Wagyu 101 Guide

Understanding Wagyu

Wagyu genetics have a complex and long history beginning with their origins in Japan. Wagyu pedigree reading and genetics can be difficult and time consuming. Fortunately, Wagyu specific Estimated Breeding Values (EBVs) are readily available and increasing in reliability. EBVs assign numerical values to a wide variety of traits making it easy to identify the strengths, weaknesses, and rankings of animals. This creates easier decision making for current breeders and less daunting decision making for those looking to enter the Wagyu industry. EBVs, along with pedigrees, prefectural analysis, and recessive testing represent a wealth of information available to all breeders.

There is an ever-increasing wealth of performance and carcass data available to breeders. It is important to consider several factors when reviewing raw data. First, what is the story behind the data? What environment were animals raised in? We cannot be comparing apples to oranges; this is why contemporary grouping and software data analysis (i.e. Breedplan) are extremely important because they attempt to take into account the influence of the environment. What was the environment; were all animals fed the same ration, were all animals on feed for the same number of days? Remember data of animals/sires from different herds cannot be directly compared because of differences in environment. EBVs and EPDs are the only way to accurately compare animals raised in different environments.

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Wagyu Breedplan

Run by the Australian Wagyu Association (the largest Wagyu registry outside Japan), Breedplan has published EBVs for Fullblood and Purebred Wagyu since 2015. This is the largest Wagyu EBV/EPD database outside of Japan. Wagyu Breedplan's analysis includes more than 101,000 dams and 11,700 sires. Breedplan data includes more than 31,500 birth weights, 33,500 weaning (200 Day) weights, 28,000 400 Day weights, Fullblood carcass data of 9,500 carcass weights, 5,700 carcass EMAs, and a total of 9,100 carcass AUS-Meat marble scores, camera marbling percent and camera fineness index measures.

Wagyu Breedplan is backed by world leading genetic analysis software from Agricultural Business Research Institute (ABRI) and Animal Genetics and Breeding Unit (AGBU) geneticists. This has led to the utilization of industry leading single-step genomic analysis to produce Genomic Enhanced EBVs (GEBVs). Commonly referred to as "Genomics", GEBVs produce increased accuracy through the analysis of 50K SNP DNA data, along with tradition pedigree and performance data. Genomics or GEBVs allow for earlier and more accurate selection and identification of elite cattle.

Wagyu Breedplan publishes four independent profitability indexes for different production strategies. They are the Self-Replacing Breeding $Index (SRI), Wagyu Breeder $Index (WBI), Wagyu Fullblood Terminal $Index (FTI), and Wagyu F1 Terminal $Index (F1I). The SRI and WBI are aimed at production systems where females are retained as herd replacements and each have different carcass value assumptions. FTI and F1I are aimed at production systems where all animals are intended for slaughter and again both have different carcass value assumptions. These indexes all have different weighted values for traits and attempt to consider production costs along with assumed carcass values. Read more about these on the Australian Wagyu Association's website.

WSU Sire Summary 2017

The Washington State Sire Summary was last published in 2017. It is a Wagyu specific Estimated Progeny Difference (EPD) sire summary. It is computed using the BOLT genetic analysis system and published by Dr Charles T. Gaskins of Washington State University. The summary utilizes data exclusively from F1 or half-blood Wagyu in its analysis. In the latest publication 4,066 marble scores, 1,742 rib eye areas, 1,740 back fat thicknesses, and 1,352 hot carcass weights records were used to compute the EPDs. It is important to note this EPD data is not directly comparable to other EBVs or EPDs calculated using other systems and data. The 2017 WSU Sire Summary publishes EPDs for Marbling, Rib Eye Area, External Fat, and Hot Carcass Weight.

Wagyu Recessive Disorders

Wagyu cattle are known to have six recessive genetic conditions. They are Erythrocyte Membrane Protein Band III Deficiency (Spherocytosis) (B3), Claudin 16 Deficiency (CL16), Chediak-Higashi Syndrome (CHS), Bovine Blood Coagulation Factor XIII Deficiency (F13), Factor XI Deficiency (F11), and IARS Disorder. The most prevalent in the Wagyu population are F11 and IARS Disorder. All are simple recessive disorders and easily managed through testing and mating decisions.

The following is a simple description of each: B3 homozygous have pernicious anemia, death normally occurs within the first week of birth. CHS homozygous have reduced immune response to disease, blood is slow to coagulate, pale coat color. CL16 homozygous have terminal kidney failure, onset can occur anywhere from late adolescence on. F13 homozygous have severe anemia, proteins for blood clotting missing or reduced. F11 homozygous have mild anemia often resulting in prolonged bleeding at castration or dehorning, mating carrier x carrier may have increased difficulty in producing viable embryos, generally non-lethal. IARS Disorder homozygous result in death of calves within the last weeks of pregnancy or shortly post birth, anemia, depression, weakness, etc. common.

SCD & Tenderness Tests

SCD: The Stearoyl CoA Desaturase (SCD) test was designed to identify cattle that exhibit a genotype that produces superior fat composition. Stearoyl CoA Desaturase (SCD) is an enzyme that changes stearic acid into oleic acid. There are two different alleles for this trait Valine (V) and Alanine (A). Therefore, the possible genotypes are AA, VA, and VV. One study found animals with the AA correlated to a lower melting point in intermuscular fat (IMF). This gene has no effect on marble score or other commonly measured carcass traits.

TENDERNESS Test: A conventional cattle test not applicable to Wagyu. Developed for and validated on Brahman, Brangus, Charolais, Red & Black Angus. A numerical 1-10 scoring scale based on the genotype of the tested animal at three different SNP locations.

Akaushi Association EPDs

The American Akaushi Association publishes some of the most extensive EPDs on Red Wagyu or Akaushi cattle. Their EPDs are based on data from F1 through Fullblood Akaushi cattle. They currently publish EPDs on Growth & Maternal Traits, Carcass Traits, and have two Indexes (Growth & Carcass).

