

AHA Rules and Regulations

SECTION I: MEMBERSHIP

A. Membership Types

1. Life membership
2. Annual (recording) membership
3. Junior membership
4. Non-resident membership

B. Life membership

Life memberships that were purchased in the past will continue to be recognized by the Association. Life members only pay member service fees and do not pay dues. Life members may attend all meetings of the Association. They have voting rights at all official membership meetings as long as they are active members (have registered at least one animal in the previous calendar year). Life members receive member rate fees for registering and transferring Hereford cattle.

Life memberships can be transferred to immediate family members; however, the membership name must remain the same.

C. Annual (recording) membership

Recording memberships are annual memberships issued by the Association in the name of an individual, farm or ranch, partnerships or corporation. To remain active, the recording members must pay annual dues on the anniversary date of their joining as a recording member. Recording members may attend all meetings of the Association. They have voting rights at all official membership meetings as long as they are active members (have registered at least one animal in the previous calendar year). Recording members receive member rate fees for registering and transferring Hereford cattle.

D. Junior membership

Junior membership in the Association is available to anyone under 22 years of age. The fee for junior membership is \$15, assessed annually on Sept. 1. The junior membership is available until the holder reaches his or her 22nd birthday. At that time, he/she may acquire an adult (life or recording) membership. Junior members have all of the privileges of recording members (except voting) including member rate fees for registering and transferring Hereford cattle, as well as participating in junior activities and scholarships.

E. Non-resident membership

Non-resident members are non-voting members residing in another country that wish to take advantage of member services including registry, total performance recording, selling of semen to members, and transfer of ownership of animals to other members. Non-resident members are subject to the same rules and fees as U.S. resident members.

F. Annual member service fee

Lifetime, recording and junior memberships require an annual member service fee of \$100 (\$20 for junior members) in order to register an animal during the current fiscal year. The fiscal year is Sept. 1 through Aug. 31. Each paid member service fee will generate a one-year subscription to the *Hereford World* magazine (except in the case of a junior membership). This fee is used to offset the costs of several under-funded services offered to active registry accounts.

G. Membership herd designation

The Association has two different tiers or levels in which members can participate when registering and transferring Hereford cattle. The mechanisms for billing of services and services available are different between each of the tiers; therefore, each membership account must be designated as to which tier or level the member's herd will participate. Each membership can have only one participation level designation. The two tiers and a brief description of each are as follows:

Pedigree registry: This participation level is designed for breeders who wish to register and transfer purebred Hereford cattle but are not interested in maintaining and reporting performance data to AHA. Pedigree registry breeders can submit registry and transfer applications on a per-head fee basis established by the Board of Directors. Pedigree breeders choose to waive performance recording on their animals and, therefore, waive the production of expected progeny differences (EPDs) on their herd.

Performance registry: This participation level is structured and oriented to simplify the billing and reporting of performance testing herds. Registry and transfer fees are assessed at the same rate as for pedigree breeders. Performance registry breeders are also required to maintain an accurate and up-to-date female inventory, listing all females currently in their breeding herd with AHA. Performance registry breeders are required to annually report calving ease and weaning weight information on the produce of every female in the inventory. Additional measures including birth and yearling weights, as well as carcass traits, can be reported but are not required. EPDs will be printed on the certificate.

EPDs will only be reported on registered animals. Non-registered animals or genetic material will not be provided EPDs.

SECTION II: AHA RECORDS, RULES AND POLICY

Application for registration of your calves is a part of the record keeping requirement of Hereford cattle. Extra careful attention to detail in submitting applications for registration will save time for you and your Association. Be sure all information is supplied and that information is accurate and legible. Applying for registry of your calves when they are still young (four months or younger) is important, **SINCE IT REDUCES THE RISK OF ERROR AND SAVES YOU BOTH TIME AND MONEY.**

There is one basic form used by the Association for registration application. Breeders participating at the pedigree registry level should disregard the fields of information used to submit birth performance data. Reports generated from the processing of registration applications will be appropriate for the breeder's level of participation.

Tattooing calves

Tattoos are a requirement for registry in the American Hereford Record. Hereford breeders were the first to adopt the ear tattoo as a requirement for registry.

A tattoo outfit consists of a pair of specially designed pliers with rows of digits numbered 0 to 9 and a bottle of India ink. Such equipment may be purchased from most livestock supply stores.

Select the desired number by rotating the digits in the ear marker. Before punching the animal's ear, assure yourself that everything is in order by punching a piece of cardboard.

Next, restrain the calf's head to prevent violent movement while applying the tattoo. Select a spot in the center of the ear and clean thoroughly with a cloth and rubbing alcohol. Avoid placing the tattoo over one of the ribs of the ear, but rather place the tattoo between the ribs of the ear. Place the ear between the jaws of the pliers with the numbers or letters on the inside of the ear. Close the pliers quickly and firmly, and then release. Use a finger or toothbrush to smear ink over the punctures made by the tattoo and rub thoroughly until ink is worked into each of the holes. Make a written record of the marks placed in the ear. It is strongly advised that breeders place the tattoo in both ears to enhance the chances that a complete tattoo identity can be established.

Herd Book of the American Hereford Association

Rule 1. OFFICIAL RECORD: The official record of the Association shall be the American Hereford Record. Such record shall be maintained in the AHA office.

Rule 2. HERD BOOK: Entries in the American Hereford Record shall contain the registration number, name, sex, tattoo, date of

birth, name and registry number of the sire and dam and the name of the breeder.

SECTION III: REGISTRATIONS

Rule 1. PRIVILEGES OF REGISTRATION: Applications for entry will only be accepted from members. Non-members must become members in order to register an animal.

Rule 2. ELIGIBILITY: Except as otherwise provided herein and subject to compliance with all applicable requirements contained in these Rules, the following animals are eligible for entry in the American Hereford Record:

- An animal born in the United States that is the progeny of parents, both of which are registered either in the American Hereford Record or in the herd book of another association that is a member of the World Hereford Council; or
- An animal born outside of the United States that, as of the date that application for entry is made into the American Hereford Record, is registered in the herd book of another association that is a member of the World Hereford Council.

Any member seeking to register an animal where such registration is based upon that animal or another animal being registered in the herd book of another association that is a member of the World Hereford Council shall furnish to AHA evidence of such foreign registration as AHA shall require. An animal may be deceased at the date that application for entry is made into the American Hereford Record. A member seeking to register an animal that is registered in the herd book of another association that is a member of the World Hereford Council is not required to be the owner or former owner of that animal.

Rule 3. APPLICATION FOR ENTRY: Application for entry should be made on the official application form (FORM 1) or through an official AHA approved electronic software system.

