

Where Next for Dairy Breeding?

ICBF & Barryroe Meeting

11th June 2008



IRISH CATTLE BREEDING FEDERATION

USE OF INSEMINATION DATA IN CATTLE BREEDING; SOME EXPERIENCES FROM IRELAND.

***A. Cromie, F. Kearney, R Evans, D Berry, D
Wilhelmus.***

ICAR/Interbull Meeting.

36th ICAR Session, Niagara Falls, United States

16-20th June.



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Use insemination data to try and avoid this!



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Overview

- Background – Irish Cattle Breeding.
- Use of Insemination data;
 1. Collection of insemination data.
 2. Use of insemination data in ICBF genetic evaluations.
 3. Use of insemination data as a support tool in decision making.
- Comments/discussion.

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ICBF - Background

- Formally established in 2000
- 4 key functions;
 1. Leadership/direction.
 2. Central Database (*Animal Events*)
 3. Genetic Evaluations (*e.g., EBI*)
 4. Breeding scheme (*GENE IRELAND*).

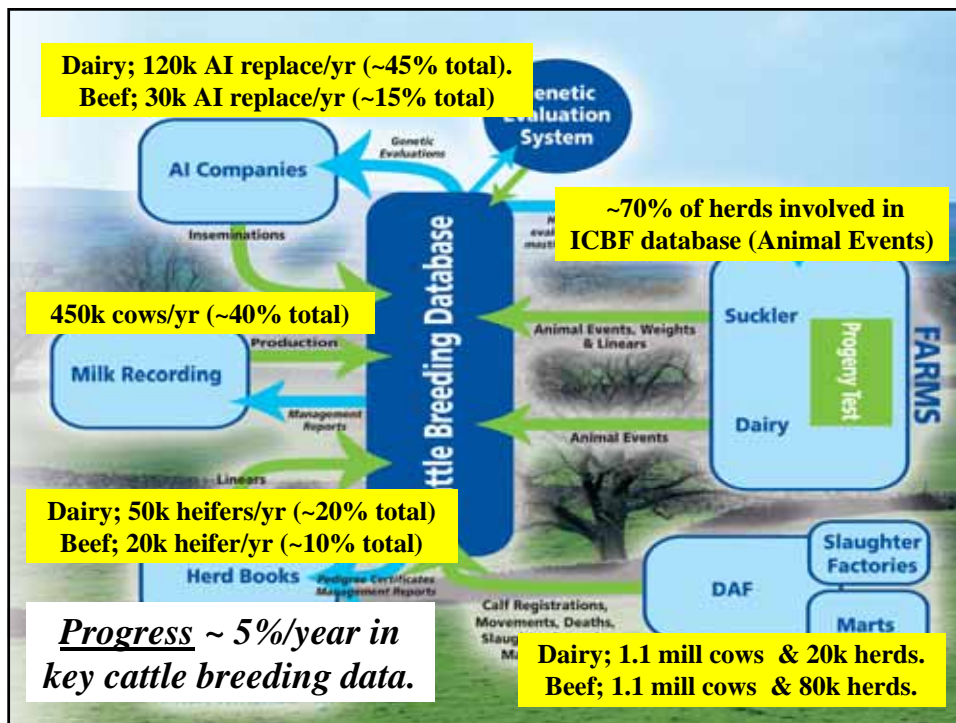
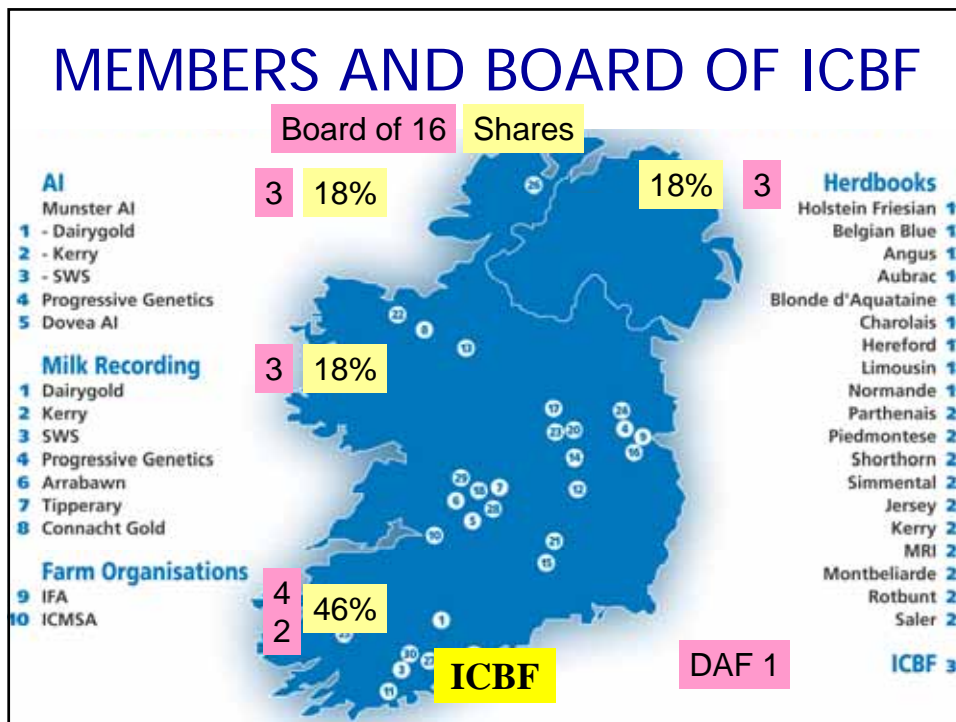
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Use of Insemination Data

1. Collection of insemination data.
2. Use of insemination data in ICBF genetic evaluations.
3. Use of insemination data as a support tool in decision making.

