



final report

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Beef CRC Genomics Database Annotation

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Executive summary

The Beef Cooperative Research Centre (CRC) was established in July 1993 and has now completed three 7-year CRC terms: Cattle and Beef Industry (Meat Quality) (CRC I; 1993-1999), Cattle and Beef Quality (CRC II; 1999-2005), and Beef Genetic Technologies (CRC III; 2005-2012). Research undertaken in CRC II and III generated a significant amount of data, including genomics, for which there is limited annotation and limited linkage between phenotypic and genomic datasets. The overarching aim of this project is to establish a Beef CRC Genomics database and provide annotation of the data stored within.

Prior to this project, the phenotypic Beef CRC database consisted of an SQL database with a webfront for researchers' access. Genomic data was house internally at AGBU within the BREEDPLAN genomic pipeline database. There was no reference to genomic data within the phenotypic database. The key outcome of this project was to include genomic sample IDs within the phenotypic database, along with descriptive information of the genotypes, enabling the pre-existing database to become the Beef CRC Genomics database. Annotation of the data was updated, along with key genomic information, and maintenance requirements and budgets for the database and the Livestock Library provided. As a result of this project, more streamlined access to Beef CRC research data has been provided, to ensure the resource remains useful for industry.

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1 Background

The Beef CRC 1, 2, and 3 ran from 1993 to 2012, generating a wealth of data for various research objectives from a significant number of projects. Data generated from a subset of those projects in CRC II and III have historically been housed in a database within the Animal Genetics and Breeding Unit (AGBU), Armidale NSW. This database, developed by AGBU, houses phenotypic and identity data from projects:

- CRC II - Project 2.3: “Links between the genetics of beef quality and components of herd profitability in northern Australia”.
- CRC III - Project 4.1.3a: “Male indicator traits to improve female reproductive performance”.
- CRC III - Project 4.1.3b: “Early predictors of lifetime female reproductive performance”.
- CRC III - The “Underpinning Genotyping” project: “Gene discovery and underpinning science”.

Data held within this database has been accessible by CRC participants since the end of CRC III via an approval process managed by MLA.

Annotation of this phenotypic data has been limited and updates of this annotation has been a key driver of this project. Additionally, genomic data originating from CRC II and III has been housed separately at AGBU with no existing link to the phenotypic database for accessibility.

The key objectives of this project were to link the phenotypic data with the genomic data, provide some annotation of the database to enable a better understanding of the raw data, and propose ongoing maintenance requirements and costs. Additional objectives include annotation of the MLA-Beef CRC Industry Sires Genotyping data and ongoing provision and maintenance of the Livestock Library. The overarching aim of these objectives is to ensure the data produced during the CRC is accessible to researchers on an ongoing basis.

2 Project objectives

The project has the following key objectives:

1. Annotate the existing Beef CRC database, including providing a search facility allowing potential users to understand the contents of the database.
2. Maintain a secure copy of the Beef CRC Genomics database, with annotation as provided by Beef CRC.
3. Upon request from R&D providers through MLA, provide extracts or copies of that data.
4. Define requirements for maintenance of the Livestock Library, and implement.

These are split into the following four milestones:

1. Contract execution
2. Annotation task defined including traits, breeds, fields, delivery date, and plan for annotation of remaining CRC datasets defined including delivery date.
3. Beef CRC Genomics database annotated and summary provided to MLA, including breeds, fields, traits, and other points defined in milestone 2.

- 4.1 Operating budget and protocol defined for maintenance of Beef CRC Genomics database completed
- 4.2 Final Report submitted and approved by MLA
- 4.3 Unspent funds returned to MLA.

3 Methodology

3.1 Beef CRC Genomics Database

Prior to this project, data from the Beef CRC II and III existed in two major forms:

1. Phenotypic data housed in an existing Beef CRC database developed by AGBU during CRC II-III;
2. Genomic data housed in AGBU as the Beef Genomic Pipeline – developed with MLA funded project L.GEN.1704.

These two data forms are described below, with the deliverable “Beef CRC Genomics Database” formed by linking these datasets together.

3.1.1 Existing Beef CRC Phenotypic database

Data generated from several projects in CRC II and III are housed in a PostgreSQL database within AGBU, with a front-end html interface accessed at <http://beefcrc.une.edu.au>. Access to this Beef CRC database is restricted to authorised users and authorisation is required on a case-by-case basis from MLA. The existing database houses phenotypic and identity data from projects:

- CRC II - Project 2.3: “Links between the genetics of beef quality and components of herd profitability in northern Australia”.
- CRC III - Project 4.1.3a: “Male indicator traits to improve female reproductive performance”.
- CRC III - Project 4.1.3b: “Early predictors of lifetime female reproductive performance”.

Data includes various cohorts of animals which can be retrieved from the database by selecting animals using a series of fields and codes, for which the documentation has been updated along with instructions for accessing and downloading data.

The existing phenotypic database does not contain genotypes captured within these projects. Rather, the genotypes are housed separately in a genomic database housed at AGBU, which was developed for the single-step BREEDPLAN genomic pipeline. However, the phenotypic database has additional genotype fields added to link these two datasets enabling access to both resources.

3.1.2 The “Underpinning Genotyping” project annotation

Genotyping was a large focus of CRC III with genotypes generated across various research programs. These genotypes were consolidated in the “Gene discovery and underpinning science” project, and currently genotypes are housed internally at AGBU within the single-step BREEDPLAN genomic pipeline database structure. While the existing Beef CRC phenotypic database contains only phenotypic data, it also contains the animal’s recorded DNA sample ID. Using this sample ID, a link between the phenotypic database and the genomic pipeline data structures has been made.

3.1.3 Data relevant publications

A list of publications resulting from projects CRC II – 2.3 (MLA B.NBP.0301), CRC III – 4.1.3a (MLA B.NBP.0361), and CRC III – Project 4.1.3b (MLA B.NBP.0363), has been updated and provided for inclusion on the Beef CRC database online documentation.

3.2 MLA-Beef CRC Industry Sires Genotyping data annotation

During and after CRC III, DNA samples from industry sires were sourced, including an independent subset of young animals, for 50k SNP panel genotyping. Samples from animals with reasonable accuracies (> 60%) for BREEDPLAN carcass EBVs, such as EMA, P8 fat and/or IMF, were requested from breed societies and their members. The genotypes were used to validate CRC-developed prediction equations for genomic breeding values for a number of traits. Additionally, the genotypes were stored and used for ongoing genomics research. These genotypes are housed internally at AGBU within the beef genomic pipeline database structure, with some annotation provided as part of this project.

3.3 Livestock Library Maintenance

The Livestock Library houses more than 60,000 publications, including those generated from Beef CRC research, providing researchers and others with access to a number of publications not currently held anywhere – these include the Recent Advances in Nutrition series, the proceedings of the Association for the Advancement of Animal Breeding and Genetics (AAABG). A key objective of this project includes provision of a secure location for the Livestock Library along with defined requirements for ongoing maintenance.

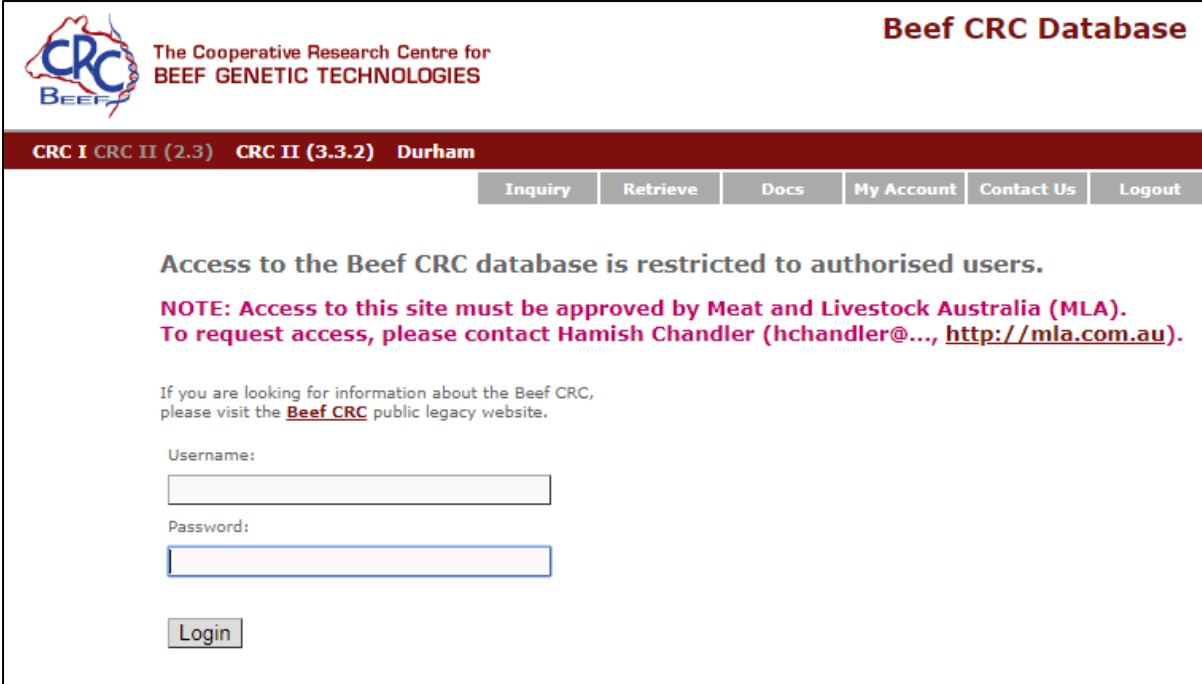
4 Results

4.1 Beef CRC Genomics Database

Prior to this project, data from the Beef CRC II and III existed as separate phenotypic database and genomic database. These two data forms are described in detail below, with the deliverable “Beef CRC Genomics Database” formed by linking these datasets together.

4.1.1 Existing Beef CRC Phenotypic database

The Beef CRC Genomics database can be accessed at <http://beefcrc.une.edu.au>, where the user will need to login as shown in Figure 1. Once logged in, the user can browse or search the data using Inquiry or Retrieve options, or view documentation in the Docs tab, as shown in Figure 2.



Beef CRC Database

The Cooperative Research Centre for
BEEF GENETIC TECHNOLOGIES

CRC I CRC II (2.3) CRC II (3.3.2) Durham

Inquiry Retrieve Docs My Account Contact Us Logout

Access to the Beef CRC database is restricted to authorised users.

**NOTE: Access to this site must be approved by Meat and Livestock Australia (MLA).
To request access, please contact Hamish Chandler (hchandler@..., <http://mla.com.au>).**

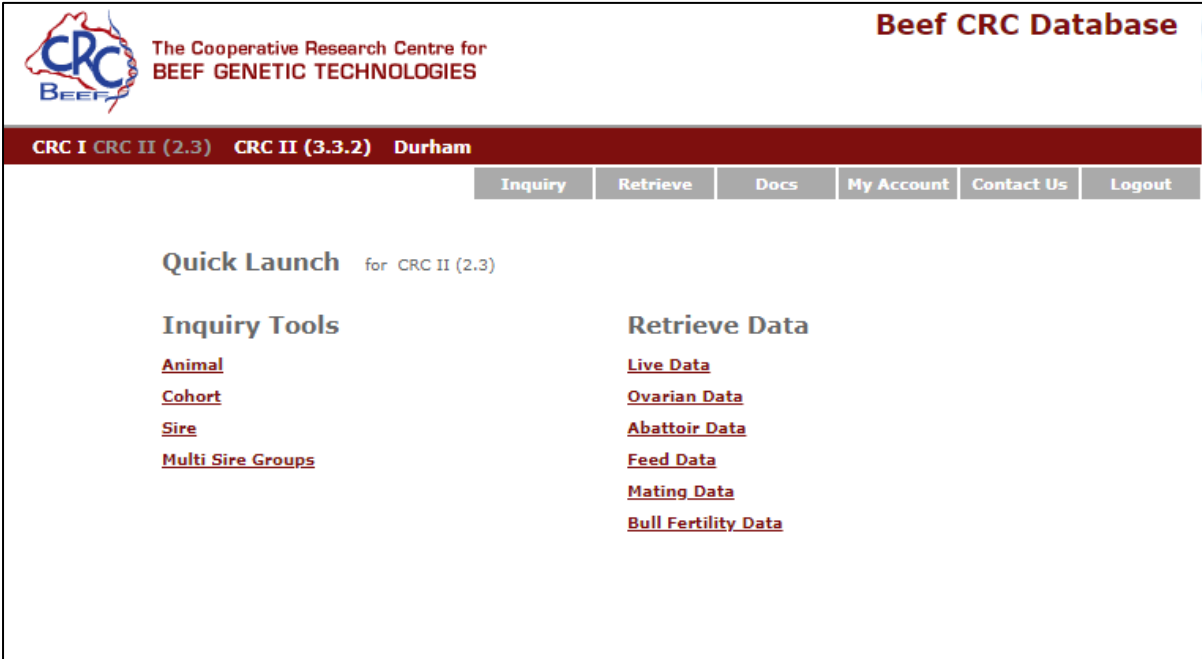
If you are looking for information about the Beef CRC,
please visit the [Beef CRC](#) public legacy website.

Username:

Password:

Login

Figure 1. Beef CRC Genomics database web interface login.



Beef CRC Database

The Cooperative Research Centre for
BEEF GENETIC TECHNOLOGIES

CRC I CRC II (2.3) CRC II (3.3.2) Durham

Inquiry Retrieve Docs My Account Contact Us Logout

Quick Launch for CRC II (2.3)

Inquiry Tools

- [Animal](#)
- [Cohort](#)
- [Sire](#)
- [Multi Sire Groups](#)

Retrieve Data

- [Live Data](#)
- [Ovarian Data](#)
- [Abattoir Data](#)
- [Feed Data](#)
- [Mating Data](#)
- [Bull Fertility Data](#)

Figure 2. Beef CRC Genomics database interface.

The PostgreSQL database houses data from various cohorts of animals which can be retrieved from the database by selecting animals using a series of fields and codes, including:

- Breed
- Sex
- Cohort
- Origin
- Location
- Live Codes
- Ovarian Codes

- Bull Fertility Codes
- Meat Codes
- Mating Outcome Codes
- Project Exit Codes

As part of this project, instructions on how to access the data have been added to the documentation available online under the website's "Docs" tab (<http://beefcrc.une.edu.au/Docs.aspx>), and also shown here in Appendix 9.1. Descriptions of the fields and codes used to filter the data have been updated and summarised in Appendix 9.2. In particular, the origins codes have been updated to better describe origins of sires and cows during the various projects, and the locations/lines the animals came from, such that some origins were used only for sires, some only for cows, and some for both. Some cows had no origin information but were relocated to a research station, which is listed as its origin. Importantly, some of the listed lines are now no longer operational. The Locations have been updated to better describe the geographical location of some stations. Updates to the Ovarian codes now better describe measurements that were taken as a trial measure and then discontinued during the project, and as such should not be used, with the online documentation explicitly stating 'do not use'.

These tables are available in the online documentation, which has also been updated as a result of this project. This online documentation is searchable using web browser search functions, or using the hyperlinks at the beginning of the documentation to skip to the appropriate section. The database structure has been updated and is illustrated with the database 'map' in Appendix 9.3. This existing phenotypic database does not contain genotypes captured within these projects. Rather, the genotypes are housed separately in a genomic database housed at AGBU, which was developed for the single-step BREEDPLAN genomic pipeline. However, an additional field has been added to the database to indicate if an animal has a genotype recorded in the genomic pipeline. This is discussed in the next section.

4.1.2 The "Underpinning Genotyping" project annotation

Genotypes produced in the "Gene discovery and underpinning science" project are housed internally at AGBU within the single-step BREEDPLAN genomic pipeline database structure. While the Beef CRC phenotypic database contains only phenotypic data, a link between the phenotypic database and the genomic data has been made using the animal's recorded DNA sample ID. An additional field 'GenoSamples' has been added to an animal's entry in the phenotypic database to indicate if an animal has a genotype recorded in the single-step BREEDPLAN genomic pipeline, housed at AGBU. Under this field, the presence of a genotype will be confirmed by a panel density (e.g. 7k, 10k, 20k, 35k, 50k, 50kv1, 80k-t, 80k-l, 140k, 800k), along with the lab where genotyping was performed (e.g. UQ), and the sample ID. An example of this is shown in Figure 3. This additional field also has function in the cohort inquiries, with a 'Genos' column added shown in Figure 4. This allows the user to see if whole cohorts are genotyped or not, and at what panel density. The addition of this data to the database has been captured in the database structure map in Appendix 9.3, shown in blue to distinguish it from phenotypic data structures. Further to this, a new 'Genotypes' document has been added to the online 'Docs' tab, showing 4,022 CRC animals in the phenotypic database that have genotypes stored in the single-step BREEDPLAN genomic pipeline database. Appendix 9.4 provides an example of the document, with the first 50 animals shown. This document provides the project ID, society registration ID, CRC ID, DNA sample ID, panel density, and database subfolder the genotype sits in (i.e. batch). This document serves as a clear link between the phenotypic database and genomic database, without providing the genotypes due to ongoing ownership and permission concerns. The genotypes themselves can be accessed by recording which animals and sample IDs are required, and contacting MLA for permission, and AGBU for the data if permitted.

Animal Details	
CRC ID	< 001019 >
Society ID	WAVWEE001019F (Society link)
Animal Name	WAVERLEY WEE001019
Breed	Brahman [BBBBBBBB]
Sire	LAN7736
Dam	Unknown
Assigned Dam	Unknown
Origin	Weetalaba
Cohort	PBE00
Sex	Heifer [H]
Date of Birth	5/10/1999
Birth Weight	
Calving Difficulty	
Year of Birth (drop)	2000
Weaning Date	14/07/2000
Weaning Weight	281
Project Exit Date	8/04/2008
Project Exit Code	2 (Generation 1 animal returned to owner)
Disposal Date	23/04/2008
Horn Status	H
Comment	Dam had twins, the weakest twin was put down
GenoSamples	50kv1(uq1019)
Breed Percent	AF-0,HH-0,SS-0,BB-1.0,OO-0,RA-0,CC-0,ND-0,RP-0
Generation	1
Sire Flag	YES
UQ_id	45415

Figure 3. Example of BeefCRC database animal entry with additional GenoSamples field. GenoSamples field highlighted.

Cohort - PBE00			
73 in Cohort			
Animal	Sex	Breed	Genos
001001	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uq1001)
001002	Heifer [H]	Brahman [BBBBBBBB]	
001004	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAB03_BC011322)
001006	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uq1006)
001010	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAG10_BC011328)
001012	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uq1012)
001013	Heifer [H]	Brahman [BBBBBBBB]	
001014	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAH10_BC011329)
001019	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uq1019)
001025	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAA11_BC011337)
001026	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAB11_BC011338)
001032	Heifer [H]	Brahman [BBBBBBBB]	
001035	Heifer [H]	Brahman [BBBBBBBB]	800k(uqCRCHD19_BC011344)
001036	Heifer [H]	Brahman [BBBBBBBB]	50kv1(uqWG0057326-DNAC11_BC011345)

Figure 4. Example of BeefCRC database cohort with additional Genos column. Animal shown in Figure 3 highlighted.

4.1.3 Data relevant publications

A full list of publications, as reported in MLA final reports, from projects CRC II – 2.3 (MLA B.NBP.0301), CRC III – 4.1.3a (MLA B.NBP.0361), and CRC III – Project 4.1.3b (MLA B.NBP.0363), is provided here in Appendix 9.5, with those previously listed ‘in preparation’ updated to include journal details. These publications have the materials and methods for the datasets housed in the Beef CRC database. Most, if not all, of these publications are available in the Livestock Library. This list has been incorporated into the online documentation of the database, titled “Data Relevant Publications”, such that researchers wishing to access data can read relevant articles to understand the experimental designs.

4.2 MLA-Beef CRC Industry Sires Genotyping data annotation

During and after CRC III, 50k SNP panel genotyping of industry sires, including an independent subset of young animals, were used to validate CRC-developed prediction equations for genomic breeding values for a number of traits. Genotypes were internally at AGBU within the beef genomic pipeline database structure, and a full list is shown in Appendix 9.6. The project resulted in 1,481 genotypes, of which 48 animals have both a 50k and 800k genotype. A summary of the sires' breeds and ages are provided in Tables 1 and 2.

There is minor overlap with the Beef CRC database, with only 14 animals existing in both datasets. As there is minor overlap with CRC animals, and the project existed outside of the CRC, the value in the addition of this tabled list to the online CRC database is questionable, and as such these genotypes have not been added online, though can be added at a later date on request.

Table 1. Breed summary of Industry Sires genotypes

Breed	Number of genotypes
Angus	375
Brahman	104
Charolais	100
Droughtmaster	126
Hereford	220
Limousin	327
Santa Gertrudis	21
Simental	101
Shorthorn	107
Total	1481

Table 2. Birth year summary of Industry Sires genotypes

Birth Year	Number of animals
1961	2
1965	2
1967	5
1968	1
1969	12
1970	18
1971	5
1972	3
1974	2
1975	3
1976	3
1977	4
1978	8
1979	10
1980	11
1981	15
1982	15
1983	13
1984	9

1985	11
1986	21
1987	28
1988	33
1989	26
1990	25
1991	33
1992	41
1993	20
1994	40
1995	31
1996	32
1997	40
1998	47
1999	75
2000	65
2001	84
2002	84
2003	89
2004	119
2005	104
2006	72
2007	97
2008	90
2009	20
2012	1
Nil	6

4.3 Proposed Maintenance Budget

4.3.1 Beef CRC Genomics Database Maintenance

The Beef CRC database web front is hosted within the UNE domain and as such the domain name costs are covered. The data is housed on internal AGBU servers which require annual maintenance/repair. Staff time for database maintenance, and data processing is conservatively estimated at 10 days per year. Budget estimates are provided in Table 3 below, estimating a yearly budget of approximately \$4,250 for ongoing maintenance of the Beef CRC Genomics Database. These estimates do not include time for ongoing changes to the database, but rather routine and regular maintenance and use. Changes to the database structure would require significant costs associated with staff time and hardware, which cannot be estimated prior to a database structure proposal.

Table 3. Annual costs for ongoing maintenance of the Beef CRC Genomics Database.

