

THIRD & FOURTH GENERATION WAGYU PROVEN SIRES

IS CARCASE DATA REALLY KING?
WELL, IT DEPENDS IF IT IS USED IN A
GENETIC ANALYSIS OF NOT

The purpose of this article is to challenge a couple of long-held myths in the Wagyu Sector.

The **first myth** is that only the Foundation Sires (first generation sires out of Japan) are proven sires for carcass traits. Through AWA BREEDPLAN, we have third and fourth-generation sires with 50 to more than 100 carcass progeny records. Though this article, we will explain the great volume of carcass data that AWA members have submitted for 780 sires so far.

The **second myth** is that having raw carcass data for the sires in your herd is the most important information relating to that sire's genetic merit. In busting the first myth above, where you have carcass data across consecutive generations of sires (e.g. first, second, third and fourth-generation sires), this adds substantial information to improving the genetic merit prediction of a sire through the pedigree of the animal.

If you are using raw carcass data for a sire in isolation or just in your own herd, you are missing out on the true value of that data alongside the large volume of carcass data being supplied by many AWA members. Combining this data within AWA BREEDPLAN is the best way to achieve genetic merit estimation of your sire.

THE FUNDAMENTALS

Over the last ten years, the AWA members have contributed more than 13,000 Fullblood carcass records into the AWA BREEDPLAN evaluation.

The year on year increase for the last two years has been significant, at 30% additional new records each year since 2019. These trends are consistent with total performance recording for other major traits (Figure 1).

In AWA BREEDPLAN, animals who have progeny in the Slaughter Register that are recorded for carcass traits including **Carcass Weight (Cwt)** and **Marble Score (MS)** can be identified by viewing the EBV table of a registered animal.

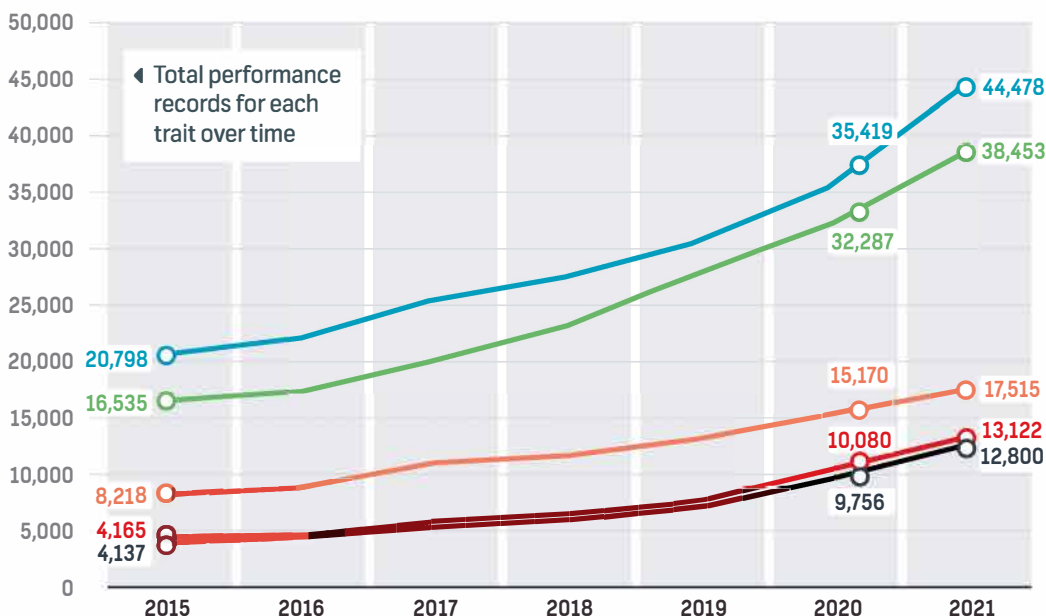


FIGURE 1
Additive performance
recording trends to June
2021.



Registering animals in the AWA Slaughter Register and providing the carcass data for these animals is FREE for AWA members. AWA covers all costs associated with this, except for DNA testing costs for parentage verification.