Rule 4. AGE OF SIRE: There is no minimum or maximum age specified for a Hereford sire or his progeny to be eligible for entry. However, applications indicating the sire was less than nine months of age at time of service will be questioned for accuracy.

Rule 5. AGE OF DAM: There is no minimum or maximum age specified for a Hereford dam or her progeny to be eligible for entry. However, applications indicating that the dam was less than nine months of age at time of conception will be questioned for accuracy.

Rule 6. 283-DAY RULE: A calf born less than 283 days after the birth of its dam's previous calf will be questioned. The breeder must then provide an explanation for the early delivery and a ruling will be made as to whether the entry will be allowed.

Rule 7. 21-DAY RULE: Females exposed to one bull must not be exposed to another bull in less than 21 days after such exposure. Avoiding double or multiple exposures will help provide positive identification of the service sire. Exposure to a second bull in less than 21 days might mean the correct service sire cannot be positively identified, requiring DNA profiling of both sires, the dam and the calf.

Rule 8. DNA PROFILING:

- All sires born after Jan. 1, 2011, and born on or before Dec. 31, 2025, are required to be DNA profiled before their progeny can be registered; parent verification will only be completed when parents of the sire are available.
- All sires born on or after Jan. 1, 2026, are required to be DNA profiled but such DNA profile shall include testing for all known genetic abnormalities and all such sires shall be fully parent verified, before their progeny can be registered.
- Whenever the eligibility for registration of any animal is in doubt because of uncertain or unknown parentage, DNA profiling by the Association shall be required.

Rule 9. MULTIPLE BIRTH: Twins or other multiple birth calves are eligible for registration. The application for registry, however, should specify such at birth.

Rule 10. TATTOO: Calves must be tattooed before application for registry is made. Each breeder may devise his own plan or system of tattoo identification using either numbers or letters or a combination of both. Any marks other than numbers or letters, however, are not permitted — meaning brand marks, symbols, etc. cannot be used. Duplication of tattoos within your herd is strongly discouraged as tattoos are frequently used by breeders as a primary form of identification. Duplication can lead to much confusion for breeder and the Association office alike.

The tattoo in one ear shall be limited to a maximum of eight characters. If the tattoo should become illegible, the same marking shall be placed in a different area of the ear. No attempt shall be made to alter or over-imprint the old tattoo. The Association must be notified when an animal is retattooed.

Rule 11. NAMING HEREFORDS: It is the responsibility of the owner to select names for his cattle. The name must not be more than 30 spaces long, counting spaces between words. For example, PRINCE DOMINO ADVANCE JUNO 133 is exactly 30 spaces long. Brands, symbols and commas cannot be used. Avoid duplicating names as no two Herefords should be named the same. It is the breeder's responsibility to avoid using names and prefixes that are being used by other breeders. Names should be appropriate for the gender of the animal, and it is recommended that names reflect the line of breeding where possible. Embryo transfer calves will carry the designation embryo transfer (ET) at the end of their name, accounting for three spaces.

The Association reserves the right to change the name assigned to an animal on an application for registry if the name submitted is deemed to be inappropriate.

Rule 12. CHANGING NAMES: The name of a Hereford may be changed, provided the animal has no registered offspring. The name may be changed only once in the lifetime of an animal. All owners must agree to the name change in the case of a partnership-owned animal. Letters must be submitted from the first and all current owners requesting the change of name along with the certificate and required fee.

Rule 13. JOINT OWNERSHIP (BREEDING INTEREST): No application for registration or transfer of an animal which shows more than four owners shall be accepted for entry in the American Hereford Record.

Rule 14. DUPLICATE CERTIFICATES: If original certificates are lost or destroyed, the owner may secure duplicates from the Association by providing the sex, registry number and tattoo of each animal. If the registry number is not available, the registration number of the dam, name of the person who registered the animal, and the sex, age and tattoo of the animal in question must be provided.

The fee for duplicate certificates for members and non-members is available from the AHA Records Department.

Rule 15. CORRECTION OF CERTIFICATES: It is recognized that occasionally errors are committed in registering cattle, and these should be corrected. If an error is discovered, it should be reported to the Association immediately and the incorrect certificate returned with a letter of explanation.

Corrections are made without charge if done within six months of the issue date or if the Association made the error. The fee for making corrections after the six-month period is available from the AHA Records Department.

Rule 16. ARTIFICIAL SERVICE: Calves may be registered that were produced through artificial insemination (AI) provided they comply with the rules governing AI as discussed in SECTION V: ARTIFICIAL INSEMINATION.

Rule 17. ELIGIBILITY FOR EMBRYO TRANSPLANT CALVES: Registration of offspring resulting from embryo transplant (ET) shall be made on an Application for Registration (FORM 1). Certificates issued shall be designated by ET following the name

of the calf. The name must be no longer than 30 characters long including the ET designation.

Registry of offspring resulting from ET may be implemented only after the following steps have been taken:

- All sires and donor dams born on or after Jan. 1, 2026, are required to be DNA profiled but such DNA profile shall include testing for all known genetic abnormalities and all such sires and dams shall be fully parent verified, before their ET progeny can be registered.
- Non-Owner AI Certificates of Service must accompany the application for each calf when the sire is not in the same recorded ownership as the donor dam.

Rule 17A. NEW EMBRYO TRANSFER POLICY: For ET calves there will no longer be an ET certificate required for registration. The new requirement for registering an ET calf will be the reporting of the recovery date of the embryo at the time of registry. ET calves will be charged an additional \$10 per head over and above the normal registry rate.

Rule 18: LEASING HEREFORDS: Herefords may be leased, provided a statement of lease is on file with the Association. If a lease statement is on file listing each animal being leased by name and registration number, the lessee can register calves sired by the bulls or produced by the cows as if he were the actual owner, provided there are no more than three owners already listed.

At the end of the lease period, unless extended, registration privileges revert back to the recorded owner.

In order to make this process more efficient and less confusing, the Association will adopt the following policies regarding leasing Hereford cattle:

- The required information needed by the Association for leasing animals will be communicated using one consistent and common lease form to be used by all members wishing to participate in this type of practice. The lease form will contain only the required information for the Association's needs and is to be used expressly for that intent. The lease form should not be construed as a binding agreement between the lessor and lessee. The Association shall in no way be involved in or assume liability for the lease, terms of the lease of registered Herefords, or the passage of legal rights thereto.
- All lease periods must include a beginning and ending date; no open-ended leases will be accepted.
- All animals involved in the lease shall be included on the lease form(s) by their registration number and name.
- The lease form must be submitted by the lessor with his/her signature.
- Should the lessor and lessee agree to extend the lease, documented notification will be required in the Association's office should the birth dates of any calves being registered out of sire or dams involved in the lease not coincide with the time period of the lease.
- If the lessor or lessee wishes to lease additional or different animals, then an additional lease form(s) should be completed with all required information and submitted by the lessor.