Item	Description	Cost (AU\$/year)
Servers:	Internal Server hardware maintenance	500.00
Maintenance:	Personnel access, data download. (Staff time \approx 10 days/year)	3750.00
Total	Total cost/year	4250.00

4.3.2 Livestock Library Maintenance

A key objective of this project includes provision of a secure location for the Livestock Library along with defined requirements for ongoing maintenance. The Livestock Library website uses several similar domain names hosted using Amazon servers (cloud-based hosting). These have an annual fee per domain, with monthly server fees. Maintenance includes financial processing, data loading, clean-up and reporting with a conservative estimate of staff time of 5 days per year. These budget estimates are provided in Table 4 below, estimating a yearly budget of approximately \$2,500 for ongoing maintenance of the Livestock Library.

Table 4. Annual costs for ongoing maintenance of the Livestock Library.

Item	Description	Cost (AU\$/year)
Hostings:	livestocklibrary.com	20.00
	livestocklibrary.com.au	35.00
	livestocklibrary.org.au	35.00
Servers:	Amazon hosting (\$40/month)	480.00
Maintenance:	Finance, data loading, clean-up, reporting (Staff time \approx 37.5hr/yr = 5 days/year)	1875.00
Total	Total cost/year	2445.00

5 Discussion

5.1 Beef CRC Genomics Database Structure

The Beef CRC Genomics Database is formed by the linking of the pre-existing phenotype database and the genomics database used for Single-Step BREEDPLAN. This enables a more streamlined access to both sources without the overheads of designing an entire new database system to house two different datasets. The genotypes themselves are not housed in the same location as the phenotypic data, rather the genotype sample IDs and density information is provided, such that researchers may request the genotype from AGBU. This arrangement has avoided the need for costly and time consuming database design and upload of genotypes that are already housed in a currently accepted format. However, should the need arise for a database which directly houses the genotype information, the current Postgres SQL system housing the phenotypic data would not be suitable, and a new database would need to be built to house both.

5.2 Annotation Challenges

The data housed in the Beef CRC phenotype database has been collected many years prior to this project, and by researchers not involved in this project. While the annotation has been updated and

previously missing annotation has been restored, there remain nuances of the data that only researchers involved in its collection can document. Experimental designs are largely captured in publications, which as a result of this project, have been provided within the database documentation. However, there remains a level of vagueness within some publications and, perhaps, a disconnect between publication method and the raw data itself. To reconnect experimental designs with the raw data, researchers involved in the initial Beef CRC projects would be required to establish these links, and thus this would form a subsequent project with many parties involved. At this stage, clarity in experimental designs and raw data selection is best sought from publication authors to ensure the data being used is fit-for-purpose. Nevertheless, despite these shortcomings, the database is a valuable resource and forms a comprehensive dataset for researchers to access.

5.3 Objectives Completion

The following summarises the deliverables for each project objective:

1. Annotate the existing Beef CRC database, including providing a search facility allowing potential users to understand the contents of the database.
 - Annotation of the Beef CRC database has been updated to provide better descriptions of the data filters both within this report, and in the online documentation. This includes a new “Instructions” document to better instruct users on how to access and download data, along with a list of publications providing experimental materials and methods for the data, and a list of Genotypes available for the Beef CRC data.
2. Maintain a secure copy of the Beef CRC Genomics database, with annotation as provided by Beef CRC.
 - The Beef CRC Genomics database, and the documentation, is housed on an internal server, with backup capabilities. The server is within the UNE IT security system. As per section 4.3.1, the maintenance requirements and budget for the database are provided.
3. Upon request from R&D providers through MLA, provide extracts or copies of that data.
 - Data requests will continue to function as per existing procedures, whereby permission is gained from MLA prior to access to the database, and any data requests are handled by contacting AGBU.
4. Define requirements for maintenance of the Livestock Library, and implement.
 - As per section 4.3.2, the maintenance requirements and budget for the Livestock Library are provided. Maintenance of the Livestock Library will continue to be performed by AGBU.

6 Conclusions/recommendations

The Beef CRC Genomics database has been established by linking the Single-Step BREEDPLAN genomics database, developed by AGBU within MLA project L.GEN.1704, to the Beef CRC phenotype database previously developed by AGBU within the Beef CRC. Annotation of the database has been updated and improved, along with provision of publication lists to ensure experimental designs behind the data collection can be accounted for in using the data. Maintenance requirements and budgets have been provided for continued operation of the database and Livestock Library. Annotation of the Industry Sires Genotyping data has been provided, with the option to include these genotypes in the Beef CRC Genomics database documentation.

The current database structure is designed to house phenotype data and not genotypes. Should a combined phenotype and genotype database be required, this will require a completely new database build, with significant costs and time required. Retrofitting data into an existing database

structure is not efficient, and as such, any project expected to generate data should be required to plan a database structure at the time of project proposal, and implement as soon as possible to ensure data is documented upon entry. This process serves as a type of 'safety measure' to ensure data is recorded, and appropriately annotated, for future use.

This project in general would have benefited from inclusion of more people that were involved in the data collection, particularly for the annotation tasks. There are nuances to the data that cannot be explained by the data or within publications, and which in general reside "in the heads of" the researchers themselves. Additionally, the length of time between data collection/finalisation of the Beef CRC and this annotation project, has meant that the details of the data may have been forgotten. Locations that were used during data collection are now either not operational and/or subdivided/acquired, such that some stations may no longer exist.

If industry wants to ensure ongoing and useful access to research project data from R&D projects, a number of steps are recommended:

- Finalisation/annotation of a dataset is recommended to be either part of the initial data collection project, or assigned as a subsequent project soon after the data collection.
- Such annotation should ideally include as much detail of experimental design and data definition as possible, and the data definition recommendation points to the value of a national data design protocol, which could be updated to accommodate new traits, methods of collecting data and other aspects of data definition, as required. Capturing the experimental detail would likely involve researchers documenting their knowledge to a greater depth and detail than is captured in scientific publications, and likely increase the time investment required for R&D projects.
- It would benefit MLA and industry to have a national database of research data, such that any project resulting in useful datasets should upload their data to this database as part of their project, to ensure resources are maintained and researchers get the most from their data.

7 Key messages

The Beef CRC database was established by AGBU to hold data collected in CRC projects managed by AGBU. The data included phenotypes and fixed effect information.

As a result of this project, researchers now have better access to genomic data from the Beef CRC projects managed by AGBU, and are provided more documentation for access and use of the Beef CRC phenotypic data for those projects.

Financial support will be needed for ongoing operation and maintenance of the Beef CRC Genomics database and the Livestock Library.

Changes or further updates to the Beef CRC Genomics database will require a subsequent project and significant funding for a newly designed database structure and extensive input from personnel involved in the Beef CRC data collection/recording projects.

Recommendations for the incorporation of data recording and database design in future research proposals have been provided.

MLA should consider the potential benefits of having a fully annotated national database for research data storage and documentation.

8 Bibliography

Burrow, H, 2006. MLA B.NBP.0301 Final Report: Links between the genetics of beef quality and components of herd profitability in northern Australia. Meat & Livestock Australia Limited, North Sydney, Australia.

Burns, BM, Corbet, NJ, McGowan, MR, Holroyd, RG, 2014. MLA B.NBP.0361 Final Report: Male indicator traits to improve female reproductive performance. Meat & Livestock Australia Limited, North Sydney, Australia.

Johnston, D, Grant, T, Prayaga, K, Walkley, J, 2013. MLA B.NBP.0363 Final Report: Early predictors of lifetime female reproductive performance. Meat & Livestock Australia Limited, North Sydney, Australia.

9 Appendix

9.1 Beef CRC database instructions document

The following instructions have been added to the online documentation to aid users in accessing the appropriate data from the Beef CRC database.

How to navigate the Beef CRC database

Data collected during various projects within the Beef CRC has been recorded within a PostgreSQL database system, with a web interface, for specific users to access. This data can be accessed either by browsing using the Inquiry tab, or downloaded using the Retrieve tab. Data can be filtered by various descriptors and codes, all of which are described in documentation in the Docs Tab.

To browse data:

1. Click on the appropriate project number (e.g. CRC II (2.3)).
2. Click on the Inquiry tab.
3. Choose how to browse data: per Animal, Cohort, Sire, Multi Sire Group.
4. Depending on how you choose, data can be chosen by inputting an entry (e.g. Animal ID) or choosing from a drop down menu or from a table of data.

To download data:

1. Click on the appropriate project number (e.g. CRC II (2.3)).
2. Click on the Retrieve tab.
3. Choose a retrieval type: Live Data, Ovarian Data, Abattoir Data, Feed Data, Mating Data, Bull Fertility Data
4. Filter the data by choosing options from various fields: Breeds, Cohorts, Origins, Sex, Sires
 - a. Within each filter, tick the box you want data from.
 - b. Click Next Step
5. Filter the data by choosing Fixed Effects and Codes: Animal Fixed Effects, Sire Fixed Effects, Dam Fixed Effects, Codes, Options
 - a. Within each filter, tick the box you want data from.
 - b. Click Next Step
6. The data is retrieved and presented on screen. To download, choose the appropriate delimiter and missing data character, and click Download Data. A data file will be downloaded to the computer.

To access genotypes:

1. Access to genotypes requires permission from genotype owners and MLA. To access data, contact MLA and AGBU to request permission, with Animal IDs and DNA sample IDs of requested genotypes.
 2. Genotype sample IDs are provided in the Beef CRC database within Animal entries and Cohorts, as well as within the Genotypes document in Docs tab.
 3. AGBU can provide genotypes when appropriate permissions are granted.
-

9.2 Beef CRC database fields summary

The following provides tables for each data filter field in the Beef CRC database, with codes and descriptions if required.

Table 5. Breed codes and description

Breed Code	Crossed	Description
3/4 GB	TRUE	3/4 Bred Gray Brahman
AAAAAAA	FALSE	Angus
AX	FALSE	Belmont AX
AXBX	FALSE	Belmont AXBX
BBBBBBBB	FALSE	Brahman
BBBRCRC	TRUE	Brahman X Tropical Composite
BLBLBLBL	FALSE	Belgium Blue
BR	FALSE	Belmont Red (AX)
BRxB	TRUE	Belmont Red x Brahman
BX	TRUE	Manadalay Brahman cross
CBAXBX	FALSE	Belmont CBX
CCCCCCC	FALSE	Charolais
Comp	FALSE	Mandalay AXBX
FFFFFFF	FALSE	Friesian
GB	FALSE	Gray Brahman
GGGGGGGG	FALSE	Guernsey
HHHHHHHH	FALSE	Hereford
LLLLLLLL	FALSE	Limousin
MGMGMGMG	FALSE	Murray Grey
OOOOOOOO	TRUE	Unknown dairy cross
RARARARA	FALSE	Red Angus
RCRCBBBB	TRUE	Tropical Composite X Brahman
RCRCRCRC	FALSE	Tropical Composite
RPRRPRP	FALSE	Red Poll
SSSSSSSS	FALSE	Shorthorn
WBWBWBWB	FALSE	Wagyu (Black)
WRWRWRWR	FALSE	Wagyu (Red)
WYWYWYWY	FALSE	Wagyu
XA	FALSE	Alexandria Composite

Table 6. Sex codes and description.

Sex	Description
B	Bull
C	Cow
H	Heifer
S	Steer

Table 7. Cohort codes and description.

Cohort	Description
BEL04	Belmont 04 drop calves
BEL05	Belmont 05 drop calves
BEL06	Belmont 06 drop calves
BEL07	Belmont 07 drop calves
BEL08	Belmont 08 drop calves
BEL09	Belmont 09 drop calves
BEL10	Belmont 2010 drop calves
BEL11	Belmont 2011 drop calves

BG06	Brigalow 06 drop calves
BG07	Brigalow 07 drop calves
BG08	Brigalow 08 drop calves
BP04	Brian Pastures 04 drop calves
BP05	Brian Pastures 05 drop calves
BP06	Brian Pastures 06 drop calves
BP07	Brian Pastures 07 drop calves
BP08	Brian Pastures 08 drop calves
BP09	Brian Pastures 09 drop calves
BP10	Brian Pastures 2010 drop calves
BP11	Brian Pastures 2011 drop calves
NPG01	Northern Pastoral Group 2001 drop calves
NPG02	Northern Pastoral Group 2002 drop calves
NPG03	Northern Pastoral Group 2003 drop calves
NPG04	Northern Pastoral Group 2004 drop calves
NPG05	Northern Pastoral Group 2005 drop calves
NPG06	Northern Pastoral Group 2006 drop calves
NPG07	Northern Pastoral Group 2007 drop calves
NPG08	Northern Pastoral Group 2008 drop calves
NPG09	Northern Pastoral Group 2009 drop calves
NPG10	Northern Pastoral Group 2010 drop calves
NPG11	Northern Pastoral Group 2011 drop calves
NPG12	Northern Pastoral Group 2012 drop calves
PBE00	Pasture Belmont 2000 drop calves
PBE01	Pasture Belmont 2001 drop calves
PBE02	Pasture Belmont 2002 drop calves
PBE03	Pasture Belmont 20003 drop calves
PBP01	Pasture Brian Pastures 2001 drop calves
PBP02	Pasture Brian Pastures 2002 drop calves
PBP03	Pasture Brian Pastures 2003 drop calves
PSL01	Pasture Swans Lagoon 2001 drop calves
PSL02	Pasture Swans Lagoon 2002 drop calves
PSL03	Pasture Swans Lagoon 2003 drop calves
PTR01	Pasture Toorak 2001 drop calves
PTR02	Pasture Toorak 2002 drop calves
SL04	Swans Lagoon 04 drop calves
SL05	Swans Lagoon 05 drop calves
SL06	Swans Lagoon 06 drop calves
SL07	Swans Lagoon 07 drop calves
SL08	Swans Lagoon 08 drop calves
SL09	Swans Lagoon 09 drop calves
SL10	Swans Lagoon 2010 drop calves
SL11	Swans Lagoon 2011 drop calves
TK04	Toorak 04 drop calves
TK05	Toorak 05 drop calves
TK06	Toorak 06 drop calves
TK07	Toorak 07 drop calves
TK08	Toorak 08 drop calves
TK09	Toorak 09 drop calves
TK10	Toorak 2010 drop calves

Table 8. Origins codes and description.

Origin	Description	Sire	Cow	Cow Locations (origins elsewhere)
Alcala	Alcala station, Cloncurry QLD, AACO		✓	
Alexandria	Alexandria Station, NT	✓	✓	
Baterham	Commercial Belmont herd		✓	
Batandra	Batandra Brahmans	✓		
Belah Valley	Colins Belah Valley (CBV) Brahmans	✓		
Belmont	Belmont Research Station	✓	✓	✓
Beresford	Beresford Station, Clermont		✓	
Blackdown	Blackdown, Jimarndy Station, May Downs QLD	✓		
Brian Pastures	Brian Pastures Research Station			✓
Bridge Creek	Bridge Creek Brahmans, Lillianvale, Nebo QLD	✓		
Brigalow	Brigalow Research Station			✓
Caiwarra	Caiwarra Brahmans, Julia Creek QLD	✓		
Cona Creek	Cona Creek Station, Springsure QLD		✓	
Corymbia	Corymbia Belmont Reds, Westbrook QLD	✓		
Delta Grove	Delta Grove Brahmans, Baralaba QLD	✓		
Fairy Springs	Fairy Springs Brahmans, Taroom QLD	✓		
Lacon	Lacon Belmont Reds, Pittsworth QLD	✓		
Lancefield	Lancefield Brahmans, Dululu QLD	✓		
Mandalay	Commercial composite herd	✓	✓	
McCart	Commercial Brahman herd	✓	✓	
Melrose	Commercial Brahman herd		✓	
Meteor Downs	Meteor Downs Station, Rolleston QLD, AACO	✓	✓	
Mimong	Mimong Station, Kynuna QLD		✓	
Montpellier	Montpellier Belmont Reds, Yeppoon QLD	✓		
Mt Eugene	Mt Eugene, Jambin QLD, Maynard Cattle Co.	✓		
Rathlyn	Rathlyn Brahmans, Emerald QLD	✓		
Roxborough	Roxborough Brahmans 'Bindaree', Moura QLD	✓		
Swans Lagoon	Swans Lagoon Research Station			✓
Tartus	Tartus Brahmans, Marlborough QLD	✓	✓	
Thom	Commercial Brahman herd		✓	
Toorak	Toorak Research Station			✓
Tremere	Tremere Pastoral, Moura QLD	✓		
Weetalaba	Weetalaba Station, Collinsville QLD	✓		

Table 9. Locations codes and description.

Location	Description	Detailed Description
PBE	Belmont	Belmont Research Station
		GPS: -23.213914,150.3897125
PBR	Berrigurra	Berrigurra Station 613 Yackam Road, Blackwater QLD 4717 GPS: -23.545645, 148.730931
Bind	Bindaree	Roxborough, 'Bindaree', Moura QLD 4718
PBP	Brian Pastures	Brian Pastures
		819 BRIAN PASTURES ROAD, GAYNDAH QLD 4625
		GPS: -25.653191,151.745929
PBG	Brigalow	Brigalow Research Station
		2081 GLENMORAL-ROUNDSTONE ROAD, THEODORE QLD 4719
		GPS: -24.83608,149.801028
PCS	Crescendo	Capella, QLD, 4723
FaSp	Fairy Springs	Fairy Springs Brahmans, Woodine, 20383 Leichhardt Hwy, Taroom, 4420 QLD
Jima	Jimarndy	Jimarndy Station 1548 May Downs Road, May Downs QLD 4742 GPS: -22.710052, 149.141240
PKG	Kiagarthur	Kiagarthur Station Condobolin NSW 2877
PSL	Swans Lagoon	Swan's Lagoon Beef Cattle Research Station
		WEAVER ROAD, MILLAROO QLD 4807
		GPS: -20.083987,147.2191 Offices
Tart	Tartus	Tartus Station, Marlborough Road, Marlborough, QLD 4705
PTR	Toorak	Toorak Research Station
		JULIA CREEK KYNUNA ROAD, JULIA CREEK QLD 4823
		GPS: -21.033137,141.800408
PTU	Tullimba	Tullimba Feedlot
		Kingstown-Torryburn Rd, Kingstown NSW
		GPS: -30.480855,151.187568
GTU	Tullimba - Grain	Tullimba Feedlot
		Kingstown-Torryburn Rd, Kingstown NSW
		GPS: -30.480855,151.187568

Table 10. Mating outcome codes and description.

Mating Outcome Code	Description
A	Aborted - Prenatal loss
C	Perinatal loss - Calf died (<48 hours)
CC	Twins, both dead as a C
CS	Calved but calf stolen
CW	Calved, calf died, stole another calf and weaned it
Cull	Removed from project
DA	Cow died, aborted
DC	Cow died, calf died (<48 hours)
DF	Cow died, lactation failure
DL	Cow died, calf died (>48 hours)
DP	Cow died, pregnant

DW	Cow died, but calf survived to weaning
Dead	Dead prior to mating, mating outcome unknown
E	Not pregnancy- empty
EC	Culled before PPO determined
L	Postnatal loss - Calf died (>48 hours)
LF	Lactation failure - Loss from preg-weaning, but time unknown
LL	Twins, Both dead as a L
NL	Cow and calf survive, but cow not lactating
O	Orphaned, cow died and calf lived
P	Pregnant but no further data or culled before mating outcome known
R#	Early abortion and reconceive with # mating outcome
S	Pregnant, but sold before mating outcome known
W	Weaned a calf
WC	Twins, one weaned, one died as a C
WL	Twins, one weaned, one died as a L
WW	Twins, both weaned
X	Not mated
Z#	Mated at neighbours with # mating outcome

Table 11. Project exit codes and description.

Project Exit Code	Description
1	Calf not delivered to CRC
2	Generation 1 animal returned to owner
3	Cast for Age
4	Poor temperament
5	Calving Difficulty
6	Double empty
7	Poor body condition
8	Eye problems
9	Bad feet
10	Leg injury
11	Bottle teats
12	Damaged udder
13	Prolapse = Vaginal/Uterine
14	Dental problem
15	Disease - Pestivirus
16	Stag
17	Deformed/abnormality
18	Sold/returned -conceived outside project mating parameters
19	Sold as grain finished steer
20	Feedlot sick animal - Out of Project
21	Stringhalt
22	Penis/prepuce damage
23	Generation 2 animal disposed from project
24	Sire surplus to project
25	Bad mother
26	Failed semen or sperm morphology tests
27	Fence Jumper
28	Reproductive abnormality
30	Dead, unable to determine cause
32	Prolapse = Anal
33	Worms
34	Ticks
35	Missing

36	Stolen
37	Lightning strike
38	Injury / Accident
39	Bloat
41	Abandoned
42	Deformed/dwarf
43	Post-castration infection
44	Trucking death
46	Disease - Three Day
47	Poisoning - Lantana
48	Poisoning - Urea
49	Stillborn calf
50	Calf died within 48 hrs birth
51	Moribund - weak
52	Drowned
53	Ruptured ureter
54	Disease - Pulpy kidney
55	Disease - Clostridium
56	Premature birth
57	Vitamin A deficiency
58	Navel infection
59	Calf fails to suck
60	Bottle teats prevent calf sucking
61	Mother died calf poddied or destroyed
62	Separated from dam
63	Died in utero
64	Dingo attack
65	Eagle attack
66	Died/Poddied due to poor mothering
67	Poddied twin
68	Birth trauma
69	Haemolytic anaemia
70	Died after branding
71	Euthanased, cause undiagnosed
72	Congenital defect
73	Respiratory problems

Table 12. Live codes and description.

