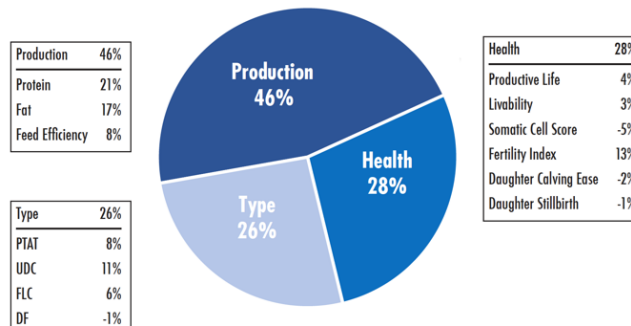


DESCRIPTION OF TERMS

1. **REGNAME**
The herdbook name of the bull.
2. **CODE #**
The unique number registered with the National Association of Animal Breeders (NAAB) with which the AI companies use to identify sires.
3. **MILK**
The average milk production of a bull's daughters in a 305 day lactation (expressed in pounds: 1 kg = 2.2 pounds).
4. **FAT**
The average fat production of a bull's daughters in a 305 day lactation (expressed in pounds).
5. **FAT%**
The average fat% of a bull's daughters.
6. **PRO**
The average protein production of a bull's daughters in a 305 day lactation (expressed in pounds).
7. **PRO%**
The average protein % of a bull's daughters.
8. **# DTRS**
The number of milking daughters this sire has in his proof.
9. **# HERDS**
The number of herds where this bull's daughters are milking.
10. **PTAM**
Predicted ability of sire to transmit genetics for milk production. The pounds of milk produced by a bull's daughters above contemporaries.
11. **PTA%F, PTAF**
As for PTAM, this is the amount of fat a bull's daughters are expected to produce above contemporaries.
12. **PTA%P, PTAP**
As for PTAM, this is the amount of **TRUE** protein a bull's daughters are expected to produce above contemporaries.
13. **REL**
Production reliability
14. **PTAT**
Type or confirmation improvement expected from a bull's daughters compared to contemporaries
15. **TPI**
Total Performance Index: This is a formula that combines type, management and production traits into one number. Very commonly used to rank bulls, TPI is the USA Holstein Association's multi trait index that ranks bulls on overall performance. The traits included in the TPI formula, and their respective percentages in the formula are:



TPI places more emphasis on type traits than the Net Merit formula, comparable emphasis on Fat and

Protein production, and slightly lower emphasis on health traits.

16. **TREL**

Type reliability

17. **SCS**

Somatic cell score: Measures a bull's milking daughter's susceptibility to mastitis. The USA herd average is 3.00 with lower proof values indicating greater resistance to mastitis incidence.

18. **SCS REL**

Somatic cell reliability

19. **PL**

Productive life is a score used to identify the productive days of life a cow will have compared to herd mates. A PL of 1.0 equates to one additional month of production in the herd. Only the first 305 days of lactation are included in the calculation of PL. Therefore, a lactation of 335 days in length will not receive any additional credit toward PL than a lactation of 305 days.

20. **PL REL**

Productive life reliability

21. **LIV**

PTA Livability (LIV) is the percent of a bull's daughters above or below the average of the breed that remain alive in the herd until they can be culled and provide a source of income for the herd.

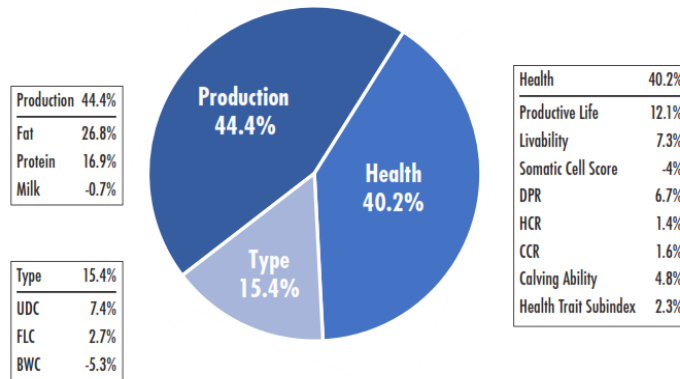
22. **FE**

The Feed Efficiency (FE) Index takes into account the individual feed costs to produce an extra pound of milk, fat and protein while accounting for differences in maintenance costs, housing costs and calving weights that may be attributed to the size of the cow. Cows that produce high volumes of milk without requiring high volumes of feed are rewarded in this index.

