ICAR
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CONFERENCE

Data Collection Methods used in the BDGP and the Development of Restful API's for Recording Herd Data.

Craig Vigors

Irish Cattle Breeding Federation

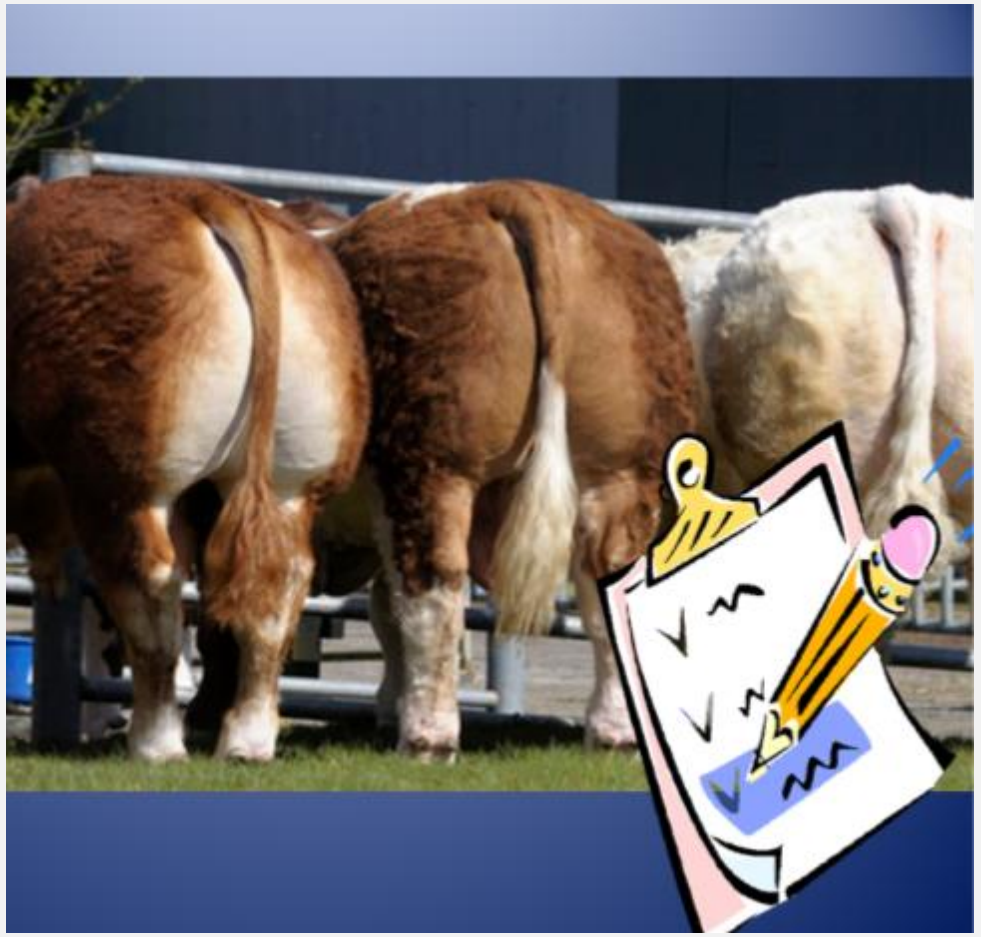
Beef Data and Genomics Programme

- 6 year scheme approved by the European Commission
- Launched by the Department of Agriculture in 2015
- Part of Ireland's 2014 – 2020 Rural Development Programme
- Goals:
  1. Increase the Genetic Merit of the Suckler Herds
  2. Reduce Greenhouse Gas Emissions of the Irish Beef Herds
- Expanded in 2017

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

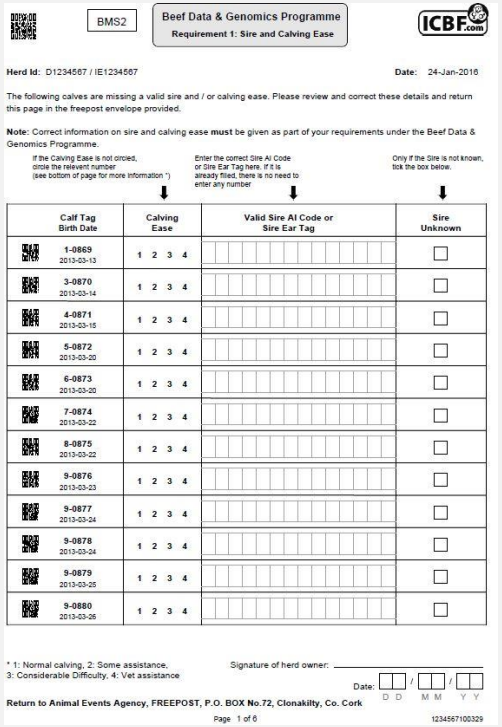
Beef Data and Genomics Programme

- 6 Requirements
  1. Record Calving Details
  2. Complete Animal Surveys
  3. Genotyping
  4. Stock Bull and Female Replacement Strategy
  5. Carbon Navigator
  6. Training



- 23500 Participants
  - 33% Online Users

Paper Forms



BMS2 — Beef Data & Genomics Programme
Requirement 1: Sire and Calving Ease

Herd Id: D1234567 / IE1234567 Date: 24-Jan-2016

The following calves are missing a valid sire and / or calving ease. Please review and correct these details and return this page in the freepost envelope provided.

Note: Correct information on sire and calving ease **must** be given as part of your requirements under the Beef Data & Genomics Programme.

If the Calving Ease is not circled, circle the relevent number (see bottom of page for more information *) | Enter the correct Sire AI Code or Sire Ear Tag here. If it is already filled, there is no need to enter any number | Only if the Sire is not known, tick the box below.