Rule 19. REGISTRATION OF HEREFORDS OVER TWO YEARS OF AGE: Application for registration of an animal received by the Association after two years from the date of birth shall be considered for registration only when accompanied by a written statement from the applicant setting forth the reason application was not submitted within the generally accepted registration period. These applications and required fees must be approved by the Board of Directors.

Rule 20. REGISTRATION FOR THE ESTATE OF A DECEASED PERSON: In the event of the death of one who normally would apply for registration of cattle, the Association requires there shall be filed in its office all documents necessary to prove the person requesting registration is legally authorized to do so.

Rule 21. REGISTRATION BY AFFIDAVIT: In case of neglect or refusal by the seller to register a calf sold at side of dam, registration

may be approved by the Board of Directors on the basis of the facts furnished to substantiate the claim.

Each affidavit must be accompanied by proof of a sale and payment in full of the purchase price and evidence of whether the dam's breeding was natural or artificial.

Rule 22. REGISTRATION ACCURACY: Accurately kept private records are essential, and in any case where an application is regarded as questionable, the burden of the proof with regard to same shall belong to the applicant, who must sustain his claims by a preponderance of evidence.

Whenever the accuracy of data contained in an application to register an animal is challenged, the matter may be referred to the Board of Directors for investigation.

Rule 23. MISREPRESENTATION OR FRAUD: If an animal's registration has been obtained through misrepresentation or fraud, or if the date of birth, tattoo number, sire, dam or service information or any other fact regarding the animal has been misrepresented, the Board of Directors or the Executive Committee of the Board may take such actions and impose such sanctions as it deems necessary.

SECTION IV: OWNERSHIP AND TRANSFER OF REGISTRATIONS

Rule 1. RESPONSIBILITY: It is the responsibility of the seller of registered Herefords to execute properly the official transfer of ownership to the buyer. Every change of ownership of an animal used for breeding purposes must be recorded by official transfer on the American Hereford Record.

No entry on the face of the certificate of registry shall be made except in the office of the Association and any unauthorized entry shall render a certificate null and void, subject to issuance of a replacement certificate at an additional fee.

Rule 2. IDENTIFICATION: It shall be the duty of the seller, before offering a registered Hereford for sale or applying for transfer, to verify that the animal carries legible tattoo marks matching those entered on its certificate.

Rule 3. APPLICATION FOR TRANSFER: Application for transfer shall be made either electronically through AHA's online service or in hard copy form on the reverse side of the registration certificate and signed by the seller or an authorized agent. The application should be legibly completed and must specify name and location of the buyer and date of delivery. For bred females, service information is also required.

Rule 4. COW WITH CALF AT SIDE: When a cow is transferred with a calf at side, the calf must first be registered in accordance with these rules (including Rule 5 of Section IV - FIRST OWNER AT REGISTRATION). Transfer of the registration of the calf shall then be separately recorded to the transferee in accordance with these rules. This is often referred to as a "transfer on entry." (See backside of registration application.)

Rule 5. FIRST OWNER AT REGISTRATION. The first owner, as reflected in the Association's records, upon the registration of an animal shall be as follows:

- for an animal that is neither an ET animal nor a clone animal, the first owner shall be the owner of the dam's registration at the time of birth of such animal; or
- for either an ET animal or a clone animal, the first owner shall be the applicant for registration of such animal.

Any transfer of the registration to a subsequent owner shall be separately recorded in accordance with these rules.

Rule 6. TRANSFER BY AFFIDAVIT: In the event of neglect or refusal by the seller to apply for transfer of registration, transfer may be recorded if approved by a majority of the Board of Directors on the basis of the facts furnished to substantiate the claim. Each affidavit must be accompanied by proof of sale and payment in full of the purchase price of the animal.

Rule 7. TRANSFERS CONSIGNED TO PUBLIC SALE: Sale managers or their representatives may fill in the buyer's name on the application for transfer of animals consigned to public sales, and if authorized by the consignor, sign such transfers in his stead. Such applications must indicate the name of the sale manager or agent representing the consignor. Applications executed under this rule are subject to Rule 12 of this section.

Rule 8. TRANSFER FROM THE ESTATE OF A DECEASED PERSON: In the event of the death of the owner of Hereford cattle, the Association requires that there should be filed in its office, documents showing the person requesting transfer is legally authorized and entitled to request such transfer. Applications executed under this rule are also subject to Rule 13 of this section.

Rule 9. TRANSFER OF EXPORTED ANIMALS: Application for transfer of an animal exported to another country shall be made with a regular Transfer Application.

Rule 10. RESPONSIBILITY OF LEGAL TITLE: A transfer of registration on the records of the American Hereford Association is not to be construed as the conveyance of legal title by the Association. The Association shall in no way be involved in or assume liability for the purchase, sale or terms of the sale of registered Herefords or the passage of legal title thereto.

Rule 11. JOINTLY OWNED ANIMALS: No animal shall be transferred to more than four owners of record at any one time. A "syndicate" or similar type entity consisting of one or more individuals, firms, etc., may be listed as one or more of the four designated owners of record.

Rule 12. MISREPRESENTATION OR FRAUD: If an animal's registration has been transferred through misrepresentation or fraud, the Board of Directors or the Executive Committee of the Board may take such actions and impose such sanctions as it deems appropriate as provided in Article IX of the Bylaws, including, without limitation, suspension of the animal's registration and any registrations of descendants of such animal and refusals of the Association to receive subsequent application of any kind from any person implicated in the misrepresentation or fraud.

Rule 13. AUTHORIZED SIGNATURE: A certificate of registry does not establish legal ownership of cattle but simply reflects the name in which cattle are registered on the books of the Association. The Association will usually make any requested change or transfer of cattle registration upon the presentation, to the Association, of the Registry Certificate covering the cattle and purporting to be signed with the name in which the Registry Certificate is issued. Due to the large number of transfers, it is impractical for the Association to verify signatures or require proof that the person signing the Registry Certificate and requesting change or transfer is in fact authorized to do so. Accordingly, a Registry Certificate should be kept in a safe place to insure against its falling into the hands of an unauthorized person who could then cause change or transfer of registration on the Association's books and the issuance of a new Registry Certificate.

If the Association receives conflicting instructions regarding any change or transfer of registration, the Association will, unless restrained by appropriate court order, honor the request of the person presenting the appropriate Registry Certificate.

SECTION V: ARTIFICIAL INSEMINATION

Rule 1. DNA TESTING: Each bull used for artificial insemination (AI) breeding purposes, whether for non-owner breeding purposes or for in-herd breeding purposes, shall be DNA profiled as provided in Section VII and a record of such DNA profile shall be filed with the Association in order that any progeny sired by such bull through AI is eligible for registration.