$$FE = (\text{dollar value of milk produced}) - (\text{feed cost of extra milk}) - (\text{extra maintenance cost})$$

23. **NM\$**

Net Merit: Economic value which combines the value of production, health, fertility and type scores. NM\$ the expected lifetime profitability of a bull's average daughter as calculated by the USDA-AIPL. The traits included in the NM\$ formula and their respective percentages in the formula are:



24. **SCE**

Sire Calving Ease: This is the estimate of the Percentage of Difficult Births in Heifers (DBH) when they calve the first time. Each standard deviation in improvement equates to a 1% decrease in difficulty. The average for AI bulls with progeny is 7.9% DBH.

25. **SCE OBS**

Number of calvings observed

26. **SCE REL**

Calving ease reliability

27. **DCE**

Daughter Calving Ease: Tendency of daughters of a particular sire to have more (or fewer) problems at calving time than an average cow and to produce calves that are born more easily (or more difficult)

than calves produced by an average cow. Measures the ability of a cow to calve easily. Each standard deviation in improvement equates to a 1% decrease in difficulty. Low Daughter Calving Ease is highly correlated with a long Productive Life.

28. FI

Fertility Index (FI) combines values from three measures of reproductive performance to provide one overall fertility score. Fertility Index = 18% HCR + 18% CCR + 64% DPR

29. DPR

Daughter Pregnancy Rate measures the cow's ability to begin cycling, show estrus, conceive and maintain pregnancy and is highly correlated with PL. A DPR of 1.0 equates to a 1% increase in pregnancy rate during a given 21 day estrus cycle. Each increase of 1% in PTA DPR equals a decrease of 4 days in PTA days open. For example, daughters of a bull with 3.4 DPR will get in calf 13.6 days quicker on average than a bull with a DPR of 0.

30. HCR

PTA HCR (Heifer Conception Rate) – measures the ability of virgin heifers to conceive. An HCR of 1.0 equates to a 1% increase in heifer conception rate.

31. CCR

PTA CCR (Cow Conception Rate) – measures the ability of lactating cows to conceive. A CCR of 1.0 equates to a 1% increase in cow conception rate.

32. SCR

Sire Conception Rate – this is not a genetic trait, but measures the fertility of the bull. An SCR of 1.0 indicates a 1% increase in conception rate when compared to average.

33. UDC

Udder Composite Index (Holstein)

Udder Depth 0.20

Fore Udder 0.16

Rear Udder Height 0.23

Rear Udder Width 0.19

Udder Cleft 0.08

Front Teat Placement 0.04

Rear Teat Placement 0.05

Teat Length 0.05

Stature -0.20

34. FLC

Feet and Legs Composite Index (Holstein)

Foot Angle 0.09

Rear Legs Rear View 0.21

Feet and Legs Score 0.70

Stature -0.20

35. KC

Kapa Casein: This indicates the “type” of Casein (milk protein) a bulls daughters will have – AA, AB or BB

36. WT\$

Places economic weights on wellness traits, directly estimating potential profit contribution of these traits for an individual animal. This multi-trait selection index focuses solely on wellness traits with unique formulas used for Holstein

