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TEN YEAR TRENDS IN THE WAGYU SECTOR

PART TWO PHENOTYPE TRENDS

Analysis of the ten year trends for phenotype (trait) averages in Fullblood Wagyu cattle is provided to complement the information provided in the multi-trait genetic trend analysis (Part 1).

GROWTH DATA SUMMARY

The number of records for each growth trait, database average and minimums and maximums are provided in Table 1. This shows the birth weight is 29.7kg on average, with 200-day weight at 175.9kg on average (across male and female). By subtracting birth weight from 200-day weight, the average daily gain across the database is 0.73 kg per day to weaning.

TABLE 1 Growth data summary.

Bwt	200-Dwt	400-Dwt	600-Dwt	MCW
BIRTH WEIGHT	**200-DAY** WEIGHT	**400-DAY** WEIGHT	**600-DAY** WEIGHT	**MATURE COW** WEIGHT
35,419 records	32,287 records	29,215 records	15,170 records	2,096 records
Ave. 29.7 kg Min. 15 kg Max. 64 kg	Ave. 175.9 kg Min. 46 kg Max. 570 kg	Ave. 285.7 kg Min. 82 kg Max. 671 kg	Ave. 380.4 kg Min. 120 kg Max. 932 kg	Ave. 462.7 kg Min. 252 kg Max. 767 kg

The database average for 400-day weight (yearling weight) is 285.7 kg. Based on the change in weight over the 200 to 400-day period, average post-weaning daily gain to yearling age is 0.55 kg per day.

The database average for 600-day weight (feedlot entry weight) is 380.4 kg. Based on the change in weight over the 400 to 600-day period, average post-yearling to feedlot entry daily gain is 0.47 kg per day.

The growth data summary in Table 1 demonstrates relatively low rates of daily gain for Fullblood cattle prior to feedlot entry, particularly during the 400 to 600-day grow-out/backgrounding period. From birth to feedlot entry, average daily gain across all recorded Fullbloods (male and female) is 0.58 kg per day.

In 2019 , the AWA released the Wagyu Feed Calculator tool to assist members with increasing growth rates to a consistent 0.7 to 0.8 kg per day to better optimise baseline marbling deposition prior to feedlot entry. This figure is consistent with minimum growth rate targets developed through the Australian Beef Cooperative Research Centre (CRC) analysis, but below recommended targets from numerous Japanese studies (eg. *The Japanese industry review of Motoyama et al., 2014 Meat Science 120: 10-18)* where feeder calves are targeted to 280 to 300 kg at approximately 9 to 10 months of age (ADG approximately 0.9 kg per day).

Japanese Black cattle are then typically fed on concentrated diets from this point to slaughter at approximately 29 months of age and 755 kg liveweight (*Japan Ministry of Agriculture, Forestry and Fisheries – 2014*). This amounts to a whole of life average daily gain of 0.77 kg.

The data provided in Table 1 shows that the pre-feedlot entry growth rate averages are significantly lower than those recommended by the Australian Beef CRC and Japanese studies.

As shown in Table 1, the AWA holds relative few mature cow weight records. The average of records held by the AWA is 462.7 kg for mature Fullblood Wagyu cows, with range in phenotypes from 252 kg up to 767 kg. This database average is not substantially different from that reported by Motoyama *et al.* (2014) for Japanese Black breeding cows at 487 kg, noting that the vast majority of breeding cows in Japan are maintained whole-of-life on feeding rations.

SCAN DATA SUMMARY

Although Intramuscular Fat percentage (IMF%) data from ultrasound scanning is not used within the Wagyu BREEDPLAN analysis, it is important to note that subcutaneous fat thickness and Eye Muscle Area (EMA) measurements from live animals are used in the BREEDPLAN analysis. Importantly, these measurements are used in the calculation of other traits such as retail meat yield and carcase Eye Muscle Area. Members are encouraged to use ultrasound scanning, as it can be important information in identifying animals with high EMA and relatively low subcutaneous fat at an early age.

In Table 2, heifer and bull ultrasound scan data is presented separately, with average rib fat (RBT) being lower and eye muscle area being higher in bulls compared to heifers. Average EMA for bulls is 64 cm^2 and rib fat is 3.26 mm.

CARCASE DATA SUMMARY

TABLE 2
Scan data summary for heifers and bulls.