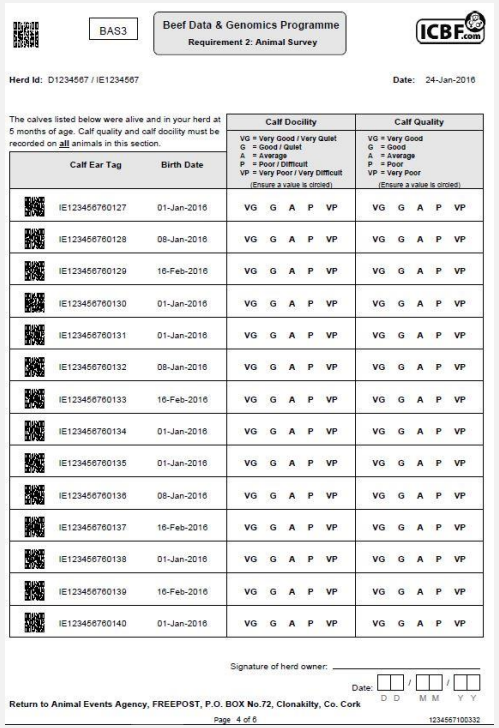
Calf Tag Birth Date	Calving Ease	Valid Sire AI Code or Sire Ear Tag	Sire Unknown
1-0869 2013-03-13	1 2 3 4		☐
3-0870 2013-03-14	1 2 3 4		☐
4-0871 2013-03-15	1 2 3 4		☐
5-0872 2013-03-20	1 2 3 4		☐
6-0873 2013-03-20	1 2 3 4		☐
7-0874 2013-03-22	1 2 3 4		☐
8-0875 2013-03-22	1 2 3 4		☐
9-0876 2013-03-23	1 2 3 4		☐
9-0877 2013-03-24	1 2 3 4		☐
9-0878 2013-03-24	1 2 3 4		☐
9-0879 2013-03-25	1 2 3 4		☐
9-0880 2013-03-26	1 2 3 4		☐

* 1: Normal calving, 2: Some assistance, 3: Considerable Difficulty, 4: Vet assistance

Signature of herd owner: _____ Date: D D / M M / Y Y

Return to Animal Events Agency, FREEPOST, P.O. BOX No.72, Clonakilty, Co. Cork

Page 1 of 6 1234567100329



BAS3 — Beef Data & Genomics Programme
Requirement 2: Animal Survey

Herd Id: D1234567 / IE1234567 Date: 24-Jan-2016

The calves listed below were alive and in your herd at 5 months of age. Calf quality and calf docility must be recorded on all animals in this section.

Calf Ear Tag	Birth Date	Calf Docility (VG = Very Good / Very Quiet, G = Good / Quiet, A = Average, P = Poor / Difficult, VP = Very Poor / Very Difficult) (Ensure a value is circled)	Calf Quality (VG = Very Good, G = Good, A = Average, P = Poor, VP = Very Poor) (Ensure a value is circled)
IE123456760127	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760128	08-Jan-2016	VG G A P VP	VG G A P VP
IE123456760129	16-Feb-2016	VG G A P VP	VG G A P VP
IE123456760130	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760131	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760132	08-Jan-2016	VG G A P VP	VG G A P VP
IE123456760133	16-Feb-2016	VG G A P VP	VG G A P VP
IE123456760134	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760135	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760136	08-Jan-2016	VG G A P VP	VG G A P VP
IE123456760137	16-Feb-2016	VG G A P VP	VG G A P VP
IE123456760138	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760139	16-Feb-2016	VG G A P VP	VG G A P VP
IE123456760140	01-Jan-2016	VG G A P VP	VG G A P VP

Signature of herd owner: _____ Date: D D / M M / Y Y

Return to Animal Events Agency, FREEPOST, P.O. BOX No.72, Clonakilty, Co. Cork

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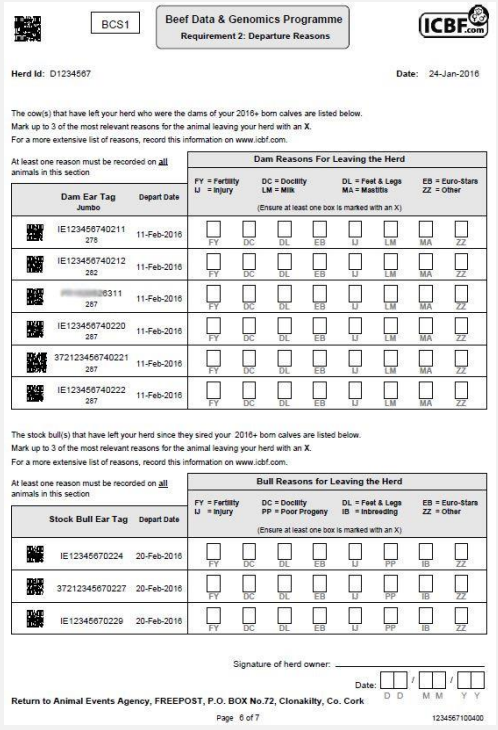

BCS1 — Beef Data & Genomics Programme
Requirement 2: Departure Reasons

Herd Id: D1234567 Date: 24-Jan-2016

The cow(s) that have left your herd who were the dams of your 2016+ born calves are listed below.
Mark up to 3 of the most relevant reasons for the animal leaving your herd with an X.
For a more extensive list of reasons, record this information on www.icbf.com.

At least one reason must be recorded on all animals in this section

Dam Ear Tag / Jumbo	Depart Date	Dam Reasons For Leaving the Herd (FY = Fertility, LI = Injury, DC = Docility, LM = Milk, DL = Feet & Legs, MA = Mastitis, EB = Euro-Stars, ZZ = Other) (Ensure at least one box is marked with an X)
IE123456740211 278	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ
IE123456740212 282	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ
[redacted]6311 287	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ
IE123456740220 287	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ
372123456740221 287	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ
IE123456740222 287	11-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ LM ☐ MA ☐ ZZ

The stock bull(s) that have left your herd since they sired your 2016+ born calves are listed below.
Mark up to 3 of the most relevant reasons for the animal leaving your herd with an X.
For a more extensive list of reasons, record this information on www.icbf.com.

At least one reason must be recorded on all animals in this section

Stock Bull Ear Tag	Depart Date	Bull Reasons for Leaving the Herd (FY = Fertility, LI = Injury, DC = Docility, PP = Poor Progeny, DL = Feet & Legs, IB = Inbreeding, EB = Euro-Stars, ZZ = Other) (Ensure at least one box is marked with an X)
IE12345670224	20-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ PP ☐ IB ☐ ZZ
37212345670227	20-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ PP ☐ IB ☐ ZZ
IE12345670229	20-Feb-2016	☐ FY ☐ DC ☐ DL ☐ EB ☐ LI ☐ PP ☐ IB ☐ ZZ

Signature of herd owner: _____ Date: D D / M M / Y Y

Return to Animal Events Agency, FREEPOST, P.O. BOX No.72, Clonakilty, Co. Cork

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Information Collected

Calf

- Sire
- Calving Ease
- Birth Size
- Vigor

(at 5 months)

- Quality
- Docility
- Scour
- Pneumonia

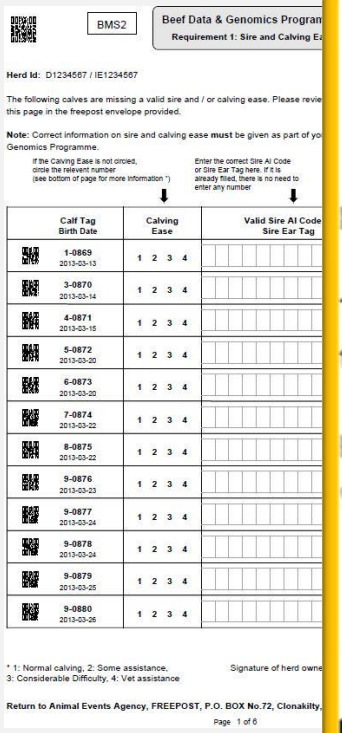
Dam

- Docility
- Milk-ability
- Departure Reason

Stock Bull

- Docility
- Functionality
- Departure Reason

Paper Forms


BMS2

Beef Data & Genomics Program

Requirement 1: Sire and Calving Ea

Herd Id: D1234567 / IE1234567

The following calves are missing a valid sire and / or calving ease. Please revie this page in the freepost envelope provided.