Mastitis

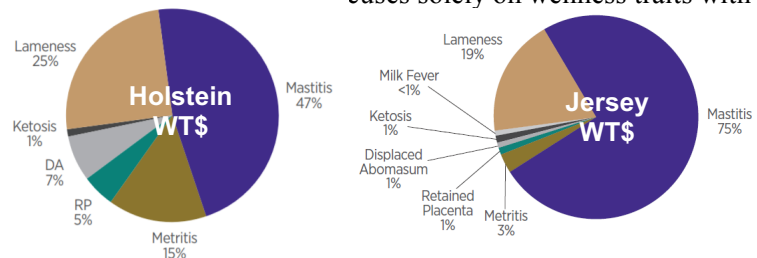
Lameness

Metritis

Retained Placenta

Displaced Abomasum

Ketosis



Economic value for Polled

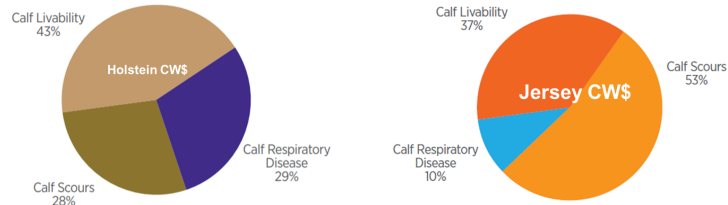
37. CWS

Places economic weights on calf wellness traits, directly estimating potential profit contribution of these traits for an individual animal. This multi-trait selection index focuses solely on calf wellness traits with unique formulas used for Holsteins and Jerseys:

Calf Livability

Calf Scours (diarrhea)

Calf Respiratory



38. DWPS

A multi-trait selection index that includes production, fertility, type, longevity, and the wellness traits, including Polled test results with unique formulas used for Holsteins and Jerseys.

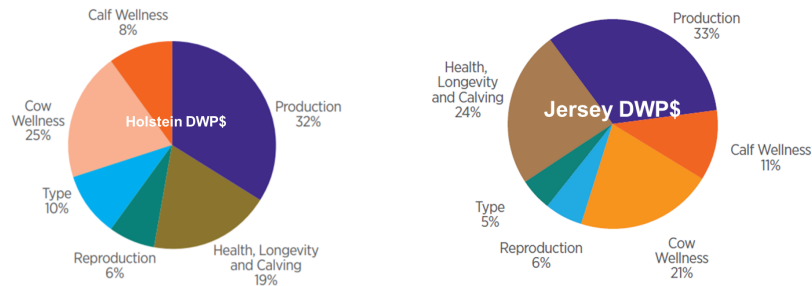
Production

Wellness

Health and Calving

Type

Fertility



39. GL

Gestation Length is expressed as the number of days greater than or less than the average gestation length for the breed. The typical range is +/-5 days. In general, gestation length has decreased over time for breeds that have selected for lower calving ease (i.e. Holstein), as calving ease and gestation length are highly correlated. Gestation Length is available for all dairy breeds.

40. CDCB Health Traits

Health traits evaluated by CDCB and ranked by standard PTA values with a typical range of +/-3. Positive values indicate higher disease resistance when compared to breed average.

Mastitis

Metritis

Retained Placenta

Ketosis

Milk Fever (Hypocalcemia)

41. Early First Calving

Indicates whether heifers will calve earlier or later than breed average. One standard deviation (+/-1.0 EFC) is equivalent to approximately 3 days, with positive values being favorable for earlier calving.

42. Jersey Performance Index (JPI)

Jersey Performance Index²⁰¹⁷ is a formula for increasing production and improving milkfat and protein levels in the milk, moderating body weight in service of greater productive efficiency, and at

the same time selecting for longer herd life, greater fertility, and better udder health.

The traits and weights in JPI2017 are PTA protein, 30%; PTA fat, 15%; CFP Milk, 8%; Functional Trait Index (incorporating Jersey Udder Index™, Body Weight Composite, and mobility), 20%; Productive Life, 6%; Livability, 4%; Somatic Cell Score, 6%; Daughter Pregnancy Rate, 7%; and Cow Conception Rate and Heifer Conception Rate, 2% each.

Overall, 53% of the emphasis is on production, 27% on Health, and 20% on functional type.

43. Jersey Udder Index (JUI)

Based on the Functional Trait Index (FTI) weightings for udder traits

This index is the sum of PTAs for udder traits multiplied by their percentage contribution to the animal's Jersey Performance Index2017:

$$\begin{aligned} \text{JUI17} = & [(2.4 \times \text{FU} / \text{SD FU}) + (1.8 \times \text{RH} / \text{SD RH}) + (0.1 \times \text{RUW} / \text{SD RUW}) \\ & + (4.7 \times \text{UD} / \text{SD UD}) + (1.9 \times \text{UC} / \text{SD UC}) \\ & + (0.9 \times \text{TP} / \text{SD TP}) + (-0.9 \times \text{TL} / \text{SD TL})] \end{aligned}$$