



# AWA MEMBER

HANDBOOK 2023

Welcome to the Australian  
Wagyu Association (AWA)  
Member Handbook. This guide  
will help you with the AWA's  
animal DNA testing and animal  
registration process.



*Materials used to produce this document are selected to reflect our sensitivity towards the natural environment on which our industry relies. We only use eco-friendly inks from vegetable oil or soybeans and paper sourced from managed regrowth or planted forests where the cycle of planting, growing and harvesting is carefully controlled. We encourage you to recycle all paper based products after use.*

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## USEFUL CONTACTS

### Australian Wagyu Association (AWA)




Suite 6, 146 Marsh St,  
ARMIDALE NSW AUSTRALIA 2350

[www.wagyu.org.au](http://www.wagyu.org.au)    

### Office hours

Monday, Thursday and Friday, 8.30am to 5pm (AEDT). Tuesday and Wednesday 6am to 5pm (AEDT) - subject to change with daylight savings. We are closed for public holidays.

### Contact us by phone

-  02 8880 7700 (within Australia)
-  +61 2 8880 7700 (international members)
-  +61 407 677 016 (WhatsApp)



*Are you needing help from our MSO team? Reserve a time with us to go through your questions.*

### Membership and general enquiries

-  [office@wagyu.org.au](mailto:office@wagyu.org.au)

### Animal registrations and transfers




-  [regos@wagyu.org.au](mailto:regos@wagyu.org.au)

### DNA testing


-  [dna@wagyu.org.au](mailto:dna@wagyu.org.au)

### BREEDPLAN enquiries

Keryn Hutton

-  [wagyu@breedplan.une.edu.au](mailto:wagyu@breedplan.une.edu.au)
-  02 6773 3059 (within Australia)
-  +6 1 2 6773 3059 (international members)

### Online Forms and Guides

-  [www.wagyu.org.au/for-members/forms-and-guides](http://www.wagyu.org.au/for-members/forms-and-guides)



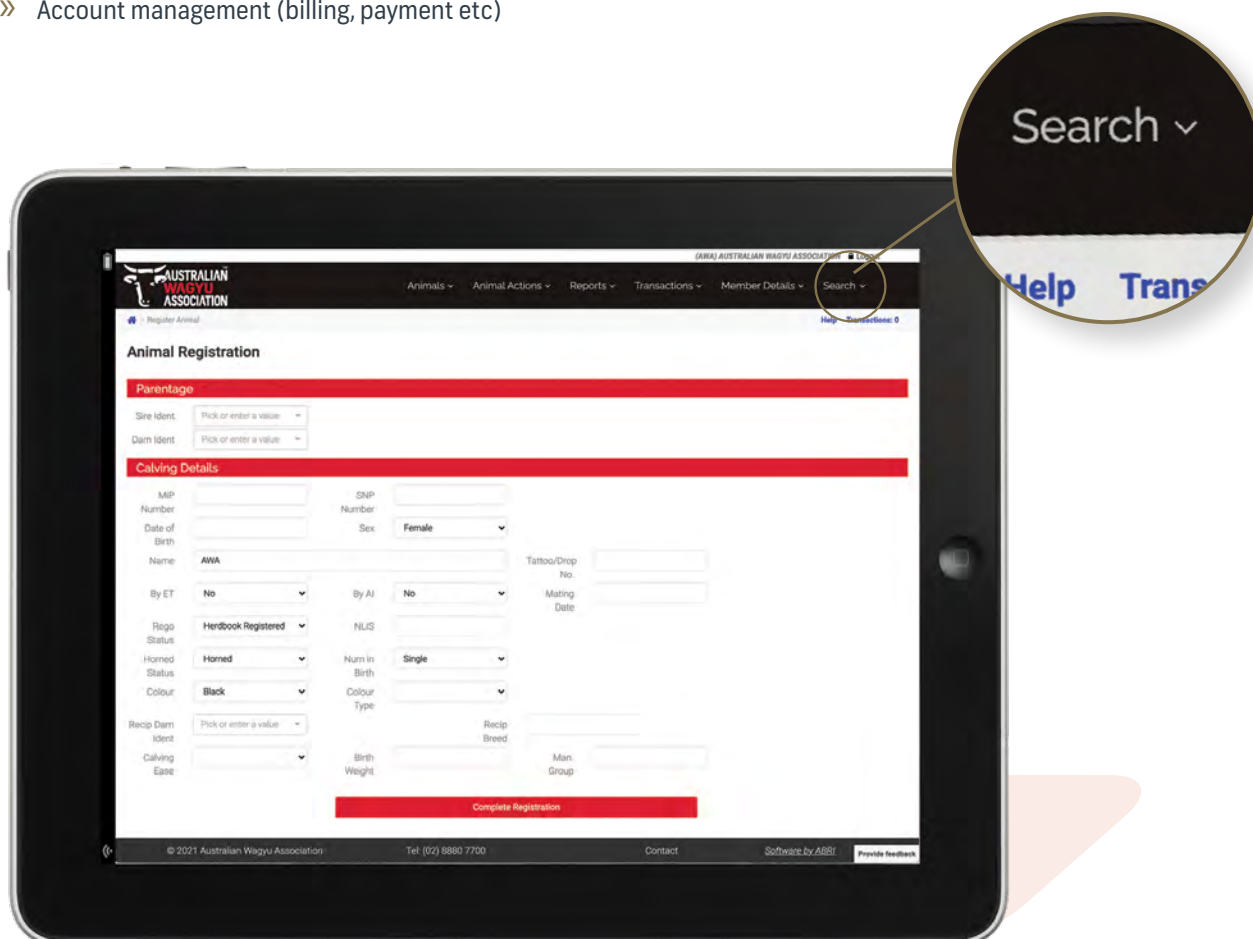
*Hover your phone camera over the code, to link to the AWA forms and guides.*

# WAGYU PORTAL

The **Wagyu Portal** is the AWA online “Member area”. Through the **Wagyu Portal** members have online access to the following Australian Wagyu Association member services:

- » Herd maintenance and management
- » Performance data entry for calf and dam (birth, weaning, yearling, scan and final traits)
- » Animal transfers
- » Membership updates (contact details, property address etc)
- » Account management (billing, payment etc)

*Information on how to use all areas of the **Wagyu Portal** is available in the Portal “Help” button.*



## TRANSACTIONS AND PAYMENTS

International payments can be completed by either bank transfer or Credit Card payments. As bank transfers attract additional fees, Credit Card payments are the preferred method of payment.

Credit card payments can be completed through the Portal, with the ability to save Credit card details for future transactions. Please see steps below to save a card for future use. More in-depth detail can be found under the “Help” button shown on the previous page.

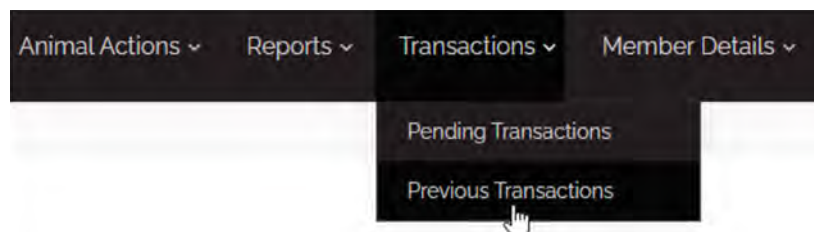
Please note:

- » We can no longer accept international Cheques
- » Members can only pay their entire account balance through the Wagyu Portal; if they wish to pay a lesser amount, they need to provide card details to accounts to process
- » The **Pay Now** button and **Manage Payment Methods** are only visible where there is an account balance to pay.



## STEP 1

Select **Previous Transactions** from the **Transactions** drop-down menu



## STEP 2

Select **"Pay now"**  
You will be able to add and  
save Credit Card details  
for future use here

### Previous Transactions

Company Name:  
Australian Wagyu Association Limited

Previous 12 Months

Next 12 Months

Rows: 35

Create Date	Work Order ID	Inventory	Registrations	Transfers
04/04/2022 10:49	220404-034			
31/03/2022 22:20	220331-058			
31/03/2022 09:33	220331-023			
15/03/2022 09:14	220315-033			
18/02/2022 15:43	220218-025			
14/02/2022 11:19	220214-015			
10/02/2022 03:01	220210-003			1
11/01/2022 11:53	220111-030		1	
30/11/2021 13:39	211130-052			
30/11/2021 05:40	211130-001			
01/11/2021 13:02	211101-021			
01/10/2021 10:59	211001-154		7	
01/10/2021 03:58	211001-010			

Current Account Balance -10.00  
Pending Balance Inc. Tax 0.00  
Total Balance 10.00

[Pay Now](#)

[Manage Payment Methods](#)

## STEP 3

If you wish to save Credit  
Card details for future use,  
select the **tick box** at the  
**bottom of the page**

### Order Summary

Total \$ 10.00

Card Number \*

Exp. Date \* Card Code

**Billing Address**

First Name Last Name

Billing Country: Australia Zip

Street Address City

State Phone Number

Email \*

☐ Save this Credit Card information for the future.



A close-up photograph of a Wagyu cow's head, showing its dark, wavy fur and a blue ear tag with the letters 'FB' in black. The cow's eye is visible on the right side of the frame.

# DNA TESTING TO REGISTRATION OVERVIEW

DNA TESTING, ANIMAL REGISTRATION  
and PERFORMANCE RECORDING is  
important to confirm the pedigrees of  
animals, assist with genetic selection  
and future mating decisions, and to  
confirm Wagyu breed claims.



## DNA testing to registration overview

**Animal registration** is the fundamental building block for seedstock production.

It aims to record the animal along with its sire and dam, which must already be registered, therefore establishing the pedigree 'tree'.

To ensure the sire and dam are correct, DNA Parent Verification is required prior to calf registration.

Full members of the AWA may register Fullblood, Purebred and Crossbred Wagyu breeding animals and commercial slaughter animals.

This enables the recording of performance data for genetic analysis through Wagyu BREEDPLAN leading to increased accuracy of EBVs and the BreedObject \$Indexes.

# DNA TESTING AND REGISTRATIONS - 9 STEPS

## 1 BECOME MEMBER OF THE AWA

To register animals with the AWA you will need to become a full member by submitting a completed **Membership Application Form** (download from the website) to the AWA by either post or email. Payment can be made by credit card or electronic funds transfer.

Once your membership has been created you will receive a BREEDPLAN enrolment form. Please complete this and return to the address on the enrolment form.



## 2 COLLECT DNA SAMPLES OR HAVE GENOTYPES SENT TO AuWA FROM AmWA

## 3 REQUESTING DNA TESTING

Complete the **International DNA test request** and email it to the AWA. **International DNA test requests** can be downloaded from the AWA website. For each **DNA test request**, please download a new test request to ensure the most up-to-date forms.



## 4 SENDING SAMPLES TO THE LAB

Once the AWA has received and processed your **DNA test request**, you will receive an order summary by email.

Please print the order summary and enclose with your samples when sending to your nominated laboratory (see lab options and addresses on page 23).

Maintain a record of your postage tracking number so that your samples can be tracked if they are not received by the lab.

## 5 DNA RESULTS

The AWA will send all **DNA results** to you. Once Parent Verification results have been received, any animals with qualifying parents will be eligible to submit for **registration**.

## 6 SUBMITTING REGISTRATIONS

Upon completion of the **DNA results**, **registrations** can be submitted to the AWA by:

- » **Stockbook Herd Management Software** (recommended)
- » **AWA Registration Form** (online)
- » **AWA Registration Form** (hard copy). Please note, a processing fee will apply.

## 7 REGISTRATION CERTIFICATES

Once the animal is registered a copy of the certificate will be emailed to the current owner of the animal and will also be available online in the Wagyu Portal. Please note: you must be a BREEDPLAN member to be able to submit data and have herd reports generated. You will receive and enrolment form when your membership is processed, please complete and email it back to us

## 8 COLLECT STANDARD PERFORMANCE INFORMATION

Collect and submit weights and scanning, and carcass data to BREEDPLAN once your animals are registered with AWA. For more information on BREEDPLAN visit our website.

## 9 ESTIMATED BREEDING VALUES (EBVs)

Animals must have registration forms submitted to the AWA, or have been registered via the Wagyu Portal prior to the 3rd of each month to be included in the monthly BREEDPLAN run. Updated EBVs are published around the 20th of each month.