Rule 2. AI BULL PERMITS: Any bull whose semen is used for AI purposes shall have an AI Bull Permit issued by the Association

prior to the registration of any progeny from such bull. This requirement is applicable to bulls whose semen is used for in-herd AI purposes and to bulls whose semen is used for non-owner AI purposes. In order for a bull whose semen is used for non-owner AI purposes to receive an AI Bull Permit, the DNA profile for such bull shall include parent verification, and such bull shall be tested for all known genetic abnormalities.

Rule 3. IN-HERD AI USE AND NON-OWNER AI USE: A Non-Owner AI Certificate of Service is not required to register the resulting progeny when both the sire and dam are in the same recorded ownership. When the sire and dam are not in the same recorded ownership, compliance with either Option A or B below is required for registration of the resulting progeny:

Option A (Non-Certificate AI Sire Program):

- The bull siring such progeny may be a participant in the Non-Certificate AI Sire Program. This Program allows the owner of such bull to sell semen without the need for a Non-Owner AI Certificate. Progeny born on or after December 1, 2006, are eligible for registration under this Program.
- In order to be eligible for this Program, all of the recorded owners of such bull shall execute and deliver to the Association an enrollment form, in a form provided by the Association. In the event that such bull is owned by a syndicate, the designated representative of the syndicate shall execute and deliver to the Association such enrollment form.
- Once a bull is a participant in this Program, such bull shall not be eligible to participate in the procedure referred to in Option B below. The fee for a bull to participate in this Program shall be as established, from time to time, by the Association.

Option B (Traditional AI):

- The member registering such progeny shall obtain a Non-Owner AI Certificate from the owner of the AI Bull Permit for such bull for each progeny subject to registration. The Non-Owner AI Certificate shall be submitted to the Association at the same time as the application for registration of such progeny is submitted to the Association.
- The owner of the AI Bull Permit for such bull shall be obligated to supply a Non-Owner AI Certificate upon the request of the member registering such progeny. Such owner shall be entitled to purchase a Non-Owner AI Certificate from the Association for such fee as may be established, from time to time, by the Association.

Rule 4. DEATH OF BULL: Progeny sired by AI by a bull that is the subject of an AI Bull Permit shall be entitled to registration after the death of such bull upon the same terms and conditions as progeny sired by AI by such bull prior to the death of such bull.

Rule 5. LABELING OF SEMEN: Semen collected from a bull that is used for AI purposes shall be properly identified by the name and registration number for such bull. It shall be the responsibility of the owner of any bull whose semen is used for AI purposes to require the person or entity collecting such semen to properly label such semen. Progeny sired by semen that is not properly labeled shall not be eligible for registration.

Rule 6. LIMITATIONS:

- The Association may cancel the AI Bull Permit of any bull that has been satisfactorily documented as being a carrier of a gene that could produce a genetic defect in its progeny.
- The Association may restrict or limit the number of Non-Owner AI Certificates that may be issued for a particular bull if, in the judgment of the Board of Directors, the semen from such bull is being used so often as to cause material and irreparable damage to the breed's genetic base. The judgment of the Board of Directors shall be based on such evidence as the Board of Directors, in its reasonable judgment, deems appropriate.

Rule 7. NON-OWNER AI CERTIFICATE ALLOCATION FOR A MULTI-OWNER BULL OR FOR A BULL OWNED IN WHOLE OR IN PART BY A SYNDICATE: Only an owner or co-owner of a bull for whom a AI Bull Permit has been issued is entitled to obtain a Non-Owner AI Certificate. Certificates will be issued on request to any recorded owner or co-owner. Contractual agreements regarding certificate privileges among co-owners are the responsibility of those co-owners. The Association will not be responsible for compliance with any such agreement.

In the instance where a recorded owner of the bull is a syndicate, it is the responsibility of the syndicate's designated representative to handle the distribution of Non-Owner AI Certificates. Those individual members of the syndicate that are not otherwise reflected as one of the four recorded owners of record of such bull will be required to obtain Non-Owner AI Certificates from a recorded owner in order to register progeny of such bull.

The Association will provide a service whereby a member of the Association can participate in a "Breeding Share Agreement" for bulls. When members participate in a "Breeding Share Agreement," they can be individually invoiced for Non-Owner AI Certificates when progeny are registered.

Rule 8. SEMEN DONATIONS TO COLLEGES AND UNIVERSITIES: The Association will make Non-Owner AI Certificates available for use by colleges or universities when a breeder makes a donation of semen from a bull that is the subject of an AI Bull Permit. A Non-Owner AI Certificate will be issued to the college or university at no cost to the breeder. The following rules must be complied with:

- The semen must be a donation to the college or university.
- The breeder must apply for the Non-Owner AI Certificates in the form of a letter to the Association indicating the institution to which the semen donation is made.
- The bull must qualify under the current rules for Non-Owner AI Certificates.
- The certificates and semen must be used by the institution that received the donation. Applications for registry from any other party will not be accepted.
- Upon approval by the Association, a Non-Owner AI Certificate will be issued directly to the college or university.

Rule 9. LIABILITY: The issuance of Non-Owner AI Certificates by the Association should in no way be construed as guaranteeing conception or that the resulting progeny shall be eligible for registration. There shall be no refunding of fees paid to the Association for a Non-Owner AI Certificate.

SECTION VI: REGISTRATION OF AN IMPORTED ANIMAL OR AN ANIMAL BORN FROM AN IMPORTED EMBRYO

Rule 1. REGISTRATION OF CALF IMPORTED IN DAM: If a dam was bred prior to importation and the record of service does not appear on the documentation provided to AHA with respect to such dam by another association that is a member of the World Hereford Council, the member seeking to register the resulting progeny shall provide to AHA from the owner of the sire on the date of service such information regarding such service as AHA shall require.

When the imported dam was bred prior to importation by AI from a bull not registered in the American Hereford Record, the member seeking to register the resulting progeny shall provide to AHA the DNA profile of such service sire from the official lab of the association that is a member of the World Hereford Council where such service sire is registered.

When, prior to the importation of a dam, such dam was bred by AI from a bull that is registered in the American Hereford Record and where no semen interest is owned by the breeder in the exporting country, the registration of the resulting progeny shall be subject to compliance with all of the requirements of Section V of the Rules.

Rule 2. REGISTRATION OF CALF IMPORTED AT SIDE: Registration of a calf imported at side of its dam shall be subject to the same requirements for registration as an animal that is not born in the United States.