Prefectural Analysis

The prefectural or 16/16 analysis is a Japanese pedigree analysis model that attempts to classify/group cattle by prefectural origin. This has been a common way to group and evaluate cattle prior to the development of EBVs and EPDs outside of Japan. This is also an especially useful tool in managing inbreeding during mating decisions. Traditionally F1 breeder have sought high % Tajima sires and Mr. Takeda's rotational breeding system utilized this to classify sires. The Australian Wagyu Association has implemented its own Prefectural Analysis System into ABRI publishing a percentage Tajima, Kedaka, Tottori, Shimane, Itozakura, Okayama, and Hiroshima along with the pedigree and EBVs of each animal registered with them. The average Wagyu according to the Australian Wagyu Association's analysis is 53.6% Tajima, 16.2% Itozakura, 7.6% Kedaka, 5.1% Shimane, 3.3% Tottori, 6.8% Okayama, 2% Hiroshima, and 5.4% Other.

Takeda Rotational Breeding

The idea of classifying cattle and breeding in a rotation to maintain balance and diversity is utilized in many breeds of cattle. This philosophy was popularized by Mr. Shogo Takeda in the Wagyu breed and is often referred to as the Takeda rotational breeding system. The principals of this system are that cattle are classified into four different groups (A,B,C,D) based on their characteristics. Group A consists of animals of with strong frame, growth, and calf raising. Group B are animals with extreme marbling and carcass traits that are small framed. Group C are animals with large frame, milk, and maternal traits. Group D consists of animals with strong marbling and carcass traits that are generally medium framed. Then cattle are bred in a circle with group A mated to group B, group B mated to C, group C mated to D, and completing the circle group D is mated to A. This, ideally, achieves similar results to the utilization of EBVs, by utilizing corrective mating of cattle to create balance. However, this system lacks any way of quantifying genetic gains achieved.

Sources:

Wagyu Breedplan (EBVs)

EBV Enquiries: http://abri.une.edu.au/online/cgi-bin/i4.dll?1=3C212A07&2=2031&4=59272F59252D24252E232E2F-2A&5=2B3C2B3C3A

About Wagyu Breedplan: https://www.wagyu.org.au/content/uploads/2020/09/AWA-BreedGuide2020.pdf

https://www.wagyu.org.au/for-members/wagyu-breeding-guide

Wagyu $Indexes: https://www.wagyu.org.au/content/uploads/2020/06/BreedObject-Index-Comparison-2020-FactSheet.pdf

https://www.wagyu.org.au/for-members/wagyu_breedobject_indexes

WSU Sire Summary

2017 WSU Sire Summary: https://wagyu.org/uploads/page/Washington%20State%20University%20Sire%20Summary.pdf

Wagyu Recessive Disorders
AWA Genetic Condition Fact Sheet: https://www.wagyu.org.au/content/uploads/2020/08/Genetic-Conditions-in-Wagyu-Fact-Sheet-2020.pdf
Foundation Sire Recessives Fact Sheet: https://www.wagyu.org.au/content/uploads/2020/08/IARS-Foundation-Sires-Aug-2020-v2.pdf
AWA Original Fact Sheet 2014: https://wagyu.org/uploads/page/Inherited%20Recessive%20Traits%20in%20the%20US%20Red%20%20Black%20Wagyu%20Breed_v5(1).pdf

SCD & Tenderness Testing
SCD Test Summary: https://wagyu.org/uploads/page/EXON%205%20and%20SCH%20tests%20for%20Japanese%20Black%20Cattle(2).pdf
SCD Test Data: http://www.rocking711.com/wp-content/uploads/2018/02/SCD-Gene-Japanese-Study-Paper-Tanigu-

chi-4-2-2003.pdf
Test Summary: https://wagyu.org/uploads/page/Igenity%20Tenderness%20Marker.pdf
Test Validation: https://www.nbcec.org/validation/igenity/tenderness.html#summary

Akaushi Association EPDs
EBV Data Base: https://akaushi.digitalbeef.com/
Progeny Tested Sire List: https://akaushi.digitalbeef.com/modules/UpDownload/store_folder/Sire_Summary/Akaushi%20 2020%20Spring%20Progeny%20Tested%20Sire%20Listing.pdf

Prefectural Analysis
AWA Fact Sheet- Prefectural Analysis: https://www.wagyu.org.au/content/uploads/2020/08/AWA-FACTSHEET_prefectural-bloodlines.pdf
Traditional Prefecture Bloodlines: https://australianwagyuforum.com.au/traditional-bloodlines/

Takeda Rotational Breeding
Rotational Breeding Summary: http://www.wagyuinternational.com/rotation.php
Takeda Rotation Information: http://www.rocking711.com/16×16/