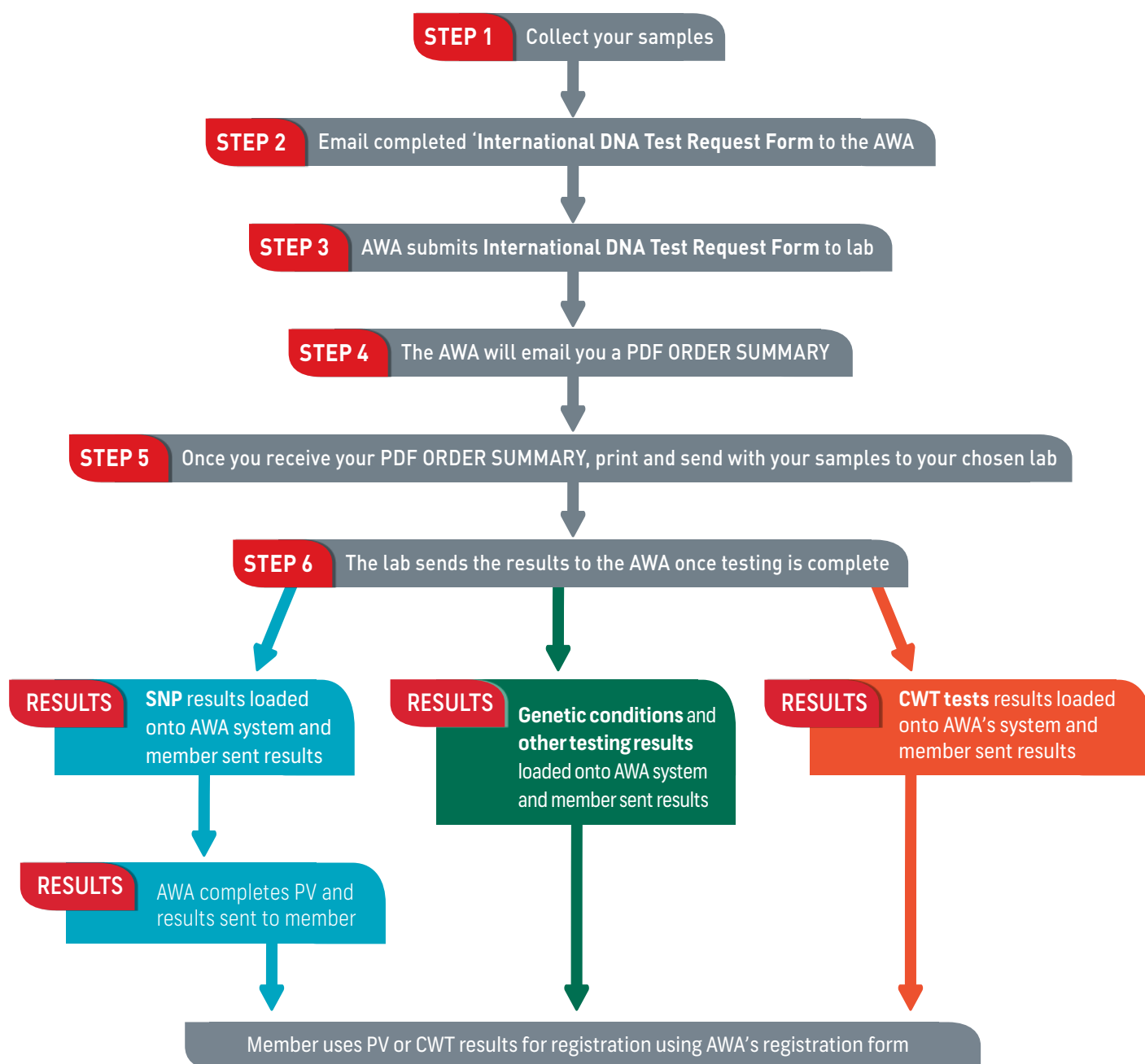


**WWW.WAGYU.ORG.AU**  
FOR MEMBERS > WAGYU BREEDPLAN



# DNA TESTING PROCESS

**Applies to all Labs** – Neogen (international) and Zoetis (international)



### STEP 1

Collect your samples using permitted (lab specific) collection kits (hair or TSU).

Talk to AWA if you do not have these

### STEP 2

Download a new International DNA test request form from the AWA website, complete with all the details of the testing you require for your collected samples. (see pages 20 and 21 for different testing options)

### STEP 3

Email completed DNA test request form to  [dna@wagyu.org.au](mailto:dna@wagyu.org.au)

### STEP 4

AWA will process your submitted request into the system and submit to the lab for testing. You will be invoiced at this time

### STEP 5

You will be emailed an acknowledgement letter with a batch number identifier and an order summary when the 'International DNA Test Request Form' has been submitted to the lab.

### STEP 6

Please print the order summary (NOT the acknowledgement letter) to enclose with your samples to the lab. This is critical to ensuring the testing can be completed accurately and without delays. The lab sends the results to AWA once testing has been completed

## SNP RESULTS (blue)

Once the lab has completed its testing, results are sent to the AWA. A member of the AWA's MSO team will load the results into AWA's system and email the results to you.

### SNP parent verification (PV) & parent discovery

The AWA completes SNP PV and parent discovery. Results are loaded into our system and reported to you. Allow up to a week for this to be completed once the AWA receive the results from the lab.

## CWT RESULTS (orange)

1. SNP results loaded into the AWA system
2. A summary of your recent SNP testing is emailed
3. SNP genotype is sent to AGBU for CWT testing
4. CWT result emailed to member once returned

## GENETIC CONDITION & OTHER TESTING RESULTS (green)

1. Results loaded into the AWA System
2. Results emailed to the member

### STEP 7

Member uses PV or CWT results for registration using AWA's Registration Form

**NOTE** Results may be reported from the lab in batches, this means that you may not receive all the results for a batch/animal in one email from the lab. AWA sends the results as soon as they are available, where additional testing (eg; PV or CWT) is required, this may take a week after the results have been reported to AWA.

# COLLECTING A DNA SAMPLE

A SAMPLE OF AN ANIMAL'S DNA IS REQUIRED TO BE SUBMITTED TO A LABORATORY FOR PARENT VERIFICATION AND OPTIONAL GENETIC RECESSIVE GENETIC CONDITION TESTING.

DNA can be collected using:

- » **Tissue Sampling Unit (TSU)** samples (preferred method)
- » **Tail hairs**
- » **Semen**

Please ensure that **hair samples** are submitted on the correct hair cards for the laboratory that they are being submitted to. These can be obtained from the AWA.

Refer to page 23 for a list of approved testing laboratories and the testing capabilities of each.

**Tissue Sampling Units (TSUs)** are particularly beneficial and are recommended for collecting samples on young animals. TSUs are no longer single use and can be re-used in the future. When collecting a sample, please ensure that a full sample is contained in the tube.



## TSU SAMPLING PROCEDURE

Follow steps 1 through to 13



1

Take an assembled TSU.  
(cutter + connection piece + collection tube)

Turn the black end so that the TSU applicator is open



2



3

Insert the TSU as shown in the picture

Turn the black end so that the TSU applicator is closed and the TSU is locked into place



4



5

Carefully squeeze the applicator handles until the large piston comes to a stop against the red connection piece

The cutter has now been grabbed.  
Release the pressure on the handles



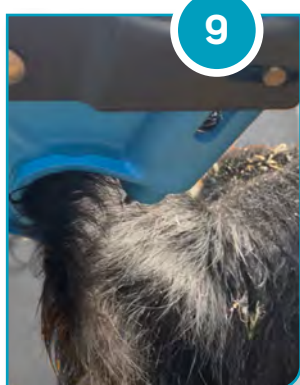
6

## Collecting a DNA sample

Remove the red connection piece while holding the red tabs and pushing sideways



**The pliers are now ready to use**



Slide the charged pliers over the ear and position the cutter about 1cm to 2cm from the edge of the ear.

Try to avoid large veins and ridges. The sample should be taken in a very swift, fluid motion

Remove the TSU tube from the applicator by twisting the black end and sliding the tube out



A tissue sample should be clearly visible in the tube

You should see the red plug in the end of the TSU if it has sealed correctly



Remove the used cutter from the pliers by pushing the handles apart



		Visual Number on TSU	Barcode Number When Scanned	AWA Sample Code When Results are Returned
Wagyu Bundle		WSAMP123	WSAMP123	WSAMP123
NLIS Matched Management Set		S23456	982 XXXXXXXXXXXXX	982 XXXXXXXXXXXXX
NLIS Tag and TSU		M00123	ABCD1234XYZ00000	ABCD1234XYZ00000
Individual TSU's		AL0000196	AL0000196	AL0000196



## Collecting a DNA sample

### TAIL HAIR SAMPLING PROCEDURE

Follow steps 1 through to 7



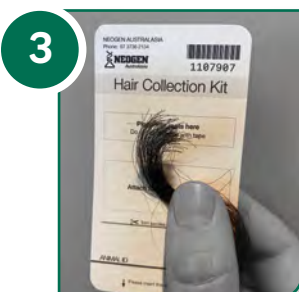
Pull (do not cut) hair from the tail switch (tip of the tail) not the tail head. Pull hair in the opposite direction from which the hair is laying, this will result in less breakage.



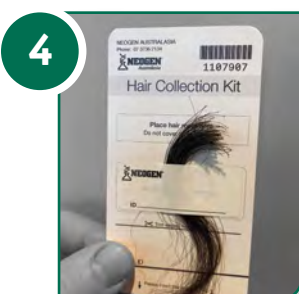
Make sure hair is free from fecal material and dirt. Save the hair roots (follicles), which contain the DNA.

Roots must be clearly visible. Approximately 30 hair roots are needed. For animals with finer hair, a minimum of 50 hairs are needed.

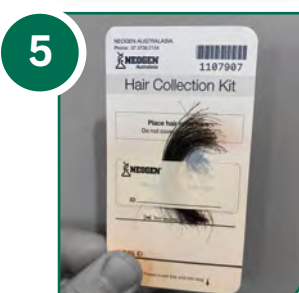
For animals younger than three months, TSUs are recommended since hair roots will likely not be visible.



Grab the Neogen Australasia Hair Collection Kit card, place the hair roots on the instructed section.



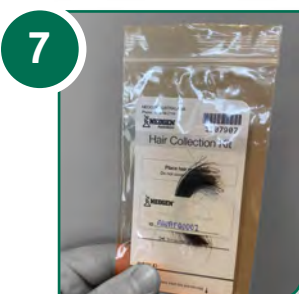
Using the supplied ID label (or tape of your own). Stick the hair to the card as instructed on the card.



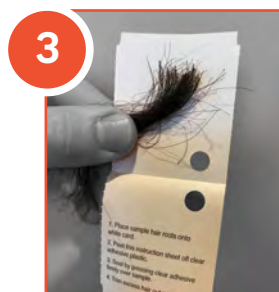
Trim the hair on the directed "trim here" line.



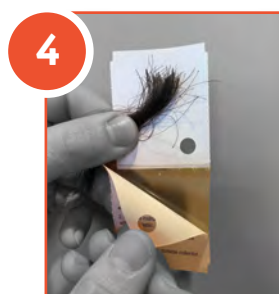
Clearly label the ID onto the hair card, this is the same ID that needs to be entered into the AWA DNA Test Request form.



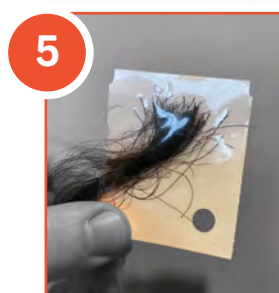
Place the Collection card with the hair into the supplied plastic bag.



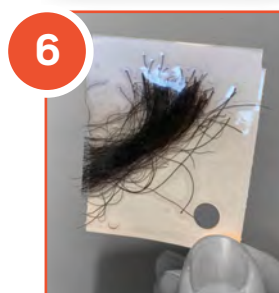
Grab the Zoetis Hair Collection kit, open it up and place the hair roots onto the white card.



Peel the instruction sheet off the clear adhesive plastic.



Seal by pressing the clear adhesive firmly over the sample.



Trim excess hair outside collector.



Clearly label the ID onto the hair card, this is the same ID that needs to be entered into the AWA DNA Test Request form.

## Collecting a DNA sample

### SEMEN SAMPLING PROCEDURE

**Semen samples** can be used for bulls where no other type of DNA is able to be collected.

- » Remove the semen straw from the liquid nitrogen and allow it to gently thaw in the refrigerator or at room temperature – do not store at room temperature for long periods of time as it may cause mold
- » Thawed semen straws need to be packaged in a way that they can't bend or break in the mail.
- » Best practice is to place the semen straw inside an empty pen cartridge, by removing the ink tub and sliding the semen straw inside the plastic shell.



#### STEP 1

Place the **semen straw** inside an empty pen cartridge, by removing the ink tub and sliding the semen straw inside the plastic shell.



#### STEP 2

Once **semen straw** is inside, put the lid back on the pen so it can't move.



# DNA TESTING OPTIONS

PURPOSE	GENOMIC SNP
PARENT VERIFICATION	+
PARENT DISCOVERY	+
GENETIC ANALYSIS Genomic EBVs	+
CROSSBRED WAGYU TEST	+

**SNP** – A SNP (Single Nucleotide Polymorphism) is the variation in a single nucleotide (or base pair) which occurs at a specific position in the DNA. These SNPs are of interest as they can directly cause some genetic conditions or they can be used as markers to study economically important traits where they are closely aligned with (or linked to) genes impacting the production trait of interest.

**GENOMIC SNP** – A Genomic SNP is a SNP panel consisting of greater than 20,000 markers. Where the genotype can be used for parent verification and parent discovery. Genomic SNPs may also be used for genetic analysis through Single-Step Wagyu BREEDPLAN, producing genomically enhanced EBVs and determining the percentage of Japanese Black content of an animal through the Crossbred Wagyu Test (CWT).

**CHEDIAK HIGASHI SYNDROME (CHS)** – Cattle that are homozygous (two copies of the recessive allele) have a reduced immune response to disease which reduces their ability to resist bacterial infection. Blood is slow to coagulate so often the first indicator is unusual umbilical cord bleeding at calving. Cattle with this syndrome often have an unusually pale coat colour.