RBT	EMA	RBT	EMA
HEIFER – RIB FAT	**HEIFER** – EMA	**BULL** – RIB FAT	**BULL** – EMA
7,390 records	**11,922** records	**4,483** records	**4,479** records
Ave. 4.13 mm Min. 1 mm Max. 14 mm	**Ave. 53.6 sq cm** Min. 25 sq cm Max. 97 sq cm	**Ave. 3.26 mm** Min. 1 mm Max. 8 mm	**Ave. 64 sq cm** Min. 26 sq cm Max. 106 sq cm

Carcase data is of keen interest to many AWA members who supply feeder cattle through supply chains and provide data back to the AWA. As provided in Part 1 - Multi-trait Genetic Improvement, a total of 47 AWA members have submitted carcase data records to the AWA. These records are provided through more than 15 different feedlots and supply chains.

TABLE 3
Carcase data summary.

CWt	MS
CARCASE WEIGHT	**MARBLE** SCORE
10,080 records	**9,786** records
Ave. 429 Min. 213 Max. >620kg	**Ave. 7.4** Min. 1 Max. 9+

The phenotypic averages for the AWA database are shown in Table 3 for carcase weight, over 10,000 Fullblood records, the average carcase weight is 429 kg, with average age of slaughter at 32 to 33 months. Carcase weights range from a minimum of 213 kg to a maximum of more than 600 kg. In the four years (2010 to 2013), the phenotypic average for CWt was 423 kg. In the three years 2017 – 2019, the phenotypic average for CWt had increased to 440 kg.

For marble score, the phenotypic average is marble score 7.4, with the full phenotypic range from MS1 to MS9+ recorded. When Aus-Meat MS values of 9+ are reported by graders, this is entered into BREEDPLAN numerically as a 10.

In the four years 2010 to 2013, the phenotypic average for MS was 7.3. In the three years 2017 – 2019, the phenotypic average for MS had increased to 7.7.

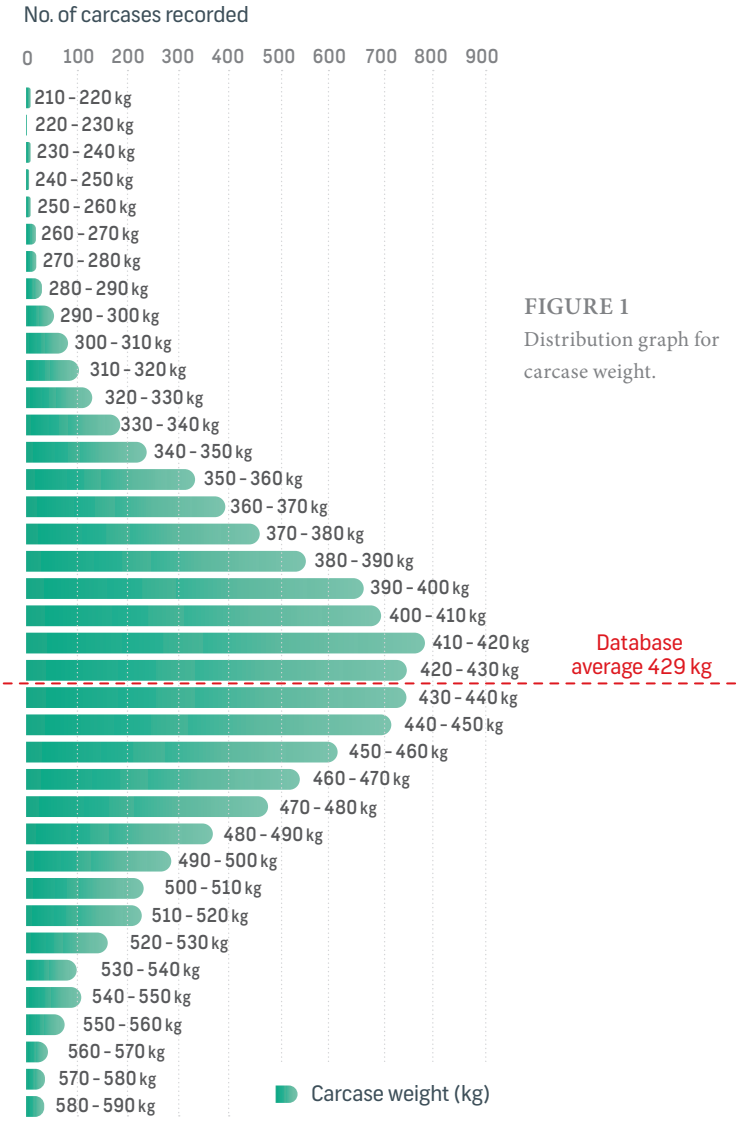


FIGURE 1
Distribution graph for carcase weight.

The distribution graphs for carcase weight and marble score are shown in Figures 1 and 2, to demonstrate the range in data within each trait.

For carcase weight, the 'Bell Shaped" curve shows the full range of carcase weights. There is significant range in carcase weight with more than 10% of carcases being less than 350kg and 10% of carcases being over 500kg.