History & Origins

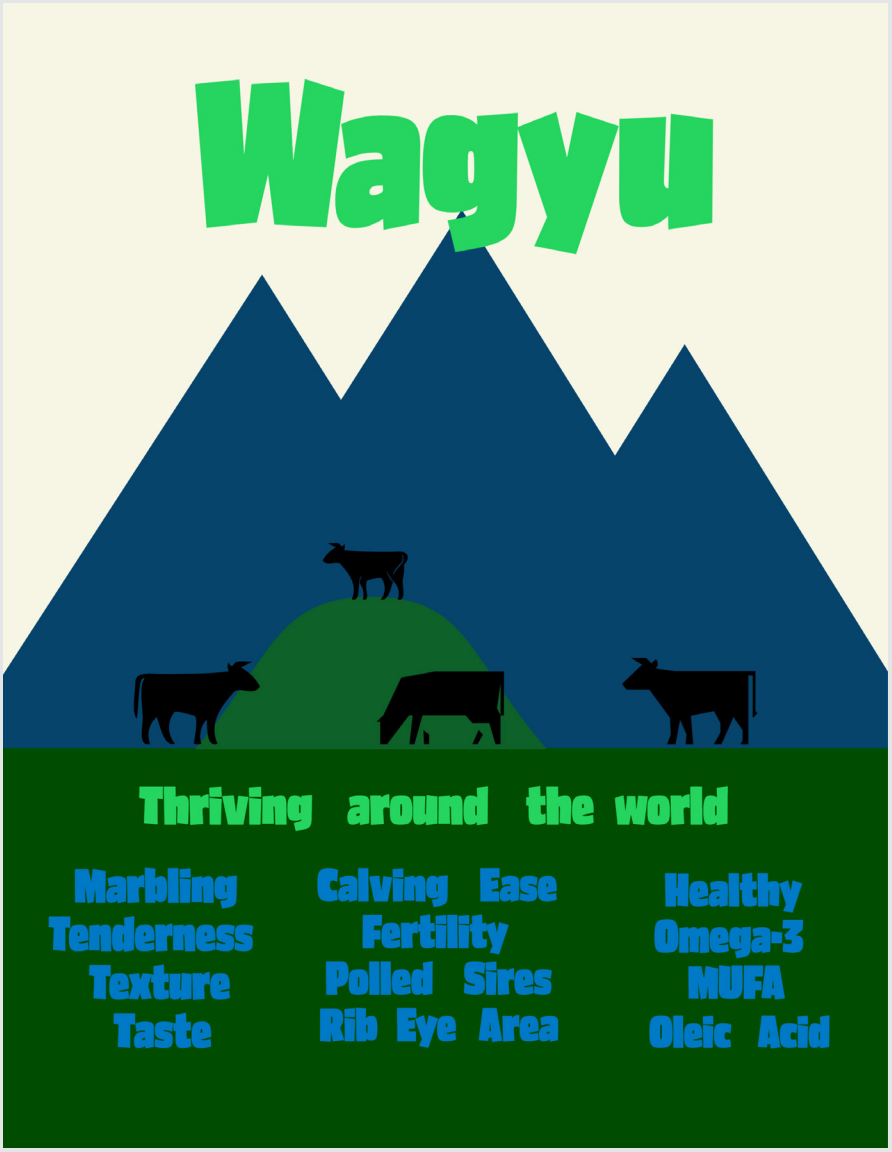
Wagyu History In Japan

The Japanese term “Wagyu” translates in English to “Japanese cow”. This is a broad term that collectively refers to the four major breeds of native cattle in Japan. These are the Japanese Black, Japanese Brown, Japanese Polled, and Japanese Shorthorn cattle.
In Japan, Japanese Black cattle make up approximately 95% of the national Wagyu herd. These make up the majority of the cattle and genetics that were exported from Japan to the USA between 1976 and 1998. Japanese Brown cattle comprise approximately 4% of the national Japanese Wagyu herd. These cattle are commonly referred to as Red Wagyu or Akaushi outside of Japan and were the only other major native breed exported from Japan. The Japanese Polled and Japanese Shorthorn breeds are very niche with both estimated to comprise less than 1% of the national Wagyu herd. These breeds have never been exported and are only present in Japan today.

Japanese Black cattle were raised for more than 2,000 years as labor and pack animals. There is even evidence that traces the Japanese Black to 3,500 years ago. The Japanese Black had heavy selection for hard working animals that can work long hours on difficult terrain. This is speculated to have resulted in the production of an animal with large fat stores in the muscle, creating wagyu’s trademark marbling ability. During the Meiji Era starting in 1868 through around 1910, Japanese Black cattle were crossbreed with foreign breeds. It was also at this time that a ban on eating beef was lifted. Depending on the prefecture, crossbreeding occurred with Brown Swiss, Shorthorn, Devon, Simmental, Ayrshire, and Holstein cattle. From 1910 on until the end of WWII breeding was heavily

segmented and crossbreeding between prefectures was not practiced. Japan's forced prefectural segregation was dismissed after WWII, the only modern segregated herd in Japan today is Hyogo prefecture's Tajima cattle. During the 1950s modern mechanization swept across the agricultural industry reducing the demand for draught animals. This led to a shift toward beef production. Performance and progeny testing were established in Japan in 1968. The subsequent creation of the marbling index lead to the creation of the dominant modern Wagyu bloodlines.

Japanese Brown cattle, known as Red Wagyu or Akaushi are comprised of two major strains. The Kumamoto prefecture and the Kochi prefecture strains. The Kumamoto strain is the most prominent and the only strain exported from Japan. Kochi have been influenced by cross breeding with Simmental and Korean cattle. The Kumamoto strain was influenced by crossbreeding with Simmental, Devon, and Korean cattle. Korean cattle, and more specifically the Hanwoo breed is closely related to the Japanese Brown.



When & Who Exported Genetics

Wagyu were first exported from Japan in 1976 when four fullblood Wagyu bulls were sent from Japan to the USA. Imported by Whitney Morris of Texas, the shipment consisted of two Japanese Black (Black Wagyu) and two Japanese Brown (Red Wagyu/Akaushi) bulls. The Black Wagyu bulls were Mazda a Tottori bull and Mt Fuji a Tajima bull. The Red Wagyu bulls were Rueshaw and Judo both of the Kumamoto strain. These bulls formed the foundation of the American Wagyu herd through crossbreeding to European breeds in Texas and Washington state to create purebred (93.75%) Wagyu.

The niche purebred Wagyu industry and research done in Texas and Washington sparked the further importation of Wagyu in the 1990s. The USA was one of the few countries with protocol in place to export live cattle from Japan. This is ultimately why all live exports first came to the USA before many left for Australia, which is much closer to the Japanese and Asian markets, where the demand for Wagyu beef was and remains extremely high. In 1993 the next fullblood Wagyu would be live imported from Japan to the USA. This is when Mannett Group (Later World K's Group) imported three fullblood Black Wagyu females and two fullblood Black Wagyu bulls.

In 1994, Mannett Group imported four Black Wagyu females and two Black Wagyu bulls. It was at this time that Dr Al and Marie Wood imported Red Wagyu from selections made by Yikio Kurosawatsu and Dr King from Kumamoto prefecture. This included nine fullblood Red Wagyu females and three fullblood Red Wagyu bulls.

Also, in 1994, Japanese Venture Partners (JVP) imported a group of Wagyu to the USA. Their shipment contained three fullblood Black Wagyu bulls, ten fullblood Black Wagyu females, and two fullblood Red Wagyu females.