Live Code	Description
WT	Liveweight (kg)
CSN	Condition Score (1-5)
FT	Flight Time (secs*100)
HH	Hip Height (cm)
L_Status	Lactation Status ### SUBJECTIVE MEASURE ### -recommend use of Mating data (Outcome.. etc)
Horn_status	Status of horn H,P,S,D
L_Struct	Leg Structure (1-9 Score of angularity 9=ideal, 1=poor. <9 needs a L_Code)
L_Code	Leg Code (FPSBHN or combo; Fetlock(pastern), Postlegged (straight hocked), Sickie, Bowed, Hocks, Not recorded)
F_Struct	Foot Structure (1-9 9=ideal, 1=chronic. <9 needs a F_Code.)
F_Code	Foot Code (LCHSWN or combo; Length, Curve, Heel, Open, Short, Wide, Not recorded)
TS	Teat Score (1-5) 1=Very small, 5=Very large bulbous
TSB	Teat Score - Back (1-5) [missing teats =0] 1=Very small, 5=Very large bulbous

TSF	Teat Score - Front (1-5) [missing teats =0] 1=Very small, 5=Very large bulbous
US	Udder Score (1-5) 1=small, 5=large
CTC	Cattle Tick Count
CTS	Cattle Tick Score (0-5)
CC	Colour Code
CS	Coat Score
SIS	Skin Inflammation Score (0-3)
SS	Sheath/Navel Score (1-9)
SctS	Scrotal Size (cm)
SctS_Op	Scrotal Size measure operator
Ever	Preputial eversion (0-250mm)
FtS	Feet Score (Code is Tullimba Feedlot specific)
BFS	Buffalo Fly Lesion Score (0-5)
TW	Tooth Wear (0-4)
EPG	EPG Counts
S_P8	Scanned Rump Fat Depth P8 (mm)
S_12/13th	Scanned Rib Fat Depth 12/13th Rib (mm)
S_EMA	Scanned Eye Muscle Area (sq cm)
S_IMF1	Scanned Intra Muscular Fat 1 (%)
S_IMF2	Scanned Intra Muscular Fat 2 (%)
S_IMF3	Scanned Intra Muscular Fat 3 (%)
S_IMF%	Desc
Carcase_Op	Carcase Scanning Operator
AT	Ambient Temperatures, (C)
RH	Relative Humidity (%)
RT	Rectal Temperature (C)
TT	Time of Temperatures taken, (24hr as HH:MM)
BL_IGF1	Blood Insulin-Like Growth Factor 1 (ng/ml)
BL_IGF1_Plate	Blood Insulin plate

Table 13. Ovarian codes and description.

Ovarian Code	Description
O_L_PrimFolSize	Left Ovary Primary Follicle Size
O_L_CLSize	Left Ovary CL Size
O_L_SecFolSize	Left Ovary Secondary Follicle Size
O_R_PrimFolSize	Right Ovary Primary Follicle Size
O_R_CLSize	Right Ovary CL Size
O_R_SecFolSize	Right Ovary Secondary Follicle Size
Preg	Preg Status ### SUBJECTIVE MEASURE ### -recommend use of Mating data (Outcome, Conception etc)
Est_FCL_1	Est date of first CL for 1st mating
Est_Pub_1	Est date of puberty for 1st mating
Est_Conc_1	Est date of conception for 1st mating
Est_EM_1	Est date of embryonic mortality for 1st mating
Est_RConc_1	Est date of reconception for 1st mating
Est_Loss_1	Est date of prenatal, perinatal and postnatal loss for 1st mating
Est_FPPCL_2	Est date of first CL postpartum for cows wet at conception for 2nd mating
Est_CLDry_2	Est date of first CL for cows dry at conception for 2nd mating
Est_PPO_2	Est date of postpartum oestrus for cows wet at conception for 2nd mating
Est_ODry_2	Est date of oestrus for cows dry at conception for 2nd mating
Est_Conc_2	Est date of conception for 2nd mating
Est_EM_2	Est date of embryonic mortality for 2nd mating
Est_RConc_2	Est date of reconception for 2nd mating
Est_Loss_2	Est date of prenatal, perinatal and postnatal loss for 2nd mating

Est_FPPCL_3	Est date of first CL postpartum for cows wet at conception for 3rd mating
Est_CLDry_3	Est date of first CL for cows dry at conception for 3rd mating
Est_PPO_3	Est date of postpartum oestrus for cows wet at conception for 3rd mating
Est_ODry_3	Est date of oestrus for cows dry at conception for 3rd mating
Est_Conc_3	Est date of conception for 3rd mating
Est_EM_3	Est date of embryonic mortality for 3rd mating
Est_RConc_3	Est date of reconception for 3rd mating
Est_Loss_3	Est date of prenatal, perinatal and postnatal loss for 3rd mating
Est_FPPCL_4	Est date of first CL postpartum for cows wet at conception for 4th mating
Est_CLDry_4	Est date of first CL for cows dry at conception for 4th mating
Est_PPO_4	Est date of postpartum oestrus for cows wet at conception for 4th mating
Est_ODry_4	Est date of oestrus for cows dry at conception for 4th mating
Est_Conc_4	Est date of conception for 4th mating
Est_EM_4	Est date of embryonic mortality for 4th mating
Est_RConc_4	Est date of reconception for 4th mating
Est_Loss_4	Est date of prenatal, perinatal and postnatal loss for 4th mating
Est_FPPCL_5	Est date of first CL postpartum for cows wet at conception for 5th mating
Est_CLDry_5	Est date of first CL for cows dry at conception for 5th mating
Est_PPO_5	Est date of postpartum oestrus for cows wet at conception for 5th mating
Est_ODry_5	Est date of oestrus for cows dry at conception for 5th mating
Est_Conc_5	Est date of conception for 5th mating
Est_EM_5	Est date of embryonic mortality for 5th mating
Est_RConc_5	Est date of reconception for 5th mating
Est_Loss_5	Est date of prenatal, perinatal and postnatal loss for 5th mating
Est_FPPCL_6	Est date of first CL postpartum for cows wet at conception for 6th mating
Est_CLDry_6	Est date of first CL for cows dry at conception for 6th mating
Est_PPO_6	Est date of postpartum oestrus for cows wet at conception for 6th mating
Est_ODry_6	Est date of oestrus for cows dry at conception for 6th mating
Est_Conc_6	Est date of conception for 6th mating
Est_EM_6	Est date of embryonic mortality for 6th mating
Est_RConc_6	Est date of reconception for 6th mating
Est_Loss_6	Est date of prenatal, perinatal and postnatal loss for 6th mating
O_Activity	Ovary Activity – Discontinued trial measure – do not use.
O_L_Activity	Left Ovary Activity – Discontinued trial measure – do not use.
O_L_OvarySize	Left Ovary Size – Discontinued trial measure – do not use.
O_L_Shape	Left Ovary Shape – Discontinued trial measure – do not use.
O_R_Activity	Right Ovary Activity – Discontinued trial measure – do not use.
O_R_OvarySize	Right Ovary Size – Discontinued trial measure – do not use.
O_R_Shape	Right Ovary Shape – Discontinued trial measure – do not use.
U_TractScoreSize	Urinary Tract Size Score – Discontinued trial measure – do not use.
U_TractScoreTone	Urinary Tract Tone Score – Discontinued trial measure – do not use.

Table 14. Bull fertility codes and description.

Bull Fert Code	Description
BBSEdate	Date of Bull Breeding Soundness Examination (BBSE) (as yyyy-mm-dd)
TBBSE	Time of Bull Breeding Soundness Examination (BBSE) (24hr as HH:MM)
ATBBSE	Ambient Temperature C - Temperature BBSE was started
TTone	Testicular Tone 1-5 Firmness and resilience of testicles where 1=very soft, 3-4=ideal, 5=very hard
Ej_Op	Ejaculator Operator (can be 1 or 2 names) If two names, the second name is the person who performs manual stimulation, when "ee,m" is recorded in the "Coll" column.

Coll	Method of Collection ee OR m OR ee,m OR blank "ee" is electroejaculation, "m" is manual stimulation, "ee,m" is both. "blank" signifies no attempt was made to collect semen (whereby the remaining fields will also be blank)
Erect	Erection (n=no,p=partial,y=yes)
PS	Penis structure Okay or other comment Structure of penis, if protruded
Vol	Volume of Ejaculate Sample Collected 0-15ml Zero will occur if no semen was collected, in which case the remaining fields should be blank
Col	Ejaculate Colour (0-5) 1=pale, 4=creamy, 5=yellow, 0=no semen
Dens	Ejaculate Density (0-5) 1=dilute, 5=dense, 0=no semen
Mass_A	Mass Activity (0-5) Mass activity of a drop of semen under low power; 1=low and 5=high
Mot	Sperm Motility (0-100%) Progressive individual forward motility of sperm
CDrops	Concentration Drops for Morphology No. of drops Sub-sample for morphology; 1 drop = 50 microlitres (ul)
Ms_Op	Microscope operator. Crush side microscope operator for vol, colour, density, mass A, motility and concentration drops.
Sdate	Sperm morphology date (as yyyy-mm-dd)
Count	Count of abnormalities from 100 sperm (1 sperm may have more than 1 abnormality) (for morphology) (0-130).
Normal	Normal Sperm - Num of normal sperm counted from 100 sperm (count).
Ab_hd	Sperm abnormal head SUM (det,py,tap,mic,mac,ter,ka,nv,dd,r,fa,ic,nc,db,la).
Ab_dethd	Sperm abnormal head - detached heads (count).
Ab_pyhd	Sperm abnormal head - pyriform heads (count).
Ab_taphd	Sperm abnormal head - tapered heads (count).
Ab_michd	Sperm abnormal head - microcephalic heads (count).
Ab_machd	Sperm abnormal head - macrocephalic heads (count).
Ab_terhd	Sperm abnormal head - teratoids (count).
Ab_kahd	Sperm abnormal head - knobbed acrosomes (count).
Ab_nvhd	Sperm abnormal head - nuclear vacuoles (count).
Ab_ddhd	Sperm abnormal head - diadem defects (count).
Ab_rhd	Sperm abnormal head - rolled heads (count).
Ab_fahd	Sperm abnormal head - flattened acrosomes (count).
Ab_ichd	Sperm abnormal head - immature cells (count).
Ab_nc	Sperm abnormal head - nuclear crests (count).
Ab_dbhd	Sperm abnormal head - double heads (count).
Ab_lahd	Sperm abnormal head - loose acrosomes (count).
Ab_mp	Sperm abnormal midpiece SUM (amp,bnmp,bmp,drmp,ddmp,samp).
Ab_amp	Sperm abnormal midpiece - abaxial midpieces (count).
Ab_bnmp	Sperm abnormal midpiece - broken necks (count).
Ab_bmp	Sperm abnormal midpiece - bent midpieces (count).
Ab_drmp	Sperm abnormal midpiece - distal reflexes (count).
Ab_ddmp	Sperm abnormal midpiece - dag defects (count).
Ab_samp	Sperm abnormal midpiece - segmental aplasia (count).
Ab_tail	Sperm abnormal tail SUM (rtail,ctail,stail,mtail).
Ab_rtail	Sperm abnormal tail - reflex tails (count).
Ab_ctail	Sperm abnormal tail - coiled tails (count).
Ab_stail	Sperm abnormal tail - stumped tails (count).
Ab_mtail	Sperm abnormal tail - multiple tails (count).
Ab_drop	Sperm abnormal droplet SUM (pd,dd).
Ab_pd	Sperm abnormal droplet - proximal droplets (count).
Ab_dd	Sperm abnormal droplet - distal droplets (count).
Comments_sperm	Morphology comments. Comments on subsample e.g. not enough sperm to count, clumped
NormalACV	ACV classification - count of normal from 100 sperm = Sum(Normal,taphd,amp,bmp,dd).

Ab_pdACV	ACV classification - count of sperm with proximal droplets = Sum(pd).
Ab_mpACV	ACV classification - count of sperm with midpiece abnormalities = Sum(bnmp,drmp,ddmp,samp,stail,mtail).
Ab_t_and_hACV	ACV classification - count of sperm with abnormal tails & loose heads = Sum(dethd,rtail,ctail).
Ab_pyACV	ACV classification - count of sperm with pyriform heads = Sum(pyhd).
Ab_kaACV	ACV classification - count of sperm with knobbed acrosomes = Sum(kahd).
Ab_v_and_tACV	ACV classification - count of sperm with vacuoles and teratoids = Sum(michd,machd,terhd,nvhd,ddhd,rhd,ichd,nc,dbhd).
Ab_saACV	ACV classification - count of sperm with swollen acrosomes = Sum(fahd,lahd).
Ej_Conc	Concentration of sperm in the ejaculate (Number) (x10e6/mL) using the no. of concentration drops.
Inhibin	Inhibin hormone (ng/mL)
TBLH	Time Basal Luteinising Hormone blood taken (24hr as HH:MM)
BLH	Blood Luteinising Hormone Basal (ng/mL)
TS LH	Time Stimulated Luteinising Hormone blood taken (24hr as HH:MM)
SLH	Blood Luteinising Hormone Stimulated (ng/mL)
LH_Grp	LH sample group
Comments_fert	Comments specific to Bull Fertility issues

Table 15. Meat codes and description.

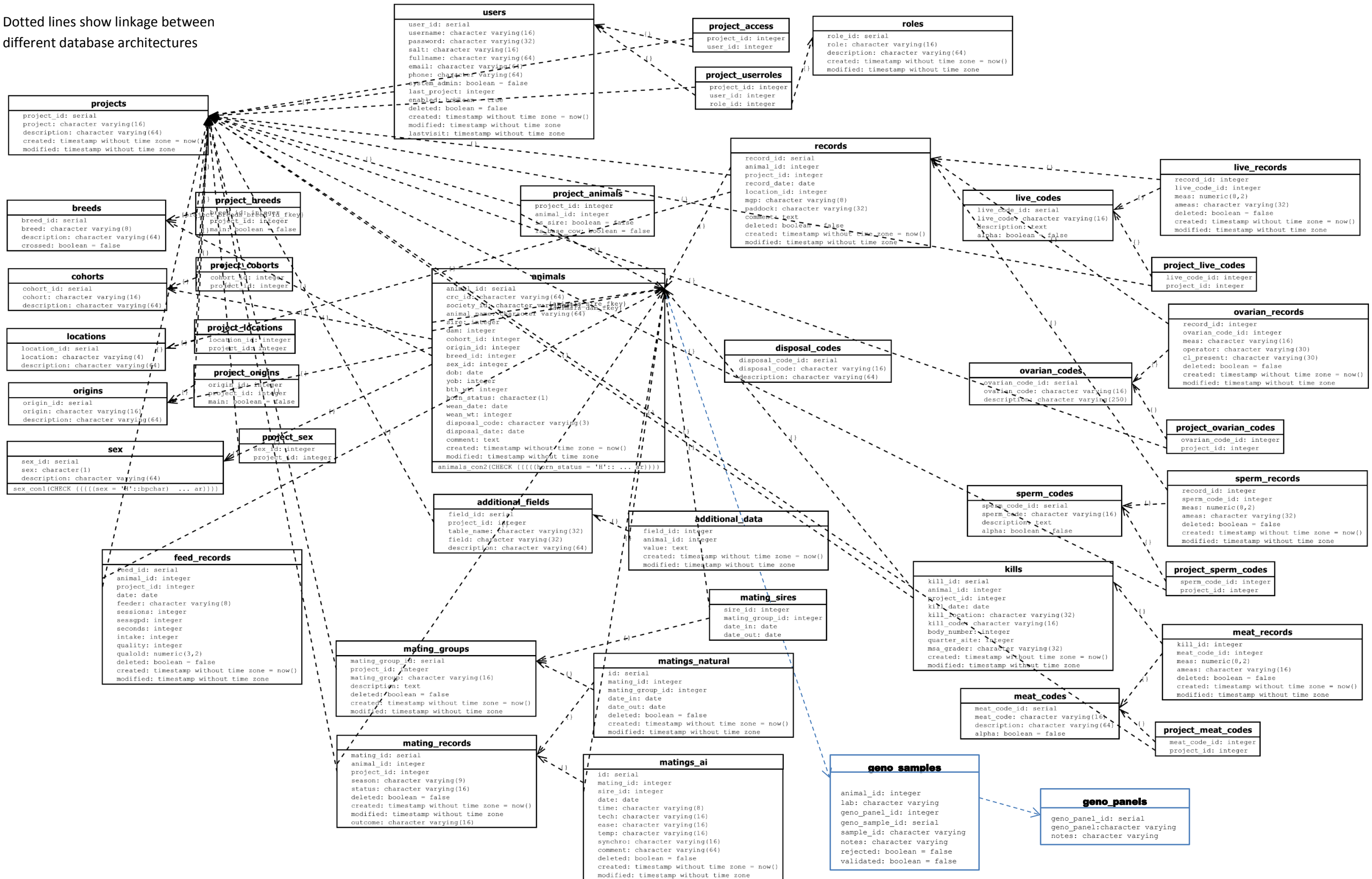
Meat Code	Description
\$_LHS	Left Hand Side Value
\$_RHS	Right Hand Side Value
C_P8	Cold p8 fat (mm)
C_P8_Dmg_Flg	Cold p8 fat damage flag D=Damaged;U=Undamaged
G_LS	Market Grade - LeftSide
G_RS	Market Grade - RightSide
MQ_LDTS_IC	Longissimus dorsi tender stretch compression
MQ_LDTS_LOSS	Longissimus dorsi tender stretch cooking loss %
MQ_LDTS_PF	Longissimus dorsi tender stretch peak force (kg)
MQ_LD_Fat%	Intramuscular Fat percentage
MQ_LD_IC	Longissimus dorsi compression (kg)
MQ_LD_LOSS	Longissimus dorsi cooking loss%
MQ_LD_PF	Longissimusdorsi Peak Force (kg)
MQ_LD_a	Longissimus dorsi a* colour
MQ_LD_b	Longissimus dorsi b* colour
MQ_LD_l	Longissimus dorsi L* colour
MQ_LD_pH	Longissimus dorsi ultimate pH
MSA_Afatcol	MSA Aust. Fat Color
MSA_Amarbgn	MSA Aust. Marbling score
MSA_Ameatcol	MSA Aust. Meat Color
MSA_EMA	MSA EMA
MSA_Hump	MSA hump height (mm)
MSA_Ribfat	MSA rib fat at 12/13th rib (mm)
MSA_Umarbgn	MSA USDA Marbling
MSA_Uos	MSA USDA Ossification
MSA_lointemp	MSA Loin Temperature (degrees Centigrade)
MSA_pH-U	MSA Ultimate pH
RT_BLADE	Retail Wt Blade
RT_CHUCK_ROLL	Retail Wt Chuck Roll
RT_CHUCK_TENDER	Retail Wt Chuck Tender
RT_CUBE_ROLL	Retail Wt Cube Roll
RT_EYE	Retail Wt Eye round

RT_FLANK	Retail Wt Flank steak
RT_FLAP	Retail Wt Flap Meat
RT_HIND	Retail Wt Hind Shank
RT_INSIDE	Retail Wt Inside Skirt
RT_INTERCOSTALS	Retail Wt Intercostals
RT_KNUCKLE	Retail Wt Knuckle
RT_NE_BRISKET	Retail Wt NE Brisket
RT_OUTSIDE	Retail Wt Outside
RT_PE_BRISKET	Retail Wt PE Brisket
RT_RUMP	Retail Wt Rump
RT_SHIN	Retail Wt Shin Shank
RT_SHORT_RIB	Retail Wt Short Rib
RT_STRIPLOIN	Retail Wt Striploin
RT_TENDERLOIN	Retail Wt Tenderloin
RT_TOPSIDE	Retail Wt Topside
RT_TRITIPS	Retail Wt Tritips
VIA_CAS_EMA	VIA CAS (Chiller Assessment System) EMA
VIA_CAS_fatcol	VIA CAS Fat Color
VIA_CAS_marbgn	VIA CAS Marbling Score
VIA_CAS_meatcol	VIA CAS Meat Color
VIA_CAS_qtrsite	VIA CAS Qtr Site
VIA_CAS_ribfat	VIA CAS Ribfat (mm)
VIA_CAS_yield%	VIA CAS Yield (mm)
VIA_WBS_LHCwt	VIA WBS (Whole Body) Predicted Hot Carc Weight - Left Side
VIA_WBS_Lyield%	VIA WBS Yield % (mm) - Left Side
VIA_WBS_RHCwt	VIA WBS Predicted Hot Carcase Weight - Right Side
VIA_WBS_Ryield%	VIA WBS Yield % (mm) - Right Side
VIA_WBS_equatio	VIA WBS Equation
VIA_WBS_version	VIA WBS Version
YLD_A_FAT	Wt of adj fat
YLD_A_TRIM	Wt of adj trim
YLD_BONE	Bone
YLD_CL	Predicted CL (%)
YLD_FAT	Fat
YLD_FAT_TRIM	Surplus/deficit of fat in trim
YLD_F_TRIM	Wt of fat in trim
YLD_H_LS_WT	H_LSwT (kg)
YLD_L_TRIM	Wt of lean in trim
YLD_RECOV	Recovery (%)
YLD_RECOV_WT	Recovered Wt (kg)
YLD_REQ_FAT	Req fat wt in trim
YLD_TRIM	Trim
YLD_WS	Wsale yield (%)
YLD_WS_WT	Wsale yield wt (kg)
Stim	Stimulation (H=High,L=Low,N=None)
A_Dent	Number of permanant incisors
B_LS	Bruising Left Side
B_RS	Bruising Right Side
H_LSwT	Hot left side wt (kg)
H_RSwT	Hot right side wt (kg)
H_P8	Hot P8 fat depth (mm)
H_Butt	Butt Score
C_marbgn	ChillerAUSMEAT assessed Marblingscore(newchips0-6)
C_meatcol	Chiller AUSMEAT assessed Meat Colour (1A-1C,2-7)

C_fatcol	Chiller AUSMEAT assessed Fat colour (code 0 - 9)
C_EMA	Chiller AUSMEAT Eye Muscle Area (sq cm)

9.3 Map of Beef CRC database structure

- Dotted lines show linkage between different database architectures



9.4 Beef CRC genotypes documentation example.

The following is an example of the Genotypes documentation available on the Beef CRC Genomics database, with the first 50 animals shown. The online resource has all 4,022 CRC animals listed.

Genotypes that exist on animals used / associated with the BeefCRC project.