**SPHEROCYTOSIS (B3)** – Cattle that are homozygous (two copies of the recessive allele) have pernicious anaemia (bleeding caused by the abnormal red blood cells). Death normally occurs within the first seven days after birth. Some cases live to adulthood but there is a severe retardation in growth.

**FACTOR XI DEFICIENCY (F11)** – Cattle that are homozygous (two copies of the recessive allele) show prolonged bleeding time after castration or dehorning. It is also possible that Carrier x Carrier matings have increased difficulty producing viable fertilised embryos or full-term pregnancies and may be repeat (return to cycle) breeders.

**ISOLEUCYL-TRNA SYNTHETASE (IARS) – PERINATAL WEAK CALF SYNDROME** – IARS Disorder results in a high frequency of death in affected calves within the last few weeks of gestation or first few days of life. The mutation results in a reduction in activity of a key enzyme that is important for the protein synthesis process in the developing embryo and newborn. Calves affected by this disorder exhibit anemia, depression, weakness, variable body temperature, difficulty nursing, growth retardation, and increased susceptibility to infection. In addition to deaths associated with weak calf syndrome, more than half of affected embryos – those carrying two copies of the IARS gene mutation – died prenatally.

## DNA testing options

**CLAUDIN 16 DEFICIENCY (CL16)** – Cattle that are homozygous (two copies of the recessive allele) have terminal kidney failure and the onset can occur any time from late adolescence. Cattle are unlikely to live more than six years.

**POLL GENE TEST** – Uses recently identified genetic markers (Celtic Poll, Pc or Friesian Poll, Pf) to identify whether animals carry the genes associated with POLLED phenotype. This **MUST** be completed in order to register an animal as ‘Polled’.

**STEAROYL-COA DESATURASE (SCD)** – SCD is the enzyme which changes stearic acid into oleic acid. Stearic acid makes deposited fat harder and increases the melting point. Conversely oleic acid makes the fat soft with a low melting point. The test identifies 2 allele types – A and V.

**Igenity Tenderness Profile (ITP/TEND)** – Tenderness is an estimate of the animals’ genetic potential for carcass tenderness as measured by the Warner-Bratzler Shear Force test. Measured on a scale of 1-10, with a higher score indicates greater tenderness.

**COAT COLOUR** – The coat colour test is run on the Melanocortin 1 Receptors (MC1R) gene and is used to identify the combination of black and red pigments in an animal. The test for coat colour looks for combinations of 3 alleles (Dominant black – ED, Wildtype – E+ and Recessive red – e)

**DILUTION FACTOR** – Dilution factors are genes that cause diluted pigment in cattle. Where the dilution gene is present it can cause coat colours such as dun, silver dun, yellow and cream due to the interaction with the MC1R gene that determines coat colour.

## CROSSBRED WAGYU TEST (CWT)

The CWT can be used when one or both parents have Wagyu content, but DNA from one or both parents is either unregistered, or cannot be registered.

A **GENOMIC SNP** must be completed for a CWT test to be requested. The Australian Wagyu Association (AWA) has developed a genomic test to measure Japanese Black Wagyu genetics in non-pedigreed crossbred animals. This development, known as the Crossbred Wagyu Test (CWT) is intended to help the supply chain determine the potential of individual cattle to produce a ‘genuine Wagyu’ eating experience, prior to induction onto feed.

The CWT measures the genomic “distance” between the genotype of a particular animal being tested and the “clouds” or reference sets of genotypes available in Australia for Wagyu and other breeds. This delivers the estimated breed content level of each breed within the individual being tested. For Wagyu, caution is required because genetic diversity studies in Japan has identified significant genetic variation between different prefectural herds.

# DNA TESTING LABS

## AWA APPROVED LAB SERVICES

AUSTRALIA / NEW ZEALAND SERVICES		NEOGEN Australasia	zoetis
Genomic SNP		✓	✓
Parentage SNP		✓	✓
Genetic conditions	CHS, B3, F11, CL16, IARS	✓	✓
HORN / POLL		✓	✓
TEND / SCD		✓	✓ SCD only
BVDV / PI		✓	✓
CWT		✓	✓
Coat colour and Dilution factor		✓	
INTERNATIONAL SERVICES			
Genomic SNP		✓	✓
Genetic conditions	F11, CHS, B3, IARS	✓	✓
Other traits	SCD, TEND, POLL	✓	✓ SCD and POLL only
CWT		✓	✓
MiP		✓	
Coat colour and Dilution factor		✓	

### NEOGEN AUSTRALASIA

14 Hume Drive  
Bundamba QLD 4304 Australia

☎ +61 (7) 3736 2134  
✉ naa@neogen.com

### NEOGEN US

4131 N. 48th Street Lincoln,  
NE 68504 USA

☎ 877 443 6489 or 402 435 0665  
✉ geneseekinfo@neogen.com

### NEOGEN CANADA

7323 Roper Road  
NW Edmonton, AB T6E 0W4 Canada

☎ 855 324 9774  
✉ neogencanada@neogen.com

### NEOGEN UK

The Dairy School, Auchincruive Ayr  
KA65HU Scotland UK

☎ +44 (0) 1292 526 099  
✉ contactgenomics@neogen.com

### ZOETIS AUSTRALIA

PO Box 75, Banyo  
QLD 4014 Australia

☎ 1300 768 400  
✉ genetics.au@zoetis.com

### ZOETIS NEW ZEALAND

Level 4, 8 Mahuhu Crescent  
Auckland 1010 New Zealand

### ZOETIS US

Building 300 333 Portage Rd  
Kalamazoo, Michigan 49007-4931  
USA

# PARENT VERIFICATION

**Parent Verification (PV)** – Where both parents are nominated and the calf is verified to the nominated sire and dam. If a parent combination isn't found the analysis will then look at all possible parents in our SNP genotype database.

**Parent Discovery (PD)** – A list of possible parents are nominated and the calf's genotype is analysed against the supplied lists of possible parents. If a parent combination isn't found the analysis will then look at all possible parents in our SNP genotype database.

**SNP PVs** – are run 'in-house' at the AWA. For animals to be run through a Parentage analysis you will need to request 'PV' in your DNA test request.

**MiP/STR PVs** – Historically MiP (aka STR) technology was used for parent verification.

Parent Verifications are run once a week with these results being sent once the run is completed.

For animals not already registered in the Herdbook, and have Parent verification provided that is based off the ISAG standardised STR/MiP markers, a Genomic SNP genotype must be provided for the animal in addition to the MiP profile used for registration. All progeny from these animals must be parent verified using 21 MiP markers or Genomic genotyping supplied by an AWA approved DNA testing laboratory.

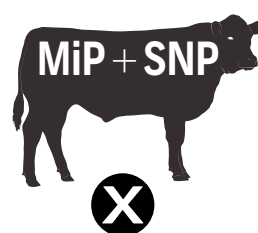
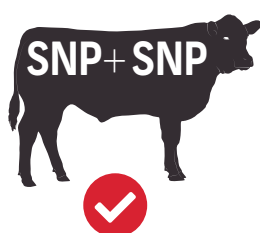
For any animal that has already completed a parent verification test through a recognised laboratory they will need to provide the AWA with a copy of the PV results, if they are STR results we require a copy of the animals STR/PV certificate and the parents STR/PV certificates.

If the animal that has had a Genomic SNP test done through a recognised lab in 20k markers or higher can have the SNP data sent to us. If the animal has not had a Genomic SNP test done on a 20k marker or higher, they will need to complete a Genomic SNP through the AWA.

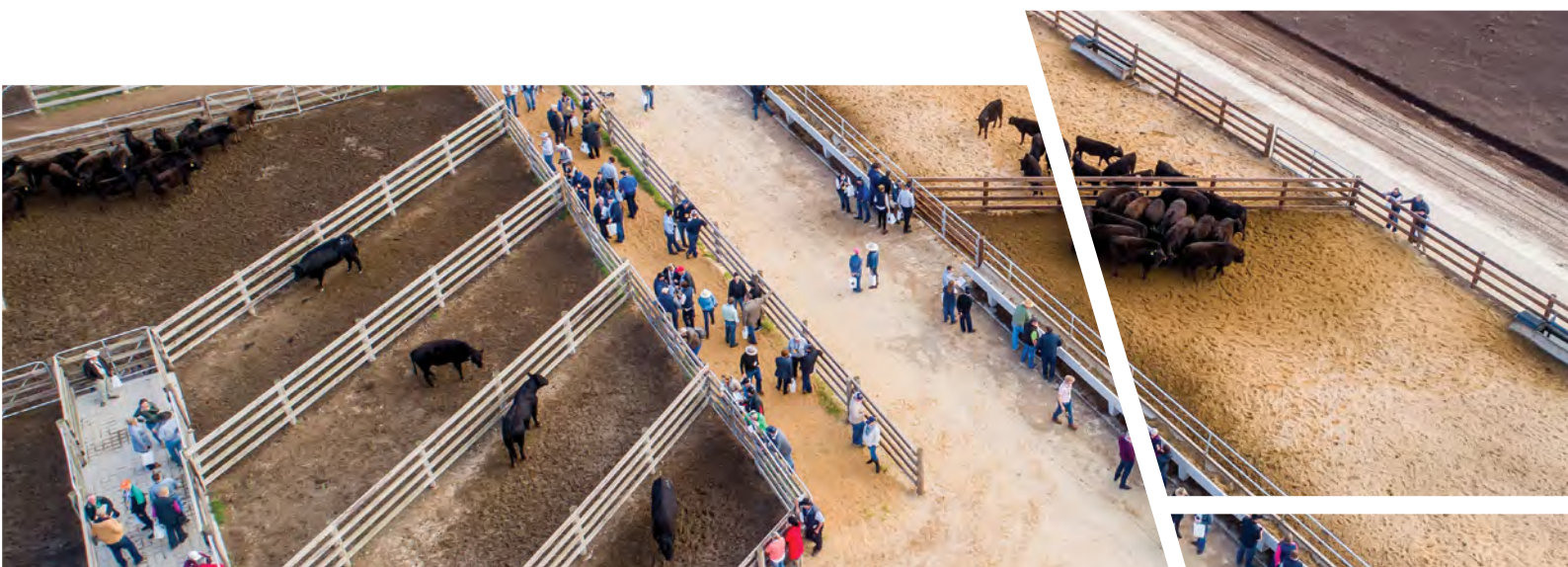
Please note that if an animal does not have parentage resolved (both sire and dam qualified) in the first 2 weeks after the genotype has been received it will be run once a month for 12 months or until it has either qualified or requested to be removed.

Just because an animals parents are registered does not mean it will parent verify. The calf and parent all need to be on the same platform to have the ability to qualify (i.e. the trio ALL on SNP or the trio ALL on MiP/STR)

	NUMBER OF MARKERS	PARENT VERIFICATION	PARENT DISCOVERY	GENETIC ANALYSIS (EBVs)	CONTENT TEST AVAIL
<b>MiP</b>	average 10 - 21	✓			
<b>GENOMIC SNP</b>	20k +	✓	✓	✓	✓

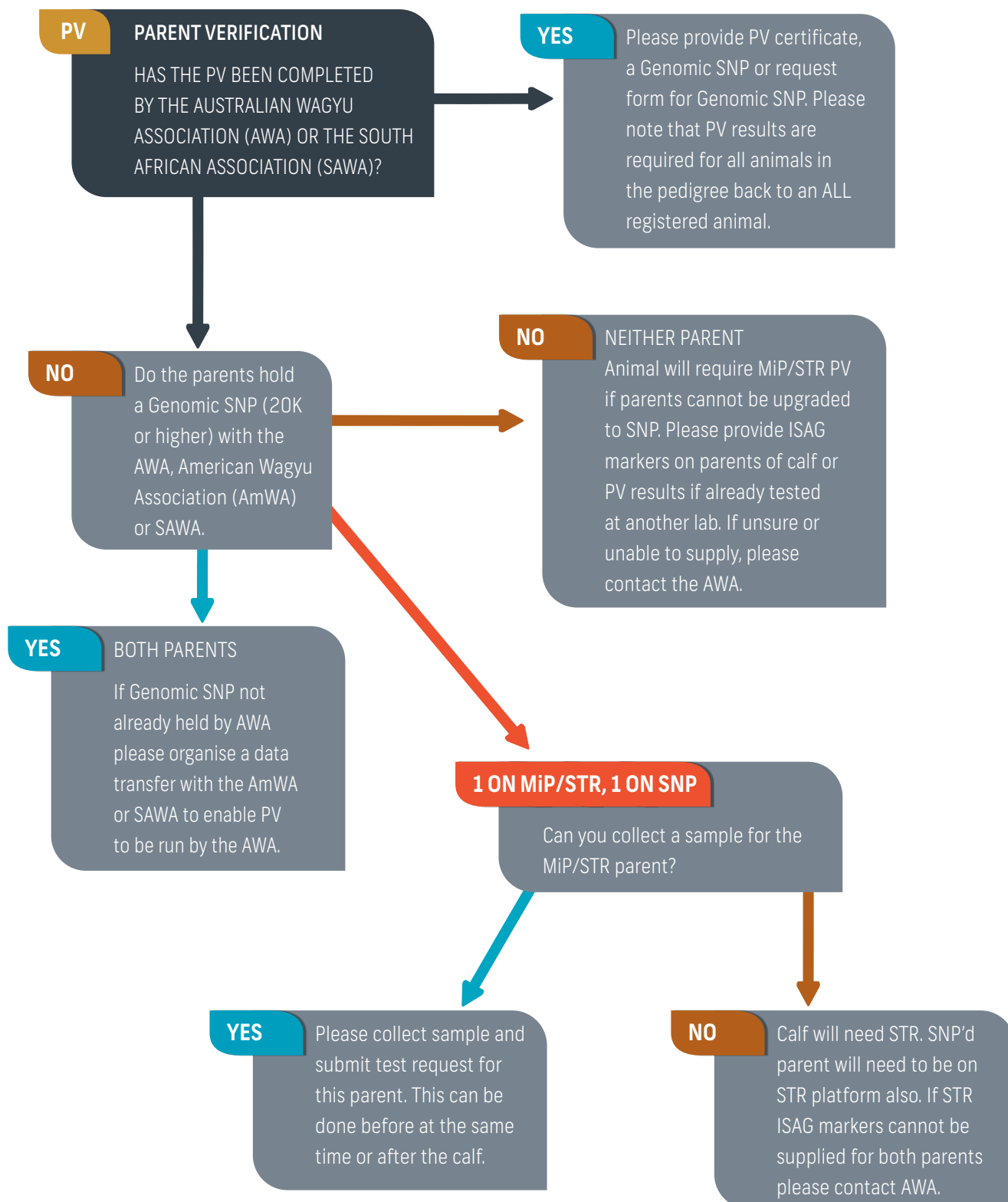


The above figure illustrates the concept that calves and both parents must be on the same technology to allow parent verification.