In 1995 Mr. Shogo Takeda imported his first group of Wagyu from Japan to the USA. This shipment included five fullblood Black Wagyu bulls and 35 fullblood Black Wagyu females.

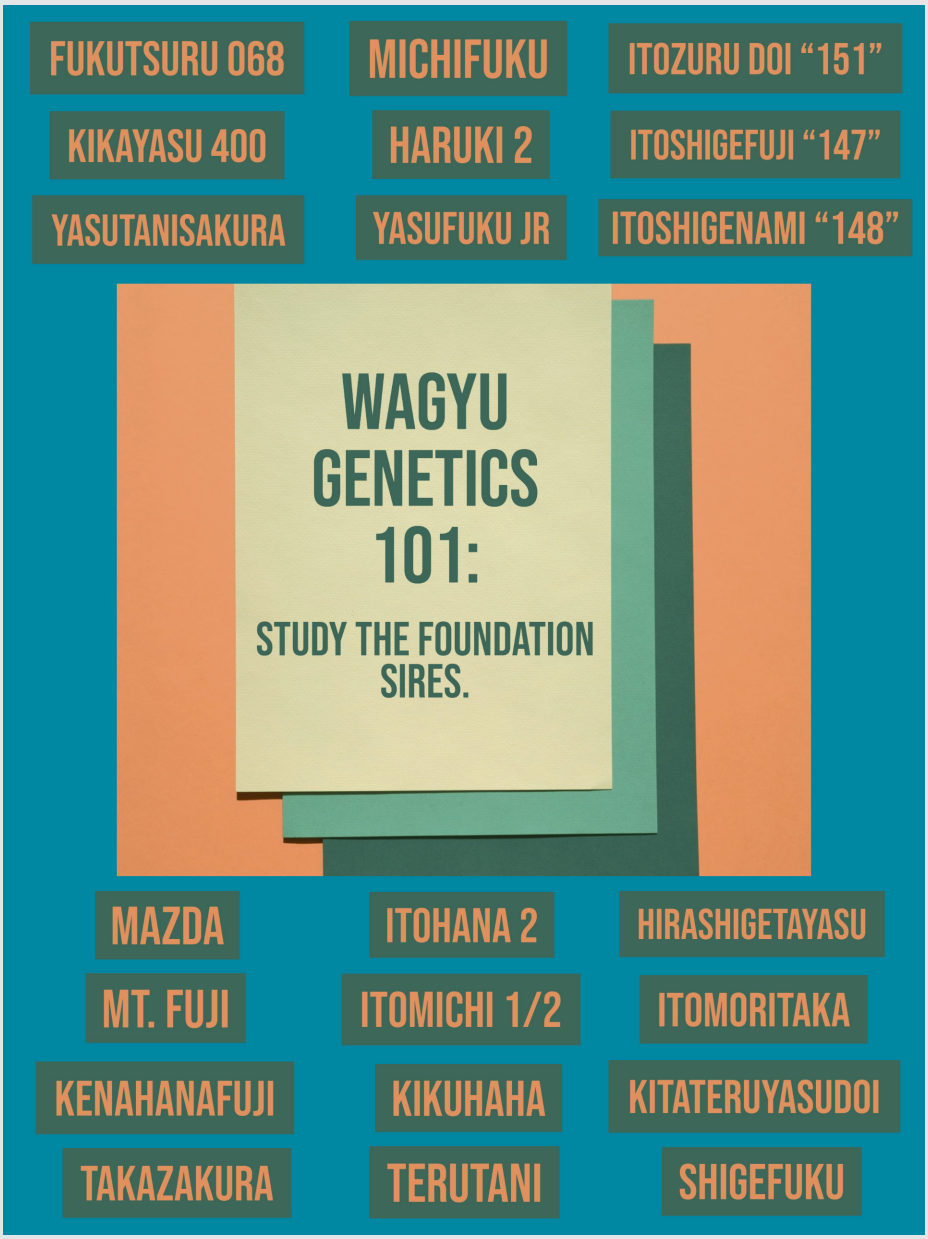
1997 saw Mannett Group import a further seven fullblood Black Wagyu females and one fullblood Black Wagyu bull.

Mr Takeda also went on to import another six bulls in 1997. Five of these were fullblood Black Wagyu and one (TF 152) is recognized as Mishima (a rare Native breed of Japanese

cattle).

From 1997 to 1998 Westholme import from Japan to the USA happened, marking the last live export of Wagyu from Japan. This was the largest import in total consisting of a 84 fullblood Black Wagyu females, 3 fullblood Black Wagyu bulls, and semen from a further 3 fullblood Black Wagyu bulls.

The Japanese government placed significant pressure on Japanese breeders to prevent the further export of live animals and genetics. In 2001 the BSE “Mad Cow” disease outbreak in Japan would close the borders and export protocol. Effectively closing the door on the possibility of further genetics exports.



References

Association, Australian Wagyu. "Australian Wagyu Update – Issue 71." 2020, https://issuu.com/australianwagyuassociation/docs/wagyuupdate_april_19_web

Bennett, Steve. "Wagyu around the World – Japan." History of Wagyu Beef Cattle Breed in Japan. 2020, www.wagyuinternational.com/global_Japan.php

Bennett, Steve. Foundation Wagyu Animals That Were Exported from Japan. 2020, www.wagyuinternational.com/foundation.php

Namikawa, Kiyoshi. BREEDING HISTORY OF JAPANESE BEEF CATTLE AND PRESERVATION OF GENETIC RESOURCES AS ECONOMIC FARM ANIMALS. https://s3.wp.wsu.edu/uploads/sites/386/2016/08/BreedingHistoryofJapaneseBeefCattle.pdf

Wagyu Breeding Guide. Australian Wagyu Association 2019, www.wagyu.org.au/content/uploads/2019/11/AWA-2019-Wagyu-Breeding-Guide.pdf.