Rule 3. REGISTRATION OF AN ANIMAL Sired BY A SEMEN INTEREST IN A BULL DOMICILED IN A FOREIGN COUNTRY: Where a member seeks to register an animal that was sired by AI with semen from a bull domiciled in a foreign country, the bull shall be registered in the American Hereford Record and shall be subject to the same requirements for the use of its semen as a bull that is domiciled in the United States; provided that DNA testing for such bull shall be provided by the official lab of the association that is a member of the World Hereford Council where such bull is registered.

Rule 4. REGISTRATION OF AN ANIMAL RESULTING FROM AN EMBRYO IMPORTED FROM A FOREIGN COUNTRY: To register an animal resulting from ET with an embryo imported from a foreign country, the animal shall be subject to the same requirements for registration as an animal that is born in the United States by means of ET.

SECTION VII: DNA TESTING

Rule 1. DNA TESTING: Over a period of years, a vast amount of technical information has become available, and DNA testing is now a useful tool for the Association's members.

Applying for the DNA profile of an animal requires a request to the Association for a DNA profile kit for each animal to be tested. The request must include the registry number of the animal to be tested.

The kit will contain all the necessary instructions for securing a DNA sample and the shipping instructions to send the sample to the Association's designated laboratory.

Notwithstanding anything to the contrary set forth in these Rules, whenever a DNA profile of an animal is required or permitted under these Rules, such Basic DNA profile shall include all components of a Basic DNA profile then capable of being provided by the Association's designated laboratory, including, but not limited to, parent verification when parent genotypes are available, each genetic abnormality that is part of the Basic panel, and genomic enhanced EPDs.

Rule 2. REQUIRED DNA TESTING:

A. The Association may require that any animal that has been registered to be subjected to a DNA profile by the Association's designated laboratory.

The Executive Committee of the Board of Directors or the Board of Directors or the Executive Vice President may require that a DNA profile be made, by the Association's designated laboratory, of any animal that has been alleged to have been incorrectly registered or any animal for which tissue analysis is otherwise deemed advisable.

It shall be the duty of the owner of record of any animal in question and the owner of record of the purported sire and dam to afford the Association or its representatives reasonable opportunity to secure DNA samples from the animals involved in any investigation.

The Executive Committee of the Board of Directors is empowered to determine who shall pay the costs of any investigation, including laboratory fees incurred under the provisions of this rule.

B. Prior to the filing of an application for registration of any animal with respect to which a DNA profile is not on file with the Association, the Association may require the owner of said animal, at the owner's cost, to provide a DNA sample for such animal to the Association's designated laboratory and to authorize such designated laboratory to provide a DNA profile for such animal to the Association.

At any Hereford competition, the owner of any animal that wins such competition shall, promptly after the announcement that such

animal has won such competition, permit the Association to secure a DNA sample from such animal and authorize the Association to obtain a DNA profile of such animal from the Association's designated laboratory.

C. If at any time the Association is in possession of two (2) or more DNA profiles allegedly from the same animal that do not match including the winner in any Hereford competition, the Board of Directors or the Executive Committee may require the Executive Vice President to undertake such investigation as the Board of Directors or the Executive Committee deems appropriate, and upon the conclusion of such investigation, the Board of Directors or the Executive Committee may take such actions and impose such sanctions as it deems appropriate as provided in Article XI of the Bylaws, including without limitation the forfeiture of any prizes including any monetary awards or ribbons awarded to such animal at such competition, the suspension of the owner's membership, or the revocation of the owner's membership.

Any such investigation may include requiring any owner to permit the Association to secure another DNA sample from such animal and authorize the Association to obtain a DNA profile of such animal from the Association's designated laboratory.

Rule 3. REFUSAL: If the owner of record shall refuse reasonable opportunity to the Association or its designated agents to secure DNA samples as set forth in Rule 2 of this Section, the Board of Directors or the Executive Committee may take such actions and impose such sanctions as it deems appropriate as provided in Article XI of the Bylaws, including without limitation the suspension of the registration of the animal in question.

Rule 4. NON-REGISTERED ANIMALS: The Association may collect and maintain DNA profiles on animals other than registered animals. The Association may, from time to time, compare the DNA profiles of registered animals and the DNA profiles of animals with respect to which applications for registration have been submitted with the DNA profiles of non-registered animals. The Association may deny registration to, or revoke the registration of, any animal based on this comparison.

Rule 5. Once a sire achieves 0.80 weaning weight accuracy, the AHA will whole genome sequence (when DNA is available) these sires. This genomic reference library will be used for research and breed improvement objectives. If available, the results of these sires will be published when a new genetic abnormality is released.

DNA TESTING TERMS AND CONDITIONS

These DNA Testing Terms and Conditions (T&Cs) shall apply to all DNA samples submitted for DNA testing via an AHA Sample Submission Form (each a "Sample"). By submitting a Sample for testing, the Member agrees that these T&Cs apply to the Sample, all testing and other uses of the Sample, all results of the testing, and all publications or other uses of the results and related data and information.

Ownership and Use. Upon submission of the Sample, the Sample shall become the sole and exclusive property of AHA, and Member shall be deemed to have assigned all right, title and interest in and to the Sample to AHA. AHA may use the Sample and provide any portion of the Sample to others for any purpose that promotes the interests of the Hereford breed as determined by AHA. Such uses may include parentage verifications, genetic abnormality testing, and breed improvement testing and research, but AHA agrees to refrain from using or allowing others to use any portion of the Sample for cloning or gene editing. AHA may also use and provide to others the results of any testing of the Sample and associated data and information (including phenotypic data and performance values), for any purpose that promotes the Hereford breed. The results of tests conducted with respect to the Sample will be published by the AHA, including, without limitation, on the record of the animal and any progeny of the animal.

Storage. The testing lab or AHA intend to store the Sample for purposes of conducting the testing requested by the Member in the Sample Submission Form. Once the initial testing results are reported to the Member, AHA may have remaining portions of the Sample stored for subsequent testing or use, but has no obligation or responsibility to do so and has no obligation or responsibility to make such portions available to the Member for subsequent testing or use.

Testing Lab. The Sample should be sent to the testing lab that is designated on the Sample Submission Form. AHA has entered into an agreement with the testing lab to provide the testing services to AHA's Members. While AHA has secured the testing services of the testing lab in an effort to ensure uniformity in testing, it should be understood that the testing lab is a third party laboratory and that AHA does not control the quality or performance of any of the services provided by the testing lab.