The table below lists the genotypes that exist for animals that were used or associated with the BeefCRC project. The ownership of the genotypes vary thus not all genotypes are available under the terms of the BeefCRC agreement.

project_id	society_rego	crc_id	sampid	panel	set
2	WAVWEE001001A	001001	1001	V1.50K	Fertility_Remaining
2	WAVWEE001003M	001003	BC011321	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001004F	001004	WG0057326-DNAB03_BC011322	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001005M	001005	BC011323	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001005M	001005	BC011323	800K	CRC-II_Group_D
2	WAVWEE001006F	001006	1006	V1.50K	Fertility_Remaining
2	WAVWEE001008M	001008	BC011326	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001009M	001009	BC011327	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001010F	001010	WG0057326-DNAG10_BC011328	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001012F	001012	1012	V1.50K	Fertility_Remaining
2	WAVWEE001014F	001014	WG0057326-DNAH10_BC011329	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001015M	001015	BC011330	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001016M	001016	BC011331	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001016M	001016	BC011331	800K	CRC-II_Group_D
2	WAVWEE001018M	001018	BC011332	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001019F	001019	1019	V1.50K	Fertility_Remaining
2	WAVWEE001020M	001020	BC011334	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001021M	001021	BC011335	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001024M	001024	BC011336	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001025F	001025	WG0057326-DNAA11_BC011337	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001026F	001026	WG0057326-DNAB11_BC011338	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001028M	001028	BC011340	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001035F	001035	CRCHD19_BC011344	800K	CRCHD_CRC2RPFemales157-296_rb20vi2011
2	WAVWEE001036F	001036	WG0057326-DNAC11_BC011345	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001039F	001039	1039	V1.50K	Fertility_Remaining
2	WAVWEE001039F	001039	WG0057326-DNAD11_BC011348	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001040F	001040	WG0057326-DNAE11_BC011349	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001041M	001041	BC011350	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001043F	001043	1043	V1.50K	Fertility_Remaining
2	WAVWEE001044F	001044	1044	V1.50K	Fertility_Remaining
2	WAVWEE001045F	001045	1045	V1.50K	Fertility_Remaining
2	WAVWEE001046F	001046	WG0057326-DNAF11_BC011354	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001048M	001048	BC011356	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001048M	001048	BC011356	800K	CRC-II_Group_C
2	WAVWEE001049F	001049	WG0057326-DNAG11_BC011357	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001050M	001050	BC011358	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001051F	001051	1051	V1.50K	Fertility_Remaining
2	WAVWEE001051F	001051	WG0057326-DNAH11_BC011359	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001053M	001053	BC011361	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001053M	001053	BC011361	800K	CRC-II_Group_C
2	WAVWEE001054F	001054	1054	V1.50K	Fertility_Remaining
2	WAVWEE001055M	001055	BC011363	50K	2010-10-14_14-13_crc2_p3_141010
2	WAVWEE001056F	001056	BC011364	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001057B	001057	WG0057341-DNAD06_BC011365	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001058M	001058	BC011366	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001059F	001059	WG0057341-DNAE06_BC011367	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001061M	001061	BC011368	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001062M	001062	BC011369	7K	CRC2_LD_Run1_FinalReport
2	WAVWEE001064B	001064	WG0057341-DNAF06_BC011371	V1.50K	BeefCRC3_GWAS1_13Jun08_DataReExport
2	WAVWEE001065F	001065	1065	V1.50K	Fertility_Remaining

9.5 Data relevant Publications list.

9.5.1 CRC II - Project 2.3 Publications

As provided in:

Burrow, H, 2006. MLA B.NBP.0301 Final Report: Links between the genetics of beef quality and components of herd profitability in northern Australia. Meat & Livestock Australia Limited, North Sydney, Australia.

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9.5.2 CRC III - Project 4.1.3a Publications

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9.6 MLA-Beef CRC Industry Sires Project Genotypes List

The following table provides a list of animals that were genotyped as part of the MLA-Beef CRC Industry Sires project, along with details and location of the genotypes and the animal's existence in the CRC phenotypic database.

Table 16. List of genotyped industry sires, with SNP density, database locations, and breed.

Society ID	DNA Sample ID	SNP Panel	Genomic Pipeline Batch	CRC Database Entry	Breed
ABS1655/1M	CV0169	50k	IndustrySires_Run3	✓	Brahman
CBV96-6822M	CV1484	50k	IndustrySires_Run3	✓	Brahman
CBV96-7085M	CV1495	50k	IndustrySires_Run3	✓	Brahman
CBV96-7086M	CV0969	50k	IndustrySires_Run3	✓	Brahman
CBV96-7086M	CV1487	50k	IndustrySires_Run3	✓	Brahman
CBV97-7247M	CV0970	50k	IndustrySires_Run3	✓	Brahman
CBV97-7302M	CV1486	50k	IndustrySires_Run3	✓	Brahman
CBV97-7439M	CV1516	50k	IndustrySires_Run3	✓	Brahman
FBD320DM	CV0327	50k	IndustrySires_Run3	✓	Brahman
JDH818/7M	CV1498	50k	IndustrySires_Run3	✓	Brahman
JFK1739M	CV0172	50k	IndustrySires_Run3	✓	Brahman
JFK2020M	CV0173	50k	IndustrySires_Run3	✓	Brahman
TTS922197M	CV0964	50k	IndustrySires_Run3	✓	Brahman
TTS994182M	CV0962	50k	IndustrySires_Run3	✓	Brahman
V8R797/3M	CV1511	50k	IndustrySires_Run3	✓	Brahman
BTGFM51	CV0004	50k, 800k	IndustrySires_Run1		Limousin
IMCFJ23	CV0005	50k, 800k	IndustrySires_Run1		Limousin
IMUFJ59	CV0006	50k, 800k	IndustrySires_Run1		Limousin
IMDFG1	CV0007	50k, 800k	IndustrySires_Run1		Limousin
CPFH80	CV0008	50k, 800k	IndustrySires_Run1		Limousin
WLPH13	CV0009	50k, 800k	IndustrySires_Run1		Limousin
ADRFL150	CV0010	50k, 800k	IndustrySires_Run1		Limousin
TWRPQ41	CV0013	50k, 800k	IndustrySires_Run1		Limousin
SLTPW16	CV0014	50k, 800k	IndustrySires_Run1		Limousin
GHSPM5	CV0016	50k, 800k	IndustrySires_Run1		Limousin
JWMFD3	CV0020	50k, 800k	IndustrySires_Run1		Limousin
MDNPY329	CV0024	50k, 800k	IndustrySires_Run1		Limousin
PKVPA501	CV0029	50k, 800k	IndustrySires_Run1		Limousin
KGPT43	CV0035	50k, 800k	IndustrySires_Run1		Limousin
IMFFN59	CV0036	50k, 800k	IndustrySires_Run1		Limousin
KGPY56	CV0038	50k, 800k	IndustrySires_Run1		Limousin
TWRPL51	CV0058	50k, 800k	IndustrySires_Run1		Limousin
IMFFN206	CV0060	50k, 800k	IndustrySires_Run1		Limousin
IMFFC1069	CV0061	50k, 800k	IndustrySires_Run1		Limousin
IMDFB291	CV0069	50k, 800k	IndustrySires_Run1		Limousin
MGWPW840	CV0071	50k, 800k	IndustrySires_Run1		Limousin
MGWPC210	CV0074	50k, 800k	IndustrySires_Run1		Limousin
JPEPN63	CV0075	50k, 800k	IndustrySires_Run2		Limousin
ZFPE6	CV0087	50k, 800k	IndustrySires_Run1		Limousin
IMUPJ8082	CV0089	50k, 800k	IndustrySires_Run4		Limousin
IMBFX4	CV0090	50k, 800k	IndustrySires_Run1		Limousin
IMUPN1026	CV0097	50k, 800k	IndustrySires_Run4		Limousin

AMSPB6021	CV0106	50k, 800k	IndustrySires_Run1		Limousin
MDNPZ348	CV0119	50k, 800k	IndustrySires_Run2		Limousin
MDNPC932	CV0125	50k, 800k	IndustrySires_Run1		Limousin
TJGPA37	CV0164	50k, 800k	IndustrySires_Run2		Limousin
IMUFE169	CV0299	50k, 800k	IndustrySires_Run4		Limousin
IMUPQ184	CV0942	50k, 800k	IndustrySires_Run4		Limousin
CPLFJ529	CV1074	50k, 800k	IndustrySires_Run1		Limousin
BHRFM383	CV1301	50k, 800k	IndustrySires_Run3		Limousin
LJVFP8	CV1302	50k, 800k	IndustrySires_Run3		Limousin
LWMFP356	CV1303	50k, 800k	IndustrySires_Run3		Limousin
PCYFM127	CV1304	50k, 800k	IndustrySires_Run3		Limousin
WFJFM180	CV1305	50k, 800k	IndustrySires_Run3		Limousin
PREPY56	CV522	50k, 800k	IndustrySires_Run1		Limousin
IMFFN55	CV524	50k, 800k	IndustrySires_Run2		Limousin
IMFFN55	CV604	50k, 800k	IndustrySires_Run2		Limousin
IMFFH4715	CV609	50k, 800k	IndustrySires_Run2		Limousin
WLPZ7	CV723	50k, 800k	IndustrySires_Run2		Limousin
WLPF11	CV937	50k, 800k	IndustrySires_Run2		Limousin
IMFFN10	CV943	50k, 800k	IndustrySires_Run2		Limousin
IMFFP95	CV944	50k, 800k	IndustrySires_Run2		Limousin
IMFFP77	CV945	50k, 800k	IndustrySires_Run2		Limousin
PREPS35	CV0002	50k	IndustrySires_Run1		Limousin
KGPV78	CV0003.2	50k	IndustrySires_Run1		Limousin
JFK979M	CV0011	50k	IndustrySires_Run3		Brahman
IMBFY176	CV0012	50k	IndustrySires_Run1		Limousin
GJSPK10	CV0015	50k	IndustrySires_Run1		Limousin
IMFFP5133	CV0018	50k	IndustrySires_Run1		Limousin
BPLPD830	CV0019	50k	IndustrySires_Run1		Limousin
ARMPL151	CV0021	50k	IndustrySires_Run1		Limousin
MGWFC225	CV0022	50k	IndustrySires_Run1		Limousin
RKXPD12	CV0023	50k	IndustrySires_Run1		Limousin
TJGPC11	CV0025	50k	IndustrySires_Run1		Limousin
PKVPC706	CV0026	50k	IndustrySires_Run1		Limousin
RBMPC11	CV0027	50k	IndustrySires_Run1		Limousin
WLPD46	CV0028	50k	IndustrySires_Run1		Limousin
WLPS45	CV0030	50k	IndustrySires_Run1		Limousin
WLPX12	CV0031	50k	IndustrySires_Run1		Limousin
IMFFM4759	CV0032	50k	IndustrySires_Run1		Limousin
IMFFL2604	CV0033	50k	IndustrySires_Run1		Limousin
KGPM185	CV0034	50k	IndustrySires_Run1		Limousin
IMUPA9119	CV0037	50k	IndustrySires_Run1		Limousin
IMUFH30	CV0042	50k	IndustrySires_Run1		Limousin
IMFFP1086	CV0044	50k	IndustrySires_Run1		Limousin
NFTFH535	CV0046	50k	IndustrySires_Run1		Limousin
IMBFD17	CV0050	50k	IndustrySires_Run1		Limousin
TRPL6	CV0052	50k	IndustrySires_Run1		Limousin
WLPQ11	CV0055	50k	IndustrySires_Run1		Limousin
WLPP5	CV0056	50k	IndustrySires_Run1		Limousin
IMFFH81	CV0059	50k	IndustrySires_Run1		Limousin
IMDFJ8	CV0062	50k	IndustrySires_Run1		Limousin
IMFFR184	CV0063	50k	IndustrySires_Run1		Limousin
IMFFS846	CV0064	50k	IndustrySires_Run1		Limousin
THAFG33	CV0065	50k	IndustrySires_Run1		Limousin
CPLFH265	CV0066	50k	IndustrySires_Run1		Limousin

KEBFP22	CV0067	50k	IndustrySires_Run1	Limousin
IMCFC9786	CV0068	50k	IndustrySires_Run1	Limousin
IMFFK56	CV0070	50k	IndustrySires_Run1	Limousin
MGWVPV733	CV0072	50k	IndustrySires_Run1	Limousin
KGPL201	CV0076	50k	IndustrySires_Run1	Limousin
IMBFB11	CV0078	50k	IndustrySires_Run1	Limousin
IMUPP15	CV0079	50k	IndustrySires_Run1	Limousin
BDLPE16	CV0080	50k	IndustrySires_Run1	Limousin
IMFFL2491	CV0082	50k	IndustrySires_Run1	Limousin
IMCFX3226	CV0083	50k	IndustrySires_Run1	Limousin
IMBFD25	CV0084	50k	IndustrySires_Run1	Limousin
MBBPK101	CV0086	50k	IndustrySires_Run1	Limousin
IMCPG63	CV0088	50k	IndustrySires_Run1	Limousin
IMDFF489	CV0091	50k	IndustrySires_Run1	Limousin
IMFFT9746	CV0092	50k	IndustrySires_Run1	Limousin
IMBFC8	CV0094	50k	IndustrySires_Run1	Limousin
IMUFZ5579	CV0095	50k	IndustrySires_Run1	Limousin
IMCFF104	CV0096	50k	IndustrySires_Run1	Limousin
YRFFJ38	CV0098	50k	IndustrySires_Run1	Limousin
ASLFJ10	CV0099	50k	IndustrySires_Run1	Limousin
IMUFF38	CV0101	50k	IndustrySires_Run1	Limousin
MGWPY356	CV0102	50k	IndustrySires_Run1	Limousin
IMCPE6387	CV0103	50k	IndustrySires_Run1	Limousin
DGCFL57	CV0104	50k	IndustrySires_Run1	Limousin
IMCPB15	CV0105	50k	IndustrySires_Run1	Limousin
IMUPW7215	CV0108	50k	IndustrySires_Run1	Limousin
MCFPX114	CV0109	50k	IndustrySires_Run1	Limousin
IMBFF202	CV0111	50k	IndustrySires_Run1	Limousin
TWRPL1	CV0113	50k	IndustrySires_Run1	Limousin
IMBFB4	CV0114	50k	IndustrySires_Run1	Limousin
IMBFZ4	CV0115	50k	IndustrySires_Run1	Limousin
MCFPB330	CV0116	50k	IndustrySires_Run1	Limousin
IMCPV210	CV0117	50k	IndustrySires_Run1	Limousin
PREPQ5	CV0118	50k	IndustrySires_Run1	Limousin
MDNPA488	CV0120	50k	IndustrySires_Run1	Limousin
MDNPW151	CV0121	50k	IndustrySires_Run1	Limousin
MDNPZ393	CV0122	50k	IndustrySires_Run2	Limousin
MDNPC927	CV0123	50k	IndustrySires_Run1	Limousin
MDNPC928	CV0124	50k	IndustrySires_Run1	Limousin
MDNPC961	CV0126	50k	IndustrySires_Run1	Limousin
MDNPC1054	CV0127	50k	IndustrySires_Run1	Limousin
MDNPC1006	CV0128	50k	IndustrySires_Run1	Limousin
IMP2932	CV0130	50k	IndustrySires_Run2	Shorthorn
CJHW023	CV0131	50k	IndustrySires_Run2	Shorthorn
KLJZ115	CV0132	50k	IndustrySires_Run2	Shorthorn
GLSW026	CV0133	50k	IndustrySires_Run2	Shorthorn
M9X564	CV0134	50k	IndustrySires_Run2	Shorthorn
M9XD2	CV0135	50k	IndustrySires_Run2	Shorthorn
98/01176	CV0136	50k	IndustrySires_Run2	Shorthorn
96/00943	CV0137	50k	IndustrySires_Run2	Shorthorn
IMUPY1124	CV0138	50k	IndustrySires_Run1	Limousin
IMUPC111	CV0140	50k	IndustrySires_Run1	Limousin
IMUPX73	CV0141	50k	IndustrySires_Run1	Limousin
IMUPB3158	CV0142	50k	IndustrySires_Run1	Limousin

IMUPA1503	CV0143	50k	IndustrySires_Run2		Limousin
IMUPA3172	CV0144	50k	IndustrySires_Run2		Limousin
BPLPZ663	CV0145	50k	IndustrySires_Run2		Limousin
RJVPZ408	CV0146	50k	IndustrySires_Run1		Limousin
SELFK98	CV0147	50k	IndustrySires_Run1		Limousin
HSPE562	CV0148	50k	IndustrySires_Run2		Limousin
KGRPU6	CV0149	50k	IndustrySires_Run2		Limousin
GLGPV194	CV0151	50k	IndustrySires_Run2		Limousin
IMUPG703	CV0152	50k	IndustrySires_Run2		Limousin
DFDPY1	CV0153	50k	IndustrySires_Run1		Limousin
MGWFY322	CV0154	50k	IndustrySires_Run1		Limousin
BNKPU1	CV0155	50k	IndustrySires_Run1		Limousin
IMUFY149	CV0156	50k	IndustrySires_Run2		Limousin
IMUFA247	CV0157	50k	IndustrySires_Run2		Limousin
GHSPZ23	CV0161	50k	IndustrySires_Run2		Limousin
MATPC52	CV0162	50k	IndustrySires_Run2		Limousin
IMDFE7178	CV0163	50k	IndustrySires_Run2		Limousin
AMSPD8128	CV0165	50k	IndustrySires_Run2		Limousin
IMFFM66	CV0166	50k	IndustrySires_Run1		Limousin
PREPR23	CV0167	50k	IndustrySires_Run1		Limousin
AMSPC7020	CV0168	50k	IndustrySires_Run1		Limousin
ABST32M	CV0170	50k	IndustrySires_Run3		Brahman
JFK165M	CV0171	50k	IndustrySires_Run3		Brahman
JDH586/6M	CV0174	50k	IndustrySires_Run3		Brahman
LAN9155M	CV0175	50k	IndustrySires_Run3		Brahman
TTS942968M	CV0176	50k	IndustrySires_Run3		Brahman
B4A456/4M	CV0177	50k	IndustrySires_Run3		Brahman
JDH404/4M	CV0178	50k	IndustrySires_Run3		Brahman
DEG007M	CV0179	50k	IndustrySires_Run3		Brahman
BRK2107M	CV0180	50k	IndustrySires_Run3		Brahman
JDH259/5M	CV0181	50k	IndustrySires_Run3		Brahman
CHR2/480M	CV0182	50k	IndustrySires_Run3		Brahman
JDH537/9M	CV0183	50k	IndustrySires_Run3		Brahman
JDH924/3M	CV0184	50k	IndustrySires_Run3		Brahman
JDH418/5M	CV0185	50k	IndustrySires_Run3		Brahman
JDH187/4M	CV0186	50k	IndustrySires_Run3		Brahman
JDH761/6M	CV0187	50k	IndustrySires_Run3		Brahman
LAN2168/1M	CV0188	50k	IndustrySires_Run3		Brahman
LAN7883M	CV0189	50k	IndustrySires_Run3		Brahman
LAN9328M	CV0190	50k	IndustrySires_Run3		Brahman
LAN2656M	CV0191	50k	IndustrySires_Run3		Brahman
LAN9125M	CV0192	50k	IndustrySires_Run3		Brahman
LAN8950M	CV0193	50k	IndustrySires_Run3		Brahman
LAN1845/1M	CV0194	50k	IndustrySires_Run3		Brahman
LAN7167M	CV0195	50k	IndustrySires_Run3		Brahman
LAN8603M	CV0196	50k	IndustrySires_Run3		Brahman
LAN9159M	CV0197	50k	IndustrySires_Run3		Brahman
IMFBF1	CV0198	50k	IndustrySires_Run2		Limousin
THAFG29	CV0199	50k	IndustrySires_Run1		Limousin
GHSPZ18	CV0200	50k	IndustrySires_Run2		Limousin
GHSPZ21	CV0203	50k	IndustrySires_Run1		Limousin
PREPV86	CV0204	50k	IndustrySires_Run2		Limousin
IMCFB1	CV0205	50k	IndustrySires_Run1		Limousin
IMFFH451	CV0206	50k	IndustrySires_Run1		Limousin

FMRFK292	CV0207	50k	IndustrySires_Run1		Limousin
VBV0018M	CV0208	50k	IndustrySires_Run3		Droughtmaster
VBV07117M	CV0209	50k	IndustrySires_Run3		Droughtmaster
DMA0133M	CV0210	50k	IndustrySires_Run3		Droughtmaster
VV_06744M	CV0211	50k	IndustrySires_Run3		Droughtmaster
96X02024	CV0212	50k	IndustrySires_Run2		Shorthorn
ZPSU29	CV0213	50k	IndustrySires_Run2		Shorthorn
ZPSW024	CV0214	50k	IndustrySires_Run2		Shorthorn
ZPSX018	CV0215	50k	IndustrySires_Run2		Shorthorn
NLRW035	CV0216	50k	IndustrySires_Run2		Shorthorn
97/05394	CV0217	50k	IndustrySires_Run2		Shorthorn
MCDW078	CV0218	50k	IndustrySires_Run2		Shorthorn
JOBYG262	CV0219	50k	IndustrySires_Run2		Shorthorn
JSNWE326	CV0220	50k	IndustrySires_Run2		Shorthorn
98/01176	CV0221	50k	IndustrySires_Run2		Shorthorn
98X01605	CV0222	50k	IndustrySires_Run2		Shorthorn
98X00039	CV0223	50k	IndustrySires_Run2		Shorthorn
GEAU21	CV0224	50k	IndustrySires_Run2		Shorthorn
97/05180	CV0225	50k	IndustrySires_Run2		Shorthorn
98/03261	CV0226	50k	IndustrySires_Run2		Shorthorn
98/03810	CV0227	50k	IndustrySires_Run2		Shorthorn
94/01309	CV0228	50k	IndustrySires_Run2		Shorthorn
M9X564	CV0229	50k	IndustrySires_Run2		Shorthorn
INGU029	CV0230	50k	IndustrySires_Run2		Shorthorn
EWAU2	CV0231	50k	IndustrySires_Run2		Shorthorn
IAWU9	CV0232	50k	IndustrySires_Run2		Shorthorn
AGFU68	CV0233	50k	IndustrySires_Run2		Shorthorn
MEGV1010	CV0234	50k	IndustrySires_Run2		Shorthorn
INGV146	CV0235	50k	IndustrySires_Run2		Shorthorn
GLSV112	CV0236	50k	IndustrySires_Run2		Shorthorn
KSTW001	CV0237	50k	IndustrySires_Run2		Shorthorn
GLSW019	CV0238	50k	IndustrySires_Run2		Shorthorn
YY_W316	CV0239	50k	IndustrySires_Run2		Shorthorn
L2_W28	CV0240	50k	IndustrySires_Run2		Shorthorn
AGFW26	CV0241	50k	IndustrySires_Run2		Shorthorn
IMP4023444	CV0242	50k	IndustrySires_Run2		Shorthorn
KSTW062	CV0243	50k	IndustrySires_Run2		Shorthorn
GEAW50	CV0244	50k	IndustrySires_Run2		Shorthorn
L2_W207	CV0245	50k	IndustrySires_Run2		Shorthorn
BDBW791	CV0246	50k	IndustrySires_Run2		Shorthorn
GLSX008	CV0247	50k	IndustrySires_Run2		Shorthorn
TV4V63	CV0248	50k	IndustrySires_Run2		Shorthorn
TV4X27	CV0249	50k	IndustrySires_Run2		Shorthorn
TREX638	CV0250	50k	IndustrySires_Run2		Shorthorn
IAWV12	CV0251	50k	IndustrySires_Run2		Shorthorn
BDBW057	CV0252	50k	IndustrySires_Run2		Shorthorn
98X03355	CV0253	50k	IndustrySires_Run2		Shorthorn
NLRW035	CV0254	50k	IndustrySires_Run2		Shorthorn
L2_X154	CV0255	50k	IndustrySires_Run2		Shorthorn
SPJX16	CV0256	50k	IndustrySires_Run2		Shorthorn
IMP4067831	CV0257	50k	IndustrySires_Run2		Shorthorn
TBTY041	CV0258	50k	IndustrySires_Run2		Shorthorn
EHSV002	CV0259	50k	IndustrySires_Run2		Shorthorn
JOBXF317	CV0260	50k	IndustrySires_Run2		Shorthorn

