



GENERATION COUNT

On May 16, 2016, the American Jersey Cattle Association converted to a Generation Count pedigree recording system.

Generation Count does just one thing. It's how you assess, at a glance, the depth of known and recorded ancestry in a Jersey pedigree. When an animal's name includes a **suffix with a number in braces**, just behind the count of {1} in the pedigree, there is an unknown animal or there's an animal that is not Jersey.

It's critical to draw the correct conclusion when you see a Generation Count in the name. So, what does a {1} look like? What does it signify?

The vast majority of animals with a Generation Count came in through Genetic Recovery, implemented in 1975. The rules for that program were changed across time, but the essence of Genetic Recovery was to bring into the AJCA system females that were Jersey but had missing or incomplete pedigree records.

These are examples of females that carried the prefix OA (Original Animal) before May

16, but now have a Generation Count suffix of {1}. The common denominator is that all have an **unknown** ancestor.

The first case is the prototype OA, the daughter of a Registered Jersey™ bull. All that is known about the dam is her brucellosis vaccination tag, so she was recorded with a placeholder name that begins with the prefix UR (Unrecorded).

ROCK MAPLE SOONER MARCUS-ET
USA 000654592

DP MARCUS JAMBOREE HESTER {1}
USA 110502199

UR BARN NAME 3923
USA 86VCZ8605

Genetic Recovery served a vital purpose by preserving pedigree records when breeding information was lost, as shown in the next example. J3751 was a GR-prefix (now GC 3) female, but the sire of the calf J5513 couldn't be determined. So, her calf J5513 was recorded with the prefix OA (now GC 1) and the pedigree information that had been accumulated was preserved.

UR PUREBRED JERSEY SIRE
USA 99PJS0104

GOLD MEDAL J5513 {1}
USA 004025133

JCJ GARY J3751 {3}
USA 003921940

Genetic Recovery rules were rewritten in 1994 so that a female with Jersey characteristics could be recorded as an OA without any information about her parents.

That rule was changed in 2015 to require one parent, sire or dam, be recorded with the AJCA, or the animal has to be genotyped. But because they met the requirements at the time recorded, many {1} females have a pedigree like this cow recorded in 2009:

UR PUREBRED JERSEY SIRE
USA 99PJS0104

RED TOP PJS 3457 {1}
USA 067143457

UR PUREBRED JERSEY DAM
USA 99PJD1002

Generation Count shows depth of AJCA-recorded ancestry, as illustrated in the pedigree of the bull Sweetie Plus Iatolas Bold {5} (Figure 1, below). The fourth dam is Gold Medal J5513 {1}. Look at her short pedigree, used as the second example for this article (column at left) to find the unknown ancestor, UR Purebred Jersey Sire.

Generation Count tracks pedigree depth from the first known, AJCA-recorded ancestor, which could have a parent of **another breed**.

The following example is for a typical J1-prefix female that was recorded under the rules for Jersey Expansion, which was implemented in 1999. All that is recorded about the dam is that she was a Holstein.

AHLEM DOMINICAN HOBBIT 21931
USA 07199746

TWIN STAR HOBBIT BOBO {1}
USA 067702015

UR UNIDENTIFIED HOLSTEIN DAM
HOUSA00099EXP0001



Fig. 1. Pedigree after implementation of Generation Count recording system for animal whose ancestors were originally recorded through Genetic Recovery with addition of BBR values.