TABLE 1
EBV table for TF Itohana 2
(IMUFN2294) identifying the
Carcass Progeny count for the sire.

July 2021 Wagyu BREEDPLAN														
	Gestation Length (days)	Birth Wt (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcass Wt (kg)	Eye Muscle Area (sq cm)	Rump Fat (mm)	Retail Beef Yield (%)	Marble Score	Marble Fineness (%)
EBV	-1.3	+1.0	+4	+10	+11	+14	+7	+1.3	+27	-3.8	+0.7	-2.4	+0.4	+0.03
Accuracy	97%	98%	98%	98%	98%	97%	98%	95%	98%	97%	97%	94%	97%	94%
Breed Avg. EBVs for 2019 Born Calves														
EBV	+0.1	+0.1	+9	+16	+19	+22	+1	-0.1	+15	+1.4	-0.1	+0.0	+0.8	+0.17

Traits Analysed: Genomics

STATISTICS: Number of Herds: 71 Progeny Analysed: 1177 Scan Progeny: 190 **CARCASS PROGENY: 265** Number of Dtrs: 328

An example is provided in Table 1 for the **foundation sire** TF Itohana 2 (IMUFN2294), which shows that he has “265 Carcass Progeny” registered in the AWA Slaughter Register for which carcass data has been provided by different AWA members.

Using the AWA Slaughter Register, AWA members have contributed carcass progeny records for the 780 different sires with carcass progeny in AWA BREEDPLAN.

HOW MANY CARCASS PROGENY RECORDS DO WE REALLY HAVE FOR DIFFERENT SIRES?

Figure 2 shows the top 25 sires ranked by the number of carcass progeny records for each sire.

Each sire is also coded by its generation, blue being **foundation sires**, red being **second-generation sires** (i.e., the progeny of a foundation sire) and green being **third-generation sires** (progeny of a second-generation sire).

The 25th ranked sire (IMJFA2351) still has more than 100 carcass progeny records.

Of note in Figure 2, is that over half of the sires with the highest number of carcass progeny records are the **second-generation sires**.