EHSY005	CV0261	50k	IndustrySires_Run2		Shorthorn
GEAY2	CV0262	50k	IndustrySires_Run2		Shorthorn
CJHW023	CV0263	50k	IndustrySires_Run2		Shorthorn
IAWY189	CV0264	50k	IndustrySires_Run2		Shorthorn
MBIA03	CV0265	50k	IndustrySires_Run2		Shorthorn
BDBA584	CV0266	50k	IndustrySires_Run2		Shorthorn
MPCZ108	CV0267	50k	IndustrySires_Run2		Shorthorn
AGFY156	CV0268	50k	IndustrySires_Run2		Shorthorn
AGFZ130	CV0269	50k	IndustrySires_Run2		Shorthorn
KSTA034	CV0270	50k	IndustrySires_Run2		Shorthorn
VKRZ034	CV0271	50k	IndustrySires_Run2		Shorthorn
VKRZ017	CV0272	50k	IndustrySires_Run2		Shorthorn
IAWZ109	CV0273	50k	IndustrySires_Run2		Shorthorn
IMP4095819	CV0274	50k	IndustrySires_Run2		Shorthorn
EWAZ305	CV0275	50k	IndustrySires_Run2		Shorthorn
CJHB610	CV0276	50k	IndustrySires_Run2		Shorthorn
KSTZ051	CV0277	50k	IndustrySires_Run2		Shorthorn
JJA64	CV0278	50k	IndustrySires_Run2		Shorthorn
INGB075	CV0279	50k	IndustrySires_Run2		Shorthorn
TV4B114	CV0280	50k	IndustrySires_Run2		Shorthorn
SDNB28	CV0281	50k	IndustrySires_Run2		Shorthorn
GLSB069	CV0282	50k	IndustrySires_Run2		Shorthorn
BDBW735	CV0283	50k	IndustrySires_Run2		Shorthorn
BDBZ058	CV0284	50k	IndustrySires_Run2		Shorthorn
AGFA96	CV0285	50k	IndustrySires_Run2		Shorthorn
EWAB389	CV0286	50k	IndustrySires_Run2		Shorthorn
SAWZ13	CV0287	50k	IndustrySires_Run4		Shorthorn
SAWZ13	CV0287	50k	IndustrySires_Run2		Shorthorn
IMP470509	CV0289	50k	IndustrySires_Run2		Shorthorn
TV4A048	CV0290	50k	IndustrySires_Run2		Shorthorn
GLSC092	CV0291	50k	IndustrySires_Run2		Shorthorn
M9XD2	CV0292	50k	IndustrySires_Run2		Shorthorn
JOBZH221	CV0293	50k	IndustrySires_Run2		Shorthorn
INGC040	CV0294	50k	IndustrySires_Run3		Shorthorn
88/04839	CV0295	50k	IndustrySires_Run3		Shorthorn
QLD668/5M	CV0296	50k	IndustrySires_Run3		Brahman
VLR26/8M	CV0298	50k	IndustrySires_Run3		Brahman
CHE14/3358M	CV0305	50k	IndustrySires_Run3		Brahman
FBD306DM	CV0306	50k	IndustrySires_Run3		Brahman
TTS92/2365M	CV0307	50k	IndustrySires_Run3		Brahman
TTS976M	CV0308	50k	IndustrySires_Run3		Brahman
B4A619/2M	CV0310	50k	IndustrySires_Run3		Brahman
GEH500M	CV0312	50k	IndustrySires_Run3		Brahman
AGK356M	CV0313	50k	IndustrySires_Run3		Brahman
TTS014445M	CV0326	50k	IndustrySires_Run3		Brahman
JDH886/2M	CV0570	50k	IndustrySires_Run3		Brahman
JDH874/8M	CV0571	50k	IndustrySires_Run3		Brahman
131885384	CV0572	50k	IndustrySires_Run3		Angus
103220902690	CV0573	50k	IndustrySires_Run3		Angus
131195611	CV0574	50k	IndustrySires_Run3		Angus
131495561	CV0575	50k	IndustrySires_Run3		Angus
131762745	CV0576	50k	IndustrySires_Run3		Angus
131597114	CV0577	50k	IndustrySires_Run3		Angus
103220946794	CV0578	50k	IndustrySires_Run3		Angus

131555499	CV0579	50k	IndustrySires_Run3	Angus
131762678	CV0580	50k	IndustrySires_Run3	Angus
131597062	CV0581	50k	IndustrySires_Run3	Angus
131637199	CV0582	50k	IndustrySires_Run3	Angus
131817184	CV0583	50k	IndustrySires_Run3	Angus
17683099752	CV0584	50k	IndustrySires_Run3	Angus
S5X061918M	CV0605	50k	IndustrySires_Run3	Droughtmaster
HCD0529M	CV0606	50k	IndustrySires_Run3	Droughtmaster
ANA071716M	CV0607	50k	IndustrySires_Run3	Droughtmaster
S5X07300M	CV0608	50k	IndustrySires_Run3	Droughtmaster
132015587	CV0728	50k	IndustrySires_Run3	Angus
131819280	CV0729	50k	IndustrySires_Run3	Angus
131934593	CV0730	50k	IndustrySires_Run3	Angus
131848760	CV0731	50k	IndustrySires_Run3	Angus
131648859	CV0732	50k	IndustrySires_Run3	Angus
131981530	CV0733	50k	IndustrySires_Run3	Angus
131622976	CV0734	50k	IndustrySires_Run3	Angus
131593188	CV0735	50k	IndustrySires_Run3	Angus
131423563	CV0736	50k	IndustrySires_Run3	Angus
131826250	CV0737	50k	IndustrySires_Run3	Angus
131827205	CV0738	50k	IndustrySires_Run3	Angus
131427317	CV0739	50k	IndustrySires_Run3	Angus
131998362	CV0740	50k	IndustrySires_Run3	Angus
131528296	CV0741	50k	IndustrySires_Run3	Angus
131324282	CV0742	50k	IndustrySires_Run3	Angus
131165954	CV0743	50k	IndustrySires_Run3	Angus
131562516	CV0744	50k	IndustrySires_Run3	Angus
132024400	CV0745	50k	IndustrySires_Run3	Angus
132050841	CV0746	50k	IndustrySires_Run3	Angus
131752534	CV0747	50k	IndustrySires_Run3	Angus
131176472	CV0748	50k	IndustrySires_Run3	Angus
131685457	CV0749	50k	IndustrySires_Run3	Angus
131389009	CV0750	50k	IndustrySires_Run3	Angus
131434200	CV0751	50k	IndustrySires_Run3	Angus
131963234	CV0752	50k	IndustrySires_Run3	Angus
131726951	CV0753	50k	IndustrySires_Run3	Angus
131685571	CV0754	50k	IndustrySires_Run3	Angus
131415197	CV0755	50k	IndustrySires_Run3	Angus
131819277	CV0756	50k	IndustrySires_Run3	Angus
131819311	CV0757	50k	IndustrySires_Run3	Angus
131819313	CV0758	50k	IndustrySires_Run3	Angus
131819316	CV0759	50k	IndustrySires_Run3	Angus
131819335	CV0760	50k	IndustrySires_Run3	Angus
131819860	CV0761	50k	IndustrySires_Run3	Angus
131819989	CV0762	50k	IndustrySires_Run3	Angus
131819366	CV0763	50k	IndustrySires_Run3	Angus
131819388	CV0764	50k	IndustrySires_Run3	Angus
131819395	CV0765	50k	IndustrySires_Run3	Angus
131819396	CV0766	50k	IndustrySires_Run3	Angus
131820078	CV0767	50k	IndustrySires_Run3	Angus
131820293	CV0768	50k	IndustrySires_Run3	Angus
131819409	CV0769	50k	IndustrySires_Run3	Angus
131824200	CV0770	50k	IndustrySires_Run3	Angus
131820087	CV0771	50k	IndustrySires_Run3	Angus

131819450	CV0772	50k	IndustrySires_Run3		Angus
131820158	CV0773	50k	IndustrySires_Run3		Angus
131819630	CV0774	50k	IndustrySires_Run3		Angus
131824208	CV0775	50k	IndustrySires_Run3		Angus
131820239	CV0776	50k	IndustrySires_Run3		Angus
131878804	CV0777	50k	IndustrySires_Run3		Angus
131878631	CV0778	50k	IndustrySires_Run3		Angus
131879183	CV0779	50k	IndustrySires_Run3		Angus
131879202	CV0780	50k	IndustrySires_Run3		Angus
131937443	CV0781	50k	IndustrySires_Run3		Angus
131935792	CV0782	50k	IndustrySires_Run3		Angus
131937826	CV0783	50k	IndustrySires_Run3		Angus
131937782	CV0784	50k	IndustrySires_Run3		Angus
131937829	CV0785	50k	IndustrySires_Run3		Angus
131937870	CV0786	50k	IndustrySires_Run3		Angus
131935871	CV0787	50k	IndustrySires_Run3		Angus
131936425	CV0788	50k	IndustrySires_Run3		Angus
132004151	CV0789	50k	IndustrySires_Run3		Angus
132004247	CV0790	50k	IndustrySires_Run3		Angus
132004171	CV0791	50k	IndustrySires_Run3		Angus
132004029	CV0792	50k	IndustrySires_Run3		Angus
132004697	CV0793	50k	IndustrySires_Run3		Angus
132004522	CV0794	50k	IndustrySires_Run3		Angus
132006663	CV0795	50k	IndustrySires_Run3		Angus
130110371	CV0796	50k	IndustrySires_Run3		Angus
131016297	CV0797	50k	IndustrySires_Run3		Angus
131091262	CV0799	50k	IndustrySires_Run3		Angus
131105761	CV0800	50k	IndustrySires_Run3		Angus
131091265	CV0801	50k	IndustrySires_Run3		Angus
131159666	CV0802	50k	IndustrySires_Run3		Angus
131149759	CV0803	50k	IndustrySires_Run3		Angus
131166964	CV0804	50k	IndustrySires_Run3		Angus
131204203	CV0805	50k	IndustrySires_Run3		Angus
131204194	CV0806	50k	IndustrySires_Run3		Angus
131220397	CV0807	50k	IndustrySires_Run3		Angus
131220456	CV0808	50k	IndustrySires_Run3		Angus
131204043	CV0809	50k	IndustrySires_Run3		Angus
131217352	CV0810	50k	IndustrySires_Run3		Angus
131267954	CV0811	50k	IndustrySires_Run3		Angus
131313633	CV0812	50k	IndustrySires_Run3		Angus
131278523	CV0813	50k	IndustrySires_Run3		Angus
131322414	CV0814	50k	IndustrySires_Run3		Angus
131355493	CV0815	50k	IndustrySires_Run3		Angus
131397024	CV0816	50k	IndustrySires_Run3		Angus
131397042	CV0817	50k	IndustrySires_Run3		Angus
131414359	CV0818	50k	IndustrySires_Run3		Angus
131429698	CV0819	50k	IndustrySires_Run3		Angus
131429700	CV0820	50k	IndustrySires_Run3		Angus
131430024	CV0821	50k	IndustrySires_Run3		Angus
131430052	CV0822	50k	IndustrySires_Run3		Angus
131430080	CV0823	50k	IndustrySires_Run3		Angus
131429875	CV0824	50k	IndustrySires_Run3		Angus
131430073	CV0825	50k	IndustrySires_Run3		Angus
131430077	CV0826	50k	IndustrySires_Run3		Angus

131430082	CV0827	50k	IndustrySires_Run3		Angus
131430083	CV0828	50k	IndustrySires_Run3		Angus
131430089	CV0829	50k	IndustrySires_Run3		Angus
131430090	CV0830	50k	IndustrySires_Run3		Angus
131430106	CV0831	50k	IndustrySires_Run3		Angus
131429769	CV0832	50k	IndustrySires_Run3		Angus
131434025	CV0833	50k	IndustrySires_Run3		Angus
131460979	CV0834	50k	IndustrySires_Run3		Angus
131485017	CV0835	50k	IndustrySires_Run3		Angus
131484574	CV0836	50k	IndustrySires_Run3		Angus
131485036	CV0837	50k	IndustrySires_Run3		Angus
131485044	CV0838	50k	IndustrySires_Run3		Angus
131485127	CV0839	50k	IndustrySires_Run3		Angus
131485059	CV0840	50k	IndustrySires_Run3		Angus
131485141	CV0841	50k	IndustrySires_Run3		Angus
131484843	CV0842	50k	IndustrySires_Run3		Angus
131484694	CV0843	50k	IndustrySires_Run3		Angus
131485165	CV0844	50k	IndustrySires_Run3		Angus
131484711	CV0845	50k	IndustrySires_Run3		Angus
131507197	CV0846	50k	IndustrySires_Run3		Angus
131540101	CV0847	50k	IndustrySires_Run4		Angus
131540090	CV0848	50k	IndustrySires_Run3		Angus
131540132	CV0849	50k	IndustrySires_Run3		Angus
131540149	CV0850	50k	IndustrySires_Run3		Angus
131540165	CV0851	50k	IndustrySires_Run3		Angus
131540201	CV0852	50k	IndustrySires_Run3		Angus
131540154	CV0853	50k	IndustrySires_Run4		Angus
131540218	CV0854	50k	IndustrySires_Run3		Angus
131540219	CV0855	50k	IndustrySires_Run3		Angus
131540275	CV0856	50k	IndustrySires_Run3		Angus
131545503	CV0857	50k	IndustrySires_Run3		Angus
131545508	CV0858	50k	IndustrySires_Run3		Angus
131571885	CV0859	50k	IndustrySires_Run3		Angus
131571948	CV0860	50k	IndustrySires_Run3		Angus
131571887	CV0861	50k	IndustrySires_Run3		Angus
131572015	CV0862	50k	IndustrySires_Run3		Angus
131572019	CV0863	50k	IndustrySires_Run3		Angus
131571892	CV0864	50k	IndustrySires_Run3		Angus
131572020	CV0865	50k	IndustrySires_Run3		Angus
131571984	CV0866	50k	IndustrySires_Run3		Angus
131571985	CV0867	50k	IndustrySires_Run3		Angus
131571903	CV0868	50k	IndustrySires_Run3		Angus
131571909	CV0869	50k	IndustrySires_Run3		Angus
131571913	CV0870	50k	IndustrySires_Run3		Angus
131601758	CV0871	50k	IndustrySires_Run3		Angus
131601824	CV0872	50k	IndustrySires_Run3		Angus
131632948	CV0873	50k	IndustrySires_Run3		Angus
131607041	CV0874	50k	IndustrySires_Run3		Angus
131602226	CV0875	50k	IndustrySires_Run3		Angus
131602235	CV0876	50k	IndustrySires_Run3		Angus
131601998	CV0877	50k	IndustrySires_Run3		Angus
131602266	CV0878	50k	IndustrySires_Run3		Angus
131602268	CV0879	50k	IndustrySires_Run3		Angus
131602291	CV0880	50k	IndustrySires_Run3		Angus

131636461	CV0881	50k	IndustrySires_Run3	Angus
131636462	CV0882	50k	IndustrySires_Run3	Angus
131636772	CV0883	50k	IndustrySires_Run3	Angus
131636798	CV0884	50k	IndustrySires_Run3	Angus
131636821	CV0885	50k	IndustrySires_Run3	Angus
131636855	CV0886	50k	IndustrySires_Run3	Angus
131690564	CV0887	50k	IndustrySires_Run3	Angus
131689596	CV0888	50k	IndustrySires_Run3	Angus
131690437	CV0889	50k	IndustrySires_Run3	Angus
131690022	CV0890	50k	IndustrySires_Run3	Angus
131689647	CV0891	50k	IndustrySires_Run3	Angus
131689664	CV0892	50k	IndustrySires_Run3	Angus
131690460	CV0893	50k	IndustrySires_Run3	Angus
131701752	CV0894	50k	IndustrySires_Run3	Angus
131690543	CV0895	50k	IndustrySires_Run3	Angus
131726091	CV0896	50k	IndustrySires_Run3	Angus
131726095	CV0897	50k	IndustrySires_Run3	Angus
131726216	CV0898	50k	IndustrySires_Run4	Angus
131726222	CV0899	50k	IndustrySires_Run3	Angus
131726133	CV0900	50k	IndustrySires_Run3	Angus
131754950	CV0901	50k	IndustrySires_Run3	Angus
131754958	CV0902	50k	IndustrySires_Run3	Angus
131754969	CV0903	50k	IndustrySires_Run3	Angus
131755022	CV0904	50k	IndustrySires_Run3	Angus
131755042	CV0905	50k	IndustrySires_Run3	Angus
131754477	CV0906	50k	IndustrySires_Run3	Angus
131755045	CV0907	50k	IndustrySires_Run3	Angus
131755058	CV0908	50k	IndustrySires_Run3	Angus
131754507	CV0909	50k	IndustrySires_Run3	Angus
131755078	CV0910	50k	IndustrySires_Run3	Angus
131754551	CV0911	50k	IndustrySires_Run3	Angus
131754555	CV0912	50k	IndustrySires_Run3	Angus
131755081	CV0913	50k	IndustrySires_Run3	Angus
131755087	CV0914	50k	IndustrySires_Run3	Angus
131754570	CV0915	50k	IndustrySires_Run3	Angus
131754571	CV0916	50k	IndustrySires_Run3	Angus
131754578	CV0917	50k	IndustrySires_Run3	Angus
131754583	CV0918	50k	IndustrySires_Run3	Angus
131754600	CV0919	50k	IndustrySires_Run3	Angus
131754909	CV0920	50k	IndustrySires_Run3	Angus
131754603	CV0921	50k	IndustrySires_Run3	Angus
131755118	CV0922	50k	IndustrySires_Run3	Angus
131754610	CV0923	50k	IndustrySires_Run3	Angus
131754656	CV0924	50k	IndustrySires_Run3	Angus
131755143	CV0925	50k	IndustrySires_Run3	Angus
131755148	CV0926	50k	IndustrySires_Run3	Angus
131755157	CV0927	50k	IndustrySires_Run3	Angus
131754749	CV0928	50k	IndustrySires_Run3	Angus
131755175	CV0929	50k	IndustrySires_Run3	Angus
LL_94928M	CV0955	50k	IndustrySires_Run3	Droughtmaster
LL_92837M	CV0956	50k	IndustrySires_Run3	Droughtmaster
8WI80031M	CV0957	50k	IndustrySires_Run3	Droughtmaster
ALI375/4M	CV0958	50k	IndustrySires_Run4	Brahman
TTS014380M	CV0959	50k	IndustrySires_Run3	Brahman

CMT298/0M	CV0960	50k	IndustrySires_Run3	Brahman
JDH855/8M	CV0961	50k	IndustrySires_Run3	Brahman
TTS045128M	CV0963	50k	IndustrySires_Run3	Brahman
TTS014382M	CV0965	50k	IndustrySires_Run3	Brahman
B4A100/4M	CV0966	50k	IndustrySires_Run3	Brahman
ABS78M	CV0967	50k	IndustrySires_Run3	Brahman
CBV93-5604M	CV0968	50k	IndustrySires_Run3	Brahman
YEN212/3M	CV0971	50k	IndustrySires_Run3	Brahman
131419631	CV0974	50k	IndustrySires_Run3	Angus
131581413	CV0975	50k	IndustrySires_Run3	Angus
131511634	CV0977	50k	IndustrySires_Run3	Angus
131427235	CV0978	50k	IndustrySires_Run3	Angus
130001693	CV0979	50k	IndustrySires_Run3	Angus
131335130	CV0981	50k	IndustrySires_Run3	Angus
131624693	CV0982	50k	IndustrySires_Run3	Angus
130182533	CV0983	50k	IndustrySires_Run3	Angus
131027216	CV0984	50k	IndustrySires_Run3	Angus
130182532	CV0985	50k	IndustrySires_Run3	Angus
131202183	CV0986	50k	IndustrySires_Run3	Angus
131794942	CV0987	50k	IndustrySires_Run3	Angus
131925993	CV0988	50k	IndustrySires_Run3	Angus
131583195	CV0989	50k	IndustrySires_Run3	Angus
131958540	CV0990	50k	IndustrySires_Run3	Angus
131924610	CV0991	50k	IndustrySires_Run3	Angus
131717866	CV0992	50k	IndustrySires_Run3	Angus
131989628	CV0993	50k	IndustrySires_Run3	Angus
131924589	CV0994	50k	IndustrySires_Run3	Angus
132052787	CV0995	50k	IndustrySires_Run3	Angus
132060334	CV0996	50k	IndustrySires_Run3	Angus
SLTPA31	CV0997	50k	IndustrySires_Run3	Limousin
131924578	CV0998	50k	IndustrySires_Run3	Angus
238642	CV0999	50k	IndustrySires_Run4	Santa Gertrudis
JAV031473M	CV1000	50k	IndustrySires_Run3	Droughtmaster
JAV082541M	CV1001	50k	IndustrySires_Run3	Droughtmaster
7HX090426M	CV1002	50k	IndustrySires_Run3	Droughtmaster
WS602662M	CV1003	50k	IndustrySires_Run3	Droughtmaster
WS604134M	CV1004	50k	IndustrySires_Run3	Droughtmaster
WS604211M	CV1005	50k	IndustrySires_Run3	Droughtmaster
WS605204M	CV1006	50k	IndustrySires_Run3	Droughtmaster
WS607401M	CV1007	50k	IndustrySires_Run3	Droughtmaster
WS608708M	CV1008	50k	IndustrySires_Run3	Droughtmaster
WS609885M	CV1009	50k	IndustrySires_Run3	Droughtmaster
WS609933M	CV1010	50k	IndustrySires_Run3	Droughtmaster
JAV072480M	CV1011	50k	IndustrySires_Run3	Droughtmaster
8RP08538M	CV1012	50k	IndustrySires_Run3	Droughtmaster
GCD052517M	CV1013	50k	IndustrySires_Run3	Droughtmaster
7HX089325M	CV1014	50k	IndustrySires_Run3	Droughtmaster
8RP08558M	CV1015	50k	IndustrySires_Run3	Droughtmaster
8RP08008M	CV1016	50k	IndustrySires_Run3	Droughtmaster
8RP080036M	CV1017	50k	IndustrySires_Run3	Droughtmaster
8RP06501M	CV1018	50k	IndustrySires_Run3	Droughtmaster
8RP08662M	CV1019	50k	IndustrySires_Run3	Droughtmaster
8RP07339M	CV1020	50k	IndustrySires_Run3	Droughtmaster
8RP0801M	CV1021	50k	IndustrySires_Run3	Droughtmaster

