AMERICAN WAGYU ASSOCIATION

DATE: July 6, 2010

TO: American Wagyu Association Members

FROM: American Wagyu Association Board of Directors

SUBJECT: Official Launch of Inherited Recessive Genetic Disorder Testing for U.S. Black Wagyu Cattle

Dear Member:

Effective today, the American Wagyu Association Board of Directors (the "Board") is announcing the official launch of Inherited Recessive Genetic Disorder Testing for U.S. Black Wagyu Cattle. As a major breed improvement initiative, the Board believes this genetic testing program will significantly improve the integrity of the Wagyu breed in the U.S. and will add long term value to producer breeding programs.

To help producers better understand all the elements and requirements of the testing program, the enclosed Fact Sheet and Guide for Producers was prepared. This document addresses the following:

- Inherited Recessive Traits and the Five Disorders
- Genetic Testing Status and Offspring Distribution Predictions
- Managing Recessive Genetic Disorders in Fullblood, Purebred, and Percentage U.S. Black Wagyu Cattle
- **Important Registration Information and Testing Policy**
- Authorized Lab
- Frequently Asked Questions
- Contact Information

It is important for producers to take the time to read and study this document, paying special attention to the section on **Important Registration Information and Testing Policy**. This section includes information about the new Board requirement to test all fullblood, purebred, and percentage AI Sires and embryo donor dams and all animals and genetics sold at American Wagyu Association sanctioned production sales.

In March, the Board authorized the testing of non member owned AI Sires. This list included 26 foundation and second generation sires. These sires have now been tested and a report containing the results of each sire for the five disorders is enclosed for you to review.

The Board and Don Brown have had extensive discussions and planning sessions on how to effectively implement this testing program. A tremendous amount of work has been done to get to the implementation stage of this project, which is three weeks ahead of schedule. Going forward, it will require that we all work together to enable us to meet our objectives of significantly improving breed integrity and adding long term value to producer breeding programs

The Board approved this program with a unanimous vote, and we believe implementing it before the breed grows larger will pay dividends to all stakeholders in the long term. We are here to help, and Don has agreed to stay on this project through the end of the calendar year to help where he is needed as well. Should you have any questions, please direct them to Don, Jerry, or Ralph. Their contact information is below:

	Phone	Email
Don Brown	(940) 577-9400	don.brown@trianglebranch.net
Jerry Reeves	(509) 397 2502	jreeves@colfax.com
Ralph Valdez	(360) 941-0644	rh@oakharbor.net

Enclosures

1. Inherited Recessive Genetic Testing for U.S. Black Wagyu Cattle - A Fact Sheet and Guide for Producers
2. iGenix Inherited Genetic Disorder Test Results for Non Member Owned AI Sires

Inherited Recessive Genetic Testing for U.S. Black Wagyu Cattle

A Fact Sheet and Guide for Producers

Inherited Recessive Traits and the Five Disorders

What is a Recessive Trait?

Many physical traits can be linked directly to a specific genetic variant (mutation) in the DNA, and these variants can be passed from parent to offspring. Because an animal inherits a copy of DNA from each parent, a mutation can be transmitted from either the sire or the dam.

A "dominant" trait is one that is physically observable in an animal when it inherits only one copy from either its sire or dam. It only takes one copy of the mutation to change the physical appearance of that animal. An example of this is Black hair color.

A "recessive" trait is one that is only physically observable when a calf inherits a mutated copy of the DNA from both parents. An example of a recessive trait is red coat color. Note that not all recessive traits are bad or of an economical problem for the animal and some may in fact have a selective advantage. Two copies of the mutation are necessary to change the physical appearance of that animal. For this reason, an animal with only one copy of the recessive gene will typically not show any sign of the trait. An animal with two copies of the recessive mutation will show the trait. Only a cross between two Carrier parents or between Carrier and Affected parents can create an Affected animal.