"What Is Wagyu?" American Wagyu Association 2020, wagyu.org/breed-info/what-is-wagyu

Original Imports & Bloodlines

Prefecture / Bloodline History

The Japanese Black Wagyu breed has many prefectural sub populations. The three major sub populations recognized outside of Japan today are Tajiri/ Tajima (Hyogo Prefecture), Fujiyoshi/ Shimane (Shimane prefecture), and Kedaka/ Tottori (Tottori prefecture). The other sub populations represented outside of Japan today include Itozakura, Okayama, and Hiroshima.

Tajima genetics come from the Hyogo prefecture, they are among the most well-known and widely utilized strains outside of Japan. The Australian Wagyu Association calculated the average fullblood Black Wagyu to be 53.6% Tajima in 2020. Hyogo prefecture is the only area that remains strictly a closed herd in Japan today. Tajima (Hyogo prefecture) genetics are the foundation of the world-famous Kobe branded beef company. Tajima bloodline genetics have been bred specifically for marbling and carcass traits, this combined with having a closed herd contribute to a high inbreeding coefficient in many of these cattle. Tajima sire bloodlines outside Japan can be broken down into three sub strains known as the Nakadoi, Kumanami, and Okudoi bloodlines. Nakadoi genetics available outside Japan predominantly come from just two sires. First is Yasumi Doi who is the sire of Monjiro, Dai 2 Yasutsuru Doi, and Yasutani Doi. Yasumi Doi genetics can be found in foundation sires Fukutsuru 068, Michifuku, Haruki 2, TF 146, Yasufuku Jr, and more. The other major Nakadoi sire is Kikunori Doi, the sire of Kikuyasu Doi, Mt Fuji, and Kikuteru Doi. These genetics can be found in foundation sires JVP Kikuyasu 400, Mt Fuji, Terutani TF40, Ki-

kuterushige TF150, and Westholme's Kikateruyasudoi 003. The second major Tajima strain is Kumanami, the best-known sire from this line is Shigekanenami the sire of Shigeshigenami. His close descendants include TF 148 Itoshigenami and Okutani. The last major strain is the Okudoi line. The only exported animal with these bloodlines was TF Kinu 1, through the sire Shiroasa. The heavy focus on marbling bred into these Tajima bloodlines is what makes them the predominant source for cross breeding genetics outside Japan. Shimane genetics logically are from the Shimane prefecture and are one of the three largest populations in Japan today along with Tajima and Kedaka. This strain is also commonly referred to by as Fujiyoshi. According to the Australian Wagyu Association the average registered Wagyu outside of Japan is 5.1% Shimane. These animals are commonly characterized as medium framed with excellent maternal traits along with good growth and meat quality. The main source of Shimane genetics outside of the Japan come from the Takeda Farms shipments. Many high Shimane females were exported by Mr Shogo Takeda, these females were characterized by strong top lines with superior maternal traits. Sires carrying Shimane genetics with influence outside of Japan include TF 149 Mitsuhikokura, World K's Haruki 2, Kitaguni 7-8, and Itomichi. It is important to note that Shimane genetics play an important role in creating the now extremely influential Itozakura bloodline.

Kedaka genetics descend from the Tottori prefecture in Japan. This population has dominated the Japanese genetics and beef production scenes in recent decades. These cattle are known for superior growth and yield while maintaining high marble scores in Japan. The Tottori line can be divided into two major strains the Kedaka and Eikou strains. The Australian Wagyu Association reported the average fullblood Wagyu outside Japan to be 7.6% Kedaka and 3.3% Tottori in 2020. The sire Eikou J512 is the founding sire of the Tottori strain and his great grandson Kedaka J721 born in 1959 was so successful and influential that he created his own strain of Tottori genetics named after himself, Kedaka. The Westholme import group represents the only significant source of Tottori and Kedaka genetics outside of Japan. Influential Tottori/Kedaka sires outside of Japan include Madza, Kensei, Hirashigetayasu, Itomoritaka, and Shigefuku. The Westholme group imported many high Tottori/Kedaka females including Hatsuhi, Umeko, Yoshie, Sekitorihana 5, and more. Tottori/Kedaka genetics represent a key outcross fullblood Wagyu genetics resource with extreme potential.

The Itozakura bloodline modern development founded on the Japanese sire Dai 7 Itozakura. Dai 7 Itozakura was bred in the Shimane prefecture and is a combination of Hyogo and Okayama genetics. This bloodline is the second most prominent outside off Japan, comprising 16.2% of the average Wagyu according the Australian Wagyu Association. The Takeda Farms import groups represent a large source of these genetics outside Japan. Influential

Year	Importer	Males	Females	Resulting Calf
1976	Morris Whitney	2	0	
		Mazda		
		Mt Fuji		
1993	Mannet Group aka World K's Group	2	3	
		World K's Michifuku	World K's Suzutani	
		World K's Haruki 2	World K's Okutani	
			World K's Rikitani	
1994	Japanese Venture Partners aka JVP	3	10	
		Fukutsuru 068	Chisahime 662	
		Kikuyasu 400	Yuriko 1	
		JVP Yasutanisakura	Kikuhana 298	
			Fukutomi 990	
			Shigehime 208	
			Yasufuji 1/4	
			Yoshifuku 2	
			Tokuhime 486	
1994	Mannet Group aka World K's Group	2	4	4
		Kenhanafuji	World K's Kanetani	World K's Tanitsuru
		Takazakura	World K's Nakagishi	World K's Nakazakura
			World K's Nakayuki	World K's Kitaguni Jr
			World K's Okahana	World K's Reiko
1995	Takeda Farms	5	35	
		Itohana 2	2 Kinto 1/2	
		Itomichi 1/2	Aino 7	
		Kikuhana	Aizakura 6/1	
		Kinto	Aizakura 5/1	
		Terutani	Chiyotake 10	Yukiharunami 4
			Chiyotake 8	Chiyotake 14/1
			Chiyotake 8/1	Chiyotake 27/1
			Chiyotake 8/1A	Chiyotake 22/1
			Chiyotake 8A	
			Chiyotake 9	Terutani 40/1
			Dai 2 Kintou 12	
			Dai 2 Kinntou 3	
			Dai 2 Kinntou 2	Yukiharunami 41
			Hikohime 3/2	Hikohime 44/1
			Hikohime 3/3	Hikohime 19/1
			Hikohime 3/4	Yukiharunami 24
			Hikohime 3/4A	Hikokura 21/1
			Hikohime 3/4B	Itomichi 42
			Hikohime 7	Hikokura 15/1
			Hikohime 8	
			Hikokura 1/11	
			Hikokura 2/25	Yukiharunami 7/1
			Hikokura 3/11	
			Hikokura 3/15	
			Hikokura 3/15A	Yukiharunami 13
			Hikokura 3/24	
			Hikokura 7/2	
			Hikokura 7/12	Takechiyo 25/1
			Hikokura 8/3	
			Hikokura 345	Mitsuhikokura 43
			Itochiyo 3	
			Kensei 3/4	
			Kinu 1	