## Parent verification



# DNA RESULTS

Once the lab has completed the requested testing, the results will be forwarded to the AWA, the turn around time is on average (from sample receipt at lab) 4 to 6 weeks. The results are processed through the AWA system and will be sent to the member soon after this.

A summary of all newly reported animals and their assigned SNP numbers, and any animals that have failed testing will also be reported to you once the parentage analysis has been completed. Below is an explanation of results you may receive.

## CHS, B3, F11, F13, IARS & CL16

The first two, three or four characters vary with the genetic condition ie. B3, CHS, CL16, F11, F13 or IARS

- F** Indicates that the sample submitted for this animal **has been tested** and found to be **FREE** of the causative mutation responsible for the indicated genetic condition. This animal is homozygous free, meaning that it has two copies of the normal variant (or allele) of the gene.
- C** Indicates that the sample submitted for this animal **has been tested** and found to be a **CARRIER** of the causative mutation responsible for the indicated genetic condition. This animal is heterozygous for the mutation, meaning that it has one mutant allele and one normal allele. This animal could pass the mutation to approximately half of its progeny.
- \_\_\_%** Indicates that, based on pedigree information supplied by the breeder of the animal, the animal **has a chance to be a carrier** of the mutation responsible for the indicated genetic condition but **HAS NOT BEEN TESTED**. The higher the indicated percentage, the larger the chance the animal may be a carrier
- FU** Indicates that, based on pedigree information supplied by the breeder of the animal, the animal is **expected to be free** of the mutation responsible for the indicated genetic condition. However, this animal **HAS NOT BEEN TESTED** for the causative mutation and the AWA gives no guarantee as to the animal's "free" status.
- A** Indicates that the sample submitted for this animal **has been tested** and found to be **AFFECTED** by the genetic condition. This animal is homozygous for the mutation responsible for the genetic condition and has two copies of the mutant variant of the gene.
- NR** the sample was tested, however no result was able to be obtained. Please collect a new sample and submit a new DNA request form.

## DNA results

### GENOTYPES AND CALL RATES

The call rate of a genotype reflects the quality, or number of successfully tested markers for that genotype. The higher the call rate, the better the quality of the genotype, the higher the likelihood of Genomics being included in BREEDPLAN and the animals EBVs and the less likely there will be issues with parentage analysis on the animal itself and on its progeny. Once genotypes have been received by AuWA we will email you a summary file with a list of genotypes that we have received that week for your herd, their DNA case numbers and the call rates of the samples. If an animal:

- » Fails testing (**red category**) its call rate will have been below 0.90 for a Genomic SNP and does not hold a useable genotype for either parentage or BREEDPLAN and EBVs. You will need to collect a new sample and re-test.
- » Falls into the **magenta category** (call rates between 0.90–0.96) we would also strongly suggest collecting a new sample and re-testing as the sample may be ok for use in parent verification but there is a high chance that the Genomics will be excluded from BREEDPLAN and EBVs and there is a higher chance of parentage issues with progeny in the future.
- » Falls into the **yellow category** (call rates between 0.96–0.98) there is a chance that the Genotype may be excluded from BREEDPLAN and EBVs, however we won't be able to tell until the animal has been through a BREEDPLAN run.
- » Falls into the **green category** (call rates over 0.98) it is unlikely that the genotype will be excluded from BREEDPLAN and EBVs unless there are other issues (such as indicating a wrong sex, wrong parent etc) when it is run through the quality checks at AGBU.

CALL RATE	TEST	MESSAGE
0.8588	GENOMIC SNP FAIL	Failed testing
0.8638	GENOMIC SNP FAIL	Failed testing
0.9017	GENOMIC SNP	Acceptable for PV. High risk of failing AGBU/Breedplan Quality assurance checks
0.902	GENOMIC SNP	Acceptable for PV. High risk of failing AGBU/Breedplan Quality assurance checks
0.9095	GENOMIC SNP	Acceptable for PV. High risk of failing AGBU/Breedplan Quality assurance checks
0.9648	GENOMIC SNP	Acceptable for PV. Intermediate risk of failing AGBU/Breedplan Quality assurance checks
0.971	GENOMIC SNP	Acceptable for PV. Intermediate risk of failing AGBU/Breedplan Quality assurance checks
0.9725	GENOMIC SNP	Acceptable for PV. Intermediate risk of failing AGBU/Breedplan Quality assurance checks
0.9805	GENOMIC SNP	Acceptable for PV. Low risk of failing AGBU/Breedplan Quality assurance checks.
0.9809	GENOMIC SNP	Acceptable for PV. Low risk of failing AGBU/Breedplan Quality assurance checks.
0.9809	GENOMIC SNP	Acceptable for PV. Low risk of failing AGBU/Breedplan Quality assurance checks.

## POLL TESTING

HH	<b>HORNED.</b> No copies of the <b>POLLED</b> molecular marker are present.
HPc	<b>POLLED.</b> One copy of the <b>POLLED-CELTIC</b> molecular marker is present.
PcPc	<b>POLLED.</b> Two copies of the <b>POLLED-CELTIC</b> molecular marker are present.
HPf	<b>POLLED.</b> One copy of the <b>POLLED-FRIESIAN</b> molecular marker is present.
PcPf	<b>POLLED.</b> One copy of the <b>POLLED-CELTIC</b> and one copy of the Polled-Friesian molecular marker are present.
PfPf	<b>POLLED.</b> Two copies of the <b>POLLED-FRIESIAN</b> molecular marker are present.

## SCD TESTING

Results presented reflect the allelic variation at a specific site in the SCD gene that changes the corresponding amino acid from Valine (V) to Alanine (A) which has a significant relationship to the melting point of fat in Wagyu, and hence enhances palatability.

<b>AA</b>	Two copies of the Alanine allele are present. Preferred type.
<b>AV</b>	One copy of the Valine allele and one copy of the Alanine allele are present.
<b>VV</b>	Two copies of the Valine allele are present.

## TEND TESTING

Increase in “tenderness” is associated with favourable alleles seen within the selected marker panel. In the report, the combined genotype results have been scored between 1 to 10, where 10 has the most favourable number of alleles present.

## COAT COLOUR

ED	Black. Two copies of the dominant black gene.
ED/E+	Black. 1 copy of the dominant black gene and one copy of the Wildtype* gene.
ED/e	Black. 1 copy of the dominant black gene and 1 copy of the recessive Red gene.
E+/e	Red. 1 copy of the wildtype* gene and 1 copy of the recessive red gene.
E+E+	Varied. 2 copies of the wildtype* gene.
e/e	Red – 2 copies of the recessive red gene.

---

**\*NOTE:** Wildtype genes are described as “neutral” and therefore the animal will usually display the colour of the other colour gene that is present. However if a dilution gene is present, the wildtype may cause unexpected expression of colours such as Dun, Silver dun, Yellow and White/Cream.

## DILUTION FACTOR

<b>N</b>	Non-Carrier. No copies of the dilutor gene present. This animal must be Red or Black.
<b>C</b>	Carrier. 1 copy of the dilutor gene present. This animal will be classified as Red (Grey).
<b>A</b>	Affected. 2 copies of the dilutor gene present. This animal will be classified as Red (Grey).

# ANIMAL REGISTRATION PROCESS

To register animals with the AWA you must be a Full member. Once you have received PV results (or CWT results) these animals are eligible for registration. Animals will have differing PV requirements dependant on the country etc. Please refer to the registration processes specific to your situation on the following pages.

Registrations can be submitted to AWA by:

- » AWA excel spreadsheet
- » Herd management software extracts (EG; Stockbook or Herdmaster)

We recommend that you register with BREEDPLAN and submit performance data for all registered animals where possible. After registering the animal, AWA will provide a unique Animal Identifier (ident) for each animal.

## FOR ANIMALS BORN PRE-01/01/2022

the animal ident is composed of **[Herd Identifier]** **[Grade]** **[Year Letter]** **[Drop Number]** eg. AWA FM0001, and will be used by the Association in all communications about the animal.

## FOR ANIMALS BORN ON OR AFTER 01/01/2022

The animal ident is composed of **[Herd Identifier]** **[Grade]** **[Year Code]** **[Drop Number]** eg. AWA F22T00001, and will be used by the Association in all communications about the animal.

The AWA Bylaws, which can be found on the AWA website, provide further details on the rules associated with animal registration.



**TABLE 1** GRADE CODE ASSIGNMENT BASED ON GENERATION OR MINIMUM % WAGYU CONTENT

GRADE	GENERATION	MIN. % WAGYU CONTENT	GRADE CODE IN IDENT
0	0 = Base Animal	Less than 50%	0
1	1 = Crossbred Wagyu F1	50+%	1
2	2 = Crossbred Wagyu F2	75+%	2
3	3 = Crossbred Wagyu F3	87+%	3
4	4 = Crossbred Wagyu F4	93+% Purebred if parent verified to sire and dam	4
PUREBRED	Purebred	93+% + PV	P
FULLBLOOD	Fullblood	PV to 2 Fullblood parents	F



## FULLBLOOD GRADE

For an animal to be eligible to be registered as a Fullblood animal in the Herdbook register it must have a DNA Parent verification qualifying the animal to both a Fullblood sire and Fullblood dam.

An animal will be regarded as a Fullblood whose forebears originate from Japan and whose pedigrees show no evidence of any grading up from base animals or outcrossing to other breeds (IE: both sire and dam must also be Fullblood Herdbook registered animals).

An animal will be regarded as a Fullblood if already registered with a recognised overseas Wagyu breed association/organisation provided the regulations governing the entry of Fullbloods into their registry comply with the AWA ByLaws. Proof of parent verification must be provided.

If an animal with grading of Grade 4 or higher, has white markings other than on the pizzle, scrotum or the underbelly posterior to the navel and rising onto the flank it will be downgraded to Grade 3 (minimum 87% Wagyu breed content).

## PUREBRED GRADE

For an animal to be eligible to be registered as a Purebred animal in the Herdbook register it must have a minimum of 93% Wagyu breed content (F4) along with a Parent verification result qualifying the animal to sire and dam.

An animal will be regarded as a Purebred if already registered with a recognised overseas Wagyu breed association/organisation provided the regulations governing the entry of Purebred into their registry comply with the AWA ByLaws. Proof of parent verification must be provided.

If an animal with grading of Grade 4 or higher, has white markings other than on the pizzle, scrotum or the underbelly posterior to the navel and rising onto the flank it will be downgraded to Grade 3 (minimum 87% Wagyu breed content).

## HERDBOOK REGISTER (HBR)

The Herdbook register is a breeding register for all Wagyu Fullblood and Purebred Wagyu animals which are DNA parent verified to their sire and dam.

To register animals in the Herdbook as Fullblood or Purebred all animals within the pedigree must also be recorded if not already registered with the association. The animals will also require proof of parent verification.

Animals are normally registered as calves, either just after birth or at weaning/marking, whichever is more convenient to on-farm management. To increase the accuracy of EBVs, early registration is recommended.

## Animal registration process

### GRADED ANIMALS

Graded animals are all animals that do not fall into either the Fullblood or Purebred category. These animals can be entered with a % Wagyu content result based on a CWT (Crossbred Wagyu Test) or by Parent Verification results that have not given them a high enough Wagyu % to be Purebred. Please see Table 1 for grades and respective Wagyu % requirements.

If an animal has a CWT below 50% and a Parent verification to a Fullblood animal it can be registered as an F1 animal.

If an animal has white markings other than on the pizzle, scrotum or the underbelly posterior to the navel and rising onto the flank, it cannot be registered higher than Grade 3 (minimum 87% Wagyu breed content) on the register. If an animal of grading of Grade 4 (minimum 93% Wagyu breed content) or higher, does not comply with the colour markings it is downgraded to Grade 3 (minimum 87% Wagyu breed content).