For marble score, the curve is truncated, where the full range of marbling is unable to be described by the Aus-Meat grading system. Even with the Aus-Meat 9+ grade being implemented recently for Wagyu carcases, the full variation in marbling expression is unable to be captured by Aus-Meat grading (evident by the attenuation of the bell shaped curve on the right hand side of the graph).

It must be highlighted that this is not a market or marketing issue, it is an issue relating to the use of Aus-Meat grading data for accurately determining the genetic merit of animals for marbling. Approximately 15% of carcases within the AWA database are recorded as being graded Aus-Meat 9+. Increasing use of the MIJ-30 camera is showing that the full range of marbling is expressed using Digital Marble Scores out to DMS-15.

Members wishing to obtain marbling grading data are encouraged to contact AWA about using the MIJ-30 carcase camera.

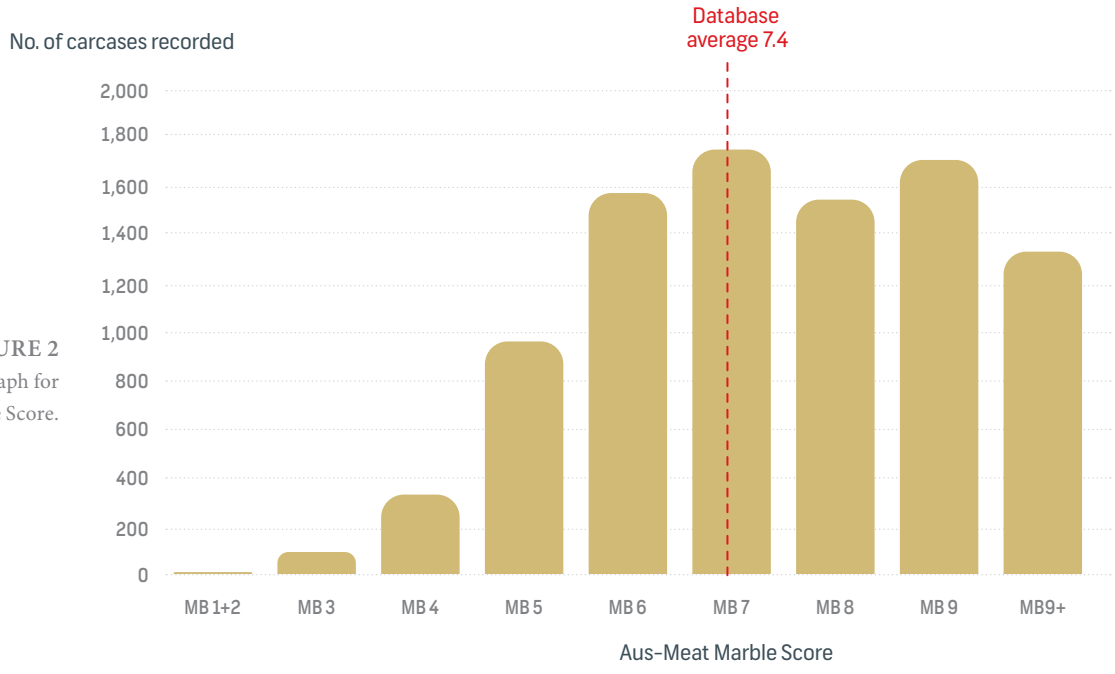
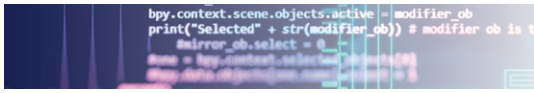


FIGURE 2
Distribution graph for Aus-Meat Marble Score.



MAKING SENSE OF PHENOTYPE INFORMATION

The Phenotype trend data is presented to explain whole-of-herd averages and to describe the range of phenotype records in the AWA database.

The data summary provided includes data from more than 120 individual members across production systems that show extreme variation and large year to year variation reflecting drought, floods and changes to farm management practices.

The data in the AWA database is derived from hundreds of different production systems, management units and year groupings. In considering this data and how it compares to your data, comparisons can only be made between individual animals within the same management groups.

It is not appropriate to look at your own information on individual animals (eg your marble score data) and state that the progeny of any particular bull is higher on average than the AWA database average and should therefore have a higher that average EBV.

There is also large variation within any trait and the measurement system can limit our ability to accurately measure the trait. For example – marble score. It may be that a sire produces progeny that all score 9 or 9+ within a management group. However, about 30% of Fullblood Wagyu score 9 or 9+. What is important, is understanding how that sires' progeny compared to other progeny in the same management group.

Comparisons between animals are only relevant if those animals are raised in the same conditions in the same management groups (contemporary groups) and can be benchmarked against known standards (link sires). Genetic evaluation is designed to highlight the true differences between animals based on genetics, not environment.