Year	Importer	Males	Females	Resulting Calf
			Takechiyo 2/4	
			Tetufuku 3/15	
1997	**Mannet Group** aka World K's Group	**1**	**6**	
		World K's Yasufuku Jr	World K's Hanateru 9	
			World K's Hisako	
			World K's Nakahana 5	
			World K's Okuito 9	
			World K's Rabito	
			World K's Taguchi 9	
1997	**Takeda Farms**	**7**	**45**	
		Kikutsurudoi	= 45 Fullblood Black Females	
		Itoshigefuji		
		Itoshigenami		
		Mitsuhikokura		
		Kikuterushige		
		Itozuru Doi		
		TF 152 Kamui		
1997-98	**Westholme**	**3**	**84**	
		Hirashigetayasu	AKEBONO J1950289-W120	
		Itomoritaka	CHIYOHIMEDOI J96-10203 - Y42	
		Kitateruyasudoi	FUKUMITSUDOI J9610584 Y47	
			HATSUHI J1950283	
		Semen From:	HIKARI J1941820	
		Shigefuku	HATSUKO J9610199	
		Dai 6 Seizan	HARUKA 2 Y64	
		Kitatsurukiku Doi	IMORIDOI J96105 Y48	
			ITOREIKO J1941827	
			KATSUHIME 7 NO 1 J1950291	
			KITACHIGUSA J122 Y60	
			KITACHIZURU J1950293 - Y1	
			KAZUAKI J1960733 R25	
			KIKUITO J W168	
			KITAKEIKO J1719 - Y7	
			KITAHARUKA 94 J1967408 - Y2	
			KITAHIKARI 97/1	
			KITAKAZU J965713	
			KITAKATSUKO Y10 J1975528	
			KITAKYOUKO J1986467 Y16	
			KITAMITIYO J1720 - Y9	
			KITAOKUMI J9612212	
			KITASAKAEDOI J962313 Y33	
			KITASEKITORI J9612214	
			KITASEKIHIRO J96-23 -Y36	
			KITATEMAKO J14138 - Y13	
			KITATIZURU 2 J962310 Y34	
			KITAYUFUKU J96-2317 - Y38	
			KIKUHIME J966539 W167	
			KOTOE 2 J96-1020 - Y44	
			KUNIKIKU 96 J965708	
			MASAKO J1933479	
			MASATOSHI 2 J720126	
			MAETA 35 - R6	
			SAKAEHIKARI J9612210	
			SAKURAHIME 3 NO 1 J1950290	
			SEKIKURAHIME	
			SATSUKI 6 J9611 - Y51	
			SEKIMASUOKISHIDA J801957 - W3	

Year	Importer	Males	Females	Resulting Calf
			SEKITORIHANA 5 J700212 - W4	
			SAWAFUJI 6 J815712 - W14	
			SEKI DAI MOTO 2 - J883856 - W115	
			SEKIOKURA	
			SEKIKURAHIME	
			SEKINAKADA 22 J769951	
			SEKISAWAFUJI J1944117 - W33	
			SEKITANAKA 3 W17 J1936979	
			SEKITSUYAFUKU W46 J1941824	
			SEKIYUHOU J9613150	
			TAKEHARU J4347 - W277	
			TAKAHIRO J1946251 - W77	
			TAKAKUNI J965809 W171	
			TAKASHIGEDOI J9612215	
			TAMAHIME J1946230 - R19	
			UMEKO J764497	
			YAMAFUJI J1946229 R13	
			YAMAKETAKAFUJI 3 J769958	
			YOSHIE J1946247 - W82	
			YOSHIFUJI 8	
			YURIYUHOU J9613151 Y66	
			24 OTHER Females	

Year	Importer	Males	Females	Resulting Calf
1976	**Morris Whitney**	**2**	**0**	
		Rueshaw		
		Judo		
1994	**Mannet Group & Englewood**	**2**	**10**	
		Shigemaru	Akiko	HB Big Al 502
		Hikari	Namiko	
		Tamamaru	Ume	HB 504 "Elephant Cow"
			Dai 8 Marunami	
			Haruko	
			Fuyuko	HB 505
			Ringo 117	
			Dai 9 Koubai 73	
			Naomi	Momigimaru
			Dai 3 Namiaki	Kaedemaru
1994	**Japanese Venture Partners** aka JVP	**0**	**2**	
			27 Homare	
			Kunisakae	
1997	**Takeda Farms**	**0**	**2**	
			Himawari 245	
			Hitomi 244	

sires carrying Itozakura blood include Itomichi, Kitaguni 7-8, Itohana, TF 149, TF 151, and TF 147. Many high Itozakura females were imported from Japan including prominent Takeda Farms and Westholme donors. This line is characterized by a combination of strong growth and carcass quality traits.

The remaining prefectural lines outside of Japan are Okayama and Hiroshima. They represent 6.8% and 2% of the average Wagyu respectively. Okayama genetics can be found through the sire Dai 7 Itozakura and his Okayama roots as well as though the sire JVP Hiratafuji 402. The Westholme imports included high Okayama females Sawafuji 6 and Yoshifuji 8. These lines have the potential to contribute many of the same upsides of Itozakura line cattle.