### SLAUGHTER REGISTER (SR)

The slaughter register is a non-breeding register for slaughter animals only. No progeny from any Slaughter Registered animals are eligible to be registered with the AWA. Animals entering the slaughter register can be Fullblood, Purebred or Graded animals (minimum 50% Wagyu breed content).

DNA testing and Parent Verification to both nominated parents is required for all animals claiming Fullblood or Purebred status.

The Slaughter Register allows breeders and marketers access to a professionally prepared pedigree certificate for animals destined for slaughter and to facilitate the capture of performance data on these animals.

### CONTENT REGISTER

The breeding register for Wagyu influenced animals not eligible for registration as Fullblood or Purebred in the Herdbook. Animals registered in the content register will be registered either by percentage breed content calculated from the percentage Wagyu of the sire and dam (must have PV results to sire, dam or both) or results from the Crossbred Wagyu Test. Based on % Wagyu breed content calculated, the grade will be assigned as per Table 1.

This register allows the registration of crossbred Wagyu animals with the objective of breeding to registered Fullblood or Purebred Wagyu animals to increase Wagyu content over subsequent generations and over time to produce a Purebred Wagyu animal.

### COLOUR TYPE

Visual coat colour of all animals on the registers shall be either red, black or red (grey). For red and black animals this shall be determined by the member on visual colouration. For any animals claiming Red (grey) status, DNA testing for coat colour and dilution factor must be completed. This shall be determined by the member on visual colouration. Black, red, red (grey) and composite (the result of combined breeding of black and red Wagyu) animals are registered in the Herdbook Register with the colour field differentiating these groups of animals. Composite registered animals have a "CC" in brackets [CC] on their registration certificate immediately after the animal's registered name, their Genotypic colour type will be displayed as composite and phenotypic colour displayed as determined by the member. Progeny of Composite registered animals are only eligible for registration in the Composite Register.

## ADDITIONAL INFORMATION

### POLLED ANIMAL REQUIREMENTS

Any Purebred animal registered as Polled or Scurred in the Herdbook must be DNA tested to determine if it is Homozygous polled or Heterozygous polled using a test to be specified by AWA. An animal with claim to Poll status cannot be registered in the Herdbook until Polled results are received from the lab. Any Polled or Scurred animal registered in a grade other than Purebred and not DNA tested to determine if it is Homozygous polled or Heterozygous polled will be assigned a phenotype of Polled Untested.

### PERMANENT FORMS OF ID

Every animal that is to be registered with the AWA shall be permanently identified with two of the following;

- » DNA typing
- » Tattoo
- » UK/IE/other National identifying tag
- » Brand

## PROCESS AFTER ANIMAL REGISTRATION

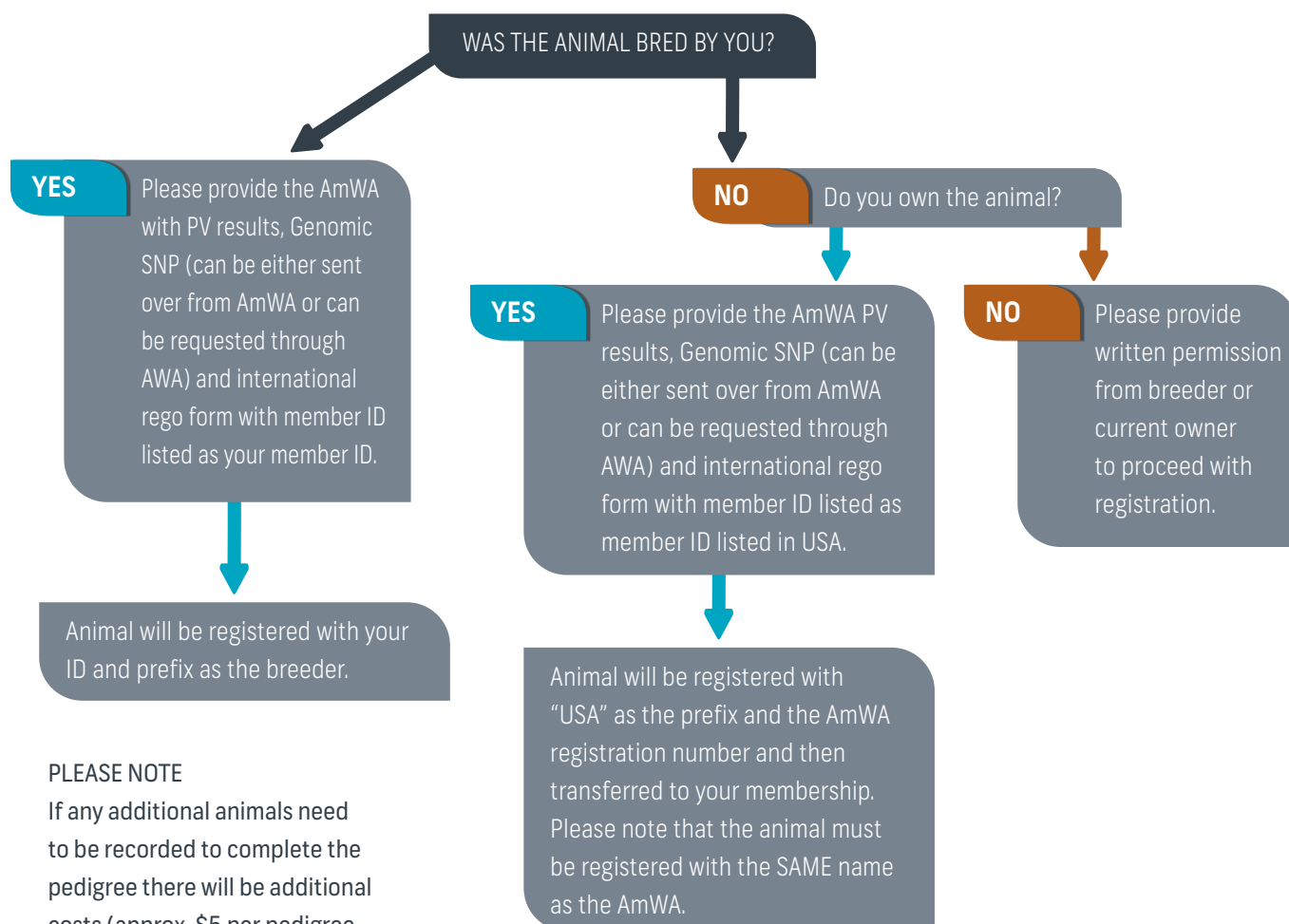
Once an animal is registered with the AWA it'll be included in the next BREEDPLAN run. To be included in the twice monthly BREEDPLAN run, animal registration paperwork must be submitted to the AWA office, or registered through the Wagyu Portal prior to the 2nd and 11th day of each month. EBVs are released during the 1st and 3rd calendar week of each month. All Fullblood and Purebred Herdbook registered animals will have their EBVs published on the website. EBVs are available on all registered animals (including content registered and Slaughter unregistered) in your monthly Herd Report loaded into the Wagyu Portal. You will need to be enrolled in BREEDPLAN to receive this. Once data is entered into Wagyu BREEDPLAN, you'll be able to supply standard performance information which in turn will provide more accurate EBVs and BreedObject \$Indexes. For more information on BREEDPLAN, see page 42.

# US REGISTRATIONS

For our US members, there are three categories that your registration process can be split into:

- ① Animals already **registered with AmWA**
- ② Animals tested with **AmWA but listed as registration isn't complete**
- ③ Animals **bred in the US** but **not tested or registered with the AmWA**

## 1 Animals already registered with AmWA



### PLEASE NOTE

If any additional animals need to be recorded to complete the pedigree there will be additional costs (approx. \$5 per pedigree animal entry).

Purebred animals will also require proof of parent verification results on all animals within pedigree to complete registration. All other animals can be content registered.

### GENOTYPES CUT OFF

If your genotypes are sent to us by AmWA before Wednesday midday (SYD time). In that case, you will receive a summary file (Animal Details file) the Monday following, including US rego numbers, AU case numbers, etc. When the AuWA receives genotypes, and before you receive the Animal Details file, significant background work is completed to load the genotypes into both the registration and PV systems, re-assigning DNA case numbers, and running Parent Verifications (if required). As a result, there can be several days between AmWA advising you that genotypes have been sent and us notifying you of the Animal details.

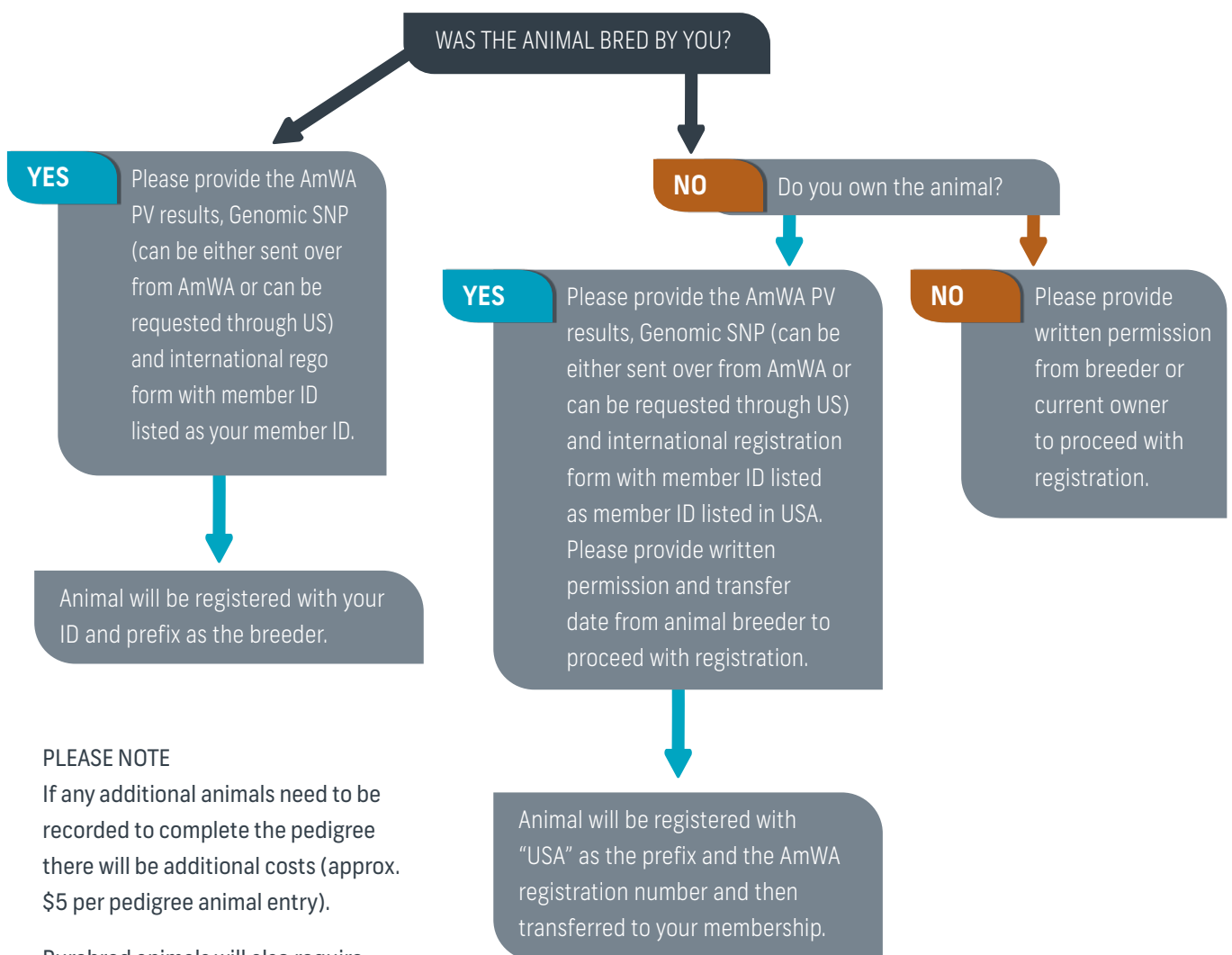
### MISSED THE WEDNESDAY MIDDAY DEADLINE?

Genotypes will be loaded the following week if they are received after Wednesday midday (SYD time). You will receive the Animal Details file the following Monday.