LIMITATION OF LIABILITY. AHA makes no representations or warranties of any kind regarding the suitability, usefulness, reliability, completeness, availability, timeliness or accuracy of the tests, the test results, and/or any other information, data, products or services provided in conjunction with the testing or in relation to the sample. All such tests, test results, and other information, data, products and services are provided "as is" without warranty of any kind. AHA hereby disclaims all warranties, representations, and conditions of any kind with regard to the tests, the test results, and/or any other information, data, products or services provided in conjunction with the testing or in relation to the sample, either express or implied, including all implied warranties of merchantability, fitness for a particular purpose, title, and non-infringement.

In no event shall AHA be liable for any direct, indirect, punitive, incidental, special, consequential or any other damages, losses, claims, injuries, or liabilities whatsoever including, without limitation, damages for loss of the sample, data or profits, loss of anticipated or expected revenue, or business interruption arising out of or in any way connected with the tests, the test results, or other information, data, products or services provided with the testing of the sample or the use or publication of the same, whether based on contract, tort, negligence, strict liability or otherwise, even if AHA has been advised of the possibility of such damages.

The sole and exclusive remedy for any defect, failure or error in relation to the testing and sample shall be a refund to the member of the testing fee and/or re-testing.

Miscellaneous. These T&Cs constitute the entire agreement between the Member and AHA with respect to the Sample, all testing and other uses of the Sample, all results of the testing, and all publications or other uses of the results and related data and information. This agreement shall be construed, enforced, and performed in accordance with the laws of the State of Missouri, without reference to the principles of conflicts of laws. If any provision of this agreement is unlawful, void, or unenforceable, whether in its entirety or in any portion, then such part shall be deemed amended, if possible, or deleted, as the case may be, from the agreement in order to render the remainder of the agreement and any provision thereof both valid and enforceable. With respect to any particular Sample, these T&Cs may not be altered, amended, modified, or rescinded, orally or by any other document, except by a writing signed by authorized representatives of each of the Member and AHA.

SECTION VIII: CLONING

Rule 1. REGISTRATION OF CLONES. Except as otherwise provided herein, and subject to compliance with all applicable requirements contained in these Rules, an animal that is produced through cloning may be registered. Registration shall be requested via a special application form provided by the Association and with payment of the regular registration fee, plus an additional clone registration fee as determined by the Association.

Rule 2: DONOR ANIMAL. The donor animal of the resulting clone animal must be a registered animal recorded in the American Hereford Record and must be DNA profiled as provided in Section VII with a record of such DNA profile filed with the Association. The DNA profile for such donor animal shall include parent verification, and such donor animal shall be tested for all known genetic abnormalities.

Rule 3: BREEDER. The breeder identified on the registration certificate of the donor animal shall be identified as the breeder on the registration certificate of the resulting clone animal.

Rule 4. FIRST OWNER AT REGISTRATION. The first owner, as reflected in the Association's records, of the registration of the clone animal shall be determined in accordance with Rule 5 of Section IV.

Rule 5. DNA PROFILING. DNA profiling of the clone animal is required and the DNA profile of the clone animal must match the DNA profile of the donor animal to confirm that it is a clone. DNA profiling may also be required by the Association of the surrogate dam.

Rule 6. DEATH OF DONOR ANIMALS. Progeny that is produced through cloning after the death of the donor animal shall be eligible for registration upon the same terms and conditions as progeny produced through cloning prior to the death of said donor animal.

Rule 7. REGISTRATION CERTIFICATES. Any registration certificate issued for a resulting clone animal shall be designated by "CL" following the name of the animal. The name must be no longer than 30 spaces long including the CL designation. The registration number of the donor animal shall also be stated on the registration certificate of the resulting clone animal.

A. All progeny descendants from any cloned parent shall have their pedigree labeled as Cloned Progeny (CLP), and the name of these progeny may be no longer than 30 spaces including the CLP.

Rule 8. RIGHTS IN MATERIALS, ANIMALS AND INTELLECTUAL PROPERTY. Nothing set forth herein or included on any registration certificates or other Association records should be construed as an indication that the Association takes any position as to the ownership or intellectual property rights of any party in and/or to genetic or other biological materials obtained from donor animals or resulting from cloning procedures. Any party transferring or otherwise disposing of, and any party purchasing or otherwise acquiring, genetic or other biological materials or animals, and any party otherwise involved in cloning activities, should take appropriate action (including due diligence) to ensure that all rights needed or desired in relation to such materials, animals and activities have been secured and that all actions in relation to such materials, animals and activities do not infringe or otherwise violate the rights of others.

Rule 9. BREEDING VALUES. Initial expected progeny differences (EPDs) generated from National Cattle Evaluation for a resulting clone animal shall be the same values as the donor animal. All data of future progeny from a resulting clone animal will be pooled with the donor progeny data for genetic evaluation.

SECTION IX: GENOME EDITING

Rule 1. RESTRICTIONS ON REGISTRATION. Except as otherwise provided herein, and subject to compliance with all applicable requirements contained in these Rules, an animal that has an intentional genomic alteration (IGA) produced by genome editing may be registered subject to the following pre-approval and eligibility requirements:

- Prior to implementing the IGA in the animal, preliminary approval of the IGA shall be requested via a special IGA pre-approval application form provided by the Association and with payment of an IGA pre-approval request fee as determined by the Association. The member applying for pre-approval must provide documentation describing the IGA

to be introduced and the expected functional difference that the IGA will create in the genome-edited animal. The Board of Directors in its sole discretion may grant or withhold pre-approval, taking into consideration the impact of introducing the IGA into the Hereford population, informed by scientific and industry standards and practices at the time the application for pre-approval is reviewed; and

- Eligibility for registration is restricted to those animals possessing an IGA that has been appropriately reviewed and approved by the applicable regulatory agency — currently the U.S. Food and Drug Administration (FDA).

Rule 2. REGISTRATION. Registration for a genome-edited animal shall be requested via a special application form provided by the Association and with payment of the regular registration fee, plus an additional IGA registration fee as determined by the Association.

Rule 3. DNA PROFILING AND CONFIRMATION OF EDIT. To be registered, the genome-edited animal must be DNA profiled as provided in Section VII and with a record of such DNA profile filed with the Association. The DNA profile for such genome-edited animal shall include parent verification. In addition, the genome-edited animal must be genome sequenced to confirm the intended edit has occurred. A record of such genome sequencing and confirmation shall be filed with the Association.

Rule 4. REGISTRATION CERTIFICATES. A registration certificate issued for a genome-edited animal shall be designated by "PB" (Precision Breeding) following the name of the animal. The name must be no longer than 30 spaces long including the PB designation.

A. All progeny descendants from any Gene Edited parent shall have their pedigree labeled as Precision Breeding Progeny (PBP), and the name of these progeny may be no longer than 30 spaces including the PBP.