Fullblood sire animal identifier

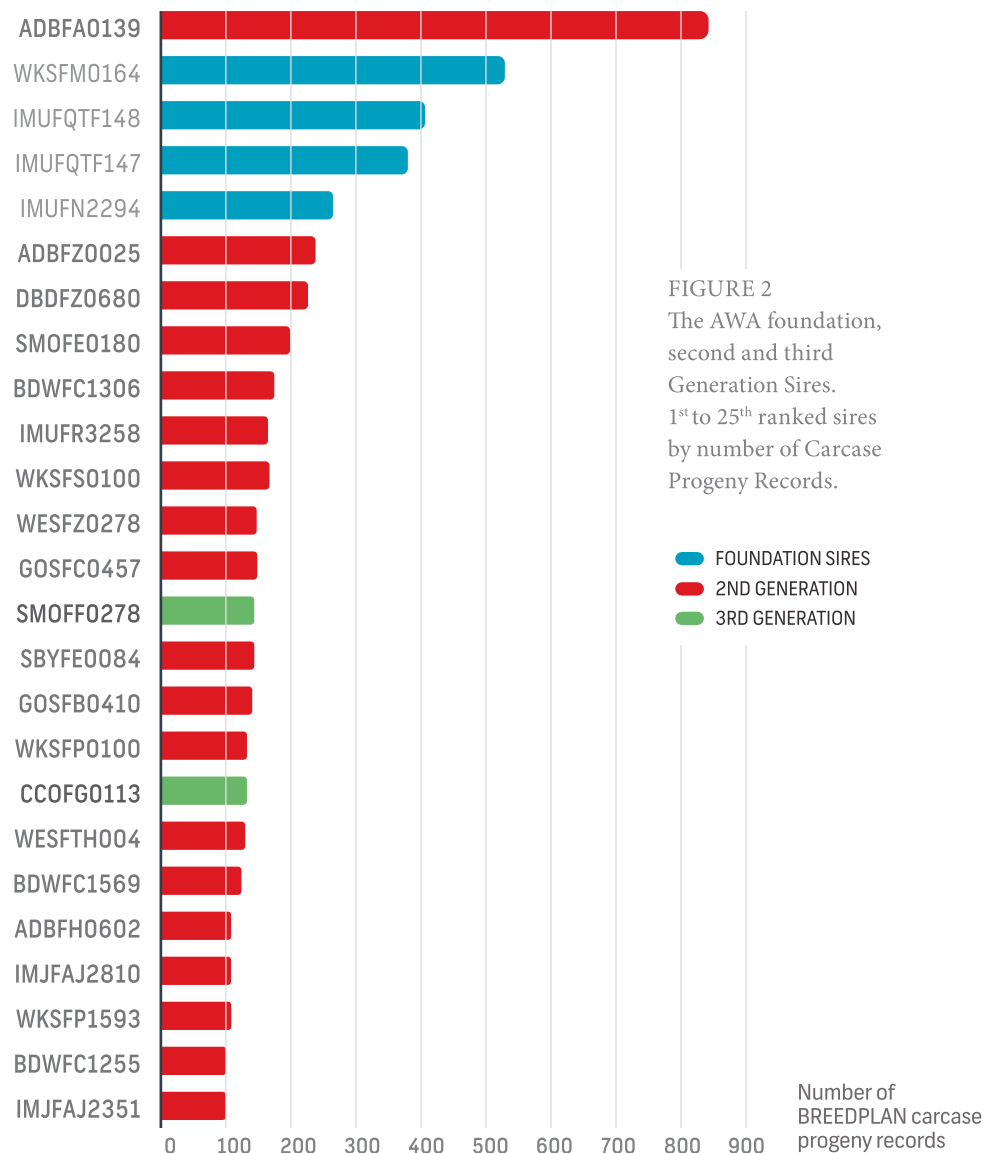


FIGURE 2
The AWA foundation, second and third Generation Sires. 1st to 25th ranked sires by number of Carcass Progeny Records.