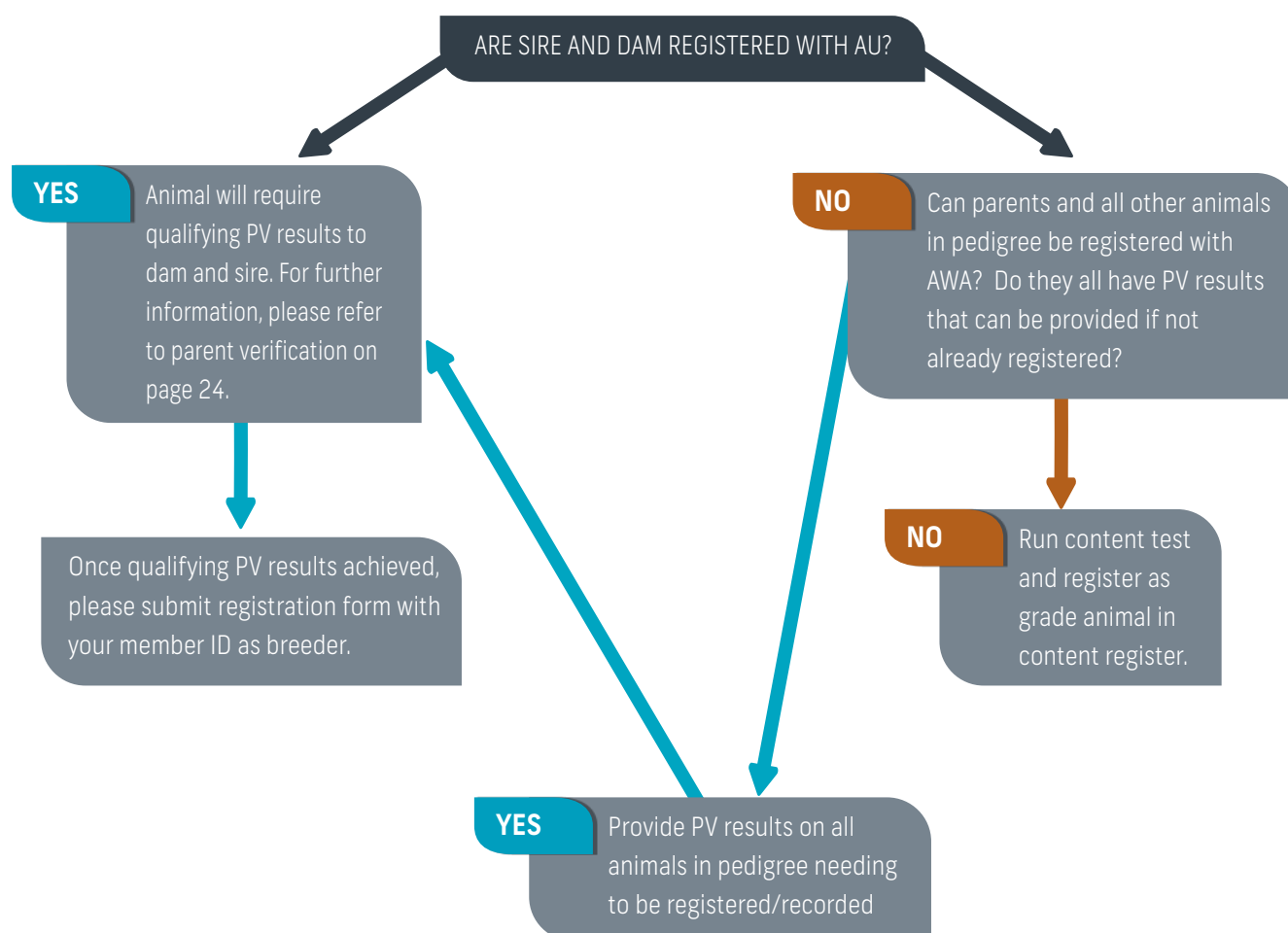
Once you have received the file, you can submit a registration file to us.



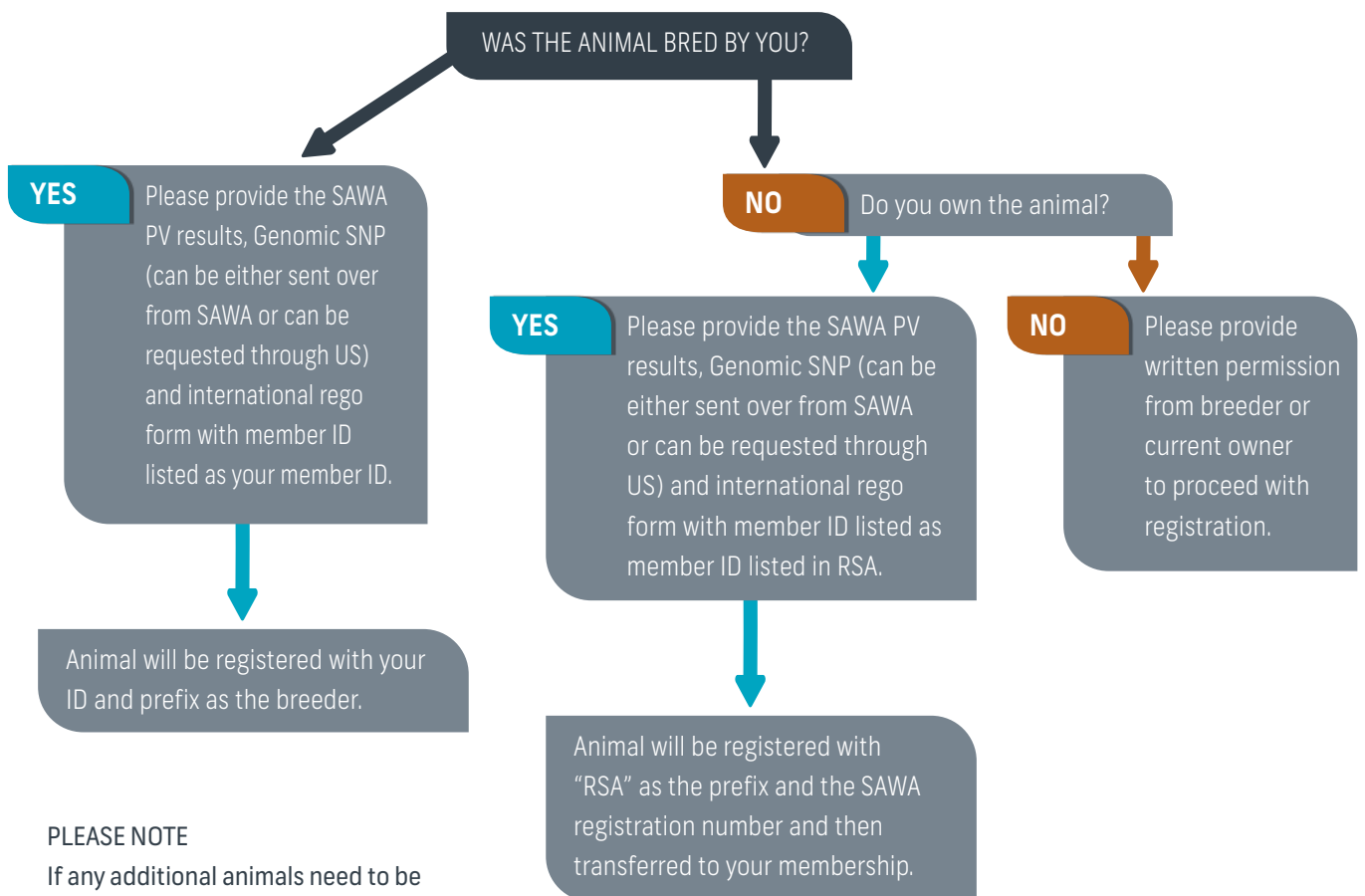
## ② Animals tested with AmWA but currently unregistered



### 3 Animals bred in the US but not tested or registered with the AmWA



# SAWA REGISTRATIONS

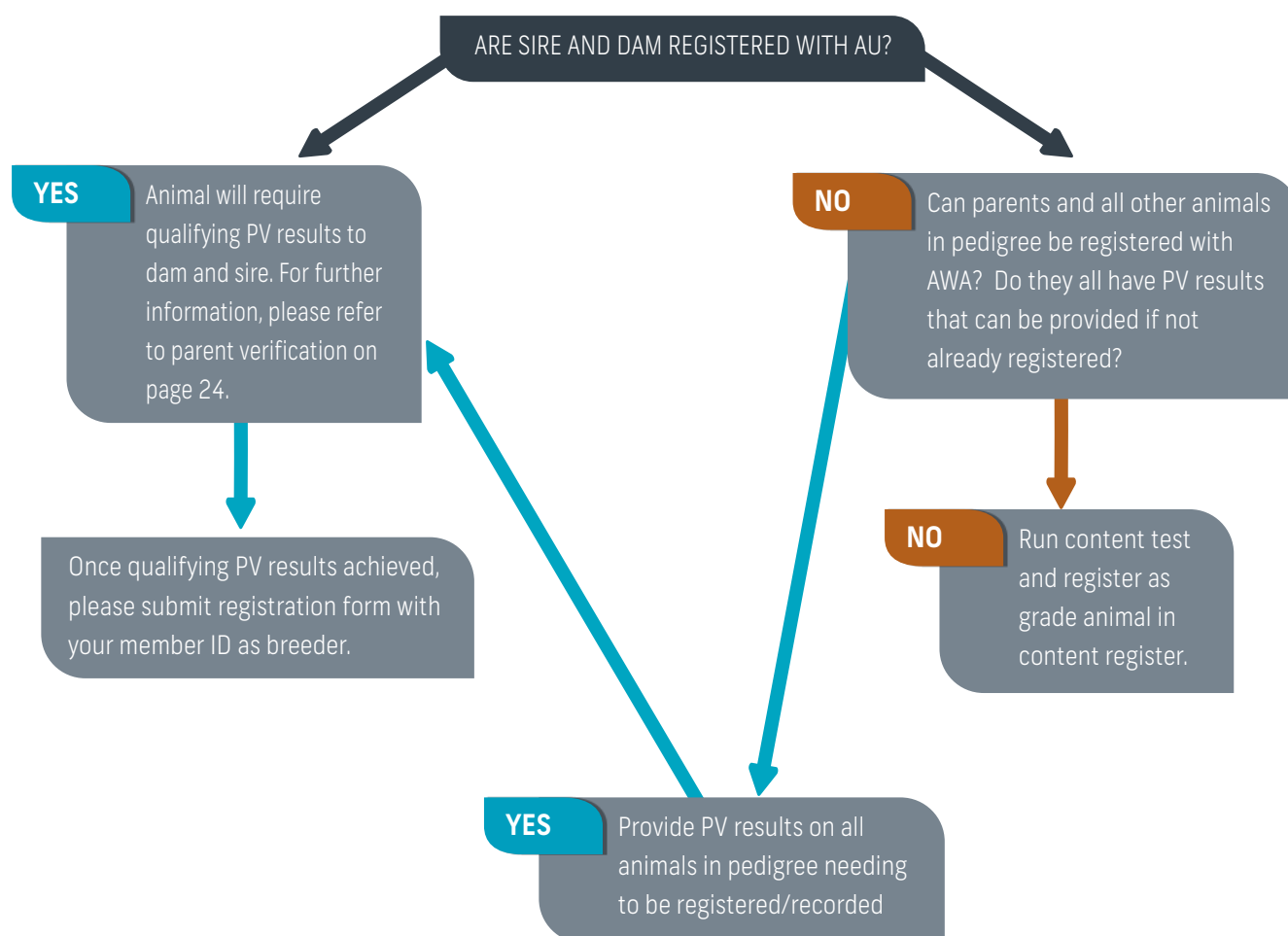


## PLEASE NOTE

If any additional animals need to be recorded to complete the pedigree there will be additional costs (approx. \$5 per pedigree animal entry).

Purebred animals will also require proof of parent verification results on all animals within pedigree to complete registration. All other animals can be content registered.

# OTHER INTERNATIONAL



# ANIMAL TRANSFERS AND DISPOSAL

## ANIMAL TRANSFERS

Once you have sold a registered animal you will need to notify the AWA of the transfer of ownership. Transfers are important for the buyer to demonstrate breeding access with the transferred animal. There are several ways you can notify the AWA of transfers:

- » Wagyu Portal
- » Transfer spreadsheet (available on the AWA website).

Transfers must be submitted by the vendor (vendor will be invoiced). Late fees apply for any transfers submitted after 60 days, please submit all transfers **even if the purchaser is not a member**.

Females animals must be listed in the ownership of a member at the time of calf birth to be able to register progeny from her. Please ensure any calves that are sold at foot are included on the transfer form.

Where a live animal is sold prior to registration, the new owner will need to seek permission from the Breeder to have the animal registered. The animal will need to be registered to the Breeders herd and will be registered with the Breeders herd ID and prefix. Upon completion of the registration the animal can then be transferred to the new owner.

