	105,8	90,2	103,9	96,6	6,4
Canada	6	105,0	93,8	102,0	97,2	5,4
Denmark	73	101,1	105,2	104,5	105,9	7,8
New Zealand	249	96,6	93,3	98,2	96,3	7,6
USA	176	115,3	101,9	110,3	104,6	9,9

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	549	117,8	109,6	111,7	111,3	8,2
Germany	1281	114,9	106,8	111,2	110,8	9,4
Denmark	580	115,2	109,2	115,4	115,5	9,4
Holland	911	115,4	107,9	114,4	114,2	9,9
USA	3084	118,3	109,6	112,9	112,3	9,0
<i>Red Holstein on Red Holstein base</i>						
Belgium	12	109,7	105,6	115,0	113,3	8,6
Switzerland	95	99,9	93,6	97,9	95,7	9,1
Czech Re-	8	104,1	97,1	104,4	101,9	4,9
Germany	239	108,7	98,5	105,7	102,5	9,1
Denmark	11	108,5	99,4	109,0	106,1	10,4
Italy	34	107,5	97,0	102,8	99,7	11,7
Holland	181	105,6	100,8	109,0	107,2	9,1

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 has slightly higher genetic level for yield than the red and white in Germany, whereas the Dutch red and white have a slightly higher genetic level for yield. 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	30	108,9	6,5	102,6	3,6	111,3	6,4
Germany	14	109,2	9,1	106,1	4,0	107,0	8,8
Denmark	63	106,2	8,3	104,3	4,8	104,8	7,6
Finland	129	101,1	7,8	98,6	4,1	103,1	6,9
Norway	70			100,3	3,7	92,9	9,0
Sweden	67	97,3	8,8	99,9	4,6	101,5	7,6

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	76	100,3	7,3	97,5	4,9	98,6	9,7
Belgium	17	106,3	6,1	100,5	5,7	101,6	11,3
Canada	525	109,7	6,6	101,5	5,9	107,4	10,6
Switzerland	61	105,2	10,1	98,3	6,4	105,0	9,0
Czech Repu-	119	104,2	6,9	101,1	4,8	102,9	8,7
Germany	1197	104,8	8,8	100,7	6,5	103,4	9,5
Denmark	550	100,2	9,7	100,5	6,5	103,6	9,7
Spain	175	107,3	8,3	101,0	5,9	107,0	7,8
Estonia	31	100,9	6,7	98,7	5,6	92,8	8,5
Finland	102	100,6	9,4	98,8	5,9	105,1	7,1
France	931	106,1	7,5	99,7	5,8	103,2	9,4
UK	198	104,9	10,5	100,3	4,7	105,4	9,8
Hungary	20	105,8	8,7	101,6	5,5	104,4	8,0
Ireland	44	84,5	15,2	95,1	3,3	89,9	11,5
Italy	785	107,8	7,6	100,9	5,7	107,5	10,0
Japan	362	106,8	7,3	100,7	5,5	104,1	10,8
Holland	818	103,6	8,8	101,3	6,3	104,3	9,8
New Zealand	362	71,9	17,3	96,7	8,2	95,2	11,2
Poland	439	100,0	9,1	99,1	6,2	98,5	10,2
Sweden	114	97,2	10,2	100,0	6,1	102,0	8,2
USA	2131	106,6	8,1	101,8	5,7	109,4	9,0

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	105,6	9,5	103,4	10,6	91,9	7,0
Canada	14	111,8	5,5	112,7	5,6	102,5	5,1
Denmark	74	98,1	10,9	101,4	8,6	100,0	9,3
USA	177	112,6	9,2	101,0	6,7	97,8	8,4

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	5	105,7	2,7
Germany	6	102,2	11,1
Denmark	48	97,7	10,2
Finland	152	99,7	8,9
Norway	70	96,9	6,9
New Zealand	20	92,5	6,0
Sweden	63	101,7	7,9

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

Country	No. of bulls	Average	STD
Australia	130	97,0	6,6
Belgium	13	94,4	8,1
Canada	300	94,5	6,9
Switzerland	27	95,2	5,4
Czech Republic	44	94,6	7,2
Germany	683	95,8	7,9
Denmark	297	101,3	8,2
Spain	86	93,3	7,7
Estonia	24	95,1	6,9
Finland	62	102,7	7,8
France	393	95,1	6,3
UK	82	96,7	7,6
Hungary	9	94,5	4,7
Ireland	55	99,1	7,6
Israel	50	100,8	6,5
Italy	424	95,3	7,4
Japan	136	91,9	7,4
Korea	5	94,4	4,7
Lithuania	8	102,1	11,3
Luxembourg	6	100,7	4,4
Holland	494	97,2	7,5
New Zealand	348	96,9	5,9
Poland	297	95,2	8,4
Slovenia	10	97,0	9,1
Sweden	57	101,7	8,5
USA	1833	98,7	7,6

Table 11. Genetic level for udder health, Jersey. Bulls born in 2008 or later.