Details Of Each Export Group

On pages 12-14 are tables with the in-depth details of the history of each import group as best known to the Wagyu industry outside of Japan. An estimated total of 221 Japanese Black and Brown Wagyu cattle were brought live to the USA with many females pregnant to elite Japanese AI sires. Additional frozen genetics were exported along with some import groups. It is important to note that much of the genetics imported was among the most elite in Japan at the time. After arrival in the USA and subsequent breeding and flushing, a second large migration of genetics from all import groups commenced to Australia the intended final destination because of it's proximity to the Japanese and greater Asian market.

Sources

Bennett, Steve. "Foundation of Black Wagyu, Red Wagyu and Akaushi That Were Exported from Japan." Foundation Wagyu Animals That Were Exported from Japan., www.wagyuinternational.com/foundation.php

"Wagyu Breeding Guide." Wagyu.org.au 2019, www.wagyu.org.au/content/uploads/2019/11/AWA-2019-Wagyu-Breeding-Guide.pdf

Buchanan, Mike. "Traditional Bloodlines." Australian Wagyu Forum 2020, australianwagyuforum.com.au/traditional-bloodlines/

Cooper, Dr. Aaron. "History and Benefits of Akaushi." Akaushiinsight, Akaushiinsight, 2 Sept. 2020, www.akaushiinsight.com/single-post/2020/09/02/History-and-Benefits-of-Akaushi.

Industry/Wagyu Sectors

The Wagyu industry is a global system with the increasing global demand for a premium marbled beef product driving the Wagyu industry. Strong and well-established Wagyu industries can be found in Japan, USA, and Australia. Emerging Wagyu sectors include Europe, South Africa, and China. The greater Wagyu Industry can be broken down into 5 sectors: Breeding, Backgrounding, Feed lotting, Carcass Sales, and Retail Beef Sales. Some businesses span multiple sectors and others focus on a specific aspect.

Breeding Fullblood, Purebred, Crossbred, Commercial

The breeding sector forms the foundation of the Wagyu supply chain. This sector focuses primarily on the cow-calf operation. They are responsible for managing genetics, breeding, and rearing through the weaning stage. Well-managed programs utilizing the correct genetics for their end goals are key to the success of the rest of the supply chain.

Backgrounding

The backgrounding stage takes weaned animals and continues to take them to feedlot entry weight. This is a critical stage for Wagyu. Wagyu need to be kept on a rising plane of nutrition to optimize marbling gain along with skeletal and structural growth. Nutrition and management are essential during this well-known marbling window in cattle.

Feed Lotting

The feed lotting sector is responsible for the growing and finishing phases of production. Traditionally animals enter the feedlot anywhere from 550-750 lbs. live weight. Wagyu are typically fed to 1,500+ lbs. live weight. Ration and nutrition balancing along with consistency are key factors in the success of this stage in Wagyu production. There are many facilities options ranging from tradition small scale Japanese styles to large commercial lots, however cattle comfort is of upmost importance to all producers.

Carcass Sales

The carcass sales sector has a variety of different strategies depending on the location and market being targeted. Regular whole carcass auctions are a staple of the Japanese Wagyu industry. Branded and boxed beef companies have a large presence internationally, exporting product globally. Small farms/ranches and artesian butchers also have a growing presence in many countries such as the USA. This sector is often a part of either a branded/boxed beef line or a vertically integrated farm/ranch that spans multiple Wagyu sectors.

Beef Sales

The beef sales sector includes restaurants, grocery stores, butcher shops, farms stores, online storefronts, and more. This part of the industry is responsible for placing Wagyu beef with the consumer. Traditionally high-end restaurants have been the target market of much of the Wagyu industry. The increase in supply of wagyu globally and the advent of social media & online sales has expanded the horizons of this industry. Wagyu is now regularly sold in grocers, farmers markets, and online storefronts. The Beef sales sector is an ever evolving and expanding integral part of the Wagyu supply chain.

Marbling

Wagyu cattle have a predisposition for superior marbling, this is both in terms of the amount of marbling and the composition of marbling. Wagyu cattle's trademark marbling has been proven to be a highly heritable trait. The Australian Wagyu Association's collaborative genetic research project calculated the heritability of AUS-Meat marble score to be 52%. A 2011 Japanese study (Nogi et. al. 2011) found the heritability of Beef Marble Score (BMS) to be 51%. It is common for Wagyu and Wagyu cross cattle to have intramuscular fat (IMF) percentages from 20% to even 50%. Marbling is a key driving factor in the premium value Wagyu cattle and beef demand globally.

Marbling Scales

There are a variety of different marbling scales used globally, it is important to understand what scale is being used when reviewing data and buying or selling Wagyu beef. There are three major scales, the USDA marbling scale, the AUS-Meat marbling scale, and the Japanese Beef Marbling Score scale.

The USDA marbling scores consist of four different categories based on the level of marbling. They are from in order of quality from worst to best Standard, Select, Choice, and Prime. Prime is classified as having moderately abundant marbling (12% or greater). Only an estimated 9% of cattle in the USA graded Prime in 2019.
USDA Beef Grading Facts: https://www.beefresearch.org/CMDocs/BeefResearch/Beef%20Grading.pdf

The Australian marbling scale is the AUS-Meat system, a 0 (least) – 9 (most) ranking based on the amount of marbling. The scale typically starts at 1 (1% IMF) and goes to 9 (21% IMF). Carcasses with IMF percentages exceeding 21% are given a further score of 9+. This scale exceeds the USDA scale but still stops where the Japanese BMS scale begins.
AUS-Meat Grading Facts: https://www.ausmeat.com.au/WebDocuments/Chiller_Assess-

ment_Language.pdf

The Japanese marbling scale is the Beef Marbling Score (BMS) system. This system was revised in 2008 and is a 1-12 scale with 1 being worst and 12 the best. Scores 1 and 2 are rare representing animals with little to no marbling. The scale typically begins at 3 (around 21% IMF) and goes to 12 (56% IMF and above). This system also takes into consideration marbling fineness and distribution.