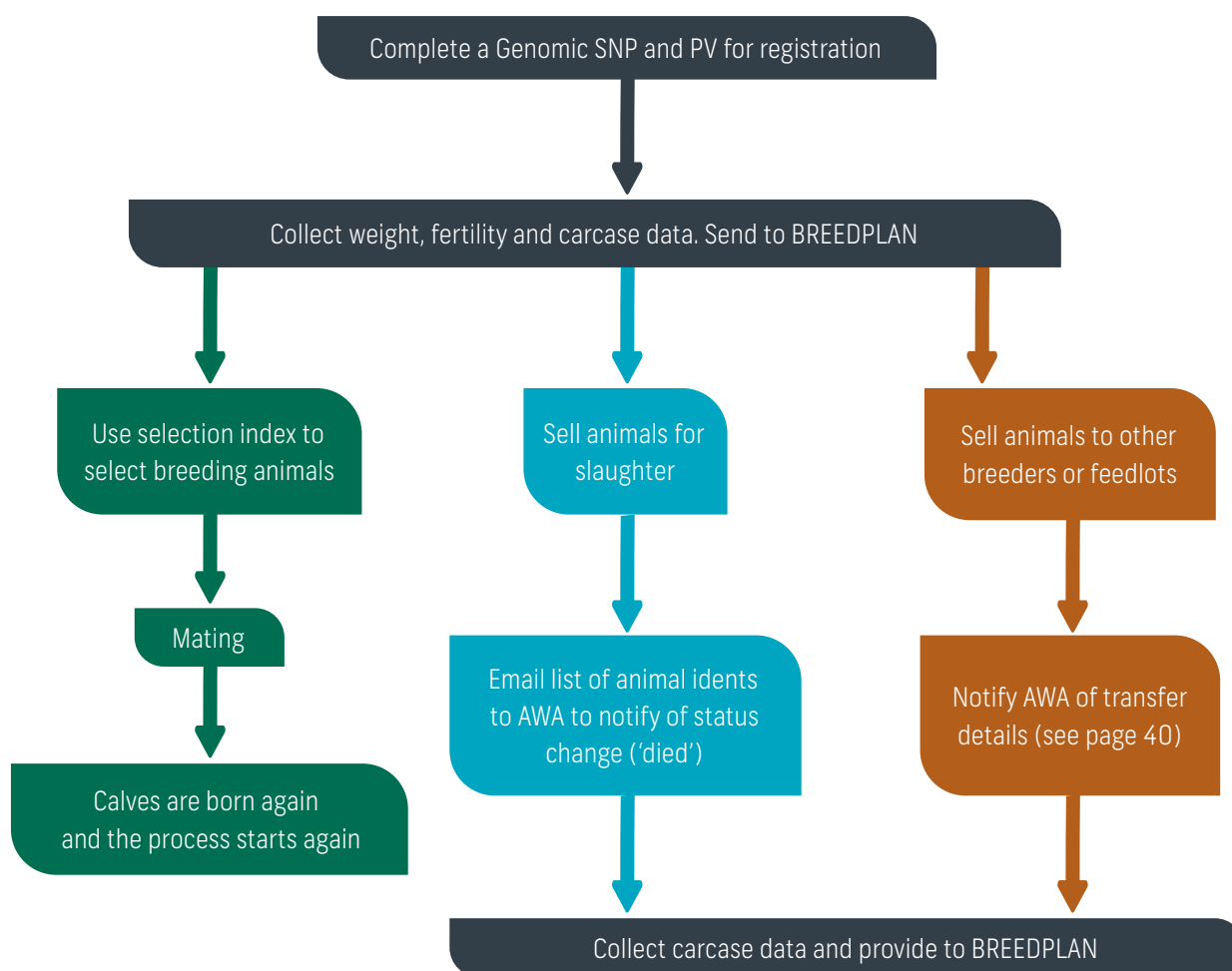
## ANIMAL DISPOSALS

To keep records up to date you also need to notify us of any disposals such as your animal has died or if you have culled the animal, there is no cost involved with disposals. To notify us of any disposals please use one of the following methods:

- » Wagyu Portal
- » Disposal spreadsheet (available on the AWA website).



## How to supply performance information and use BREEDPLAN effectively



# BREEDPLAN AND EBVs

BREEDPLAN is a modern genetic evaluation system for beef cattle. It offers the potential to accelerate genetic progress, tighten up breeding operations, improve productivity and increase prices for cattle sold for breeding and slaughter. It has been implemented as the national beef recording scheme in Australia, New Zealand, Namibia, Thailand and the Philippines, and its use is also increasing in the United States, Canada, United Kingdom, Hungary, South America and South Africa.

BREEDPLAN uses the world's most advanced genetic evaluation system (based on Best Linear Unbiased Prediction (BLUP) technology) and incorporates genomic information to produce Estimated Breeding Values (EBVs) of recorded cattle for a range of important production traits (e.g. weight, carcase, fertility).

## EBVs EXPLAINED

An animal's breeding value can be defined as its genetic merit for each trait. While it is not possible to determine an animal's true breeding value, it is possible to estimate it. These estimates of an animal's true breeding value are called EBVs (Estimated Breeding Values).

EBVs are expressed as the difference between an individual animal's genetics and the genetic base to which the animal is compared. EBVs are reported in the units in which the measurements are taken (e.g. kilograms for the weight EBVs). Thus a value of +12kg for 400 day weight means the animal is genetically superior by 12 kg at 400 days compared with the genetic base of the relevant cattle population. On average, half of this difference will be passed on to the animal's progeny as half an animal's genes come from the sire and half from the dam. BREEDPLAN produces EBVs for a range of economically important traits.

These traits currently include:

WEIGHT	FERTILITY/CALVING	CARCASE	OTHER
Birth Weight	Scrotal Size	Eye Muscle Area	Docility*
Milk	Days to calving *	Fat Depth	Net Feed Intake*
200-day Growth	Gestation Length	Retail Beef Yield	
400-day Weight	Calving Ease*	Carcase Weight	
600-day Weight		Marble Score	
Mature Cow Weight		Marble Fineness	

\* Currently not available as EBVs for Wagyu

It should be noted that EBVs are only available if sufficient data has been recorded for that trait. For an in detail description of traits and further information please see page 47 (Wagyu BREEDPLAN EBVs and \$Indexes explained)

## USING AND RECORDING WITH BREEDPLAN

Why should seedstock producers performance record their animals with BREEDPLAN? In answering this question, we firstly need to discuss some general concepts regarding genetics.

### MAKING GENETIC IMPROVEMENT

The primary objective of the seedstock producer should be to make genetic improvement. Genetic improvement occurs when the average genetic value of the offspring (eg. the current calves) is higher than the average genetic value of the previous generation from which the parents were selected. In other words, the calves that are produced are superior to their parents.

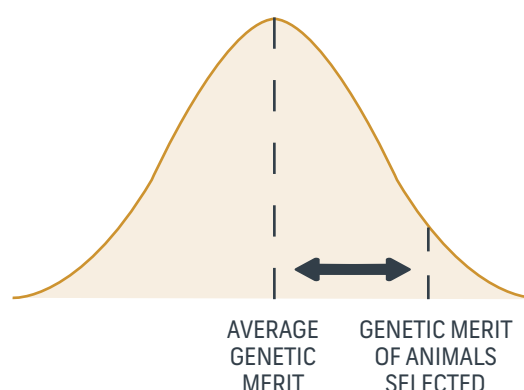
Genetic improvement can be made for either an individual trait or across a range of traits. Leading seedstock producers will be concentrating on making genetic improvement for a range of traits simultaneously, with the relative importance given to each trait determined by the influence that the trait has on the profitability of the beef enterprise.

Several key factors influence the rate of genetic improvement that is made in a seedstock herd. Seedstock breeders need to appreciate how these factors interact in the dynamics of their breeding herd to ensure that long term sustainable genetic progress is achieved.

The factors that determine the rate of genetic improvement that is achieved are defined in countless different formulas within the different genetic textbooks that are available. Undoubtedly however, these factors focus on two key areas.

The first and most important area influencing the rate of genetic improvement that is achieved relates to the genetic superiority of the animals that were selected to become parents. The higher the genetic merit of the animals selected to become parents relative to the animals that were available for selection, the higher the genetic improvement that can be achieved.

In simple terms, the greater the genetic superiority of the parents, the greater the genetic improvement that will be achieved. This is often referred to as “selection intensity” or the “selection differential”.



One of the key factors influencing the amount of genetic improvement that is achieved is how genetically superior the animals are that are selected for inclusion in the breeding program.

The second key area influencing the rate of genetic improvement relates to the average age of the animals that are selected to become parents. If genetic improvement is being achieved in the herd, the younger the age of the parents that are used, the greater the genetic improvement that will be achieved.

This is a result of the younger animals being of higher genetic merit than the older animals in the herd. This is often referred to as “generation length”, with a shorter generation length being associated with greater genetic improvement.

### SELECTING ANIMALS FOR USE IN A BREEDING PROGRAM

Given the relationship between the genetic superiority of the animals that are selected to become parents and the rate of genetic improvement that is achieved, it is imperative that the most genetically superior animals available are selected for use within a breeding program.

So how do we identify which animals are genetically superior? If we are selecting a bull to join from a mob of yearling bulls, how do we ensure that the bull we select will be the one with the best genetic package so that the subsequent genetic improvement is maximised?

The first complication that can cause difficulty when trying to select the most genetically superior animal is the fact that it is challenging to “see” many of the traits that influence the profitability of a beef enterprise. For example, it is hard to tell what level of marbling a bull’s progeny will have or how fertile his female daughters will be compared to another bull simply by assessing them visually. In reality, for a lot of the important traits, visual selection only allows us to select animals on what we think is there.

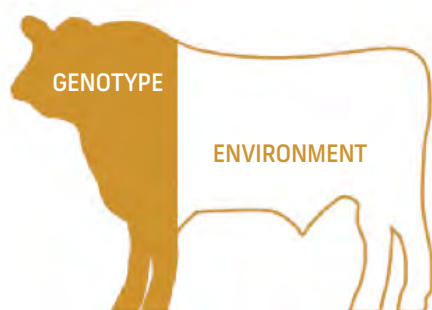


It can be challenging to ‘see’ many of the traits that influence the profitability of a beef enterprise when selecting animals for use within a breeding program.

The challenge of not being able to “see” many of the important traits can be overcome somewhat by objectively measuring the performance of animals (eg. by using ultrasound scanning to measure eye muscle area of an animal), however the second complication that needs to be considered when selecting animals for use within a breeding program is that the performance of an animal is influenced by not only its genetic merit but also a raft of non genetic factors.

These include nutrition, disease status and age just to name a few. The implication of this is “what you see is not necessarily what you get” and so it is imperative that selection decisions are based on the genetic differences between animals if genetic improvement is to be achieved.

The influence of non genetic factors on the performance of an animal limits our ability to select animals simply by assessing them either visually or by using objective raw performance measurements in isolation. While astute cattlemen may be able to adjust for differences in some of the non genetic effects such as nutrition and age, there are still other non genetic effects that can not be accounted for that will cloud any selection decision.



What you see is not necessarily what you get. Selection decisions can be compromised by selection on differences between animals that are due to non genetic factors.

Research has demonstrated that even when all the known non genetic differences between animals are accounted for, only a relatively small proportion of the remaining differences in performance between animals are passed on to the progeny of these animals. For the technically minded, the proportion of the difference that is observed in the progeny is referred to as the “heritability” and varies from trait to trait.

So how do we get around these complications to ensure that the animal we select will be the one the best genetic package? Remember, we are not trying to select the animal with the best performance, but rather the animal whose progeny will perform the best. This is where tools like BREEDPLAN can be used to assist with our selection decisions.

## USING BREEDPLAN TO ASSIST WITH ANIMAL SELECTION

BREEDPLAN is a genetic evaluation program that compares animals on the basis of their value as parents, that is, their breeding value.

The BREEDPLAN genetic evaluation is run by the Agricultural Business Research Institute (ABRI) at the University of New England in Armidale and operates through a Board of Management which has representation from industry and technical organisations, as well as producer members. BREEDPLAN research and development is carried out by the Animal Genetics and Breeding Unit (AGBU), also at the University of New England.

BREEDPLAN is all about increasing accuracy of selection decisions, and when properly understood and used, can be a significant aid to a cattleman’s decision making when selecting animals for use within a breeding program. Look through the jargon and long titles and you will see that BREEDPLAN is an industry based service backed by some of the best expertise in the world. It considers all the pedigree, performance and genomic information that is available on an animal and its relatives to produce an estimate of an animal’s breeding value, that is an “Estimated Breeding Value” (EBV). BREEDPLAN is a similar technology to that which has been used by the pig, poultry and dairy industries to make such dramatic production changes over the last few decades. It has worked wonderfully well for those industries, and works just as well for the genetic evaluation of Wagyu beef cattle.

BREEDPLAN is a genetic evaluation program for cattle that provides an estimate of an animal’s true breeding value.

# BREEDPLAN and EBVs

## BENEFITS OF BREEDPLAN

The main benefit offered by BREEDPLAN is its use as a selection tool to assist in the identification of the most genetically superior animals for use within a breeding program from those that are available. As previously discussed, the greater the genetic superiority of the animals that are selected to become parents relative to the animals that were available for selection, the higher the genetic improvement that will be achieved.

Seedstock herds recording with BREEDPLAN receive a comprehensive report for their herd which includes Estimated Breeding Values (EBVs) for their sires, dams, heifer, bull and steer progeny. Amongst other things, this allows effective identification of the animals with the best genetic package, including the ability to identify and select against the normal trait antagonisms. For example increase growth and muscling, while also increasing marbling.

Herds recording with BREEDPLAN also receive regular assessments of the change in the genetics of their herd over time relative to their breed, plus access to other genetic tools that assist with animal selection and genetic

progress such as the \$Index Values, TakeStock, MateSel and Internet Solutions EBV related functions (e.g EBV enquiry or sale catalogues with EBVs displayed).

In addition to its benefit as a tool to increase the rate of genetic improvement through better selection of animals, BREEDPLAN also offers seedstock producers with a valuable marketing tool through the provision of EBVs on sale animals. In a recent survey conducted by a large Breed Society in Southern Australia, 95% of commercial producers indicated that they use EBVs when selecting sale animals, providing a clear indication of the demand for this information.