Why have these Recessive Traits recently shown up in Wagyu cattle?

Most animals are actually Carriers of a mutation somewhere in their DNA for one or many recessive traits. Because an animal must inherit two copies of a given recessive mutation to be Affected, and with only a few animals typically sharing the same mutation in the whole population, there is rarely a mating cross that has the potential to create Affected offspring under natural selection. Most abnormal recessive traits are never even discovered.

However, under the selection pressure of most current breeding strategies, and given the relatively small founding population of Wagyu cattle outside of Japan, it is common to utilize a backcross and line breeding with a highly regarded sire line. If the original sire was a Carrier, there is a percentage of its generational offspring that will also be Carriers. In this case, it creates a higher-than-average frequency of Carriers and potentially Affected cattle in the population. Artificial insemination of a popular sire which is a carrier of a recessive gene is capable of spreading this gene throughout a population much faster than when bulls are only used in natural breeding conditions. This has also happened in the Wagyu breed in Japan, Australia, and the United States.

What are the Five Recessive Disorders?

In the last 10 years, several Recessive Disorders have been shown to be caused by recessive traits (mutations) in the Wagyu breed:

- **Erythrocyte Membrane Protein Band III Deficiency (Spherocytosis) (Band 3)**
  Affected cattle (cattle with two copies of the causative mutation) are morbidly anemic. The mutations affect a protein necessary for proper shape and function of red blood cells. Calves are

typically born weak and small (40-55 lbs birth weight) with severe anemia, labored breathing, palpitations, and not able to stand or suckle at birth. This disorder is often lethal, but some affected cattle survive to adulthood, although with severely retarded growth.

- **Claudin 16 Deficiency (CL16)**
  This mutation causes a buildup of fibrous tissue in the kidneys as well as other tissues. Affected cattle suffer from a severe risk of kidney failure throughout their lives. Other symptoms include growth retardation, increased blood urea nitrogen and creatinine values, diarrhea and overgrowth of hooves. It may or may not be lethal, but affected cattle tend to have atypically short lives.

- **Chediak-Higashi Syndrome (CHS)**
  Affected cattle have a deficiency in cells that make up a functional immune system. As a result, these calves are often more susceptible to disease and infection. These cattle may also have a light coat color, and slight coagulation problems (hemorrhaging). This disorder is usually not lethal.

- **Bovine Blood Coagulation Factor XIII Deficiency (F13)**
  This disorder is where one of the proteins needed to form blood clots is missing or reduced. Symptoms include severely prolonged bleeding time, bruising from castration/branding, and severe anemia. Death occurs in most cases. NOTE, this test is still in R&D as a positive control animal has not been identified in the US or Australia. We will continue to run this test and report the results to the American Wagyu Association (the "Association"), and if and when a Positive animal is identified by the test, staff from iGenix will work with the breeder and the Association to validate the results. When the validation is complete iGenix will begin reporting on this disorder to the member. If you have an animal that has symptoms as described above, please collect a blood sample (purple top blood tube) or nasal swab and contact the iGenix lab.

- **Factor XI Deficiency (F11)**
  This mutation affects the efficiency of the clotting factor F11. Affected cattle suffer from mild hemophilia-like bleeding tendencies, either spontaneously or following trauma and surgical procedures. It is also possible that Affected animals have increased difficulty producing viable fertilized embryos and full-term pregnancies and are often Repeat Breeders[1]. Normal repeat

[1] Repeat Breeders are Cows that are cycling normally, with no clinical abnormalities, which have failed to conceive after at least two successive inseminations or embryo transfers. From a clinical perspective, there are two types of repeat breeders:

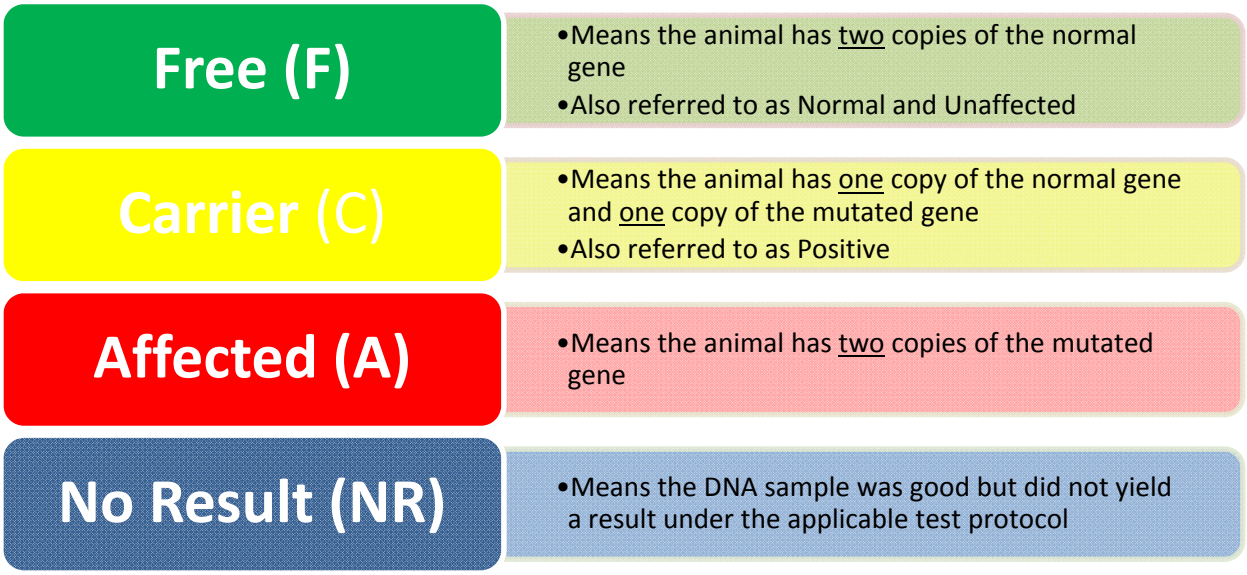
1. **Early repeats -** Cows that come into heat within 17-24 days after insemination or embryo transfer. In these animals the luteal function has been shorter than normal or typical for the physiological estrus cycle in non bred cows. In these cows the most probable event is either failure of fertilization (delayed ovulation, poor semen quality etc.) or early embryonic death (delayed ovulation, poor embryo quality, unfavorable uterine environment, precocious luteolysis).

2. **Late repeats -** Cows that come into heat later than 25 days after insemination or embryo transfer. In these animals the luteal function was maintained for longer than the physiological luteal phase in non bred cows. Fertilization and initial recognition of pregnancy probably took place but for some reason (inadequate luteal function, inadequate embryo signaling, infectious diseases, induced luteolysis) luteolysis was induced and pregnancy lost.

breeding may be considered 40% with 60% conception being an industry average. It has been reported that factor 11 increased rebreeding by 50% in the Canadian Holstein breed, so now instead of 60% conception we will get 40% conception with 60% of the animals open to be rebred.

Genetic Testing Status and Offspring Distribution Predictions

The genetic status of each tested animal will be reported as one of the four following results:



The Science of Genetics Predicts the Following Results from Each Type of Mating:

Mating	Offspring Distribution		
	Free	Carrier	Affected
Free x Free	100%		
Free x Carrier	50%	50%	
Carrier x Carrier	25%	50%	25%
Free x Affected		100%	
Carrier x Affected		50%	50%
Affected x Affected			100%

Managing Recessive Genetic Disorders in Fullblood, Purebred, and Percentage U.S. Black Wagyu Cattle

For proper herd management it is important for breeders to have an accurate understanding of the status of their cattle with respect to the genetic disorders. Without knowing the Free, Carrier, and/or Affected cattle in a breeder's herd, it is impossible to eliminate or reduce the risk of propagating the disorders in future generations of cattle. Actively addressing these genetic disorders today will pay dividends in the near future to both the breeder and collectively for the Wagyu breed.