● FOUNDATION SIRES
● 2ND GENERATION
● 3RD GENERATION

Number of BREEDPLAN carcass progeny records

Fullblood sire animal identifier

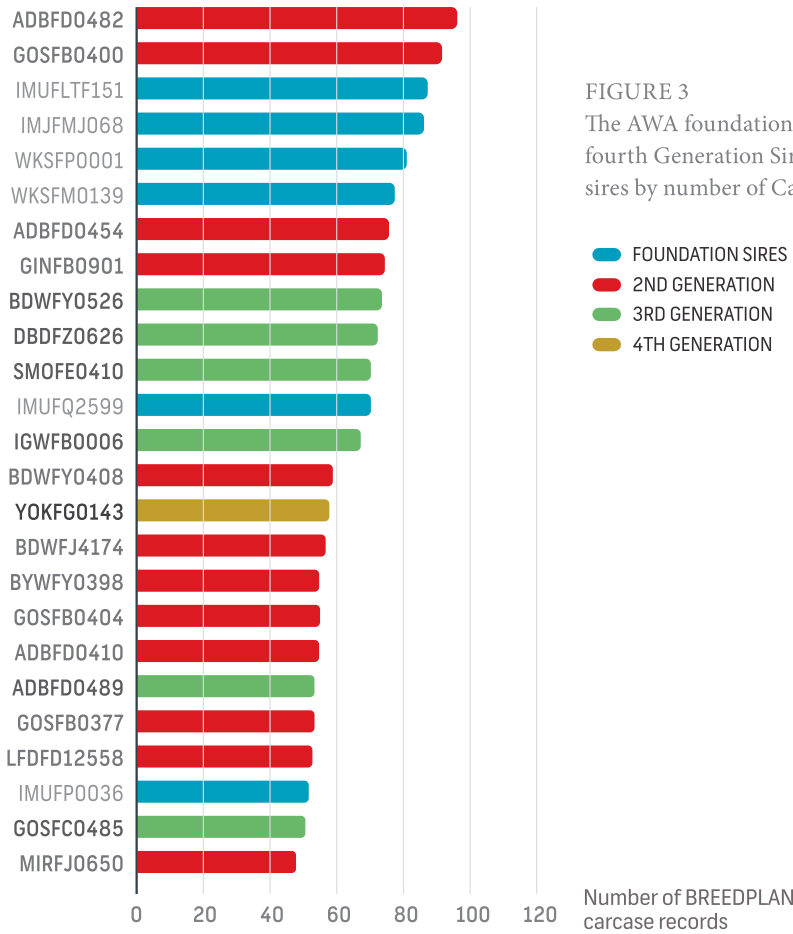


FIGURE 3
The AWA foundation, second, third and fourth Generation Sires. 26th to 50th ranked sires by number of Carcase Progeny Records.

- FOUNDATION SIRE
- 2ND GENERATION
- 3RD GENERATION
- 4TH GENERATION

We also see that there are two **third-generation sires** in the top 25 ranked sires. This means that there are **third-generation sires** with more than 100 carcase progeny records in AWA BREEDPLAN.

The ranking of the next 25 sires, being numbers 26 to 50 based on carcase progeny numbers, is shown in Figure 3. Again, there are more **second-generation sires** (12) compared to **foundation sires** (6).

There are just as many **third-generation sires** (6) as there are **foundation sires** in this selection.

Notably, a **fourth-generation sire** YOKFG0143 is the 40th ranked sire by number of carcase progeny records. The sire YOKG0143 has 59 of his own carcase progeny recorded, and there is a total of 790 carcase progeny collectively recorded across his pedigree including progeny from his sire, grand sires, great grand sires, and great-great grand sires.

The ranking of the sires from number 225 to number 250 based on carcase progeny numbers, is shown in Figure 4. Again, there are far more **second-generation sires** (14) compared to **foundation sires** (1). There are **7 third-generation sires** as well as **2 fourth-generation sires** and one **fifth-generation sire** who has 11 carcase progeny records recorded against him.

Fullblood sire animal identifier

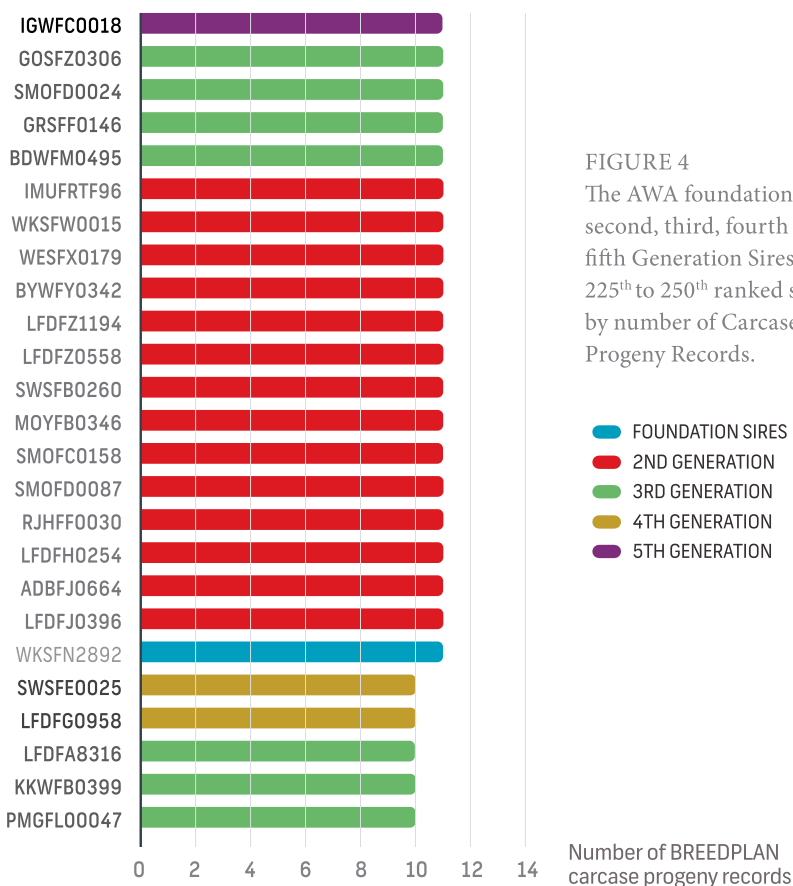


FIGURE 4
The AWA foundation, second, third, fourth and fifth Generation Sires. 225th to 250th ranked sires by number of Carcase Progeny Records.