Note: Correct information on sire and calving ease must be given as part of yo Genomics Programme.

If the Calving Ease is not circled, circle the relevent number (see bottom of page for more information *)

Enter the correct Sire AI Code or Sire Ear Tag here. If it is already filled, there is no need to enter any number

	Calf Tag Birth Date	Calving Ease	Valid Sire AI Code Sire Ear Tag
	1-0869 2013-03-13	1 2 3 4	
	3-0870 2013-03-14	1 2 3 4	
	4-0871 2013-03-15	1 2 3 4	
	5-0872 2013-03-20	1 2 3 4	
	6-0873 2013-03-20	1 2 3 4	
	7-0874 2013-03-22	1 2 3 4	
	8-0875 2013-03-22	1 2 3 4	
	9-0876 2013-03-23	1 2 3 4	
	9-0877 2013-03-24	1 2 3 4	
	9-0878 2013-03-24	1 2 3 4	
	9-0879 2013-03-25	1 2 3 4	
	9-0880 2013-03-26	1 2 3 4	

* 1: Normal calving, 2: Some assistance, 3: Considerable Difficulty, 4: Vet assistance

Signature of herd owne

Return to Animal Events Agency, FREEPOST, P.O. BOX No.72, Clonakilty,

Page 1 of 6

BMS2

Beef Data & Genomics Programme

Requirement 1: Sire and Calving Ease

Herd Id: D1234567 / IE1234567 **Date:** 24-Jan-2016

The following calves are missing a valid sire and / or calving ease. Please review and correct these details and return this page in the freepost envelope provided.

Note: Correct information on sire and calving ease **must** be given as part of your requirements under the Beef Data & Genomics Programme.

If the Calving Ease is not circled, circle the relevent number (see bottom of page for more information *)

Enter the correct Sire AI Code or Sire Ear Tag here. If it is already filled, there is no need to enter any number

Only if the Sire is not known, tick the box below.

Calf Tag Birth Date	Calving Ease	Valid Sire AI Code or Sire Ear Tag	Sire Unknown
1-0869 2013-03-13	1 2 3 4		☐
3-0870 2013-03-14	1 2 3 4		☐

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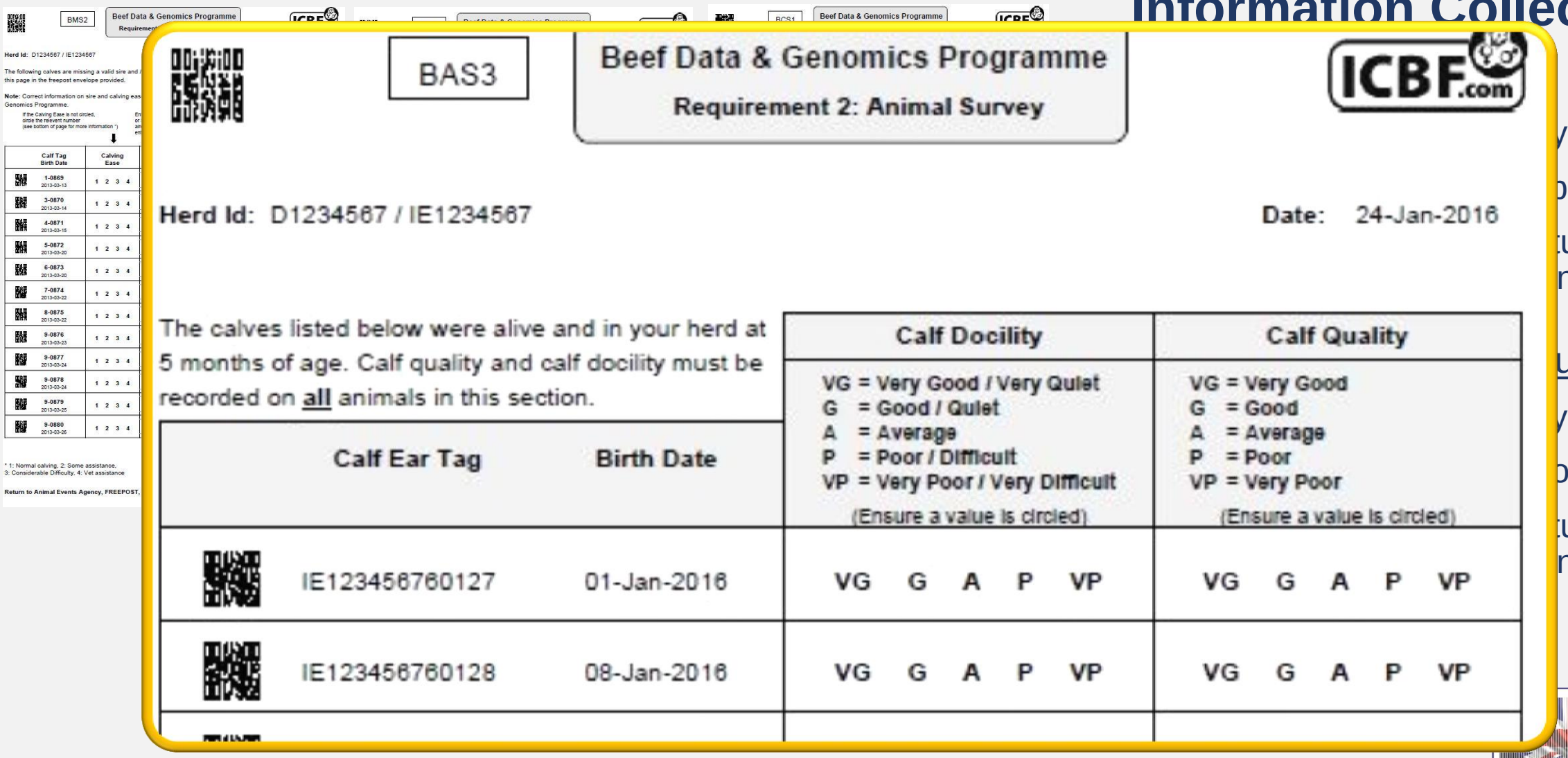
Paper Forms

Information Collected



BMS2

Beef Data & Genomics Programme

Herd Id: D1234567 / IE1234567

The following calves are missing a valid sire and / this page in the freepost envelope provided.