MRO0859M	CV1022	50k	IndustrySires_Run3	Droughtmaster
8RP04026F	CV1023	50k	IndustrySires_Run3	Droughtmaster
8RP05332M	CV1024	50k	IndustrySires_Run3	Droughtmaster
8RP06001M	CV1025	50k	IndustrySires_Run3	Droughtmaster
8RP07479M	CV1026	50k	IndustrySires_Run3	Droughtmaster
8RP08565F	CV1027	50k	IndustrySires_Run3	Droughtmaster
B2V0443M	CV1028	50k	IndustrySires_Run3	Droughtmaster
MPG052080M	CV1029	50k	IndustrySires_Run3	Droughtmaster
LAG07127M	CV1030	50k	IndustrySires_Run3	Droughtmaster
8RP09035M	CV1031	50k	IndustrySires_Run3	Droughtmaster
8RP09100M	CV1032	50k	IndustrySires_Run3	Droughtmaster
8RP09158M	CV1033	50k	IndustrySires_Run3	Droughtmaster
8RP09165M	CV1034	50k	IndustrySires_Run3	Droughtmaster
8RP09581M	CV1035	50k	IndustrySires_Run3	Droughtmaster
8RP09592M	CV1036	50k	IndustrySires_Run3	Droughtmaster
8RP09593M	CV1037	50k	IndustrySires_Run3	Droughtmaster
8RP09595M	CV1038	50k	IndustrySires_Run3	Droughtmaster
8RP09598M	CV1039	50k	IndustrySires_Run3	Droughtmaster
PTC05117M	CV1040	50k	IndustrySires_Run3	Droughtmaster
JAV98832M	CV1041	50k	IndustrySires_Run3	Droughtmaster
131806348	CV1042	50k	IndustrySires_Run3	Angus
131806351	CV1043	50k	IndustrySires_Run3	Angus
131806356	CV1044	50k	IndustrySires_Run3	Angus
131738890	CV1045	50k	IndustrySires_Run3	Angus
IMFFN58	CV1046	50k	IndustrySires_Run1	Limousin
IMBFF9	CV1047	50k	IndustrySires_Run1	Limousin
IMFFQ190	CV1048	50k	IndustrySires_Run1	Limousin
LFLFG7	CV1049	50k	IndustrySires_Run1	Limousin
IMFFK4838	CV1050	50k	IndustrySires_Run2	Limousin
LN8942479M	CV1051	50k	IndustrySires_Run3	Droughtmaster
MYMA097	CV1052	50k	IndustrySires_Run3	Shorthorn
BDBD817	CV1053	50k	IndustrySires_Run3	Shorthorn
BDBD815	CV1054	50k	IndustrySires_Run3	Shorthorn
BDBV013	CV1055	50k	IndustrySires_Run3	Shorthorn
RRR2135M	CV1056	50k	IndustrySires_Run3	Brahman
LAG08108M	CV1057	50k	IndustrySires_Run3	Droughtmaster
BOM07186M	CV1058	50k	IndustrySires_Run3	Droughtmaster
CFM087138M	CV1059	50k	IndustrySires_Run3	Droughtmaster
2UU072735M	CV1060	50k	IndustrySires_Run3	Droughtmaster
U9C076393M	CV1061	50k	IndustrySires_Run3	Droughtmaster
R5XX020	CV1062	50k	IndustrySires_Run1	Hereford
YPHW251	CV1063	50k	IndustrySires_Run1	Hereford
LCI15WCHR	CV1064	50k	IndustrySires_Run1	Hereford
KFSY218	CV1065	50k	IndustrySires_Run1	Hereford
EMUQ40	CV1066	50k	IndustrySires_Run1	Hereford
RASK032	CV1067	50k	IndustrySires_Run1	Hereford
DCPL53M91	CV1068	50k	IndustrySires_Run1	Hereford
AEDH98	CV1069	50k	IndustrySires_Run1	Hereford
IMFFS1143	CV1070	50k	IndustrySires_Run1	Limousin
IMUFL7622	CV1071	50k	IndustrySires_Run1	Limousin
IMBFP1	CV1072	50k	IndustrySires_Run1	Limousin
IMFFP140	CV1075	50k	IndustrySires_Run2	Limousin
IMCFF4	CV1076	50k	IndustrySires_Run1	Limousin
IMUFH7444	CV1077	50k	IndustrySires_Run1	Limousin

IMCFF1598	CV1078	50k	IndustrySires_Run1	Limousin
PMFA22	CV1079	50k	IndustrySires_Run1	Limousin
IMCFG9766	CV1080	50k	IndustrySires_Run1	Limousin
IMUPN117	CV1081	50k	IndustrySires_Run1	Limousin
IMFFK52	CV1082	50k	IndustrySires_Run1	Limousin
IMFFP1552	CV1083	50k	IndustrySires_Run1	Limousin
131821129	CV1084	50k	IndustrySires_Run3	Angus
131611949	CV1085	50k	IndustrySires_Run3	Angus
AEDV111	CV1086	50k	IndustrySires_Run1	Hereford
BWNV344	CV1087	50k	IndustrySires_Run1	Hereford
AEDZ52	CV1088	50k	IndustrySires_Run1	Hereford
DAYE312	CV1089	50k	IndustrySires_Run1	Hereford
TASA14	CV1090	50k	IndustrySires_Run1	Hereford
AEDA74	CV1091	50k	IndustrySires_Run1	Hereford
AEDM1	CV1092	50k	IndustrySires_Run1	Hereford
AEDW39	CV1093	50k	IndustrySires_Run1	Hereford
WKHE604	CV1094	50k	IndustrySires_Run3	Hereford
AEDZ11	CV1095	50k	IndustrySires_Run3	Hereford
AEDY20	CV1096	50k	IndustrySires_Run3	Hereford
AEDX55	CV1097	50k	IndustrySires_Run3	Hereford
AEDY22	CV1098	50k	IndustrySires_Run3	Hereford
AEDP23	CV1099	50k	IndustrySires_Run3	Hereford
ZZZ14XCHR	CV1100	50k	IndustrySires_Run3	Hereford
AEDB28	CV1101	50k	IndustrySires_Run3	Hereford
AEDA124	CV1102	50k	IndustrySires_Run3	Hereford
DB_C58	CV1103	50k	IndustrySires_Run3	Hereford
AEDX16	CV1104	50k	IndustrySires_Run3	Hereford
AEDY169	CV1105	50k	IndustrySires_Run3	Hereford
AEDT73	CV1106	50k	IndustrySires_Run3	Hereford
AEDA28	CV1107	50k	IndustrySires_Run3	Hereford
JDOW51	CV1108	50k	IndustrySires_Run3	Hereford
RMTNGA152KCHR	CV1109	50k	IndustrySires_Run3	Hereford
014788076	CV1110	50k	IndustrySires_Run3	Hereford
AEDY132	CV1111	50k	IndustrySires_Run3	Hereford
0617020076	CV1112	50k	IndustrySires_Run3	Hereford
KMPB184	CV1113	50k	IndustrySires_Run3	Hereford
WNAC26	CV1114	50k	IndustrySires_Run3	Hereford
WNAC68	CV1115	50k	IndustrySires_Run3	Hereford
WNAD1	CV1116	50k	IndustrySires_Run3	Hereford
RSHD651	CV1117	50k	IndustrySires_Run4	Hereford
YPHC091	CV1118	50k	IndustrySires_Run3	Hereford
AEDD1	CV1119	50k	IndustrySires_Run3	Hereford
0216088406	CV1120	50k	IndustrySires_Run3	Hereford
0216088132	CV1121	50k	IndustrySires_Run3	Hereford
MTTY12	CV1122	50k	IndustrySires_Run3	Hereford
YAVD026	CV1123	50k	IndustrySires_Run3	Hereford
BMED36	CV1124	50k	IndustrySires_Run3	Hereford
BWNZ260	CV1125	50k	IndustrySires_Run3	Hereford
IHSY203	CV1126	50k	IndustrySires_Run3	Hereford
YPHX122	CV1127	50k	IndustrySires_Run3	Hereford
TPCZ133	CV1128	50k	IndustrySires_Run3	Hereford
LLL65HAPR	CV1129	50k	IndustrySires_Run3	Hereford
WTAZ51	CV1130	50k	IndustrySires_Run3	Hereford
LLL45HCHR	CV1131	50k	IndustrySires_Run3	Hereford

DB_Y71	CV1132	50k	IndustrySires_Run3	Hereford
BWNS178	CV1133	50k	IndustrySires_Run3	Hereford
0216000219	CV1134	50k	IndustrySires_Run3	Hereford
WNAV16	CV1135	50k	IndustrySires_Run3	Hereford
LHBW188	CV1136	50k	IndustrySires_Run3	Hereford
MTTY74	CV1137	50k	IndustrySires_Run3	Hereford
WNAD101	CV1138	50k	IndustrySires_Run3	Hereford
WNAA85	CV1139	50k	IndustrySires_Run3	Hereford
WNAC280	CV1140	50k	IndustrySires_Run3	Hereford
SMOY8	CV1141	50k	IndustrySires_Run3	Hereford
WNAC68	CV1142	50k	IndustrySires_Run3	Hereford
SODL69	CV1143	50k	IndustrySires_Run3	Hereford
WNAB132	CV1144	50k	IndustrySires_Run3	Hereford
WNAC26	CV1145	50k	IndustrySires_Run4	Hereford
WNAD1	CV1146	50k	IndustrySires_Run4	Hereford
SBPY781	CV1147	50k	IndustrySires_Run3	Hereford
FEL745APR	CV1148	50k	IndustrySires_Run3	Hereford
0277044133	CV1149	50k	IndustrySires_Run3	Hereford
MKRA004	CV1150	50k	IndustrySires_Run3	Hereford
PBSA192	CV1152	50k	IndustrySires_Run3	Hereford
TDWD226	CV1153	50k	IndustrySires_Run3	Hereford
RTAD007	CV1154	50k	IndustrySires_Run3	Hereford
GOLD121	CV1155	50k	IndustrySires_Run3	Hereford
HH4E001	CV1156	50k	IndustrySires_Run3	Hereford
GVPQ267	CV1157	50k	IndustrySires_Run3	Hereford
CHAV592	CV1158	50k	IndustrySires_Run3	Hereford
YAVX035	CV1159	50k	IndustrySires_Run3	Hereford
YAVV086	CV1160	50k	IndustrySires_Run3	Hereford
IHSK271M90	CV1161	50k	IndustrySires_Run3	Hereford
GVPJ057M89	CV1162	50k	IndustrySires_Run3	Hereford
YAVW014	CV1163	50k	IndustrySires_Run3	Hereford
TZRS106	CV1164	50k	IndustrySires_Run3	Hereford
CHAV030	CV1165	50k	IndustrySires_Run3	Hereford
KEEB017	CV1166	50k	IndustrySires_Run3	Hereford
YAVB035	CV1167	50k	IndustrySires_Run3	Hereford
752637010AHR	CV1168	50k	IndustrySires_Run3	Hereford
YAVA391	CV1169	50k	IndustrySires_Run3	Hereford
YAVW379	CV1170	50k	IndustrySires_Run3	Hereford
YAVV093	CV1171	50k	IndustrySires_Run3	Hereford
YAVW185	CV1172	50k	IndustrySires_Run3	Hereford
HH1U120	CV1173	50k	IndustrySires_Run3	Hereford
HMMV530	CV1174	50k	IndustrySires_Run3	Hereford
INGX019	CV1175	50k	IndustrySires_Run3	Hereford
751902443AHR	CV1176	50k	IndustrySires_Run3	Hereford
HH1S018	CV1177	50k	IndustrySires_Run3	Hereford
7524340UCHR	CV1178	50k	IndustrySires_Run3	Hereford
CCCQ081	CV1179	50k	IndustrySires_Run3	Hereford
HRMV092	CV1180	50k	IndustrySires_Run3	Hereford
RASZ068	CV1181	50k	IndustrySires_Run3	Hereford
LHHC61AHR	CV1182	50k	IndustrySires_Run3	Hereford
YAVX180	CV1183	50k	IndustrySires_Run3	Hereford
HH1T182	CV1184	50k	IndustrySires_Run3	Hereford
JENT311	CV1185	50k	IndustrySires_Run3	Hereford
HH1Z149	CV1186	50k	IndustrySires_Run3	Hereford

GVPJ127M89	CV1187	50k	IndustrySires_Run3	Hereford
GAH78KCHR	CV1188	50k	IndustrySires_Run3	Hereford
SLCU028	CV1189	50k	IndustrySires_Run3	Hereford
WCSM226	CV1190	50k	IndustrySires_Run3	Hereford
YAVU149	CV1191	50k	IndustrySires_Run3	Hereford
PRA26BCHR	CV1192	50k	IndustrySires_Run3	Hereford
YAVB278	CV1193	50k	IndustrySires_Run3	Hereford
AGF20ZCHR	CV1194	50k	IndustrySires_Run3	Hereford
BMEA14	CV1195	50k	IndustrySires_Run3	Hereford
YAVY207	CV1196	50k	IndustrySires_Run3	Hereford
YAVB028	CV1197	50k	IndustrySires_Run3	Hereford
HRMT097	CV1198	50k	IndustrySires_Run3	Hereford
BMET36	CV1199	50k	IndustrySires_Run3	Hereford
751914119AHR	CV1200	50k	IndustrySires_Run3	Hereford
HRPD159	CV1201	50k	IndustrySires_Run3	Hereford
HIR21ECHR	CV1202	50k	IndustrySires_Run3	Hereford
GAH4LCHR	CV1203	50k	IndustrySires_Run3	Hereford
YAVD029	CV1204	50k	IndustrySires_Run3	Hereford
JNH226E	CV1205	50k	IndustrySires_Run3	Hereford
GVP239	CV1206	50k	IndustrySires_Run3	Hereford
BCD6KCHR	CV1207	50k	IndustrySires_Run3	Hereford
DB_C303	CV1208	50k	IndustrySires_Run3	Hereford
MEAC41	CV1209	50k	IndustrySires_Run3	Hereford
AEDA49	CV1210	50k	IndustrySires_Run3	Hereford
MEP60GCHR	CV1211	50k	IndustrySires_Run3	Hereford
MTT2126	CV1212	50k	IndustrySires_Run3	Hereford
SBPY781	CV1213	50k	IndustrySires_Run3	Hereford
VALB56	CV1214	50k	IndustrySires_Run3	Hereford
LHBX62	CV1215	50k	IndustrySires_Run3	Hereford
FV_Y75	CV1216	50k	IndustrySires_Run3	Hereford
FV_D23	CV1217	50k	IndustrySires_Run3	Hereford
FV_Z72	CV1218	50k	IndustrySires_Run3	Hereford
ACCR70	CV1219	50k	IndustrySires_Run3	Hereford
FV_N20	CV1220	50k	IndustrySires_Run3	Hereford
0805030023	CV1221	50k	IndustrySires_Run3	Hereford
WCSM138	CV1222	50k	IndustrySires_Run3	Hereford
ZZZ517APR	CV1223	50k	IndustrySires_Run3	Hereford
H1044100L	CV1224	50k	IndustrySires_Run3	Hereford
ZZZA03APR	CV1225	50k	IndustrySires_Run3	Hereford
H005263L	CV1226	50k	IndustrySires_Run3	Hereford
GER117FAPR	CV1227	50k	IndustrySires_Run3	Hereford
LHBU78	CV1228	50k	IndustrySires_Run3	Hereford
KMPB28	CV1229	50k	IndustrySires_Run3	Hereford
KMPV119	CV1230	50k	IndustrySires_Run3	Hereford
0277044110	CV1231	50k	IndustrySires_Run3	Hereford
MTTU86	CV1232	50k	IndustrySires_Run3	Hereford
VALN72	CV1233	50k	IndustrySires_Run3	Hereford
SMOA29	CV1234	50k	IndustrySires_Run3	Hereford
SODM23	CV1235	50k	IndustrySires_Run3	Hereford
WNAT35	CV1236	50k	IndustrySires_Run3	Hereford
CCCS142	CV1237	50k	IndustrySires_Run3	Hereford
KMPX54	CV1238	50k	IndustrySires_Run3	Hereford
TLPP44	CV1239	50k	IndustrySires_Run3	Hereford
SBPY766	CV1240	50k	IndustrySires_Run3	Hereford

0347022046	CV1241	50k	IndustrySires_Run3	Hereford
VALP85	CV1242	50k	IndustrySires_Run3	Hereford
RGFP43	CV1243	50k	IndustrySires_Run3	Hereford
RMT46BCHR	CV1244	50k	IndustrySires_Run3	Hereford
KMPQ052	CV1245	50k	IndustrySires_Run3	Hereford
WKHW515	CV1246	50k	IndustrySires_Run3	Hereford
DB_G81M87	CV1247	50k	IndustrySires_Run3	Hereford
KMPY31	CV1248	50k	IndustrySires_Run3	Hereford
0989U0065	CV1249	50k	IndustrySires_Run3	Hereford
WRLU123	CV1250	50k	IndustrySires_Run3	Hereford
GEWR51	CV1251	50k	IndustrySires_Run3	Hereford
WKHY601	CV1252	50k	IndustrySires_Run3	Hereford
ZZB80APR	CV1253	50k	IndustrySires_Run3	Hereford
CCCS620	CV1254	50k	IndustrySires_Run3	Hereford
NOR66G	CV1255	50k	IndustrySires_Run3	Hereford
CCCP145	CV1256	50k	IndustrySires_Run3	Hereford
CCCR114	CV1257	50k	IndustrySires_Run3	Hereford
H006526RCHR	CV1258	50k	IndustrySires_Run3	Hereford
VALR75	CV1259	50k	IndustrySires_Run3	Hereford
JCJ7CAPR	CV1260	50k	IndustrySires_Run3	Hereford
CCCR079	CV1261	50k	IndustrySires_Run3	Hereford
KMPN3149M93	CV1262	50k	IndustrySires_Run3	Hereford
HRPM150M92	CV1263	50k	IndustrySires_Run3	Hereford
HRMS070	CV1264	50k	IndustrySires_Run3	Hereford
CHAR508	CV1265	50k	IndustrySires_Run3	Hereford
131556216	CV1266	50k	IndustrySires_Run3	Angus
131629453	CV1267	50k	IndustrySires_Run3	Angus
LL_991660M	CV1268	50k	IndustrySires_Run3	Droughtmaster
IMCFD5764	CV1269	50k	IndustrySires_Run4	Limousin
IMUPC103	CV1270	50k	IndustrySires_Run4	Limousin
IMUPY3861	CV1271	50k	IndustrySires_Run3	Limousin
131952924	CV1272	50k	IndustrySires_Run3	Angus
131763178	CV1273	50k	IndustrySires_Run3	Angus
132015587	CV1274	50k	IndustrySires_Run3	Angus
7520163XCHR	CV1275	50k	IndustrySires_Run3	Hereford
115982ACHR	CV1276	50k	IndustrySires_Run3	Hereford
HRPM044M92	CV1277	50k	IndustrySires_Run3	Hereford
HRPV132	CV1278	50k	IndustrySires_Run3	Hereford
7523849NCHR	CV1279	50k	IndustrySires_Run3	Hereford
WCSM226	CV1280	50k	IndustrySires_Run3	Hereford
MPSN106M93	CV1281	50k	IndustrySires_Run3	Hereford
1FJA231	CV1282	50k	IndustrySires_Run4	Hereford
HRPT085	CV1283	50k	IndustrySires_Run3	Hereford
7513711KCHR	CV1284	50k	IndustrySires_Run3	Hereford
PLY529	CV1285	50k	IndustrySires_Run3	Hereford
HRPQ182	CV1286	50k	IndustrySires_Run3	Hereford
MPSV484	CV1287	50k	IndustrySires_Run3	Hereford
GAVT20	CV1288	50k	IndustrySires_Run3	Hereford
MKPH377M88	CV1289	50k	IndustrySires_Run3	Hereford
HRPS219	CV1290	50k	IndustrySires_Run3	Hereford
HCCL150	CV1291	50k	IndustrySires_Run3	Hereford
YYT016	CV1292	50k	IndustrySires_Run3	Hereford
HRPA229	CV1293	50k	IndustrySires_Run3	Hereford
RHHY67	CV1294	50k	IndustrySires_Run3	Hereford