Methods for managing recessive genetic disorders are breeder specific and depend on the type of cattle operation, i.e., registered, commercial, fullblood, purebred, percentage, seedstock, beef production, etc. Below are some suggested methods for breeders to consider. It should be noted that this list is not all inclusive.

1. Test all animals and remove Affected animals from the herd. Always use Free animals to mate with any Carrier animals remaining in the herd. A commitment must be made to test all offspring from Carrier animals that will remain in the breeding herd. The Carrier rate will be reduced over time in future generations.
2. Test all animals and remove all Affected animals and Carrier sires. Use only Free sires in the breeding program going forward. A commitment must be made to test all offspring from Carrier dams that will remain in the breeding herd. This will reduce the Carrier rate the same as in Method 1 above.
3. Test and remove Carrier and Affected animals from the herd. Only use Free animals in the breeding program going forward. No further testing will be required. This Method will ensure a totally Free herd going forward.
4. Test all animals and use Carrier and/or Affected[2] animals ONLY in a terminal breeding program.
5. Test all animals and use Carrier and/or Affected[2] animals as recipients. If a cleanup bull is used, it should be Free. Offspring DNA verified to the cleanup bull must be tested for any animals that will remain in the breeding herd.
6. These are just five examples of management methods that can be used exclusively or in combination.

[2]According to research in the Holstein breed, Affected F11 animals have a tendency to be repeat breeders. It is anticipated that a study will be conducted to determine if there is a correlation between Affected F11 Wagyu and Repeat Breeders.

As discussed above, proper management has a major impact on reducing the frequency of Carrier and Affected animals in a breeder's herd. **Table 1** demonstrates the reduction in the Carrier rate in future generations when consistently using Free sires on Carrier dams and their future generational offspring.

As you can see the Carrier percentage is basically eliminated by the seventh generation and no Affected cattle are in the offspring distribution.

However, if a Carrier sire were reintroduced to the fourth generation dams, the fifth generation offspring would be 48.44% Free vs. 96.88, 50% Carrier vs. 3.12%, and 1.56% Affected vs. 0%.

Table 1 – Generation 1: Free Sire x Carrier Dam

Generation	Offspring Distribution		
	Free	Carrier	Affected
1st	50.00%	50.00%	
2nd	75.00%	25.00%	
3rd	87.50%	12.50%	
4th	93.75%	6.25%	
5th	96.88%	3.12%	
6th	98.44%	1.56%	
7th	99.22%	0.78%	

Conversely, **Table 2** shows the offspring distribution when a Carrier sire is mated to a Carrier dam, and Carrier sires are used to mate with the future generational offspring dams. The offspring distribution remains constant through all future generations. Having 25% Affected offspring annually is a costly endeavor for any breeder to experience.

Table 2 – Carrier Sire x Carrier Dam

Generation	Offspring Distribution		
	Free	Carrier	Affected
1st	25.00%	50.00%	25.00%
2nd	25.00%	50.00%	25.00%
3rd	25.00%	50.00%	25.00%
4th	25.00%	50.00%	25.00%
5th	25.00%	50.00%	25.00%
6th	25.00%	50.00%	25.00%
7th	25.00%	50.00%	25.00%

Important Registration Information and Testing Policy

Registration Information

Effective October 1, 2010, offspring from animals required to be tested in the section below, will not be eligible for registration until such time that the applicable testing has been completed and the results are received by the Association.

Required Testing Effective October 1, 2010

All fullblood, purebred, and percentage AI sires and embryo donor dams are required to be tested for all five genetic disorders. All live cattle and genetics sold at Association sanctioned production sales must be tested as well and the results must be published in the sale catalog for all potential buyers to review prior to the sale. As an exception to Required Testing, if both the sire and dam of the offspring are Free from all five of the genetic disorders set out above, the offspring will be exempt from testing and will be given "Free" status by the Association for all five genetic disorders.