- FOUNDATION SIRE
- 2ND GENERATION
- 3RD GENERATION
- 4TH GENERATION
- 5TH GENERATION

GETTING THE MOST VALUE OUT OF CARCASE DATA

As stated earlier, AWA members have submitted carcase progeny records for 780 sires. 262 of these have 10 or more carcase progeny records of their own. However, as per the example of the **fourth-generation sire** YOKFG0143 (Figure 3), if we account for the contributions of the sires in the pedigrees of **second, third, fourth and fifth-generation sires**, we get far greater power in our genetic analysis.

Looking back at Figure 2, if we take the 14th ranked sire by number of carcase progeny as an example of a **third-generation sire** - SMOFF0278 has 143 carcase progeny himself. These carcase records not only contribute to determining his genetic merit (his EBVs), but also the genetic merit of the sires in his pedigree (Figure 5).

Looking at the pedigree of the **third-generation sire** SMOFF0278 (Figure 5), we can see that in addition to his 143 own carcase progeny, there are a total of 1,152 carcase progeny from his sire, grand sires and great grand sires also within his pedigree.

Within the AWA BREEDPLAN analysis, the records of each of the 1,152 carcase progeny in the pedigree of SMOFF0278 all contribute to determining SMOFF0278's genetic merit (his EBVs).

Likewise, SMOFF0278's 143 carcase progeny records contribute to determining the genetic merit (EBVs) of every ancestor in his pedigree (sires and dams). This is one of the reasons why using a genetic evaluation to determine genetic merit is very important, rather than just looking at raw sire averages within a single data set.

Using AWA BREEDPLAN, the EBVs for SMOFF0278 also considers the genetic merit of the females that SMOFF0278 was mated to. In determining the genetic merit of SMOFF0278, half of the progeny outcome of his carcase progeny came from the female side. This can't be determined from sire averages alone, but it can be accurately determined through AWA BREEDPLAN.