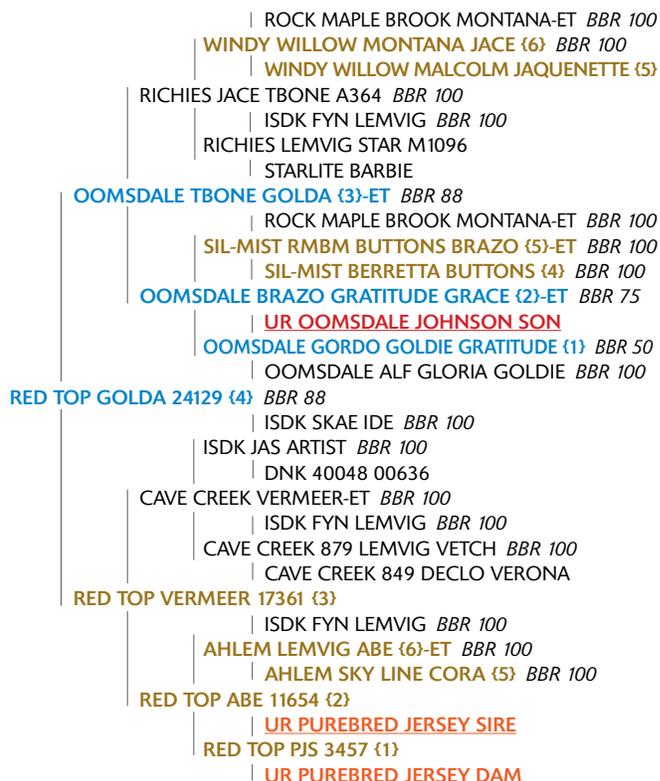


Fig. 2. Pedigree after implementation of Generation Count recording system for animal with ancestors recorded through Genetic Recovery and Jersey Expansion with addition of BBR values.

The next example is for a female whose dam was recorded as a crossbred (code XX) in the DHI system.

LEDGEBROOK HERMIE
USA 061729609
LEDGEBROOK HERMIE 1691 {1}
USA 062163326
DAM INFO UNAVAILABLE
XXUSA000061139368

Every feature of the Generation Count system is illustrated in the pedigree of Red Top Golda 24129 {4} (Figure 2).

Starting on the maternal side, the third dam is a {1} that was previously discussed in this article as the OA recorded in 2009. The female line adds 1 to the Generation Count at each step because the bulls have a Generation Count equal to or higher than their mates.

On the paternal side, not only does the pedigree of 24129 trace to two Genetic Recovery females, Windy Willow Malcolm Jaquette {5} and Sil-Mist Berretta Buttons {4}, it also includes an ancestor of another breed, the bull named UR Oomsdale Johnson Son. This fact does not change the progression in Generation Count, because Generation Count points equally to unknown animals as well as animals of another breed.

Finally, as also illustrated in this pedigree, the Generation Count suffix is dropped from an animal's registration name after {6}. After seven generations are recorded without unknown or other-breed ancestors, that animal has Herd Register status. In this example, that is Richies Jace TBone A364, the offspring of Windy Willow Montana Jace {6} and a cow with Herd Register status.

BREED BASE REPRESENTATION

Breed Base Representation (BBR) values for genotyped Jersey cattle were officially released June 7, 2016 by the Council on Dairy Cattle Breeding.

Only genotyped animals will have a BBR. That value assesses the degree to which alleles in its genome are in common with the allele frequency of each and every breed reference group (*Ayrshire, Brown Swiss, Guernsey, Holstein and Jersey*). The more the animal's genetic make-up resembles its breed reference group, the higher its BBR for the primary breed.

CDCB policy is to report BBR values of 94 or greater for one breed as 100. BBR values for Jersey from 93 down to 50 are reported as calculated.

With retirement of the Genetic Recovery and Jersey Expansion recording programs and their replacement with Generation Count system, there may be questions about the breed composition of a particular genotyped animal.

Combined with the AJCA pedigree, BBR values help answer those questions.

Here's how.

Recall that Generation Count tells you the depth of known and AJCA-recorded ancestry in a pedigree. When an animal has a **name suffix with a number in braces**, just behind the count of {1} in its pedigree, there is either an *unknown animal* or there's an animal that is *not Jersey*. BBR values can indicate whether the *unknown animal* is a Jersey or of another breed and if so, to what degree.

Let's consider those starting points separately.

These first two examples are for animals recorded with **unknown dams**.