Annual Association Sales

Only cattle and genetics from cattle testing Free for all five genetic disorders are allowed to be sold through these sponsored events.

Publication of Test Results

All test results will be added to registration certificates and will be posted on the Association website. Once the Breedplan implementation is complete the information will be tracked in the database which is available to the public. Test results will be published in all public sale catalogs.

Fullblood, Purebred, and Percentage Cattle Not Tested

Effective January 1, 2011, any animal that traces to a known Carrier or Affected tested animal will be classified in Association records as a "Potential Carrier" until such time that the animal is tested and the status will be updated as applicable.

Authorized Lab

The following lab is authorized by the American Wagyu Association to conduct testing for the genetic disorders set out in this document for all fullblood, purebred, and percentage Wagyu in the U.S. The website has all the information and documents you will need from ordering your test swabs to receiving your results. The cost of the test per animal is $83 plus shipping charges.

AgProDx, an iGenix Inc. company
Contact: Dr. Tera Eerkes
Phone: 206.855.6932
7865 NE Day Rd. West Ste. 103
Bainbridge Island, WA 98110

Website: www.AgProDx.com
Email: teerkes@AgProDx.com

Frequently Asked Questions

Q. What affect do the genetic disorders have on Wagyu meat products?

A. Absolutely no affect. Beef products from Carrier and/or Affected cattle have no impact on the quality, safety, and health of the end product.

Q. Are Fullblood Red Wagyu subject to the five genetic disorders described in this document?

A. No, the five disorders addressed in this document are specific to Black Wagyu. However, there are two recessive hereditary disorders specific to the Red Wagyu where the specific gene causing the disorder has been identified. The disorders are: 1) Chondrodysplastic dwarfism which is displayed by shortening of limbs and joint abnormalities and 2) Hemophilia A which results in a severe bleeding tendency. iGenix is aware of these disorders and is considering including genetic tests for these in the future.

Q. Do I have to test all of my animals?

A. No, you are only required to test your AI sires, embryo donor dams, and animals/genetics sold in Association sanctioned production sales. However, it is a good idea to test all of your breeding stock so you can effectively manage your breeding program and reduce the risk of propagating the genetic disorders throughout your herd and having Affected offspring.

Q. Do I have to test offspring from Free parents?

A. No, if both of the parents are Free, then the offspring will be Free as well.

Q. Do I have to destroy carrier animals?

A. Absolutely No. Each animal should be judged on all of its phenotypic qualities. If the animal is excellent in many characteristics but happens to be a carrier for one of the disorders, you can still use the animal for breeding stock, including as a donor. However, you will need to be responsible for testing all of the offspring and typically keeping the Free animals for your breeding program and using the Carrier animals in your terminal beef program either as cows or for harvest.

Q. If I've not ever experienced any of the symptoms of the disorders in my herd, does that mean my herd is Free?

A. Not necessarily. You could have Carrier animals in your herd and not know it, because a Carrier does not display any symptoms of the disorder. You will only see the symptoms described in this document with Affected cattle.

Q. If I breed a Carrier cow to a Free bull, what is the chance of having an Affected calf?

A. 0% chance. However, you have a 50% chance of having a Carrier calf and a 50% chance of having a Free calf.

Q. Why are Carriers of genetic disorders important?

A. Carriers of genetic disorders used in breeding programs (registered or commercial) are responsible for propagating the recessive mutation within the cattle population.

Q. What does a Carrier of a genetic disorder look like?

A. A Carrier of any genetic disorder looks perfectly normal; there is nothing in the way an animal looks (its phenotype) that indicates that the animal is a Carrier of a genetic mutation.