Note: Correct information on sire and calving eas Genomics Programme.

If the Calving Ease is not circled, circle the relevent number (see bottom of page for more information *)

	Calf Tag Birth Date	Calving Ease
	1-0869 2013-03-13	1 2 3 4
	3-0870 2013-03-14	1 2 3 4
	4-0871 2013-03-15	1 2 3 4
	5-0872 2013-03-20	1 2 3 4
	6-0873 2013-03-20	1 2 3 4
	7-0874 2013-03-22	1 2 3 4
	8-0875 2013-03-22	1 2 3 4
	9-0876 2013-03-23	1 2 3 4
	9-0877 2013-03-24	1 2 3 4
	9-0878 2013-03-24	1 2 3 4
	9-0879 2013-03-25	1 2 3 4
	9-0880 2013-03-26	1 2 3 4

* 1: Normal calving, 2: Some assistance, 3: Considerable Difficulty, 4: Vet assistance

Return to Animal Events Agency, FREEPOST,

BAS3

Beef Data & Genomics Programme

Requirement 2: Animal Survey

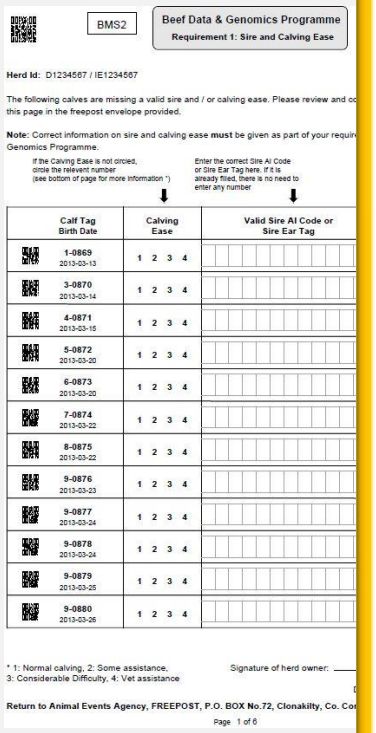
Herd Id: D1234567 / IE1234567

Date: 24-Jan-2016

The calves listed below were alive and in your herd at 5 months of age. Calf quality and calf docility must be recorded on all animals in this section.

Calf Ear Tag	Birth Date	Calf Docility	Calf Quality
		VG = Very Good / Very Quiet G = Good / Quiet A = Average P = Poor / Difficult VP = Very Poor / Very Difficult (Ensure a value is circled)	VG = Very Good G = Good A = Average P = Poor VP = Very Poor (Ensure a value is circled)
IE123456760127	01-Jan-2016	VG G A P VP	VG G A P VP
IE123456760128	08-Jan-2016	VG G A P VP	VG G A P VP

Paper Forms



BMS2

Beef Data & Genomics Programme
Requirement 1: Sire and Calving Ease

Herd Id: D1234567 / IE1234567

The following calves are missing a valid sire and / or calving ease. Please review and co
this page in the freepost envelope provided.

Note: Correct information on sire and calving ease **must** be given as part of your requir
Genomics Programme.

If the Calving Ease is not circled, circle the relevent number (see bottom of page for more information *)

Enter the correct Sire AI Code or Sire Ear Tag here. If it is already filled, there is no need to enter any number

Calf Tag Birth Date	Calving Ease	Valid Sire AI Code or Sire Ear Tag
1-0869 2013-03-13	1 2 3 4	
3-0870 2013-03-14	1 2 3 4	
4-0871 2013-03-15	1 2 3 4	
5-0872 2013-03-20	1 2 3 4	
6-0873 2013-03-20	1 2 3 4	
7-0874 2013-03-22	1 2 3 4	
8-0875 2013-03-22	1 2 3 4	
9-0876 2013-03-23	1 2 3 4	
9-0877 2013-03-24	1 2 3 4	
9-0878 2013-03-24	1 2 3 4	
9-0879 2013-03-25	1 2 3 4	
9-0880 2013-03-26	1 2 3 4	

* 1: Normal calving, 2: Some assistance, 3: Considerable Difficulty, 4: Vet assistance

Signature of herd owner: ____

Return to Animal Events Agency, FREEPOST, P.O. BOX No.72, Clonakilty, Co. Co

Page 1 of 6

	IE123456740220 287	11-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ LM	☐ MA	☐ ZZ
	372123456740221 287	11-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ LM	☐ MA	☐ ZZ
	IE123456740222 287	11-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ LM	☐ MA	☐ ZZ

The stock bull(s) that have left your herd since they sired your 2016+ born calves are listed below.

Mark up to 3 of the most relevant reasons for the animal leaving your herd with an **X**.

For a more extensive list of reasons, record this information on www.icbf.com.

At least one reason must be recorded on all animals in this section

Bull Reasons for Leaving the Herd

FY = Fertility DC = Docility DL = Feet & Legs EB = Euro-Stars
IJ = Injury PP = Poor Progeny IB = Inbreeding ZZ = Other

(Ensure at least one box is marked with an X)

Stock Bull Ear Tag	Depart Date								
IE12345670224	20-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ PP	☐ IB	☐ ZZ
37212345670227	20-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ PP	☐ IB	☐ ZZ
IE12345670229	20-Feb-2016	☐ FY	☐ DC	☐ DL	☐ EB	☐ IJ	☐ PP	☐ IB	☐ ZZ