DB_Z79	CV1295	50k	IndustrySires_Run3	Hereford
COOW972	CV1296	50k	IndustrySires_Run3	Hereford
BH899487M	CV1297	50k	IndustrySires_Run4	Droughtmaster
BH800576M	CV1298	50k	IndustrySires_Run3	Droughtmaster
BH8041043M	CV1299	50k	IndustrySires_Run3	Droughtmaster
B2M05438M	CV1300	50k	IndustrySires_Run3	Droughtmaster
FSAW134	CV1306	50k	IndustrySires_Run3	Hereford
GRKC093	CV1307	50k	IndustrySires_Run3	Hereford
TV4W48	CV1308	50k	IndustrySires_Run3	Shorthorn
YY_C26	CV1309	50k	IndustrySires_Run3	Shorthorn
IMFFP403	CV1310	50k	IndustrySires_Run3	Limousin
DGCFL57	CV1311	50k	IndustrySires_Run4	Limousin
IMCFE512	CV1312	50k	IndustrySires_Run3	Limousin
IMCFJ77	CV1313	50k	IndustrySires_Run3	Limousin
IMBFA110	CV1314	50k	IndustrySires_Run3	Limousin
S5X92758M	CV1315	50k	IndustrySires_Run3	Droughtmaster
S5X941064M	CV1316	50k	IndustrySires_Run3	Droughtmaster
S5X941066M	CV1317	50k	IndustrySires_Run3	Droughtmaster
S5X951082M	CV1318	50k	IndustrySires_Run3	Droughtmaster
S5X972406M	CV1319	50k	IndustrySires_Run3	Droughtmaster
S5X052266M	CV1320	50k	IndustrySires_Run3	Droughtmaster
S5X07300M	CV1321	50k	IndustrySires_Run3	Droughtmaster
S5X052262M	CV1322	50k	IndustrySires_Run3	Droughtmaster
S5X041814M	CV1323	50k	IndustrySires_Run3	Droughtmaster
7HX861585M	CV1324	50k	IndustrySires_Run3	Droughtmaster
2DP0235M	CV1325	50k	IndustrySires_Run3	Droughtmaster
2DP0518M	CV1326	50k	IndustrySires_Run3	Droughtmaster
QYB976M	CV1327	50k	IndustrySires_Run3	Droughtmaster
WS696550M	CV1328	50k	IndustrySires_Run3	Droughtmaster
U9C891765M	CV1329	50k	IndustrySires_Run3	Droughtmaster
SSD891379M	CV1330	50k	IndustrySires_Run3	Droughtmaster
GP378234M	CV1331	50k	IndustrySires_Run3	Droughtmaster
SHK86207M	CV1332	50k	IndustrySires_Run3	Droughtmaster
DVU85980M	CV1333	50k	IndustrySires_Run3	Droughtmaster
VSD88600M	CV1334	50k	IndustrySires_Run3	Droughtmaster
8RP87500M	CV1335	50k	IndustrySires_Run3	Droughtmaster
8RP03268M	CV1336	50k	IndustrySires_Run3	Droughtmaster
BOM9937M	CV1337	50k	IndustrySires_Run3	Droughtmaster
WS602622M	CV1338	50k	IndustrySires_Run3	Droughtmaster
WS605255M	CV1339	50k	IndustrySires_Run3	Droughtmaster
WS69977M	CV1340	50k	IndustrySires_Run3	Droughtmaster
JAV031685M	CV1341	50k	IndustrySires_Run3	Droughtmaster
JAV031473M	CV1342	50k	IndustrySires_Run3	Droughtmaster
SIS80694M	CV1343	50k	IndustrySires_Run3	Droughtmaster
PID000010M	CV1344	50k	IndustrySires_Run3	Droughtmaster
PID020033M	CV1345	50k	IndustrySires_Run3	Droughtmaster
PID040020M	CV1346	50k	IndustrySires_Run3	Droughtmaster
WS605160M	CV1347	50k	IndustrySires_Run3	Droughtmaster
LN8942479M	CV1348	50k	IndustrySires_Run3	Droughtmaster
HCC08192M	CV1349	50k	IndustrySires_Run3	Droughtmaster
RSD02102M	CV1350	50k	IndustrySires_Run3	Droughtmaster
RSD0480M	CV1351	50k	IndustrySires_Run3	Droughtmaster
2EB000065M	CV1352	50k	IndustrySires_Run3	Droughtmaster
TMC02387M	CV1353	50k	IndustrySires_Run3	Droughtmaster

C7M08291M	CV1354	50k	IndustrySires_Run3		Droughtmaster
DG802214M	CV1355	50k	IndustrySires_Run3		Droughtmaster
IPC05129M	CV1356	50k	IndustrySires_Run3		Droughtmaster
IPC07102M	CV1357	50k	IndustrySires_Run3		Droughtmaster
U9C023607M	CV1358	50k	IndustrySires_Run3		Droughtmaster
TU80221M	CV1359	50k	IndustrySires_Run3		Droughtmaster
2UU031580M	CV1360	50k	IndustrySires_Run3		Droughtmaster
SD70839M	CV1361	50k	IndustrySires_Run3		Droughtmaster
VV_05646M	CV1362	50k	IndustrySires_Run3		Droughtmaster
VV_06701M	CV1363	50k	IndustrySires_Run3		Droughtmaster
ANA061339M	CV1364	50k	IndustrySires_Run3		Droughtmaster
PTC052M	CV1365	50k	IndustrySires_Run3		Droughtmaster
NA	CV1366	50k	IndustrySires_Run3		Droughtmaster
8RP08010M	CV1367	50k	IndustrySires_Run3		Droughtmaster
TMC9698M	CV1368	50k	IndustrySires_Run3		Droughtmaster
5FPT008	CV1369	50k	IndustrySires_Run3		Hereford
IMFFL217	CV1370	50k	IndustrySires_Run3		Limousin
CPLFP1068	CV1371	50k	IndustrySires_Run3		Limousin
DJGPE1419	CV1372	50k	IndustrySires_Run4		Limousin
MUWFE24	CV1373	50k	IndustrySires_Run4		Limousin
BPLPD842	CV1375	50k	IndustrySires_Run4		Limousin
GCNFY309	CV1376	50k	IndustrySires_Run4		Limousin
MDNPE1385	CV1377	50k	IndustrySires_Run4		Limousin
BCTPC64	CV1378	50k	IndustrySires_Run4		Limousin
MATPE148	CV1379	50k	IndustrySires_Run4		Limousin
KCCPE50	CV1380	50k	IndustrySires_Run4		Limousin
GHSPB20	CV1381	50k	IndustrySires_Run4		Limousin
132013307	CV1382	50k	IndustrySires_Run3		Angus
132084518	CV1383	50k	IndustrySires_Run3		Angus
132000354	CV1384	50k	IndustrySires_Run3		Angus
132247171	CV1385	50k	IndustrySires_Run3		Angus
19507008D21	CV1386	50k	IndustrySires_Run3		Angus
132096408	CV1387	50k	IndustrySires_Run3		Angus
132006995	CV1388	50k	IndustrySires_Run3		Angus
131993315	CV1389	50k	IndustrySires_Run3		Angus
131993102	CV1390	50k	IndustrySires_Run3		Angus
119900974197	CV1391	50k	IndustrySires_Run3		Angus
131999691	CV1392	50k	IndustrySires_Run3		Angus
LTHPB3	CV1393	50k	IndustrySires_Run4		Limousin
131915735	CV1394	50k	IndustrySires_Run3		Angus
131954703	CV1395	50k	IndustrySires_Run3		Angus
132015587	CV1396	50k	IndustrySires_Run3		Angus
131945969	CV1397	50k	IndustrySires_Run3		Angus
JPEPN63	CV1398	50k	IndustrySires_Run4		Limousin
131992812	CV1399	50k	IndustrySires_Run3		Angus
131982112	CV1400	50k	IndustrySires_Run3		Angus
132024203	CV1401	50k	IndustrySires_Run3		Angus
131629453	CV1402	50k	IndustrySires_Run3		Angus
132108069	CV1403	50k	IndustrySires_Run3		Angus
132009691	CV1404	50k	IndustrySires_Run3		Angus
132047250	CV1405	50k	IndustrySires_Run3		Angus
132000469	CV1406	50k	IndustrySires_Run3		Angus
132061527	CV1407	50k	IndustrySires_Run3		Angus
132072544	CV1408	50k	IndustrySires_Run3		Angus

132004165	CV1409	50k	IndustrySires_Run3	Angus
132056057	CV1410	50k	IndustrySires_Run3	Angus
132062189	CV1411	50k	IndustrySires_Run3	Angus
132024420	CV1412	50k	IndustrySires_Run3	Angus
IMFFU76	CV1413	50k	IndustrySires_Run4	Limousin
131969771	CV1414	50k	IndustrySires_Run3	Angus
16932004379	CV1415	50k	IndustrySires_Run3	Angus
131736654	CV1416	50k	IndustrySires_Run3	Angus
132330073	CV1417	50k	IndustrySires_Run3	Angus
131765371	CV1418	50k	IndustrySires_Run3	Angus
131280500	CV1419	50k	IndustrySires_Run3	Angus
131820842	CV1420	50k	IndustrySires_Run3	Angus
132010249	CV1421	50k	IndustrySires_Run3	Angus
IMFFP95	CV1422	50k	IndustrySires_Run4	Limousin
IMUPW042	CV1423	50k	IndustrySires_Run4	Simmental
IMUPX081	CV1424	50k	IndustrySires_Run4	Simmental
IMUPY068	CV1425	50k	IndustrySires_Run4	Simmental
IMUPZ012	CV1426	50k	IndustrySires_Run4	Simmental
IMU3A101	CV1427	50k	IndustrySires_Run4	Simmental
IMU1Z026	CV1428	50k	IndustrySires_Run4	Simmental
IMU1C249	CV1429	50k	IndustrySires_Run4	Simmental
IMU3Y100	CV1430	50k	IndustrySires_Run4	Simmental
IMUPA013	CV1431	50k	IndustrySires_Run4	Simmental
NA	CV1433	50k	IndustrySires_Run4	Angus
IMUPD028	CV1434	50k	IndustrySires_Run4	Simmental
IMUPD003	CV1435	50k	IndustrySires_Run4	Simmental
AJYPZ070	CV1436	50k	IndustrySires_Run4	Simmental
DNKPT003	CV1437	50k	IndustrySires_Run4	Simmental
DNKPT009	CV1438	50k	IndustrySires_Run4	Simmental
GRKC093	CV1439	50k	IndustrySires_Run3	Hereford
FSAW134	CV1440	50k	IndustrySires_Run3	Hereford
HRPD200	CV1441	50k	IndustrySires_Run3	Hereford
GRKB664	CV1442	50k	IndustrySires_Run3	Hereford
GRKD091	CV1443	50k	IndustrySires_Run3	Hereford
GRKC041	CV1444	50k	IndustrySires_Run3	Hereford
GRKB684	CV1445	50k	IndustrySires_Run3	Hereford
IMCPB659	CV1446	50k	IndustrySires_Run4	Simmental
IMCPV057	CV1447	50k	IndustrySires_Run4	Simmental
IMCPA825	CV1448	50k	IndustrySires_Run4	Simmental
IMCPC7052	CV1449	50k	IndustrySires_Run4	Simmental
IMCPB040	CV1450	50k	IndustrySires_Run4	Simmental
IMCPY817	CV1451	50k	IndustrySires_Run4	Simmental
IMCPX826	CV1452	50k	IndustrySires_Run4	Simmental
13235098787	CV1453	50k	IndustrySires_Run3	Angus
131825285	CV1454	50k	IndustrySires_Run3	Angus
132021466	CV1455	50k	IndustrySires_Run3	Angus
132049341	CV1456	50k	IndustrySires_Run3	Angus
132252733	CV1457	50k	IndustrySires_Run3	Angus
131862949	CV1458	50k	IndustrySires_Run3	Angus
131862950	CV1459	50k	IndustrySires_Run3	Angus
131532244	CV1460	50k	IndustrySires_Run3	Angus
131834717	CV1461	50k	IndustrySires_Run3	Angus
131868453	CV1462	50k	IndustrySires_Run3	Angus
131760218	CV1463	50k	IndustrySires_Run3	Angus

131764139	CV1464	50k	IndustrySires_Run3	Angus
131916314	CV1465	50k	IndustrySires_Run3	Angus
131859470	CV1466	50k	IndustrySires_Run3	Angus
131915735	CV1467	50k	IndustrySires_Run3	Angus
131915356	CV1468	50k	IndustrySires_Run3	Angus
131606073	CV1469	50k	IndustrySires_Run3	Angus
NA	CV1470	50k	IndustrySires_Run3	Angus
NA	CV1471	50k	IndustrySires_Run4	Angus
U9C087946M	CV1472	50k	IndustrySires_Run4	Droughtmaster
SSD045062M	CV1473	50k	IndustrySires_Run4	Droughtmaster
SSD034612M	CV1474	50k	IndustrySires_Run4	Droughtmaster
MD8062839M	CV1475	50k	IndustrySires_Run4	Droughtmaster
INW089M	CV1476	50k	IndustrySires_Run4	Droughtmaster
MRO0956M	CV1477	50k	IndustrySires_Run4	Droughtmaster
2UU093245M	CV1478	50k	IndustrySires_Run4	Droughtmaster
EDD07549M	CV1479	50k	IndustrySires_Run4	Droughtmaster
CBV98-8196M	CV1480	50k	IndustrySires_Run3	Brahman
OLP127M	CV1481	50k	IndustrySires_Run3	Brahman
CBV94-5886M	CV1482	50k	IndustrySires_Run3	Brahman
OLP134M	CV1483	50k	IndustrySires_Run3	Brahman
CBV02-0558M	CV1485	50k	IndustrySires_Run3	Brahman
JDH561M	CV1488	50k	IndustrySires_Run3	Brahman
JDH172/3M	CV1489	50k	IndustrySires_Run3	Brahman
CBV95-6590M	CV1490	50k	IndustrySires_Run3	Brahman
JDH558M	CV1491	50k	IndustrySires_Run3	Brahman
CBV02-0556M	CV1492	50k	IndustrySires_Run3	Brahman
JDH757/8M	CV1493	50k	IndustrySires_Run3	Brahman
CBV02-0612M	CV1494	50k	IndustrySires_Run3	Brahman
CBV79-366M	CV1496	50k	IndustrySires_Run3	Brahman
CBV97-7365M	CV1497	50k	IndustrySires_Run3	Brahman
JDH284/4M	CV1499	50k	IndustrySires_Run3	Brahman
BTCP90-2006M	CV1501	50k	IndustrySires_Run3	Brahman
CBV98-8041M	CV1502	50k	IndustrySires_Run3	Brahman
CBV98-7855M	CV1503	50k	IndustrySires_Run3	Brahman
BTCP90-2017M	CV1504	50k	IndustrySires_Run3	Brahman
SJA602M	CV1505	50k	IndustrySires_Run3	Brahman
BTCP90-2070M	CV1506	50k	IndustrySires_Run3	Brahman
GAT600/1M	CV1507	50k	IndustrySires_Run3	Brahman
CBV98-7877M	CV1508	50k	IndustrySires_Run3	Brahman
BTCP90-2008M	CV1509	50k	IndustrySires_Run3	Brahman
MJP144M	CV1510	50k	IndustrySires_Run3	Brahman
CBV91-4235M	CV1512	50k	IndustrySires_Run3	Brahman
BTCP95-0036M	CV1513	50k	IndustrySires_Run3	Brahman
CBV97-7482M	CV1514	50k	IndustrySires_Run3	Brahman
BTCP90-2022M	CV1515	50k	IndustrySires_Run3	Brahman
CBV87-2574M	CV1517	50k	IndustrySires_Run3	Brahman
CBV02-1002M	CV1518	50k	IndustrySires_Run3	Brahman
CBV99-8875M	CV1519	50k	IndustrySires_Run3	Brahman
41G445M	CV1520	50k	IndustrySires_Run3	Brahman
JDH380/4M	CV1521	50k	IndustrySires_Run3	Brahman
JDH564/4M	CV1522	50k	IndustrySires_Run3	Brahman
GAT700/1M	CV1523	50k	IndustrySires_Run3	Brahman
QLD293/1M	CV1524	50k	IndustrySires_Run3	Brahman
BTCP90-2016M	CV1525	50k	IndustrySires_Run3	Brahman

RWR601M	CV1526	50k	IndustrySires_Run3		Brahman
IMUPX012	CV1527	50k	IndustrySires_Run4		Simmental
IMUPA360	CV1528	50k	IndustrySires_Run4		Simmental
MBBPC218	CV1529	50k	IndustrySires_Run4		Simmental
MBBPZ160	CV1530	50k	IndustrySires_Run4		Simmental
IMUPU033	CV1531	50k	IndustrySires_Run4		Simmental
IMUPQ520	CV1532	50k	IndustrySires_Run4		Simmental
IMUPW397	CV1533	50k	IndustrySires_Run4		Simmental
YAGZ23	CV1534	50k	IndustrySires_Run4		Hereford
ARKFT5	CV1535	50k	IndustrySires_Run4		Limousin
BLBFL19	CV1536	50k	IndustrySires_Run4		Limousin
IMFFQ8371	CV1537	50k	IndustrySires_Run4		Limousin
IMUPG102	CV1538	50k	IndustrySires_Run4		Limousin
KGPK414	CV1539	50k	IndustrySires_Run4		Limousin
IMFFW8738	CV1540	50k	IndustrySires_Run4		Limousin
ARANZFG108	CV1541	50k	IndustrySires_Run4		Limousin
IMBFX20	CV1542	50k	IndustrySires_Run4		Limousin
IMFFN70	CV1543	50k	IndustrySires_Run4		Limousin
IMFFQ1052	CV1544	50k	IndustrySires_Run4		Limousin
IMBFQ61	CV1546	50k	IndustrySires_Run4		Limousin
IMFFP116	CV1547	50k	IndustrySires_Run4		Limousin
IMFFM1622	CV1548	50k	IndustrySires_Run4		Limousin
131632258	CV1549	50k	IndustrySires_Run4		Angus
131794942	CV1550	50k	IndustrySires_Run4		Angus
131764531	CV1551	50k	IndustrySires_Run4		Angus
131879645	CV1552	50k	IndustrySires_Run4		Angus
131952549	CV1553	50k	IndustrySires_Run4		Angus
131527657	CV1554	50k	IndustrySires_Run4		Angus
131632259	CV1555	50k	IndustrySires_Run4		Angus
131753768	CV1556	50k	IndustrySires_Run4		Angus
132093178	CV1557	50k	IndustrySires_Run4		Angus
131470217	CV1558	50k	IndustrySires_Run4		Angus
132093203	CV1559	50k	IndustrySires_Run4		Angus
131703800	CV1560	50k	IndustrySires_Run4		Angus
132093160	CV1561	50k	IndustrySires_Run4		Angus
131820842	CV1562	50k	IndustrySires_Run4		Angus
131861231	CV1563	50k	IndustrySires_Run4		Angus
131575310	CV1564	50k	IndustrySires_Run4		Angus
131841822	CV1565	50k	IndustrySires_Run4		Angus
131791785	CV1566	50k	IndustrySires_Run4		Angus
131857424	CV1567	50k	IndustrySires_Run4		Angus
132317526	CV1568	50k	IndustrySires_Run4		Angus
132093134	CV1569	50k	IndustrySires_Run4		Angus
131632241	CV1570	50k	IndustrySires_Run4		Angus
131123790	CV1571	50k	IndustrySires_Run4		Angus
21147007773	CV1572	50k	IndustrySires_Run4		Angus
131418915	CV1573	50k	IndustrySires_Run4		Angus
131616411	CV1574	50k	IndustrySires_Run4		Angus
132093123	CV1576	50k	IndustrySires_Run4		Angus
131554147	CV1577	50k	IndustrySires_Run4		Angus
131372721	CV1578	50k	IndustrySires_Run4		Angus
131857418	CV1579	50k	IndustrySires_Run4		Angus
131527607	CV1580	50k	IndustrySires_Run4		Angus
131753733	CV1581	50k	IndustrySires_Run4		Angus

132041971	CV1582	50k	IndustrySires_Run4	Angus
131555499	CV1583	50k	IndustrySires_Run4	Angus
131632253	CV1585	50k	IndustrySires_Run4	Angus
132041960	CV1586	50k	IndustrySires_Run4	Angus
131418911	CV1587	50k	IndustrySires_Run4	Angus
131791789	CV1588	50k	IndustrySires_Run4	Angus
131794753	CV1589	50k	IndustrySires_Run4	Angus
132273345	CV1591	50k	IndustrySires_Run4	Angus
132093130	CV1592	50k	IndustrySires_Run4	Angus
131372740	CV1593	50k	IndustrySires_Run4	Angus
132093199	CV1594	50k	IndustrySires_Run4	Angus
132246792	CV1595	50k	IndustrySires_Run4	Angus
132317489	CV1596	50k	IndustrySires_Run4	Angus
132093172	CV1597	50k	IndustrySires_Run4	Angus
132093149	CV1598	50k	IndustrySires_Run4	Angus
132093190	CV1599	50k	IndustrySires_Run4	Angus
131736654	CV1600	50k	IndustrySires_Run4	Angus
16932004379	CV1601	50k	IndustrySires_Run4	Angus
131280500	CV1602	50k	IndustrySires_Run4	Angus
131984282	CV1603	50k	IndustrySires_Run4	Angus
132330059	CV1605	50k	IndustrySires_Run4	Angus
132317561	CV1606	50k	IndustrySires_Run4	Angus
132093194	CV1607	50k	IndustrySires_Run4	Angus
132317563	CV1608	50k	IndustrySires_Run4	Angus
132317564	CV1609	50k	IndustrySires_Run4	Angus
131288203	CV1610	50k	IndustrySires_Run4	Angus
132273245	CV1611	50k	IndustrySires_Run4	Angus
132273352	CV1612	50k	IndustrySires_Run4	Angus
132330065	CV1613	50k	IndustrySires_Run4	Angus
131885311	CV1614	50k	IndustrySires_Run4	Angus
132010249	CV1615	50k	IndustrySires_Run4	Angus
131547502	CV1616	50k	IndustrySires_Run4	Angus
131793735	CV1617	50k	IndustrySires_Run4	Angus
132037570	CV1618	50k	IndustrySires_Run4	Angus
131962575	CV1619	50k	IndustrySires_Run4	Angus
131910010	CV1620	50k	IndustrySires_Run4	Angus
131806698	CV1621	50k	IndustrySires_Run4	Angus
IMBFV22	CV1622	50k	IndustrySires_Run4	Limousin
IMFFN42	CV1623	50k	IndustrySires_Run4	Limousin
IMFFP267	CV1624	50k	IndustrySires_Run4	Limousin
IMCFH2825	CV1625	50k	IndustrySires_Run4	Limousin
IMBFK176	CV1626	50k	IndustrySires_Run4	Limousin
IMFFR8369	CV1627	50k	IndustrySires_Run4	Limousin
DRDFL4	CV1628	50k	IndustrySires_Run4	Limousin
SRFW48	CV1629	50k	IndustrySires_Run4	Limousin
IMBFE15	CV1630	50k	IndustrySires_Run4	Limousin
260141	CV1631	50k	IndustrySires_Run4	Santa Gertrudis
280573	CV1632	50k	IndustrySires_Run4	Santa Gertrudis
260137	CV1633	50k	IndustrySires_Run4	Santa Gertrudis
229005	CV1634	50k	IndustrySires_Run4	Santa Gertrudis
266482	CV1635	50k	IndustrySires_Run4	Santa Gertrudis
199879	CV1636	50k	IndustrySires_Run4	Santa Gertrudis
259902	CV1637	50k	IndustrySires_Run4	Santa Gertrudis
280590	CV1638	50k	IndustrySires_Run4	Santa Gertrudis