Often confused with a marbling scale is the Japanese quality grade scale, which is based on yield and quality (Fat color, meat color, marbling, and texture). The highest quality grade is A5. To make the A5 grade the carcass must have a yield of 72% or above, a BMS of 8-12, meat color No. 3 – 5, fat color No. 1 – 4, and a very fine texture.
Japanese BMS Guide: https://wagyu.org/uploads/page/JMGA%20Beef%20Marbling%20Standard(2008).pdf

Japanese Quality Grade Guide:
https://wagyu.org/uploads/page/JMGA%20Meat%20Grading%20Brochure_english.pdf

Objective Measurement

Objective measurement is extremely important in the collecting of carcass data. The industry standard is utilizing a independent 3rd party certified grader or software analysis system. These graders and systems typically measure marbling, rib fat, ribeye muscle area, fat color, meat color, and more. Some of the popular systems used in the Wagyu industry include accredited AUS-Meat graders, a Meat Image Japan (MIJ) Carcass Camera, a MasterBeef Carcass Camera, and Meat & Livestock Australia (MLA) graders.
MIJ Camera Fact Sheet: https://www.wagyu.org.au/content/uploads/2019/11/MIJ-Fact-Sheet.pdf

Master Beef Website: https://masterbeef.com.au/collect/
AUS-Meat Website: https://www.ausmeat.com.au/
MLA Website: https://www.mla.com.au/Marketing-beef-and-lamb/Meat-Standards-Australia/MSA-beef/Grading

Health Benefits

Wagyu beef has been shown to have higher Mono Unsaturated Fatty Acid (MUFA) content than conventional beef, have more Oleic Acid than conventional beef, and a higher ratio of Unsaturated Fatty Acid (UFA) to Saturated Fatty Acid (SFA) than conventional beef. To top it off, consuming beef high in MUFA has been shown to decrease the “bad” Low Density Lipoprotein (LDL) cholesterol and increase the “good” High Density Lipoprotein (HDL) cholesterol. Studies have proven Wagyu’s superior MUFA, Oleic Acid, overall Fatty Acid profile to be highly heritable. This means the probability of Wagyu passing on their superior traits to their progeny is high regardless of their environment.

The Mono Unsaturated Fatty Acid (MUFA) content of Wagyu beef has been measured at 59.9% of all Fatty Acids (Zembayashi et. al. 1995), 57.1% of all Fatty Acids (Gotoh et. al. 2016), and 56.4% of all Fatty Acids (Nogi et. al. 2011). These high figures in turn give Wagyu beef a high MUFA: SFA ratio that has been measured at 1.69 (Zembayashi et. al. 1995), 1.43 (Nogi et. al. 2011), and 1.37 (Gotoh et. al. 2016). Conventional beef regularly has a MUFA: SFA ratio of around 1.10. The heritability of MUFA in Wagyu has been measured at 68% (Nogi et. al. 2011).

Oleic acid is a key driving factor in the incredible taste, flavor, juiciness, and low melting point of Wagyu beef. Oleic acid is the monounsaturated omega-9 fatty acid found in olive oil. Oleic acid levels in Wagyu exceed that of regular beef, normally exceeding 50% of all fatty acids. Oleic Acid in Wagyu has been measured at 51.27% (Nogi et. al. 2011) compared to conventional beef at 45% of all fatty acids.

According to Dr. Stephen Smith, Oleic Acid decreased the levels of LDL cholesterol and increased the HDL cholesterol levels in Texas A & M studies. The American Heart Association reports high levels of HDL are associated with reduced risk for heart disease and heart attacks, whereas low levels of HDL (less than 40 mg/dL) are associated with increased risk of heart disease (Texas et. al. 2020).

The high reported levels and heritability of Wagyu's marble score, MUFA, Oleic Acid, and MUFA: SFA gives significant weight to the strong health claims frequently attached to Wagyu beef. The Wagyu industry has the potential to select for and improve these traits due to their high heritability.

References

Australian Wagyu Association. "COLLABORATIVE GENETIC RESEARCH PROJECT." AUSTRALIAN WAGYU ASSOCIATION, 2020, www.wagyu.org.au/content/uploads/2019/11/Collaborative-Genetic-Research-Project-FactSheet.pdf

Gotoh, Takafumi, and Seon-Tea Joo. "Characteristics and Health Benefit of Highly Marbled Wagyu and Hanwoo Beef." Korean Journal for Food Science of Animal Resources, Korean Society for Food Science of Animal Resources, 2016, www.ncbi.nlm.nih.gov/pmc/articles/PMC5243954/

Hale, Dan. "USDA Beef Quality and Yield Grades." Meat Science, 26 Oct. 2018, meat.tamu.edu/beefgrading/

Nogi, T. "Heritabilities and Genetic Correlations of Fatty Acid Compositions in Longissimus Muscle Lipid with Carcass Traits in Japanese Black Cattle." Semanticscholar.org, 2011, pdfs.semanticscholar.org/97db/7a693c142a737421f32a805057626db069bc.pdf?_ga=2.133431373.2145166032.1600224304-696679669.1600224304

Texas Wagyu Association. "Wagyu Beef." Texas Wagyu Association, 2020, www.texaswagyuassociation.org/about-wagyu/wagyu-beef/

Zembayashi, M. "Effect of Breed Type and Sex on the Fatty Acid Composition of Subcutaneous and Intramuscular Lipids of Finishing Steers and Heifers1." img1.Wsimg.com, 1995, img1.wsimg.com/blobby/go/7493ae1b-4573-4bbe-9ca9-9ae0ad839b63/downloads/1d29b8vad_527815.pdf?ver=1584124190248

WAGYU

INCREASED VALUE:

- Quality Grade
- Yield Grade
- Rib Eye Area
- Mouth-Watering Beef
- High Demand

INCREASED QUALITY:

- Marbling
- Unsaturated Fat
- Oleic Acid
- Tenderness
- Taste

#WAGYUEDGE
#WAGYUGENETICS
#CARCASSTRAITS