Collected

am

- Docility
- Milk-ability
- Departure Reason

tock Bull

- Docility
- Functionality
- Departure Reason

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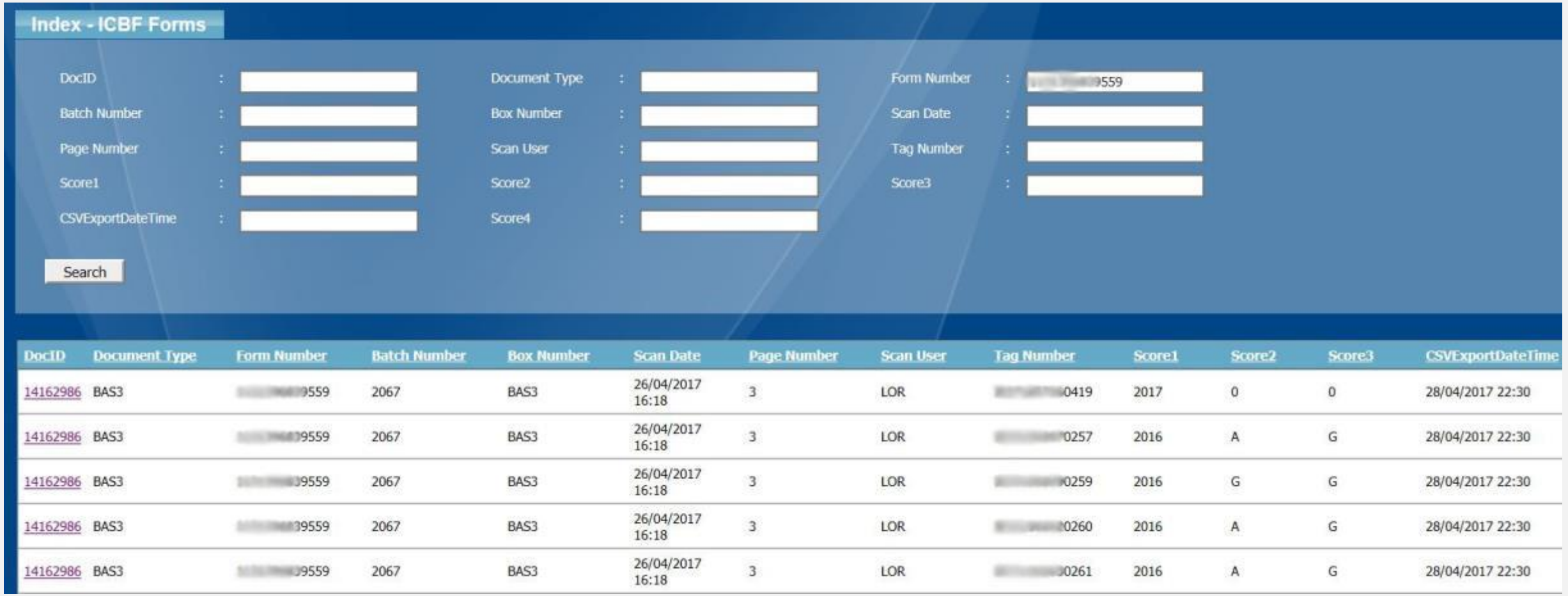
Paper Forms – Processing



Index - ICBF Forms

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Batch Number : Box Number : Scan Date :

Page Number : Scan User : Tag Number :

Score1 : Score2 : Score3 :

CSVExportDateTime : Score4 :

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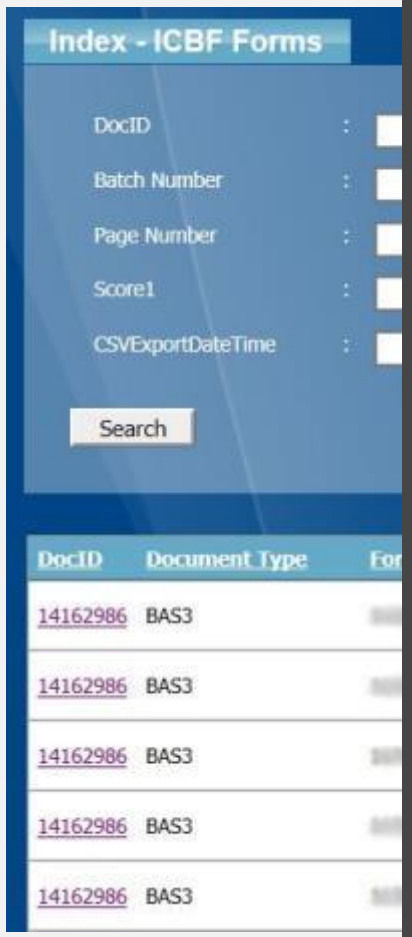
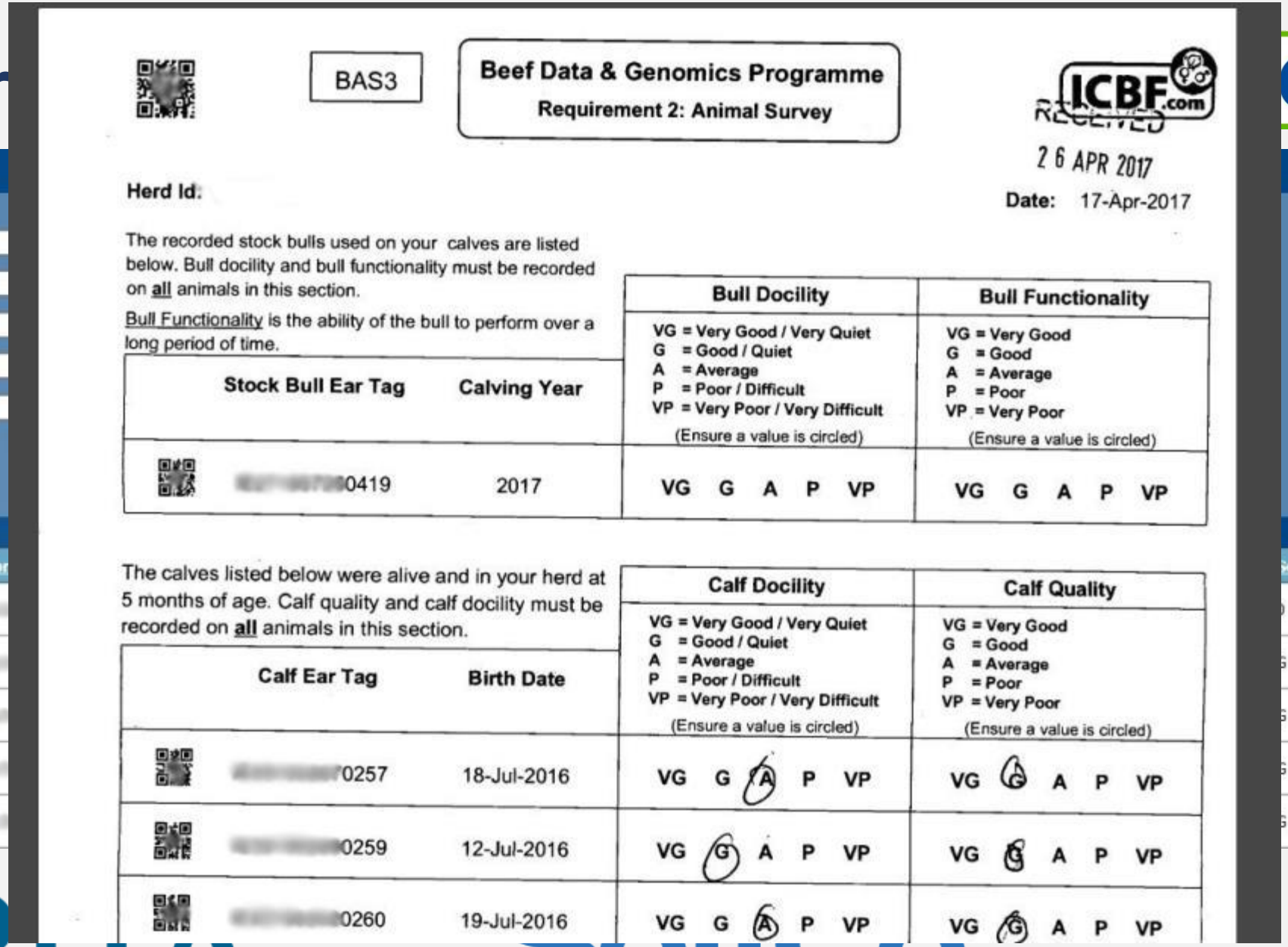
Paper