257470	CV1639	50k	IndustrySires_Run4		Santa Gertrudis
257136	CV1640	50k	IndustrySires_Run4		Santa Gertrudis
221216	CV1641	50k	IndustrySires_Run4		Santa Gertrudis
189701	CV1642	50k	IndustrySires_Run4		Santa Gertrudis
WEIPA032	CV1643	50k	IndustrySires_Run4		Simmental
WEIPC120	CV1644	50k	IndustrySires_Run4		Simmental
WEEPZ067	CV1645	50k	IndustrySires_Run4		Simmental
WEIPA057	CV1646	50k	IndustrySires_Run4		Simmental
WEEPB116	CV1647	50k	IndustrySires_Run4		Simmental
IMUPW666	CV1648	50k	IndustrySires_Run4		Simmental
IMUPA870	CV1649	50k	IndustrySires_Run4		Simmental
IMCPY628	CV1650	50k	IndustrySires_Run4		Simmental
IMCPC025	CV1651	50k	IndustrySires_Run4		Simmental
IMUPES46	CV1652	50k	IndustrySires_Run4		Simmental
132317562	CV1653	50k	IndustrySires_Run4		Angus
IMCFU1	CV1655	50k	IndustrySires_Run4		Limousin
131830509	CV1656	50k	IndustrySires_Run4		Angus
US2334113	CV1657	50k	IndustrySires_Run4		Simmental
1222AL0021	CV1658	50k	IndustrySires_Run4		Simmental
IMFPQ079	CV1659	50k	IndustrySires_Run4		Simmental
0898AM2114	CV1660	50k	IndustrySires_Run4		Simmental
IMBPQ055	CV1661	50k	IndustrySires_Run4		Simmental
6000AJ6801	CV1662	50k	IndustrySires_Run4		Simmental
6000AW0174	CV1663	50k	IndustrySires_Run4		Simmental
6000AB6908_71	CV1664	50k	IndustrySires_Run4		Simmental
ADCPC068+83	CV1666	50k	IndustrySires_Run4		Simmental
ADCPW017	CV1667	50k	IndustrySires_Run4		Simmental
0299AJ0082	CV1668	50k	IndustrySires_Run4		Simmental
0299AC0927	CV1669	50k	IndustrySires_Run4		Simmental
IMAPP601	CV1670	50k	IndustrySires_Run4		Simmental
1562AR0017	CV1671	50k	IndustrySires_Run4		Simmental
1667AU0053	CV1673	50k	IndustrySires_Run4		Simmental
1667AW0101	CV1674	50k	IndustrySires_Run4		Simmental
1667AW0023	CV1675	50k	IndustrySires_Run4		Simmental
1067AR0016	CV1676	50k	IndustrySires_Run4		Simmental
0003AX0131	CV1677	50k	IndustrySires_Run4		Simmental
ISKPX006	CV1678	50k	IndustrySires_Run4		Simmental
1637AJ0923	CV1679	50k	IndustrySires_Run4		Simmental
0475AG0033	CV1680	50k	IndustrySires_Run4		Simmental
1261AB0043	CV1681	50k	IndustrySires_Run4		Simmental
1308AK0022	CV1682	50k	IndustrySires_Run4		Simmental
1308AN0083	CV1683	50k	IndustrySires_Run4		Simmental
1308AR0037	CV1684	50k	IndustrySires_Run4		Simmental
APAPY001	CV1685	50k	IndustrySires_Run4		Simmental
AGHPY004	CV1687	50k	IndustrySires_Run4		Simmental
1276AG0481	CV1688	50k	IndustrySires_Run4		Simmental
0208AN0151	CV1689	50k	IndustrySires_Run4		Simmental
0049AE0033	CV1690	50k	IndustrySires_Run4		Simmental
0049AB0639	CV1691	50k	IndustrySires_Run4		Simmental
0049AG0476	CV1692	50k	IndustrySires_Run4		Simmental
0049AN0179	CV1694	50k	IndustrySires_Run4		Simmental
0049AU0158	CV1695	50k	IndustrySires_Run4		Simmental
0049AL0128	CV1696	50k	IndustrySires_Run4		Simmental
1448AA0108	CV1697	50k	IndustrySires_Run4		Simmental

6000AZ6211_69	CV1699	50k	IndustrySires_Run4		Simmental
1289AK0020	CV1700	50k	IndustrySires_Run4		Simmental
1501AM0023	CV1701	50k	IndustrySires_Run4		Simmental
0079AH0801	CV1702	50k	IndustrySires_Run4		Simmental
1261AK0134	CV1705	50k	IndustrySires_Run4		Simmental
1261AZ0004	CV1707	50k	IndustrySires_Run4		Simmental
1261AZ0006	CV1708	50k	IndustrySires_Run4		Simmental
1261AX0072_88	CV1709	50k	IndustrySires_Run4		Simmental
1261AN0121	CV1710	50k	IndustrySires_Run4		Simmental
1261AN0022	CV1711	50k	IndustrySires_Run4		Simmental
1261AP0122	CV1712	50k	IndustrySires_Run4		Simmental
1261AP0031	CV1713	50k	IndustrySires_Run4		Simmental
1261AR0052	CV1714	50k	IndustrySires_Run4		Simmental
1261AW0932	CV1715	50k	IndustrySires_Run4		Simmental
1455AD0264	CV1716	50k	IndustrySires_Run4		Simmental
HRHPY234	CV1717	50k	IndustrySires_Run4		Simmental
IMUPJ091	CV1719	50k	IndustrySires_Run4		Simmental
IMBPF007	CV1722	50k	IndustrySires_Run4		Simmental
NA	CV1723	50k	IndustrySires_Run4		Simmental
IMCPB010	CV1724	50k	IndustrySires_Run4		Simmental
6000AN0862	CV1725	50k	IndustrySires_Run4		Simmental
IMUPG711	CV1726	50k	IndustrySires_Run4		Simmental
0079AK0004	CV1727	50k	IndustrySires_Run4		Simmental
1261AB0148	CV1728	50k	IndustrySires_Run4		Simmental
WEEPY069	CV1729	50k	IndustrySires_Run4		Simmental
6000AP4606	CV1730	50k	IndustrySires_Run4		Simmental
IMBFP111	CV1731	50k	IndustrySires_Run4		Limousin
IMBFX407	CV1732	50k	IndustrySires_Run4		Limousin
IMFFX1849	CV1733	50k	IndustrySires_Run4		Limousin
IMFFY9212	CV1734	50k	IndustrySires_Run4		Limousin
IMBFS159	CV1735	50k	IndustrySires_Run4		Limousin
IMUPB322	CV1736	50k	IndustrySires_Run4		Limousin
262964	CV1737	50k	IndustrySires_Run4		Santa Gertrudis
290891	CV1738	50k	IndustrySires_Run4		Santa Gertrudis
51087	CV1739	50k	IndustrySires_Run4		Santa Gertrudis
271162	CV1740	50k	IndustrySires_Run4		Santa Gertrudis
225434	CV1741	50k	IndustrySires_Run4		Santa Gertrudis
268385	CV1742	50k	IndustrySires_Run4		Santa Gertrudis
202618	CV1743	50k	IndustrySires_Run4		Santa Gertrudis
249975	CV1744	50k	IndustrySires_Run4		Santa Gertrudis
IMFFR2213	CV300	50k	IndustrySires_Run1		Limousin
GLGFA29	CV301	50k	IndustrySires_Run1		Limousin
IMFFY81	CV302	50k	IndustrySires_Run1		Limousin
IMFFS132	CV303	50k	IndustrySires_Run1		Limousin
GHSPB20	CV304	50k	IndustrySires_Run2		Limousin
JJW023	CV314	50k	IndustrySires_Run3		Shorthorn
95/01873	CV315	50k	IndustrySires_Run3		Shorthorn
91X06672	CV316	50k	IndustrySires_Run3		Shorthorn
94/02087	CV318	50k	IndustrySires_Run3		Shorthorn
98X00264	CV319	50k	IndustrySires_Run3		Shorthorn
KSTC023	CV320	50k	IndustrySires_Run3		Shorthorn
GEAU21	CV321	50k	IndustrySires_Run3		Shorthorn
SDNB28	CV322	50k	IndustrySires_Run3		Shorthorn
GHSPZ17	CV323	50k	IndustrySires_Run2		Limousin

PAPC316	CV324	50k	IndustrySires_Run2		Limousin
KSTA030	CV325	50k	IndustrySires_Run3		Shorthorn
ECSPA3	CV521	50k	IndustrySires_Run2		Limousin
SLTPT8	CV523	50k	IndustrySires_Run1		Limousin
ARHFA39	CV525	50k	IndustrySires_Run2		Limousin
CKBPJ8	CV526	50k	IndustrySires_Run4		Limousin
DLLPK63	CV527	50k	IndustrySires_Run1		Limousin
BNKPR2	CV528	50k	IndustrySires_Run1		Limousin
IMFFM1209	CV529	50k	IndustrySires_Run1		Limousin
IMBFY1004	CV531	50k	IndustrySires_Run1		Limousin
IMBFY10	CV532	50k	IndustrySires_Run2		Limousin
IMBFB173	CV533	50k	IndustrySires_Run2		Limousin
IMBFC103	CV534	50k	IndustrySires_Run2		Limousin
IMUPH56	CV535	50k	IndustrySires_Run2		Limousin
IMFFH65	CV536	50k	IndustrySires_Run2		Limousin
IMUFF3089	CV537	50k	IndustrySires_Run2		Limousin
IMUPA3198	CV538	50k	IndustrySires_Run2		Limousin
IMCFG5296	CV539	50k	IndustrySires_Run2		Limousin
IMBFY1	CV540	50k	IndustrySires_Run2		Limousin
IMBFA141	CV541	50k	IndustrySires_Run2		Limousin
IMFFG7478	CV542	50k	IndustrySires_Run2		Limousin
IMDFL339	CV543	50k	IndustrySires_Run2		Limousin
IMDFL423	CV544	50k	IndustrySires_Run2		Limousin
IMCFD743	CV545	50k	IndustrySires_Run2		Limousin
RQHFAQ96	CV546	50k	IndustrySires_Run2		Limousin
IMFFZ960	CV547	50k	IndustrySires_Run2		Limousin
IMUPL9643	CV548	50k	IndustrySires_Run2		Limousin
TRPT10	CV549	50k	IndustrySires_Run2		Limousin
CPLFT353	CV550	50k	IndustrySires_Run2		Limousin
SDRFT6	CV552	50k	IndustrySires_Run2		Limousin
IMFFB448	CV553	50k	IndustrySires_Run2		Limousin
IMBFB67	CV554	50k	IndustrySires_Run2		Limousin
IMFFP5111	CV555	50k	IndustrySires_Run2		Limousin
IMBFY84	CV556	50k	IndustrySires_Run2		Limousin
IMBFZ20	CV557	50k	IndustrySires_Run2		Limousin
IMUPL703	CV558	50k	IndustrySires_Run2		Limousin
IMUPL607	CV559	50k	IndustrySires_Run2		Limousin
IMUFM903	CV560	50k	IndustrySires_Run2		Limousin
IMUPM265	CV561	50k	IndustrySires_Run2		Limousin
IMCFH49	CV562	50k	IndustrySires_Run2		Limousin
IMFFM1153	CV563	50k	IndustrySires_Run2		Limousin
WDFH15	CV564	50k	IndustrySires_Run2		Limousin
IMFPC9678	CV565	50k	IndustrySires_Run2		Limousin
IMFFP97	CV566	50k	IndustrySires_Run2		Limousin
IMFFW1363	CV567	50k	IndustrySires_Run2		Limousin
IMUFA62	CV569	50k	IndustrySires_Run2		Limousin
LCTPZ1	CV585	50k	IndustrySires_Run2		Limousin
WLPY7	CV586	50k	IndustrySires_Run2		Limousin
WLPX19	CV587	50k	IndustrySires_Run2		Limousin
WLPW4	CV588	50k	IndustrySires_Run2		Limousin
IMFFP1882	CV589	50k	IndustrySires_Run2		Limousin
IMBFZ92	CV590	50k	IndustrySires_Run2		Limousin
WLPY6	CV591	50k	IndustrySires_Run2		Limousin
IMFFS831	CV592	50k	IndustrySires_Run2		Limousin

JAEFE43	CV593	50k	IndustrySires_Run2		Limousin
IMBFA60	CV594	50k	IndustrySires_Run2		Limousin
WLPK54	CV595	50k	IndustrySires_Run2		Limousin
IMFFP2588	CV596	50k	IndustrySires_Run4		Limousin
IMFFM4267	CV597	50k	IndustrySires_Run2		Limousin
IMBFA3	CV599	50k	IndustrySires_Run2		Limousin
IMFFB8514	CV601	50k	IndustrySires_Run2		Limousin
SXCFG5	CV602	50k	IndustrySires_Run2		Limousin
IMDPY457	CV603	50k	IndustrySires_Run2		Limousin
IMCFF5949	CV610	50k	IndustrySires_Run2		Limousin
MCFPZ163	CV611	50k	IndustrySires_Run2		Limousin
BENFE11	CV612	50k	IndustrySires_Run2		Limousin
IMNFY8	CV613	50k	IndustrySires_Run2		Limousin
TPKFH30	CV614	50k	IndustrySires_Run2		Limousin
TPKPN147	CV615	50k	IndustrySires_Run2		Limousin
2UP_P46E	CV616	50k	IndustrySires_Run2		Charolais
NA	CV617	50k	IndustrySires_Run2		Limousin
IAFA6020F	CV618	50k	IndustrySires_Run2		Charolais
ADV_X50E	CV619	50k	IndustrySires_Run2		Charolais
OAC_F7069E	CV620	50k	IndustrySires_Run2		Charolais
IAFA6009F	CV621	50k	IndustrySires_Run2		Charolais
IAE_X4745F	CV622	50k	IndustrySires_Run2		Charolais
IACC6080F	CV623	50k	IndustrySires_Run2		Charolais
IACC6081F	CV624	50k	IndustrySires_Run2		Charolais
OAC_P438E	CV625	50k	IndustrySires_Run2		Charolais
IAF_C6025F	CV626	50k	IndustrySires_Run2		Charolais
IAF_N6187F	CV627	50k	IndustrySires_Run2		Charolais
IAFC6022F	CV628	50k	IndustrySires_Run2		Charolais
IAEC6156F	CV629	50k	IndustrySires_Run2		Charolais
IAEE6113F	CV630	50k	IndustrySires_Run2		Charolais
IAFK6096F	CV631	50k	IndustrySires_Run2		Charolais
ISA_V1104F	CV632	50k	IndustrySires_Run2		Charolais
OAU_Z4609E	CV633	50k	IndustrySires_Run2		Charolais
OAC_U8742E	CV634	50k	IndustrySires_Run2		Charolais
IAE_B6704F	CV635	50k	IndustrySires_Run2		Charolais
IAFC6029F	CV636	50k	IndustrySires_Run2		Charolais
IAE_A6198F	CV637	50k	IndustrySires_Run2		Charolais
OAU_U6E	CV638	50k	IndustrySires_Run2		Charolais
OAU_Z2022E	CV639	50k	IndustrySires_Run2		Charolais
OAU_Y6623E	CV640	50k	IndustrySires_Run2		Charolais
IAE_C535F	CV641	50k	IndustrySires_Run2		Charolais
IAFE6035F	CV642	50k	IndustrySires_Run2		Charolais
IAF_E6034F	CV643	50k	IndustrySires_Run2		Charolais
IAF_E6001F	CV644	50k	IndustrySires_Run2		Charolais
IAF_F6002F	CV645	50k	IndustrySires_Run2		Charolais
FEN_Z73F	CV646	50k	IndustrySires_Run2		Charolais
FEN_Z128E	CV647	50k	IndustrySires_Run2		Charolais
OAC_U1400E	CV648	50k	IndustrySires_Run2		Charolais
OAF_L481F	CV649	50k	IndustrySires_Run2		Charolais
GO_V80E	CV650	50k	IndustrySires_Run2		Charolais
IAC_D6710E	CV651	50k	IndustrySires_Run2		Charolais
IACF6100E	CV652	50k	IndustrySires_Run2		Charolais
OAF_P8894F	CV653	50k	IndustrySires_Run2		Charolais
IAC_F6072F	CV654	50k	IndustrySires_Run2		Charolais

LJA_A11E	CV655	50k	IndustrySires_Run2		Charolais
OAU_Z4017E	CV656	50k	IndustrySires_Run2		Charolais
OAU_A5113E	CV657	50k	IndustrySires_Run2		Charolais
OAU_P4148E	CV658	50k	IndustrySires_Run2		Charolais
OAU_Z6616E	CV659	50k	IndustrySires_Run2		Charolais
OAU_X2061E	CV660	50k	IndustrySires_Run2		Charolais
OAU_W3377E	CV661	50k	IndustrySires_Run2		Charolais
IAC_E2E	CV662	50k	IndustrySires_Run2		Charolais
USM509416	CV663	50k	IndustrySires_Run2		Charolais
IAEE6134F	CV664	50k	IndustrySires_Run2		Charolais
OAC_M70E	CV665	50k	IndustrySires_Run2		Charolais
OAE_R3779F	CV666	50k	IndustrySires_Run2		Charolais
IAEA6702F	CV667	50k	IndustrySires_Run2		Charolais
IAE_C6710F	CV668	50k	IndustrySires_Run2		Charolais
OAF_U9451F	CV669	50k	IndustrySires_Run2		Charolais
OAF_U9352F	CV670	50k	IndustrySires_Run2		Charolais
PK_M109E	CV671	50k	IndustrySires_Run2		Charolais
TOL_C93E	CV672	50k	IndustrySires_Run2		Charolais
OAF_U4134F	CV673	50k	IndustrySires_Run2		Charolais
AJ1_U37E	CV674	50k	IndustrySires_Run2		Charolais
OACK0342E	CV675	50k	IndustrySires_Run2		Charolais
IAC_C6199E	CV676	50k	IndustrySires_Run2		Charolais
OAU_Y2200E	CV677	50k	IndustrySires_Run2		Charolais
OAC_Q17E	CV678	50k	IndustrySires_Run2		Charolais
JDS_H374E	CV679	50k	IndustrySires_Run2		Charolais
MR_N84E	CV680	50k	IndustrySires_Run2		Charolais
MR_W114E	CV681	50k	IndustrySires_Run2		Charolais
OAC_U2E	CV682	50k	IndustrySires_Run2		Charolais
IAE_M6176F	CV683	50k	IndustrySires_Run2		Charolais
OAET5813F	CV684	50k	IndustrySires_Run2		Charolais
IACA6709E	CV685	50k	IndustrySires_Run2		Charolais
083860003G	CV686	50k	IndustrySires_Run2		Charolais
083940091F	CV687	50k	IndustrySires_Run2		Charolais
IAC_G6193E	CV688	50k	IndustrySires_Run2		Charolais
IAFA6004F	CV689	50k	IndustrySires_Run2		Charolais
FR5811102125	CV690	50k	IndustrySires_Run2		Charolais
IAFA6050F	CV691	50k	IndustrySires_Run2		Charolais
TJ_E29D	CV692	50k	IndustrySires_Run2		Charolais
TJ_J16E	CV693	50k	IndustrySires_Run2		Charolais
FR7121333571	CV694	50k	IndustrySires_Run2		Charolais
VHV_B24E	CV695	50k	IndustrySires_Run2		Charolais
VHV_Z80E	CV696	50k	IndustrySires_Run2		Charolais
FR4240983344	CV697	50k	IndustrySires_Run2		Charolais
IACH6079E	CV698	50k	IndustrySires_Run2		Charolais
OAU_T7998E	CV699	50k	IndustrySires_Run2		Charolais
OAU_X1979E	CV700	50k	IndustrySires_Run2		Charolais
003720001F	CV701	50k	IndustrySires_Run2		Charolais
OAC_B7395E	CV702	50k	IndustrySires_Run2		Charolais
083990038F	CV703	50k	IndustrySires_Run2		Charolais
083830016F	CV704	50k	IndustrySires_Run2		Charolais
OAFN0189F	CV705	50k	IndustrySires_Run2		Charolais
USM454024	CV706	50k	IndustrySires_Run4		Charolais
TOL_D101E	CV707	50k	IndustrySires_Run2		Charolais
083070026E	CV708	50k	IndustrySires_Run2		Charolais

CAM652217	CV709	50k	IndustrySires_Run2		Charolais
OAF_Q6122F	CV710	50k	IndustrySires_Run2		Charolais
TOL_Z1805E	CV711	50k	IndustrySires_Run2		Charolais
TOL_D213E	CV712	50k	IndustrySires_Run2		Charolais
TOL_D194E	CV713	50k	IndustrySires_Run2		Charolais
TOL_D196E	CV714	50k	IndustrySires_Run2		Charolais
TOL_D190E	CV715	50k	IndustrySires_Run2		Charolais
2UP_L41E	CV716	50k	IndustrySires_Run2		Charolais
WJSPY37	CV717	50k	IndustrySires_Run2		Limousin
KVLPT6	CV718	50k	IndustrySires_Run2		Limousin
IMFFP3527	CV719	50k	IndustrySires_Run2		Limousin
IMFFP2884	CV720	50k	IndustrySires_Run2		Limousin
IMFFN20	CV721	50k	IndustrySires_Run2		Limousin
IMBFW2	CV722	50k	IndustrySires_Run2		Limousin
IMFFV8375	CV724	50k	IndustrySires_Run2		Limousin
IMFFQ819	CV725	50k	IndustrySires_Run2		Limousin
SGPFV18	CV726	50k	IndustrySires_Run2		Limousin
IMUPZ1641	CV930	50k	IndustrySires_Run2		Limousin
IMUPB9571	CV931	50k	IndustrySires_Run2		Limousin
IMUPA1219	CV932	50k	IndustrySires_Run2		Limousin
IMUPB2332	CV933	50k	IndustrySires_Run2		Limousin
IMUFD832	CV934	50k	IndustrySires_Run2		Limousin
HCSPS154	CV935	50k	IndustrySires_Run2		Limousin
GCOPP404	CV936	50k	IndustrySires_Run2		Limousin
KGRPS3	CV938	50k	IndustrySires_Run2		Limousin
BCTPX28	CV939	50k	IndustrySires_Run2		Limousin
MATPE148	CV940	50k	IndustrySires_Run2		Limousin
IMBFX489	CV946	50k	IndustrySires_Run2		Limousin
IMBFZ2	CV947	50k	IndustrySires_Run2		Limousin
IMFFU76	CV948	50k	IndustrySires_Run2		Limousin
IMFFN7496	CV949	50k	IndustrySires_Run2		Limousin
IMFFR6196	CV950	50k	IndustrySires_Run2		Limousin
IMFFR1260	CV951	50k	IndustrySires_Run2		Limousin
IMFFW969	CV952	50k	IndustrySires_Run2		Limousin
IMBFD3	CV953	50k	IndustrySires_Run2		Limousin