Q. If a cow has an Affected calf, what does that mean?

A. If a cow has an Affected calf, and it is the cow's natural calf, it means the cow is a Carrier of the applicable genetic mutation and the sire of the calf is also a Carrier.

Q. If a recipient cow has an Affected calf, what does that mean?

A. If a recipient cow has an Affected calf, and the calf is not the result of a cleanup bull being used after ET, then it means that both the donor cow and the sire are both Carriers of the applicable genetic mutation. If the calf is the result of the cleanup bull, it means that both the recipient cow and the cleanup bull are both Carriers of the applicable genetic mutation.

Q. What do I do with non Carrier females in my herd?

A. If the females tested Free and are bred to Free bulls, they will never produce Affected or Carrier calves. This is really ideal and these females can be used throughout your breeding program with no risk of propagating the genetic mutations**.**

Contact Information

Should you have any questions, please contact any of us below:

	Phone	Email
Don Brown	(940) 577-9400	don.brown@trianglebranch.net
Jerry Reeves	(509) 397 2502	jreeves@colfax.com
Ralph Valdez	(360) 941-0644	rh@oakharbor.net

DISCLAIMER - Genetic test results are based on samples provided by breeders. The American Wagyu Association AND the Board of Directors make no statements, representations or warranties about the accuracy or completeness of, any information relating to the status of a particular animal; and, disclaims all responsibility for information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages, and costs you may incur as a result of information being inaccurate or incomplete in any way for any reason.

iGenix, inc.

Inherited Genetic Disorder Test Results for Non Member Owned AI Sires

Effective July 6, 2010

NOTE, the F13 test is still in R&D as a positive control animal has not been identified in the US or Australia. We will continue to run this test and report the results to the American Wagyu Association (the "Association"), and if and when a Positive animal is identified by the test, staff from iGenix will work with the breeder and the Association to validate the results. When the validation is complete iGenix will begin reporting on this disorder to the member.

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By proceeding to the results page you agree that you have read and accepted AWA and BOD policy above.

Animal Name	Registration Number	iGenix Test Results				
		Band 3	CL16 (Type I) Alt	CHS	F13	F11 Alt
Haruki II	FB1614	F	F	F	F	F
Hirashigetayasu ETJ-001	FB670	F	F	F	F	F
Itohana 2 TF38	FB2294	NT	NR	NT	NT	NT
Itomichi 1/2 TF36	FB2126	F	F	F	F	F
Itomichi TF728	FB7585	F	F	F	F	F
Itomoritaka 002 ETJ-002	FB681	F	F	C	F	F
Itoshigefuji TF147	FB3681	F	F	C	F	F
Itoshigenami TF148	FB3682	F	F	F	F	C
Itozurudoi ETN01 (1st clone of TF151)	FB9849	F	F	F	F	C
Itozurudoi ETN02 (2nd clone of TF151)	FB9866	F	F	F	F	C
JVP Fukutsuru 068	FB2101	F	F	F	F	C
JVP Kikuyasu 400	FB2100	F	F	F	F	F
Kimifuku TF726	FB7584	F	C	F	F	C
Kitaguni Jr	FB2422	F	F	F	F	F
Kitateruyasu ETJ-003	FB686	F	F	F	F	C
Michifuku	FB1615	F	F	F	F	F
Mitsuhikokura TF149	FB3683	F	F	C	F	F
Sanjirou	FB2501	F	F	F	F	F
Shigeshigetani 1593	FB2907	F	F	F	F	F
Takazakura	FB2892	F	F	F	F	F
TF601	FB5999	F	F	C	F	C
TF603	FB6188	F	F	C	F	F
TF604	FB5998	F	F	F	F	F
TF605	FB5997	F	F	F	F	F
Yasufuku Jr	FB5061	F	F	F	F	F
Yasutanisakura 931	FB2102	C	C	F	F	C

Ledgend

Free	F
Carrier	C
Affected	A
No Result	NR
Not Yet Tested	NT

Effective Date: 7/6/2010