BAS3

Beef Data & Genomics Programme

Requirement 2: Animal Survey

ICBF.com

RECEIVED

26 APR 2017

Herd Id.

Date: 17-Apr-2017

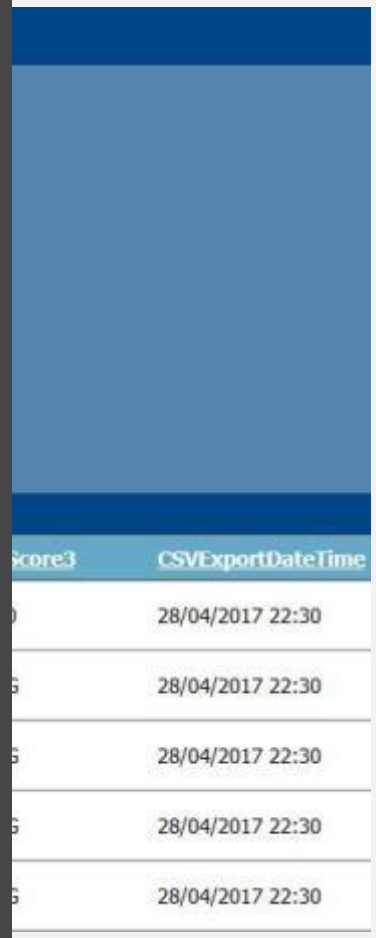
The recorded stock bulls used on your calves are listed below. Bull docility and bull functionality must be recorded on **all** animals in this section.

Bull Functionality is the ability of the bull to perform over a long period of time.

Stock Bull Ear Tag	Calving Year	Bull Docility	Bull Functionality
		VG = Very Good / Very Quiet G = Good / Quiet A = Average P = Poor / Difficult VP = Very Poor / Very Difficult (Ensure a value is circled)	VG = Very Good G = Good A = Average P = Poor VP = Very Poor (Ensure a value is circled)
[illegible]0419	2017	VG G A P VP	VG G A P VP

The calves listed below were alive and in your herd at 5 months of age. Calf quality and calf docility must be recorded on **all** animals in this section.

Calf Ear Tag	Birth Date	Calf Docility	Calf Quality
		VG = Very Good / Very Quiet G = Good / Quiet A = Average P = Poor / Difficult VP = Very Poor / Very Difficult (Ensure a value is circled)	VG = Very Good G = Good A = Average P = Poor VP = Very Poor (Ensure a value is circled)
[illegible]0257	18-Jul-2016	VG G A P VP	VG G A P VP
[illegible]0259	12-Jul-2016	VG G A P VP	VG G A P VP
[illegible]0260	19-Jul-2016	VG G A P VP	VG G A P VP



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Web Application - Desktop

Calf Information

- Record Sire
- Record Calving Ease
- Record Birth Size
- Record Vigour

For calves 5 months of age and older:

- Record Docility
- Record Quality
- Record Scour
- Record Pneumonia

Dam Information

- Record Dam Docility
- Record Milk Ability
- Record Departure Reasons

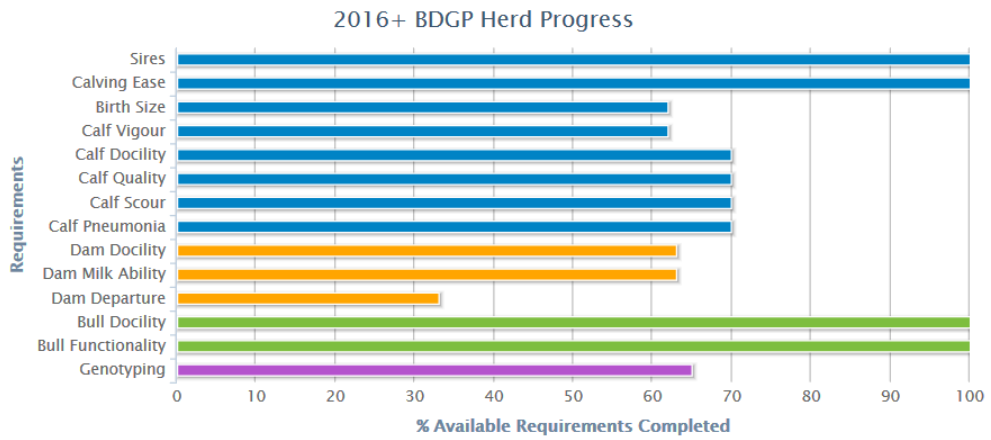
Stock Bull Information

- Record Bull Docility
- Record Functionality
- Record Departure Reasons

Genotype Information

- Self-Selection
- View Genotype Details

Herd Summary



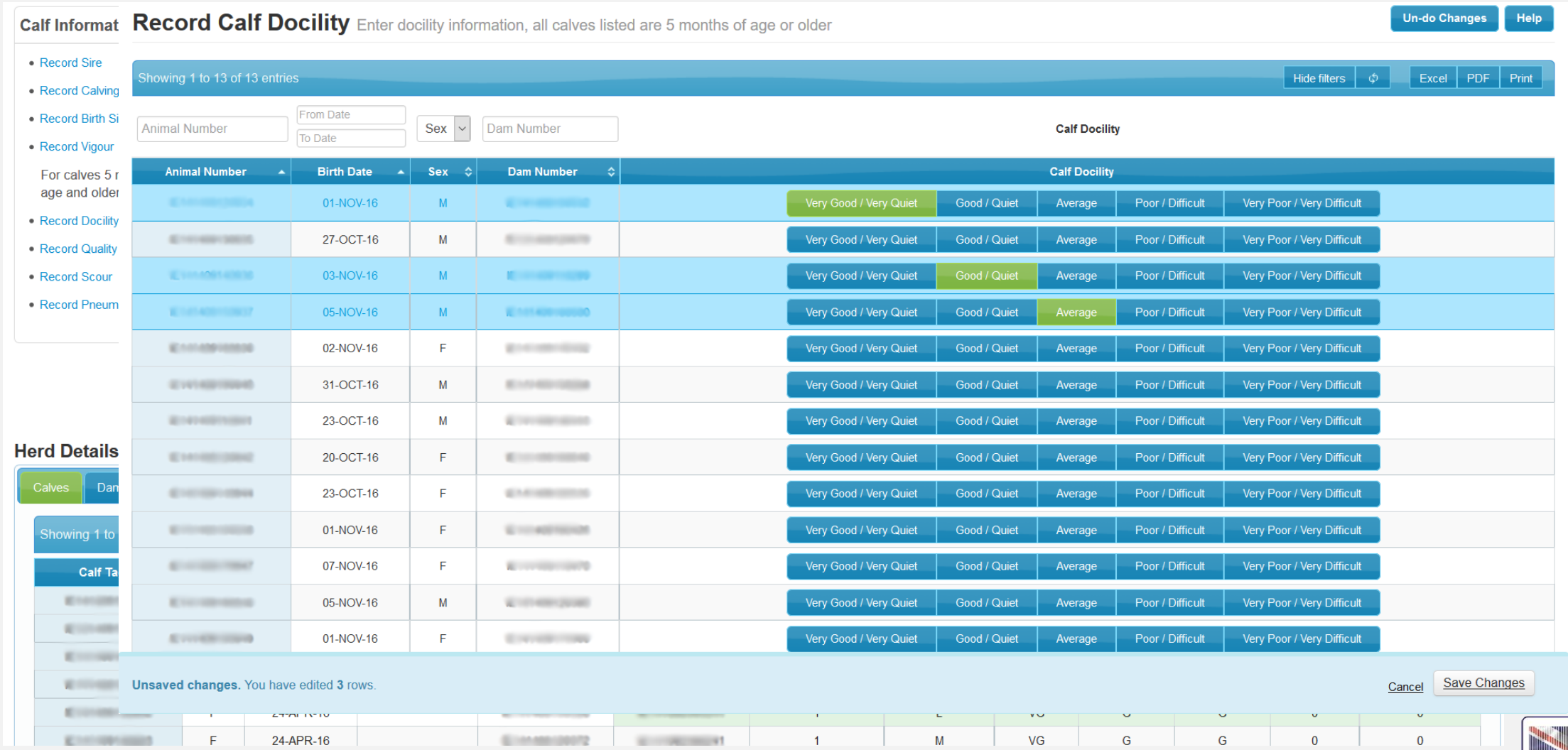
Herd Details

Calves | Dams | Sires | Departed Dams | Departed Sires

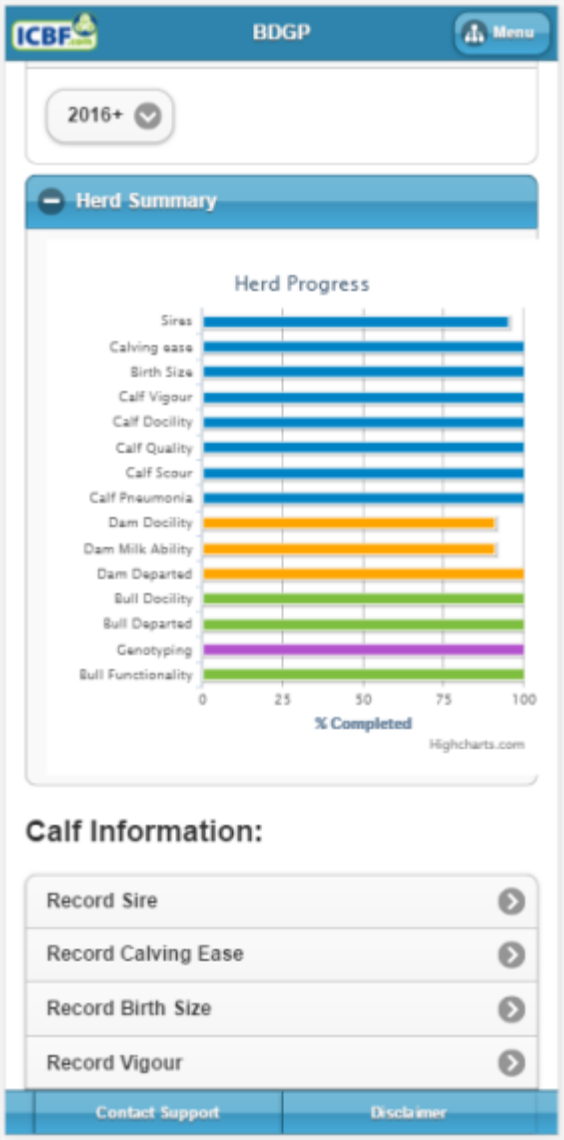
Showing 1 to 74 of 74 entries — Show filters | Excel | PDF | Print