## PERFORMANCE RECORDING TIMELINE

Table 2 details the performance information that currently contributes to the calculation of BREEDPLAN EBVs and outlines the stage of the production cycle that each set of information should be recorded.

**TABLE 2** PERFORMANCE INFORMATION THAT CONTRIBUTES TO CALCULATION OF BREEDPLAN EBVs

JOINING	BIRTH	WEANING	YEARLING	18 MONTHS	MATURITY
Mating program details	Date of birth	200-Day Weight	400-Day Weight	600-Day Weight	Cow disposal code (heifers and cows)
All dates	Birth weight	Mature cow weight	Scrotal circumference		Mature cow weight
Preg. test results	Calving difficulty score	Docility score		Scanning measures (EMA, Fats)	
	Recipient dam details	Flight time		Abattoir carcass data	
				Structural score information	

**NOTE** Members of BREEDPLAN are not required to record all the above information for each particular animal. Members should aim to record the traits that are important to their breeding objective or that of their clients (at a minimum).



# WAGYU BREEDPLAN EBVs AND BreedObject \$Indexes EXPLAINED

## AUSTRALIAN WAGYU GENETIC ANALYSIS

The Australian Wagyu BREEDPLAN analysis provides the most thorough and accurate assessment of Wagyu genetics available outside Japan. The March 2021 analysis includes over 40,000 calves that have at least a weaning (200 day) weight recorded. This represents 115,000 dams and 14,000 sires. In addition, there are over 37,000 animals with birth weights and 34,000 with 400 day weights. Carcase data includes 12,000 carcase weights, 8,000 carcase EMAs, 11,000 carcase AUS-MEAT marble scores, 4,000 camera marbling percent measures and 4,000 camera fineness index measures.

## ESTIMATED BREEDING VALUES (EBVs)

An animal's breeding value is its genetic merit, half of which will be passed on to its progeny. While we will never know the exact breeding value, it is possible to make good estimates based on the performance of the animal and its progeny. These are called Estimated Breeding Values (EBVs) and are therefore the best estimate of an animal's genetic merit. EBVs are expressed as the difference between an individual animal's genetics and the genetic base to which the animal is compared.

## ACCURACY

An accuracy value is presented with every EBV and gives an indication of the amount of information that has been used in the calculation of that EBV. The higher the accuracy, the lower the likelihood of change in the animal's EBV as more information is analysed for that animal or its relatives.

### ACCURACY RANGE INTERPRETATION

**LESS THAN 50%** = Low accuracy and should be considered a preliminary estimate. The EBV could change substantially as more performance information becomes available.

**50 – 74%** = Medium accuracy, usually based on the animal's own records and pedigree.

**75 – 90%** = Medium-high accuracy and usually includes some progeny information. Becoming a more reliable indicator of the animal's value as a parent.

**90% AND ABOVE** = High accuracy. It is unlikely that the EBV will change much with the addition of more progeny data.

## BREEDPLAN EBVs and BreedObject \$Indexes

### FERTILITY AND BIRTH EBVs

**Scrotal Size EBV (SS)** (cm) is an indicator of male fertility in regard to semen quality and quantity in Western breeds of cattle. Higher (positive) EBVs indicate higher fertility. There is also a small negative correlation (desirable) with the age of puberty and fertility in female progeny. The relationship between scrotal size and fertility in Wagyu is assumed, but not proven.

**Gestation Length EBV (GL)** (days) is based on AI records. Lower (negative) GL EBVs indicate shorter gestation lengths which generally relate to lighter birth weights and easier calving.

**Birth Weight EBV (BW)** (kg) is based on the measured birth weight of animals, adjusted for dam age. The lower the value the lighter the calf at birth and the lower the likelihood of a difficult birth. This is particularly important when selecting sires for use over heifers.

### GROWTH EBVs

**200-Day Milk EBV (MILK)** (kg) is an estimate of an animal's milking ability. For sires, this EBV is indicative of their daughter's milking ability as it affects the 200-day weight of their calves.

**200-Day Growth EBV (200)** (kg) is calculated from the weight of animals taken between 80 and 300 days of age. Values are adjusted to 200 days and for dam age. This EBV is the best single estimate of an animal's genetic merit for growth to early ages.

**400-Day Weight EBV (400)** (kg) is calculated from the weight of animals taken between 301 and 500 days of age, adjusted to 400 days and for dam age. This EBV is the best single estimate of an animal's genetic merit for yearling weight.

**600-Day Weight EBV (600)** (kg) is calculated from the weight of animals taken between 501 and 900 days of age, adjusted to 600 days and for dam age. This EBV is the best single estimate of an animal's genetic merit for growth beyond yearling age.

**Mature Cow Weight EBV (MCW)** (kg) is based on the weight of the cow when the calf is weighed for weaning, adjusted to five years of age. This EBV is an estimate of the genetic difference in cow weight at five years of age and is an indicator of growth at later ages and potential feed maintenance requirements of the females in the breeding herd. Breeders of steers wishing to grow animals out to a larger weight may also use the Mature Cow Weight EBV.

## CARCASE EBVs

**Carcase Weight EBV (CWt)** (kg) is based on abattoir carcase records and live weight measurements (particularly 600 Day weight) and is an indicator of the genetic differences in carcase weight at the industry average slaughter age of 990 days. Larger positive values are more favourable.

**Eye Muscle Area EBV (EMA)** (cm<sup>2</sup>) estimates genetic differences in eye muscle area at the 12/13th rib site of a 420kg dressed carcase. A higher positive EBV indicates larger eye muscle area and therefore higher retail beef yields. Ultrasound scans, Aus-Meat and Japanese Digital Image Camera measured Eye Muscle Areas from slaughter animals contribute to this EBV.

**Rump Fat EBV (RUMP)** (mm) estimates the genetic differences in fat depth at the P8 site of a 420kg dressed carcase. A higher positive EBV indicates more subcutaneous fat and earlier maturity.

**Retail Beef Yield Percent EBV (RBY)** (%) estimates the genetic differences in total (boned out) meat yield as a percentage of a 420kg dressed carcase. A higher positive EBV indicates higher percentage yield for the 420kg carcase weight.

**Marble Score EBV (MS)** (Aus-Meat Marble Score) is an estimate of the genetic difference in the Aus-Meat Marble Score in a 420kg carcase. Marble score EBV utilises ultrasound scan and Aus-Meat Marble score on a scale of 1 to 10 where 10 is equivalent to an Aus-Meat Marble Score grading of 9+. Where results from the Meat Image Japan digital carcase camera are available, Camera Marbling Percentage and Marble Fineness are also used to calculate Marble Score EBV as the genetic correlations between these measures and Aus-Meat Marble Score are very high. Larger positive values are more favourable.

**Marble Fineness EBV (MF)** (Marbling Fineness Index) estimates the genetic differences in the Marbling Fineness Index (degree of fineness of marbling fat) as measured by the Japanese Digital Image Camera. A higher more positive EBV indicates higher levels of marbling fineness.

## BreedObject \$Indexes

BreedObject \$Indexes, which utilize Wagyu BREEDPLAN EBVs, are now available and allows selection of Wagyu seedstock based on profitability for different commercial production systems. Four Wagyu BreedObject \$Indexes have been developed to date, these being:

**Self-replacing Breeding \$Index (SRI)**

**Wagyu Breeder \$Index (WBI)**

**Wagyu Fullblood Terminal \$Index (FTI)**

**Wagyu F1 Terminal \$Index (F1I)**

Each of the \$Indexes are targeted specifically to a defined Wagyu production and market scenario and producers should identify and use the index that best suits their purpose. It is not appropriate to compare index values of different \$Indexes as they are based on different production model assumptions. It is not the index with the highest \$ value that you should use, it is the index that best reflects your production system.

BreedObject \$Indexes target economic breeding objectives based on average herd and market conditions and have generally targeted the main markets within the main production systems, combining genetic information within BREEDPLAN into one EBV for each \$Index that considers production costs and realised value.

## BREEDPLAN EBVs and BreedObject \$Indexes

### Self-replacing Breeding Index (SRI)

The Self-replacing Index can be used to select Fullblood bulls that will produce more profitable females when these are retained in Fullblood or Purebred herds, in addition to profitable slaughter progeny.

The SRI estimates the genetic differences between animals in terms of net profitability per cow joined for production of replacement females and slaughter steers to a carcass weight of 435kg at 32 months of age and a 385kg carcass from surplus heifers at 29 months of age. In terms of relative economic importance, the SRI places the following emphasis on these main traits: 41% on marbled score (MS); 14% on Residual Feed Intake (RFI) feedlot; 12% on sale liveweight (which will reflect the growth potential and therefore carcass weight of an animal); 9% on meat yield; 6% on dressing percentage and 23.5% placed on other cow and calf traits.

### Wagyu Breeder Index (WBI)

The Wagyu Breeder Index estimates the genetic differences between animals in net profitability per cow joined in a commercial Fullblood or Purebred self-replacing herd that has a low-input, grass-based production system. Heifers are retained for breeding and steers and surplus females are sold as feeders for feedlot finishing.

Steers are assumed to be slaughtered at 32 months after 550 days of feedlot finishing targeting 460kg carcasses. Heifers are retained for breeding and therefore maternal traits are of importance. Marbling is targeted at breed average with optimised growth.

In terms of relative economic importance, the WBI places the following emphasis on these main traits: 37% on marbled score (MS); 12% on sale liveweight; 9% on meat yield; 7% on dressing percentage and 13% placed on other cow and calf traits.

### Fullblood Terminal Index (FTI)

The Fullblood Terminal Index has an increased weighting on the Marbled Score EBV and can be used to select bulls to produce profitable slaughter progeny where none are retained for breeding.

The FTI estimates the genetic differences between animals in terms of net profitability per cow joined based on production of slaughter stock only, with a 435kg carcass from steers at 32 months of age and a 385kg carcass from heifers at 29 months of age. In terms of relative economic importance, the FTI places the following emphasis on these main traits: 64% on MS; 11% on Residual Feed Intake (RFI) feedlot; 9% on sale liveweight; 7% on meat yield; 5% on dressing percentage and 3% placed on other young animal traits and 0% on maternal traits.

### F1 Terminal Index (F1I)

The F1 Terminal Index has an increased weighting on the Marbled Score EBV and can be used to select bulls to produce profitable F1 slaughter progeny where none are retained for breeding.

The F1 Index estimates the genetic differences between animals in terms of net profitability per cow joined based on production of a 420kg carcass from steers and a 387kg carcass from heifers at 28 months of age. In terms of relative economic importance, the F1 Index places the following emphasis on these main traits: 68% on MS; 9% on Residual Feed Intake (RFI) feedlot; 4% on sale liveweight; 6% on meat yield; 4% on dressing percentage and 9% placed on other young animal traits and 0% on maternal traits.

### Breed average and percentile table

For benchmarking, the Percentile Table which reflects the distribution of EBVs of animals born two years ago is also very helpful of determining how the EBVs of a specific animal compare to the calves born two years ago.

## SUBMITTING PERFORMANCE INFORMATION TO BREEDPLAN

The following section describes the different methods by which breeders can submit performance information of their animals to BREEDPLAN.

### 1 BREEDPLAN COMPATIBLE FORM (Microsoft Excel)

A Microsoft Excel form has specifically been developed to enable breeders to submit performance electronically to BREEDPLAN. Using this method, breeders simply enter the performance information of their animals into the BREEDPLAN Microsoft Excel spreadsheet and submit it to BREEDPLAN via either email to BREEDPLAN directly.

The BREEDPLAN form (+ detailed information regarding how to submit data using this method) can be obtained by contacting staff at BREEDPLAN. Please note, BREEDPLAN will not accept the submission of performance via spreadsheet if it is not in the correct format.

### 2 HERD RECORDING PROGRAM (BREEDPLAN compatible)

Many of the modern herd recording computer programs have the facility to submit performance electronically to BREEDPLAN. Practical Systems Stockbook is recommended for AWA members. Using this method, breeders simply enter the performance information of their animals into their herd recording program. They can then use the facilities available within the herd recording program to export the performance data in a file and submit it to BREEDPLAN via email.

Please contact your software supplier if you are in any doubt about whether your herd recording program is BREEDPLAN compatible and/or if you require any assistance submitting your performance to BREEDPLAN using this method.

### 3 WAGYU PORTAL

The Wagyu Portal offered on the AWA website provides another alternative for data submission. This service includes the ability to submit your calf registrations electronically, search the Association database with animal and EBV enquires, complete transfers and load some performance data.

Using this method, you can select “Performance overview” from the “Animals” drop down menu. You can then select a Year and trait type that you wish to enter, select the animal to enter it for and “update”.

### 4 PERFORMANCE RECORDING FORMS (hardcopy)

The most traditional method used by breeders to submit the performance information of their animals is by completing the standard BREEDPLAN paper performance recording forms.

Using this method, breeders will automatically be forwarded pre-printed paper performance recording forms shortly after they have registered their calves with AWA. Each form will list all calves within the herd for a particular calving year, season and sex. Breeders will then enter the performance information of their animals into the relevant columns by hand and mail the completed form to the BREEDPLAN office at ABRI. The completed form will be processed and a new form forwarded to the breeder for use when recording the next set of performance for their animals.

A different paper performance recording form is available for recording post birth weights, mature cow weights, scanning information and abattoir carcass data. The appropriate form should be used for the type of performance information being collected.



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