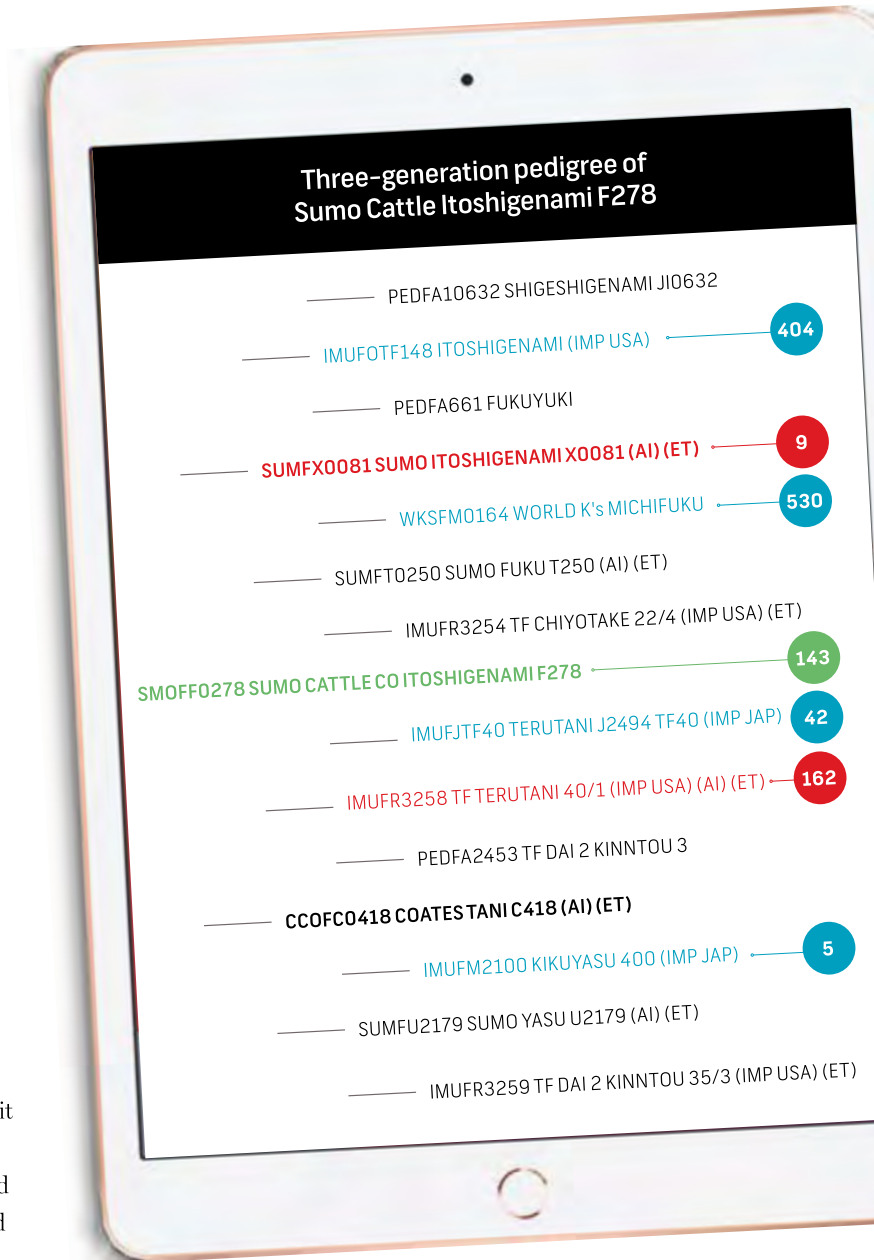


FIGURE 5 The three-generation pedigree of SMOFF0278, noting carcase records for himself (**third-generation**) and the sires in his pedigree, being the **foundation** and **second-generation**.



SUMMARY STATISTICS FOR AWA BREEDPLAN CARCASE DATA

There are 262 sires that have 10 or more carcass progeny records in AWA BREEDPLAN. Many of these sires inform each other through shared pedigrees to generate genetic merit estimates through EBVs and to create higher accuracy EBVs. Summary statistics for all sires that have 10 or more carcass progeny records in AWA BREEDPLAN are shown in Table 2.

As shown in Table 2, 11 of the top 262 sires are **fourth-generation** or higher with an average of 23 carcass records and Marble Score (MS) EBV accuracy of 79% and Carcass Weight (Cwt) EBV accuracy of 85%. These accuracies are the same as the average of the 60 **third-generation sires**, who have on average 29 carcass records. This is due to the high accuracy of sires within the pedigrees of the **fourth-generation sires**.

The largest number of sires in the top 262 are **second-generation sires** (the progeny of Foundation sires). There are 169 **second-generation sires** that have an average of 39 carcass progeny records each and average MS and Cwt EBV accuracies of 81% and 86% respectively. On average, the 22 first-generation (**foundation**) sires have 118 carcass records per sire, but these range from a minimum of 11 records (WKSFN2892 World K’s Takazakura: Figure 4) to a maximum of 564 records (WKSFM0164 World K’s Michifuku Figure 1).

The average accuracy of the MS and Cwt EBVs for **foundation sires** are 91% and 94% respectively. The MS and Cwt EBVs for the **foundation sires** reflect both the carcass progeny records for these sires and the contribution of the carcass records from **second, third, fourth** and **fifth-generation** sire progeny of the **foundation sires**.

TABLE 2
Summary Statistics for Sires with more than 10 carcass progeny.