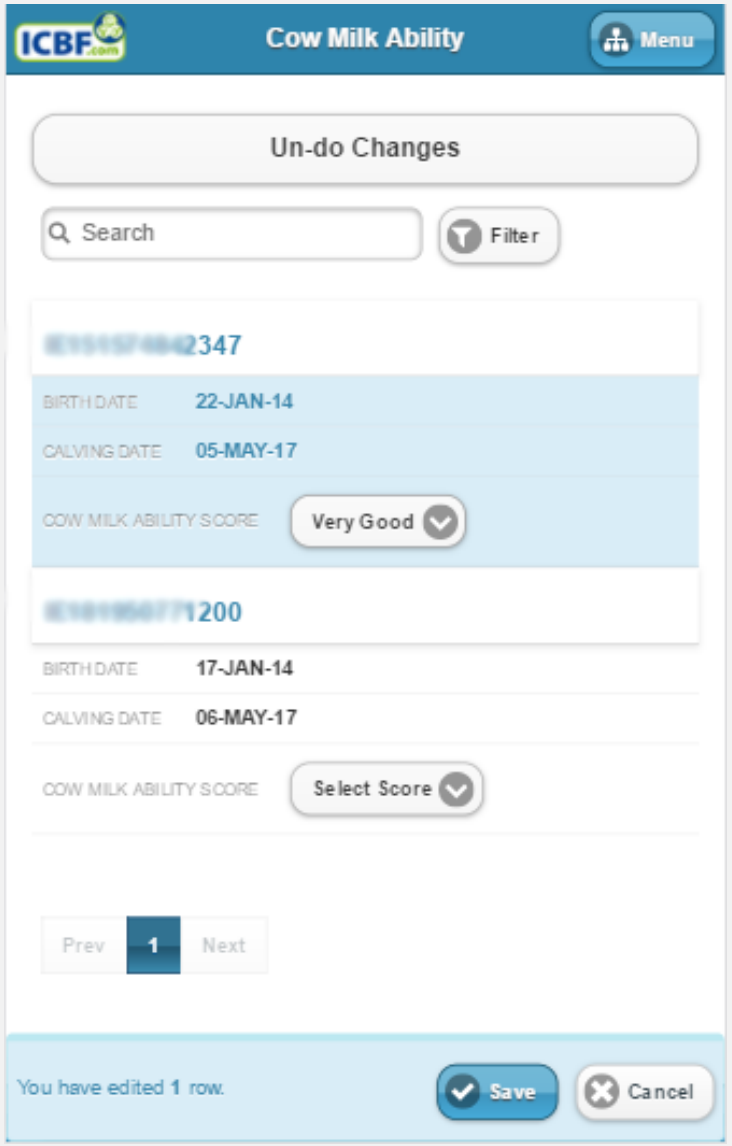
Calf Tag	Sex	Birth Date	Death Date	Dam	Sire	Calving Ease	Birth Size	Vigour	Docility	Quality	Scour	Pneumonia
[redacted]	F	17-FEB-16		[redacted]	UNKNOWN	1	M	G	G	VG	0	0
[redacted]	M	31-JAN-16	10-MAY-17	[redacted]	UNKNOWN	1	M	VG	G	VG	0	0
[redacted]	F	22-APR-16		[redacted]	[redacted]	1	M	VG	G	G	0	0
[redacted]	F	23-APR-16		[redacted]	[redacted]	1	M	VG	G	G	0	0
[redacted]	F	24-APR-16		[redacted]	[redacted]	1	L	VG	G	G	0	0
[redacted]	F	24-APR-16		[redacted]	[redacted]	1	M	VG	G	G	0	0

Web Application - Desktop



Web Application - Mobile





Google play

Download on the App Store

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Data Quality – Calf Docility Heritability

Farmer: 0.30 Genetic correlation of **0.78** between two traits **Technician: 0.22**

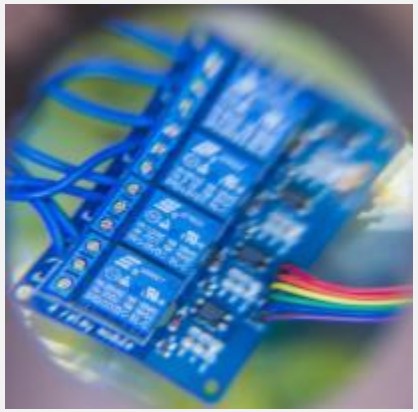
Farmer has longer to observe the animal?

Score	Animals	% of Total
Very Quiet	66144	12.2
Quiet	219502	40.6
Average	226709	41.8
Difficult	28337	5.2
Very Difficult	1553	0.3

Score	Animals	% of Total
Docile	15287	13.9
Restless	73835	67.3
Nervous	18880	17.2
Flighty / Wild	1503	1.4
Aggressive	144	0.1

Ross Evans (2012). The benefits of using farmer scored traits in beef genetic evaluations [PowerPoint slides]. Retrieved from http://www.icar.org/index.php/icar-meetings-news/38th-session-cork-ireland/

API – Application Programming Interface



Herd API's

- A set of web services available to software and sensor providers to provide data services to farmers.

- REST/JSON
  - Smaller data transfer when compared to SOAP/XML
  - Easy to process (if HAL is used).
  - Flexible authentication using OAuth 2.0
  - Data access is controlled by limiting the scope

Herd API's – GET Insemination Example

GET http://apitest.dev64.icbf.com/herd-fertility/insemination?start_date=10-Apr-17


```
{
 "_links": {
  "self": {
   "href": "http://apitest.dev64.icbf.com/herd-fertility/insemination?start_date=01-Apr-17&page=1"
  },
  "first": {
   "href": "http://apitest.dev64.icbf.com/herd-fertility/insemination?start_date=01-Apr-17"
  },
  "last": {
   "href": "http://apitest.dev64.icbf.com/herd-fertility/insemination?start_date=01-Apr-17&page=1"
  }
 },
 "_embedded": {
  "insemination": [ {
     "id": "1478411718",
     "animal_id": "IE123456790741",
     "activity_date": "03-APR-17",
     "activity_type": "AIN",
     "bull_used": "RUU",
     "editable": "UD",
     "_links": {
      "self": {
       "href": "http://apitest.dev64.icbf.com/herd-fertility/insemination/1478411718"
      }
     }
    } ]
 },
 "page_count": 1,
 "page_size": 100,
 "total_items": 1,
 "page": 1
}
```

Herd API Authentication – OAuth 2.0

www.icbf.com

https://

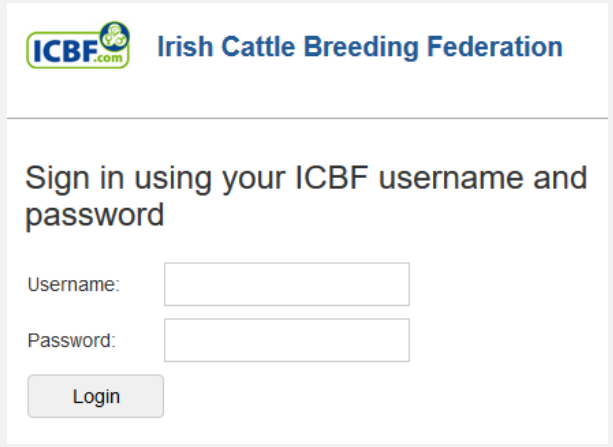
Resource Owner (Farmer)

1. Login with ICBF credentials

2. Receive Authorization Code

3. Send Authorization Code

4. Receive Refresh and Access Tokens



ICBF Authorisation Server

Herd API's – Services Available

Methods Available : GET (read) **POST** (create) **PUT** (update) **DELETE**

Herd Details

- Animal Details

Fertility

- Heat
- Insemination
- Pregnancy Diagnosis

Evaluation

- Beef
- Dairy

Weight

- Live Weight

Lactation

- Period

Health

- General Health
- Treatments

Veterinary

- Medicine

Conclusion

Paper	• High volume of data, slowly being replaced with new technology • Will remain for the foreseeable future
Web	• Volume increasing over time to a point • Provides convenience and timeliness in recording
Mobile	• Further improvement of convenience and timeliness
API	• Facilitates many data sources, e.g. sensors • Devices that use the API need to be made available.

Questions?