STEINHAUERS SAMSON LEMONHEAD
USA 118662185
ZIM BLUE BAY LEMONHEAD 19735 {1}
JEB40003135301640
DAM INFO UNAVAILABLE
JEB40003123621552

19735 {1} has been genotyped and her BBR value is 100. The sire's BBR is also 100, so the conclusion is that the dam is Jersey.

In this example, all three of the animals have been genotyped, even the UR dam.

BUTTERCREST GALVANIZE
USA 117275551
WOODCREST GALVANIZE BANDIT {1}
JEB40003013217054
UR CHAIN 22147 21391083
USA 0713826616

They all have BBRs of 100, increasing confidence that this animal is purebred.

For an animal recorded with a **non-Jersey parent**, BBR values can tell you "how much Jersey" there is in the animal's genetic makeup. This example, shown earlier, is a female sired by a Herd Register bull and out of a cow recorded as a crossbred (code XX) in the DHI system.

LEDGEBROOK HERMIE
USA 061729609
LEDGEBROOK HERMIE 1691 {1}
USA 062163326
DAM INFO UNAVAILABLE
XXUSA000061139368

Ledgebrook Hermie 1691 {1} has a BBR of 60 based on a 50K genotype. Assuming that 50% of genes are inherited from the sire and 50% from the dam, the quick conclusion is that, whatever other breeds were behind the dam of 1691, any Jersey inheritance from there was very, very small.

Now consider this animal, also discussed previously.

AHLEM DOMINICAN HOBBIT 21931
USA 071199746
TWIN STAR HOBBIT BOBO {1}
USA 067702015
UR UNIDENTIFIED HOLSTEIN DAM
HOUSA00099EXP0001

This cow recorded with the AJCA as an F1 Jersey-Holstein crossbred has a BBR of 100 from her genotype. Unusual results like

that flag an animal for closer examination of its parentage and, when required, pedigree correction.

Key Points

BBR and Generation Count measure different things.

Generation Count tells you the depth of AJCA-recorded ancestry in the animal's pedigree. If that animal has been genotyped, Breed Base Representation tells you how similar that animal's genomic profile is to the Jersey reference group. BBR is very effective at detecting the presence of genetics from another breed(s) when it (they) provide a significant percentage of the alleles.

That makes BBR a valuable tool for confirming or disconfirming pedigree information, in turn contributing to the overall accuracy and transparency of the AJCA animal recording system.

Of the 104,060 animals that received BBR values on June 7, 93.6% of them had a BBR of 100. For those that were lower than 100, the AJCA ancestry records provide the explanation. There are animals that have many generations of documented Jersey ancestry, but because they are relatively unrelated to the Jersey reference group, they have a lower BBR. The others, in general, have an ancestor of another breed in the pedigree.

It is important to understand that there is not a strict correspondence between BBR values and Generation Counts.

That's obvious in the five-generation pedigree for Sweetie Plus Iatolas Bold {5} (Figure 1, opposite side). Regardless of Generation Count, every genotyped animal in his pedigree has a BBR of 100. That's entirely consistent with how the Genetic Recovery program identified and recorded females with Jersey characteristics but missing pedigree records.

Contrast that with the pedigree of Red Top Golda 24129 {4} (Figure 2, opposite side). On the *sire side*, BBR and Generation Count do track as would be expected from continued use of Jersey bulls on a F1 female. "Gratitude{1}" has a BBR of 50, her daughter a BBR of 75 and the grandson "Golda{3}" is BBR 88. However, 24129 {4} is also genotyped, and has a BBR value of 88. Why the BBR is not closer to the expected value of 94 is a question for further research.

FOR MORE INFORMATION

For more information on Generation Count and Breed Base Representation, see *AJCA Pedigree Recording and Registry Status* published on the USJersey web site (permalink <http://bit.do/Animal-ID-Systems>), or request a copy from the office.

Your AJCA-NAJ Area Representative is available to answer your questions, as are Herd Services staff. Call them at 614/861-3636 or email records@usjersey.com.