Country	No. of bulls	Average	STD
Denmark	63	100,5	9,3
USA	193	89,6	7,3

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

- Red breeds: Denmark, Sweden and Finland have higher genetic level than Norway
- 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	39	91,3	6,9
Canada	67	92,3	8,6
Germany	18	95,1	6,1
Denmark	51	95,0	6,1
Finland	205	93,0	12,9
UK	10	87,8	6,2
New Zealand	86	89,0	5,7
Sweden	113	97,8	10,8
USA	33	85,8	8,8

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

Country	No. of bulls	Average	STD
Australia	340	88,8	7,5
Østrig	5	82,1	14,2
Belgium	26	96,3	7,7
Canada	1044	91,4	8,4
Switzerland	23	90,2	9,3
Czech Republic	243	92,4	8,2
Germany	1989	93,0	8,6
Denmark	551	97,7	9,2
Spain	335	94,3	6,6
Finland	76	93,5	9,0
France	1916	89,7	7,4
UK	250	95,1	7,2
Hungary	65	92,0	8,8
Ireland	217	93,7	6,7
Israel	185	96,6	6,9
Italy	1208	94,6	7,1
Luxembourg	7	90,7	3,1
Holland	1514	93,3	8,7
New Zealand	1017	92,9	5,8
Slovenia	42	88,6	7,6
Sweden	100	100,0	9,9
USA	4995	97,0	9,4
South Africa	14	91,4	10,7

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

Country	No	Average	STD
Australia	69	88,0	5,7
Canada	52	86,4	7,0
Denmark	78	99,0	7,4
UK	6	83,0	6,9
Ireland	6	91,6	5,6
New Zealand	809	90,0	5,3
USA	536	87,8	6,2
South Africa	14	89,0	5,2

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	30	97,1	5,9	10	98,0	6,4
Denmark	55	98,8	7,3	64	98,0	8,2
Finland	132	99,7	8,6	132	99,2	9,1
Norway	70	100,0	6,9	70	93,7	7,8
Sweden	68	101,0	7,6	68	102,8	7,2

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	134	94,8	6,9	2	111,0	1,4
Belgium	13	99,5	8,7	13	99,6	9,8
Canada	313	93,9	7,4	286	96,4	9,2
Switzerland	28	93,6	6,7	10	98,9	9,1
Germany	711	94,2	7,6	687	98,5	7,7
Denmark	307	100,8	7,9	297	101,7	8,8
Finland	63	100,8	8,7	63	100,3	8,5
France	554	96,3	8,5	458	98,4	8,2
UK	73	96,5	7,0	27	96,6	8,1
Hungary	9	95,8	7,0	6	98,8	6,9
Ireland	60	102,0	6,9	1	108,0	
Israel	3	96,3	5,5	53	100,2	6,1
Italy	426	94,6	7,8	169	100,1	6,8
Luxembourg	7	99,4	3,1	6	100,0	3,3
Holland	509	97,8	7,2	452	98,1	8,1
New Zealand	33	104,2	3,8	8	96,8	9,9
Sweden	58	102,8	8,5	63	101,8	7,4
USA	1928	96,9	6,5	1742	101,6	6,8

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	7	102,6	4,6
Canada	8	97,1	5,5
Germany	6	100,0	4,3
Denmark	37	100,7	8,6
Finland	123	95,9	9,0
Norway	70	102,6	5,1
New Zealand	16	100,1	3,4
Sweden	56	105,3	9,0

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

Country	No. of bulls	Average	STD
Australia	54	92,4	6,1
Belgium	13	95,6	5,7
Canada	270	95,7	5,2
Switzerland	12	95,2	2,1
Czech Republic	13	96,2	1,8
Germany	556	94,8	6,1
Denmark	285	100,5	8,6
Finland	61	101,9	7,7
France	265	95,6	3,0
UK	64	96,6	4,6
Ireland	31	113,0	5,7
Israel	43	99,9	2,7
Italy	350	95,7	4,3
Luxembourg	6	95,0	2,8
Holland	413	96,5	6,3
New Zealand	322	108,9	6,9
Poland	61	97,6	6,1
Sweden	48	105,3	8,9
USA	1614	98,2	8,0

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

Country	No. of bulls	Average	STD
Australia	16	95,9	5,4
Canada	6	101,7	7,8
Denmark	65	103,3	11,9
New Zealand	249	98,6	5,7
USA	169	94,9	8,7

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 a higher level than Denmark, but a lower level than 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	93,7	3,0	12	97,8	2,9
Canada	30	93,7	4,6	30	97,5	4,1
Germany	12	100,4	6,3	12	102,3	4,1
Denmark	63	100,6	4,0	30	101,2	4,3
Finland	132	96,3	5,1	131	99,4	4,3
Norway	66	94,6	1,2	69	99,2	1,6
Sweden	65	96,6	5,6	65	100,1	4,8