Rule 5: RIGHTS IN MATERIALS, ANIMALS AND INTELLECTUAL PROPERTY. Nothing set forth herein or included on any registration certificates or other Association records should be construed as an indication that the Association takes any position as to the ownership or intellectual property rights of any party in and to genetic or other biological materials used in or resulting from genome-editing activities. Any party transferring or otherwise disposing of, and any party purchasing or otherwise acquiring, genetic or other biological materials or animals, and any party otherwise involved in genome-editing activities, should take appropriate action (including due diligence) to ensure that all rights needed or desired in relation to such materials, animals and activities have been secured and that all actions in relation to such materials, animals and activities do not infringe or otherwise violate the rights of others.

SECTION X: GENETIC DEFECT POLICY

Procedures for collecting abnormality data and reporting the information to the AHA membership:

Physical and functional abnormalities are present in all breeds of cattle. In order to monitor abnormalities in Hereford cattle, the American Hereford Association requests the collection of abnormality information from AHA members on a voluntary basis.

Specialist Dr. David Steffen, veterinarian for the University of Nebraska Veterinary and Biomedical Science Department, has worked closely with many breeds in the area of genetic abnormalities. The AHA will be working with him to diagnose abnormalities as being genetic or non-genetic in origin.

Not all abnormalities are genetic in origin. Some defects can be attributed to sickness or nutrition. Dr. Steffen works to determine the root cause of the defect.

All AHA members are invited to read the procedures for reporting genetic abnormalities.

A. Reporting Physical Abnormalities to AHA

Any AHA member who becomes aware of a possible physical or functional abnormality in an AHA-registered animal shall immediately notify the AHA Director of Breed Improvement at 816-842-3757.

Upon receiving notification of a possible physical functional abnormality, the AHA Records Department will take the following steps to confirm the abnormality and determine if it is genetic in origin:

- Provide the member with an abnormality report form, which the member shall promptly complete and return to the AHA;
- Provide the member with instructions for collecting and submitting for analysis, as deemed appropriate, blood and tissue samples from the animal in question.

The reporting member shall promptly comply with all AHA instructions regarding the gathering and submission of tissue and blood samples.

B. AHA Genetic Consultant

The AHA will refer confirmed physical abnormalities to a genetic consultant for analysis. The genetic consultant shall be chosen by the AHA Board. Currently the genetic consultant is David Steffen, DVM Ph.D., from the University of Nebraska. The AHA genetic consultant is responsible for determining if sufficient evidence exists to establish a definite cause of a particular physical abnormality. All AHA members shall cooperate fully in any investigation necessary to such determination. The genetic consultant will advise the Board of diagnostic criteria for established genetic diseases and will evaluate evidence to determine if diagnostic criteria are met. Dr. Steffen will perform these evaluations as a pathologist for the Nebraska University Diagnostic Center.

C. Notification to Owners of Affected Animals and Owners of Parents of Affected Animals

Once a physical abnormality has been confirmed and parentage has been verified, all owners of record of the abnormal animal and owners of record of the parents of the abnormal animal will receive the following information from the AHA:

- A description of the physical abnormality in question.
- The recorded sire and dam of the abnormal animal.
- Whether as a preliminary matter the abnormality appears to be genetic in origin.
- If the abnormality appears to be genetic, what steps are planned to determine whether the parents of the abnormal animal are carriers of the physical abnormality.

D. Notification to AHA Membership

Upon confirmation that an AHA-registered animal has either (i) produced a sufficient number of abnormal progeny (at least two confirmed, parent-identified cases) such that there is a high likelihood that such animal is a carrier of a genetic defect, or (ii) been the subject of positive DNA test (See Section E) that indicates that such animal is a carrier of a genetic defect, the AHA will immediately notify the owners of record of the confirmed carrier, by first-class mail, of the AHA's intent to designate their animal as a confirmed carrier of a genetic defect. In addition, the AHA will immediately add a special code to the animal's registration to indicate this fact. An animal that has been designated as a confirmed carrier of a genetic abnormality shall be immediately placed on a confirmed carrier list, which will be disseminated on the AHA website and which will be available upon request.

Upon the release of a new genetic abnormality to the membership, AHA will publish the affected animals and their parent(s), if available. Additionally, AHA will publish the genetic abnormality results of all animals involved in research and discovery of a new genetic condition.

Any AHA member who may be aggrieved by the AHA's designation of a particular animal as a confirmed carrier of a genetic defect may file a complaint with the AHA Executive Committee

within thirty (30) days after the mailing of the notice. The filing of such a complaint will not stay the confirmed carrier designation. The complaint shall be heard and disposed of by the Executive Committee in accordance with the procedures set forth in Article XI of AHA's Bylaws. In the event that a complaint has not been filed within thirty (30) days after the mailing of the notice, the confirmed carrier designation will become final.

In the event that the complaint results in a final unappealable determination that the subject animal is not a confirmed carrier of a genetic defect, AHA will immediately remove the special code from the animal's registration. In addition, such animal shall be immediately removed from the confirmed carrier list.

In the event that an AHA registered animal has an unbroken pedigree link to a confirmed carrier of a genetic defect and such animal has not been the subject of a negative DNA test that is conducted pursuant to Section E below and that conclusively indicates that such animal is not a carrier of a genetic defect, AHA shall immediately add a special code to such animal's registration to indicate this fact.

In the event that the complaint results in a final unappealable determination that the subject animal is not a potential carrier of a genetic defect, AHA will immediately remove the special code from such animal's registration. The results of a DNA test that is conducted pursuant to Section E below and that conclusively indicates that the subject animal is not a carrier of a genetic defect shall constitute conclusive evidence that the subject animal is not a potential carrier of a genetic defect.

E. DNA Genetic Abnormality Testing

In the case the AHA identifies a gene marker test for a genetic abnormality, animals may be tested to determine carrier status by an AHA approved laboratory. If breeders wish to officially confirm an animal free of a genetic abnormality and designate it as such on the animal's pedigree, then the following guidelines must be met:

- The breeder must request the DNA test kit from the AHA Records Department.
- The results of the test must be returned directly to AHA from the official lab.

F. Classification of Genetic Abnormalities

The AHA currently recognizes the following physical abnormalities that have been confirmed by its genetic consultant to be genetic in origin under certain circumstances:

- CLASS I (LETHAL)
 - Snorter Dwarfism
 - Maple Syrup Urine Disease (Neuraxial Edema)
 - Internal Hydrocephalus
 - Idiopathic Epilepsy (IE)
 - Mandibulofacial Dysostosis (MD)
- CLASS II (NON-LETHAL)
 - Hypotrichosis
 - Dermoid
 - Alopecia/Dyserythropoiesis
 - Color Dilutor
 - Delayed Blindness

G. Description of Defects

- CLASS I (LETHAL)
 - Snorter Dwarfism**
 - Symptoms: Undersized, short-legged, short-bodied animal, usually potbellied with noisy breathing. Several different types include a broad-headed, bulging forehead and a long- and mature-headed kind. X-ray of 10-day-old dwarfs may show abnormal lumbar vertebrae. Most cases are simple autosomal recessive; some forms are incomplete dominance.
 - Confirmation: Pathologic exam

Maple Syrup Urine Disease (Neuraxial Edema)

- Symptoms: Calves will be of normal size at birth. May

not be able to get up or lift head. A sudden touch or loud noise may cause a vigorous extension of the legs and neck. Contraction (muscle spasms) may last one or two minutes and can be made to reappear. Simple autosomal recessive.