TOTAL NUMBER OF SIRES 262

SIRE GENERATION	No. OF SIRES	Ave. BIRTH YEAR	No. OF FB CARCASE RECORDS	Ave. CARCASE RECORDS PER SIRE	Ave. MS EBV ACCURACY	Ave. Cwt EBV ACCURACY
FOUNDATION SIRES	22	1994	2,592	118	91%	94%
2ND GENERATION SIRES	169	2007	6,665	39	81%	86%
3RD GENERATION SIRES	60	2009	1,711	29	79%	85%
4TH OR HIGHER GENERATION SIRES	11	2010	256	23	79%	85%
AVERAGE OF SIRES WITH 10 OR MORE RECORDS		2007	11,224	42.8	81%	86%

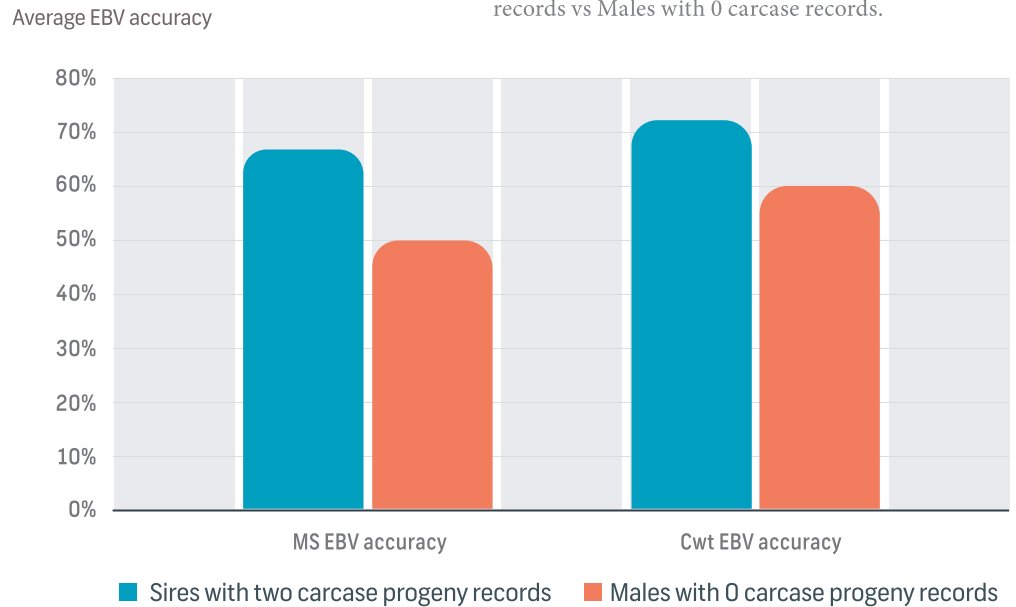
GETTING STARTED WITH CARCASS PROGENY RECORDING

Even small numbers of carcass progeny can start to impact a sire's EBVs and their accuracy. There are 102 sires in AWA BREEDPLAN that have 2 carcass progeny records used in the Wagyu genetic analysis.

As shown in Figure 6, the average accuracy of MS EBV for these sires (blue bar) is 67%. This compares to average accuracy of the MS EBV of newly born male calves (orange bar) with no carcass progeny at 50%.

The average Cwt EBV accuracy for sires with 2 carcass progeny records used in AWA BREEDPLAN is 72%, compared to average accuracy of the MS EBV of newly born male calves with no carcass progeny at 60%.

FIGURE 6
Comparison of Marble Score and Carcass Weight EBV accuracy: Sires with 2 carcass records vs Males with 0 carcass records.



SUMMARY AND IMPLICATIONS

1. There are **more second and third-generation sires** with **significant numbers of carcass progeny** than there are **foundation sires** with significant numbers of carcass progeny. We also have third and fourth-generation sires with 50 to more than 100 carcass progeny records.
2. **Using raw averages for sires within your own herd has limited utility in determining genetic merit.** Together, AWA members have submitted carcass progeny data for 780 sires. Through the AWA BREEDPLAN genetic analysis, the 13,000 carcass progeny records on these sires are used to generate high accuracy EBVs that take into account carcass data across up to 5 generations of sires (and dams) within a pedigree.
3. **Even low numbers of carcass records are beneficial in contributing to the EBV of the sire and the accuracy of those EBVs.** Compared to males with no carcass progeny, the MS and Cwt EBVs of sires with only 2 carcass progeny records are on average 17% higher.

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MORE INFORMATION

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