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	133	104,9	3,7	133	102,0	3,9
Belgium	12	94,1	5,0	12	99,8	4,0
Canada	266	97,3	5,0	266	101,5	5,1
Switzerland	22	98,1	5,7	21	100,9	3,3
Germany	503	98,2	5,7	388	100,3	9,0
Denmark	285	100,4	6,9	242	100,4	6,8
Finland	59	99,9	4,8	59	101,2	4,4
France	323	98,1	6,5	308	102,7	5,5
UK	91	98,4	9,3	91	101,1	7,7
Italy	16	97,7	6,9	11	99,2	6,6
Luxembourg	5	88,3	5,3			
Holland	365	98,8	8,1	337	99,8	6,5
New Zealand	9	97,2	3,9	9	100,2	3,3
Slovenia	11	97,4	7,6			
Sweden	59	96,4	7,5	55	99,3	7,5
USA	251	98,0	5,6	244	100,9	5,6

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

Country	No. of bulls	Average	STD
Australia	28	103,9	4,3
Canada	12	100,8	6,0
Denmark	74	103,9	6,0
USA	7	99,1	4,9

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 among the countries with the lowest level. 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	16	-7,0	7,6
Germany	15	2,6	7,5
Denmark	82	3,8	13,5
Finland	223	2,1	8,7
Norway	178	-7,3	8,8
Sweden	144	5,3	8,2
USA	5	-13,0	6,6

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

Country	No. of bulls	Average	STD
Australia	24	-1,6	7,4
Belgium	13	5,0	8,1
Canada	279	-4,8	7,6
Switzerland	19	-8,5	8,9
Czech Republic	20	-4,6	7,8
Germany	632	-3,8	8,5
Denmark	304	7,6	9,2
Spain	72	-5,8	8,4
Estonia	21	-7,1	6,4
Finland	64	5,8	8,8
France	318	-1,1	7,2
UK	71	-1,1	9,1
Hungary	5	-0,8	9,0
Ireland	37	-4,9	10,7
Italy	399	-5,1	7,8
Japan	31	3,8	6,7
Luxembourg	6	-6,0	4,4
Holland	441	2,0	8,5
Poland	246	-6,4	8,0
Slovenia	10	-17,1	7,4
Sweden	72	3,1	16,2
USA	1397	2,5	8,0

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

Country	No. of bulls	Average	STD
Canada	5	-7,2	6,9
Denmark	73	6,8	7,9
USA	155	-4,4	8,7

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 April 2014 the following changes are done compared to December 2013 routine evaluation:

#### Yield

- Jersey from South Africa include more data
- RDC from Norway has improved model and pedigree data
- RDC, Holstein and Jersey from Australia has changed genetic base
- Holstein from Italy has delete cows calving before 1998. Base is changed
- Holstein from Slovenia has changed genetic base

#### Calving

- Holstein from Australia has changed genetic base
- RDC from Ireland participate for the first time
- Holstein from Italy has delete cows calving before 1998. Base is changed

#### Conformation

- Jersey from South Africa has fewer official bulls
- Holstein from Switzerland has fewer effective daughters for some bulls
- Holstein from Slovenia has changed genetic base
- RDC, Holstein and Jersey from Holland has changed calculation of overall conformation
- RDC, Holstein and Jersey from Australia has changed genetic base
- Holstein from Italy has delete cows calving before 1998. Base is changed
- RDC, Holstein and Jersey from New Zealand has fewer official bulls born in 2007

#### Udder health

- All breeds from Australia has changed genetic base
- Holstein from Italy has deleted oldest data, which means that status of oldest bulls can change
- All breeds from Slovenia has changed base
- Holstein from Belgium has improved data
- RDC from Norway has improved model and pedigree data
- Holstein from Hungary has changed base
- RDC and Jersey from DFS has improved genetic parameters
- Holstein from Japan has improved pedigree which means that number of bulls/herds has decreased for some bulls

#### Longevity

- Italy has deleted oldest data, which means that status of oldest bulls can change
- Australia has changed genetic base
- Slovenia has changed base definition – some bulls are not official any more
- Belgium has improved data
- France has decreased number of daughters/herds for some bulls
- Japan has improved pedigree which means that number of bulls/herds has decreased for some bulls
- Switzerland has fewer effective daughters for some bulls

#### Milking speed and temperament

- Holstein from Slovenia has changed genetic base
- All breeds from Holland has changed to a multi trait model

### Fertility

- Italy has deleted oldest data, which means that status of oldest bulls can change
- Australia has changed genetic base
- Slovenia has changed base definition – some bulls are not official any more
- Belgium has improved data
- France has decreased number of daughters/herds for some bulls
- Japan has improved pedigree which means that number of bulls/herds has decreased for some bulls

Regards

Ulrik Sander Nielsen, Anders Fogh, Emma Carlén, Elina Paakala and Martha Bo Almskou