- Confirmation: Histopath of nervous tissue or biochemical test

Internal Hydrocephalus (water head)

- Symptoms: Excess fluid is present in the brain which may result in a bulging forehead. Calves are usually born dead or die shortly after birth. Some cases may be environmental. Needs careful diagnosis. Simple autosomal recessive.
- Confirmation: Gross pathologic exam

Idiopathic Epilepsy (IE)

- Symptoms: Age of onset (occurrence of the first seizure) can be variable, ranging from birth to several months of age. Occurrence and persistence of seizures may be influenced by environmental stressors such as temperature extremes (e.g., extreme cold during calving) or increased physical activity (e.g., processing at vaccination or weaning). Upon initial onset of seizure episodes, individuals will typically lie on their side with all limbs extended in a rigid state. Manual flexing of the limbs is possible, but return to the extended position occurs after release. Seizure episodes may last from several minutes to more than an hour. Autosomal recessive.
- No anatomic abnormalities or histologic lesions detected.
- Confirmation: AHA approved expert

Mandibulofacial Dysostosis (MD)

- Symptoms: The anatomic features overlap with a variety of other facial defects and can include cleft palate, brachygnathia (short jaw) and camplygnathia (crooked jaw or face). These are variably present in affected calves and are sometimes dramatic. The unique and consistent hallmarks of the condition include unusual bilateral skin tags just behind the corner of the mouth. These tags are attached to an unusual bone formation. There may be additional skin tags near and/or below the ears. A ridge of Meckel's cartilage, a structure usually present only during embryonic development, is retained in these calves and attaches to the skin tag. This cartilage is encased in bone as it is followed from the skin tag toward the base of the ear. This bone attaches specifically to the zygomatic process of the temporal bone (just above the articulation of the jaw). The calves' ears are sometimes slightly small and floppy. Muscles of the jaw are underdeveloped, and calves may have an elongate oral opening appearing as an exaggerated smile. The nursing reflex is present, but nursing is not vigorous. Calves with the additional cleft palate, severely shortened or crooked jaws are debilitated in ability to nurse. Calves with the defect are live born but are not able to thrive.

• CLASS II (NON-LETHAL)

Hypotrichosis (hairlessness)

- Symptoms: Partial to almost complete lack of hair. Affected calves are often born with very short, fine, kinky hair that may fall out, leaving bare spots or areas particularly susceptible to rubbing. The condition may vary in expression as the animal matures and is usually less noticeable in older animals. The haircoat color will sometimes appear "frosted" or "silverish." Tail switch may be underdeveloped. Simple autosomal recessive.
- Confirmation: Megatrichohyaline granule skin biopsy

Dermoid (feather eyes)

- Symptoms: Skin-like masses of tissue occur on the eye or eyelid. Animals may become partially or completely blind. Polygenic inheritance.
- Confirmation: Clinical diagnosis with photos or biopsy

Alopecia/Anemia, Dyserythropoiesis

- Symptoms: Short, curly hair, hair loss on neck and shoulder. Progressive generalized hair loss. White areas appear dirty and calves are anemic.
- Confirmation: Blood test for anemia plus skin biopsy

Color Dilutor

- Symptoms: Carrier Hereford bulls or females when mated to black cattle can produce offspring with a haircoat that is gray, smokey or chocolate color.
- Confirmation: Clinical diagnosis with photos

Delayed Blindness

- Symptoms: Initial clinical signs may include the animal having difficulty navigating their surroundings, bumping into stationary objects, and slowly navigating unfamiliar terrain. These cattle will also lack a menace response (reaction to something being moved toward the eye). Delayed Blindness is caused by retinal degeneration within the eye. Cattle affected by Delayed Blindness are not born blind but vision loss is noticeable near or just after one year of age.
- Confirmation: A detailed ophthalmologic evaluation of the retina in the back of the eye

H. Lethal vs. Non-Lethal

A lethal genetic abnormality is a genetic abnormality which usually results in death of the animal or production of the animal is significantly impaired causing major economic loss.

Non-lethal abnormalities do not cause death, nor do they significantly affect production or commercial profitability. Non-lethals may, however, cause economic loss to seedstock producers.

I. Breeding to Avoid Abnormalities

Breeders that may have a problem with a simple recessive abnormality can make use of available DNA-based diagnostic tests or implement mating systems designed to reduce the frequency of the abnormal gene in their herds and the breed. Where a DNA-based test is available, breeders can directly test animals for the presence of a specific mutation causing the disease. Animals confirmed to be carriers should be used cautiously, and serious consideration should be given to their removal from the seedstock breeding herd. However, breeders should guard against carelessly throwing away good genetics because a sire or dam is a carrier unless that animal's good characteristics remain available in the breed from another source. In the absence of a DNA-based test, mating systems should rely on the use of bulls known not to have produced affected calves. Sons of carrier animals can be used if they have been tested free of the abnormality through a series of special test matings. Mating a bull to seven affected females, 17 carrier cows or 35 of his own daughters with no abnormal offspring provides three ways to test for the presence of a recessive gene. With specific regard to non-lethal abnormalities, each breeder must assess the potential economic impact the abnormality may have on his operation.

J. Predicted Outcome of Certain Matings Using Hypotrichosis as an Example

Hypotrichosis (non-lethal) results from homozygosity of a simple autosomal recessive gene. This means that both parents must possess the hypotrichosis gene in order to produce an affected calf. Approximately 25% of the calves resulting from the mating of two carrier animals will be affected, while 50% will be normal appearing but carriers of hypotrichosis, and the remaining 25% will be normal and non-carriers. Possible matings and the predicted outcomes are shown in the table below:

Matings ¹	Affected		
	Hypotrichosis	Unaffected Carrier	Unaffected Normal
hh x hh	100%	0%	0%
hh x Hh	50%	50%	0%
hh x HH	0%	100%	0%
Hh x Hh	25%	50%	25%
Hh x HH	0%	50%	50%
HH x HH	0%	0%	100%

¹hh-affected with hypotrichosis; Hh-carrier; HH-normal