First Service to Conception (FSC)

Introduced in August 2026, First Service to Conception PTA predicts a lactating cow's genetic ability to conceive after her first insemination, measured as the number of days from first service to conception, relative to the breed base. Genomic and genetic evaluations for FSC are provided for Ayrshire, Brown Swiss, Guernsey, Holstein, Jersey, and Milking Shorthorn (traditional only) males and females.

Benefits of Trait

- Captures fertility performance independent of voluntary waiting period (VWP)
- Reflects individual cow response to modern reproductive management practices
- Improves evaluation of fertility in herds using extended or customized VWP
- Complements DPR and CCR by providing an interval-based measure of conception efficiency

Heritability

FSC has a heritability of 3.2%. This level is typical for reproductive performance traits, indicating that genetic progress is gradual but cumulative over time.

Description of Trait

FSC is the number of days from the cow's first breeding to conception within a lactation. If the cow conceives after 200 days, the FSC is set to 200 days. If the cow never conceives, the FSC is set to 230 days. The number of days is multiplied by -1, so positive PTA is desirable.

Correlations with Other Traits

Within the reproductive performance trait portfolio, FSC is strongly correlated with Daughter Pregnancy Rate (+0.96) and Cow Conception Rate (+0.98) and moderately correlated with Heifer Conception Rate (+0.47). These correlations allow information from related reproductive performance traits to improve evaluation accuracy, particularly when data is limited.

Data Source

The data used to calculate this trait is stored in the National Cooperator Database. FSC utilizes reproductive records for lactating cows, including first insemination dates, pregnancy confirmations, and subsequent calving information reported through U.S. dairy records programs.

Producers can help continue to improve reproductive performance traits by recording key information in on-farm software.

- Ensure animal ID is unique and recorded correctly
- Confirm each animal has sire, dam, and date of birth
- Properly record service sire with the NAAB code or bull ID for each reproductive event
- Record ET births

How to Interpret the Trait

FSC is a useful trait for producers who want cows to get pregnant as quickly as possible after the first breeding, without focusing on how many services it takes.

PTAs are interpreted based on the breed average and expressed in days. Positive PTA values translate to fewer days from first service to conception. Meanwhile, negative values indicate more days from the breed average.

HO Bull A
FSC PTA: +5.0 (days)
Expected daughter average: 50.60 days

JE Bull A
FSC PTA: +5.0 (days)
Expected daughter average: 47.04 days

HO Bull B
FSC PTA: 0.0 (days)
Expected daughter average: 55.60 days

JE Bull B
FSC PTA: 0.0 (days)
Expected daughter average: 52.04 days

HO Bull C
FSC PTA: -5.0 (days)
Expected daughter average: 60.60 days

JE Bull C
FSC PTA: -5.0 (days)
Expected daughter average: 57.04 days

These averages are calculated during a test run and may vary slightly in August and beyond as additional phenotypic data becomes available.

- Ayrshire ..... 63.44 days
- Brown Swiss ..... 71.94 days
- Guernsey ..... 79.50 days
- Holstein ..... 55.60 days
- Jersey ..... 52.04 days
- Milking Shorthorn ..... 47.66 days

Inclusion in Selection Indexes

As a newly introduced trait, FSC is not included in the lifetime merit indexes at this time. During the next revision, its inclusion will be evaluated.

Resources and Research

Published research supporting this trait and the 2026 reproductive revisions is available by scanning this QR code.

Listen to The CDCB CowCast for a conversation with lead researcher Dr. Taylor McWhorter about the 2026 revisions to reproductive traits. Available on YouTube and podcast platforms on May 12.

Range of Population

Most animals fall within a relatively narrow range around zero, with positive values indicating a higher-than-average genetic ability for successful conception per insemination and negative values indicating a lower-than-average ability relative to the breed base. These PTA values are calculated during a pre-release analysis. Some variation is expected in August 2026.

	Active A.I. Bulls ("A" Status Bulls)			Genomic Bulls ("G" Status Bulls)			Bulls born since 2000 (≥ 90% reliability)		
	PTA Range	Mean PTA	SD	PTA Range	Mean PTA	SD	PTA Range	Mean PTA	SD
Ayrshire	-7.3 to +15.4	+2.38	6.60	-4.4 to +9.6	+1.15	2.79	-11.2 to +17.9	+0.99	6.01
Brown Swiss	-7.8 to +9.2	+0.19	3.90	-10.4 to +10.1	+0.13	4.56	-20.1 to +12.1	-1.63	5.59
Guernsey	-9.5 to +10.9	+2.75	6.13	-11.0 to +17.5	+2.69	6.96	-15.5 to +15.3	-2.57	6.81
Holstein	-24.8 to +20.7	+2.13	6.13	-15.4 to +20.1	+4.81	4.74	-30.2 to +27.3	-5.35	6.90
Jersey	-12.5 to +15.2	+0.20	5.68	-17.2 to +15.3	+1.57	5.18	-31.3 to +25.1	-3.39	6.15
Milking Shorthorn	-14.7 to +4.7	-3.28	8.38	---	---	---	-12.2 to +13.5	-0.63	5.33

Approximately 68% and 95% of observations fall within one and two standard deviations (SD) of the mean, respectively. The following example demonstrates how these proportions apply to active Holstein and Jersey bulls.

	PTA Standard Deviations ("A" Status Bulls)			
	-2	-1	+1	+2
Holstein	-10.14	-4.00	+8.26	+14.40
Jersey	-11.16	-5.48	+5.88	+11.56

Reliability Ranges

Reliability varies by animal and is influenced by the amount of available information. Young animals typically have lower reliability, while proven sires with extensive daughter records have higher reliability.

	"A" Status Bulls
Ayrshire	31% to 98.2%
Brown Swiss	49% to 99%
Guernsey	37.7% to 93%
Holstein	30.6% to 99%
Jersey	58.3% to 99%
Milking Shorthorn	52.1% to 89.7%

Applying FSC on the Farm

What makes FSC unique?

1. FSC is measured and expressed in days
2. FSC is independent of VWP
3. FSC includes a covariable for days-in-milk at first insemination

How is the conception date determined for FSC?

FSC is the difference in days between the first insemination and the insemination that results in a confirmed pregnancy. A confirmed pregnancy is identified by a positive pregnancy result or a subsequent calving date.

Differences in Cow Reproductive Performance Traits

Trait	Expressed In	PTA Range of Active A.I. Bulls[1]	Application of Trait
First Service to Conception (FSC)	Days	Holstein: -24.8 to +20.7 Jersey: -12.5 to +15.2 Brown Swiss: -7.8 to +9.2	Useful for producers who select voluntary waiting periods on a cow basis and want cows to get pregnant as quickly as possible after the first breeding without focusing on how many services it takes.
Daughter Pregnancy Rate (DPR)	Percent (%)	Holstein: -5.3 to +5.7 Jersey: -3.6 to +5.0 Brown Swiss: -1.6 to +3.0	Informational for producers who use a voluntary waiting period on a herd level and want cows to cycle, get bred, and become pregnant quickly, regardless of the number of services.
Cow Conception Rate (CCR)	Percent (%)	Holstein: -8.3 to +7.3 Jersey: -4.1 to +5.1 Brown Swiss: -3.6 to +2.9	Best for a producer who wants to improve conception rate success per service, since this trait reflects how many inseminations are needed.

1 - Values produced in a test run scenario. Some variation is expected in August 2026 as more phenotypic records are added and the list of Active A.I. bulls is updated.