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1. Collection of Insemination Data



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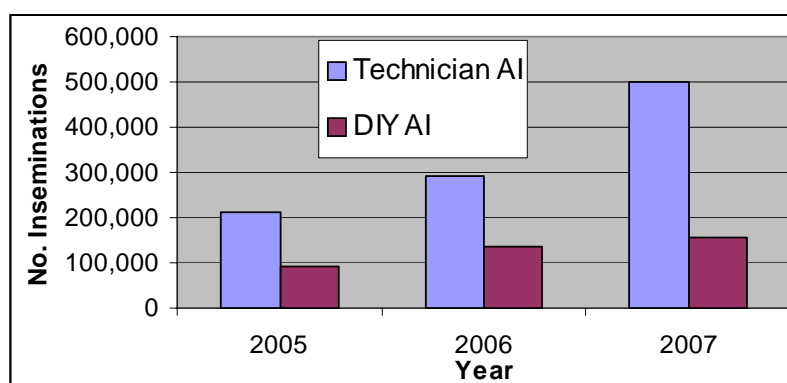
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1. Collection of Insemination Data

- i. Trends in recording
- ii. Technician recording of AI data
- iii. Farmer recording of AI data
- iv. Future plans

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i. Trends in Recording



- >100% increase in AI recording.
- ~40% of total AI events in 2007 (& 70% in 2008)

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ii. Technician Recording

- AI handheld technology
 - Itronix handheld
 - Linked to database (GPRS).
 - All cows on hand-held.
 - Docket printed on-farm.
 - 240 now in operation (90%)
- Major benefits.
 - Inbreeding & lethal gene check.
 - Farmer support;
 - Sire Advice.
 - Fertility management
 - AI Company support;
 - No docket!
 - Fertility management.
 - Invoicing & stock control



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iii. Farmer recording of AI data

- 157k - 63% Farm PC, 9% sheets & 28% via ICBF website
- Web-based recording - New for 2007
 - Breeding charts for on-farm recording (during season)
 - Web-based recording (end of season).
 - Farmers can also record "as events happen".
- Link to Fertility management reports.

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ICBF Breeding Chart

HerdPlus
Profit through Science

Dairy Herd Breeding Chart Year 2008
Herd Owner PAT CRONIN NID IE1417638

Cow Tag	Cow FB	Cow EBI (€)	Milk (€)	Fert (€)	Cow's Mat		Lact No.	Date Calved	Calf Ease	Proposed Bulls			Service Information									
					Mat Size	Grand Size				Bull 1	Bull 2	Bull 3	Pre-Service Heat	First	Second	Third	Fourth	Prog Test Result				
													Date	Date	Bull	Date	Bull	Date	Bull	Date	Bull	
IEFF120054R	54	120	47	56	MAU		9	26-MAR-08	1	BRZ	RDU	GRO										
IEFF120055P	55	94	20	59	LEW	OMK	9	16-MAR-08	1	BRZ	CZO	CBH										
IEFF12006RE	68	121	43	64	MAU	RSG	8			BRZ	RDU	GRO										
IEFF120096M	90	83	59	19	LOS	KEM	9	01-MAR-08	2	WUZ	BRZ	CBH										
IE141763820127	127	133	45	76	LEW	WYI	7			BRZ	CZO	RDU										
IE141763800157	157	116	53	44	LEW	APN	6			BRZ	CBH	WUZ										
IE141763800188	188	107	16	76	MAU	RSG	7	19-FEB-08	2	CZO	RDU	BRZ										
IE141763810217	217	84	13	71	AHD	APN	5	12-FEB-08	1	CZO	RDU	GRO										
IE1417638302	219	89	37	51	AHD	APN	6	05-FEB-08	1	RDU	CZO	GRO										

Animal ID, Ancestry & EBI, calving data

Suggested Matings

Record Serves.

Printed A3 "card-board" and put on the wall of the dairy/office

Irish Cattle Breeding Federation (ICBF) Microsoft Internet Explorer

http://www.icbf.com/

Irish Cattle Breeding Federation

Striving to achieve the greatest possible genetic improvement in the national cattle herd for the benefit of Irish farmers, the dairy and beef industries and members. [Learn more about ICBF.](#)

Home Services News & Publications About ICBF

Services

- HerdPlus
- Genet ID(LA)(D)
- Genetic Evaluations
 - Farm Software Bull Files
- Tully Beef Centre
- Milk Recording
- Heritbook Services
- Suckler Scheme

Publications

- This Week's Report.pdf
- Past Week's Reports
- Cattle Statistics
- Annual Reports
- Academic Papers

Learn more about ICBF

- Contact Information
- Costs and Benefits
- The Database
- Members
- Structure
- International Representation
- Legal and Privacy

ICBF Sign Up Forms

- ICBF Active Bull List
- Dairy Active Bull List Spring 2008
- Beef Active Bull List Summer 2008

HerdPlus
Profit through Science

Online Services

User name: ie1417638
Password: *****
[Log In](#)

Where do I get my username and password?
Experiencing problems - [Click Here](#)

Bull Search

Search by:
 Cook Tag/Herd Book
 TAG/IT
 Name (at end of name)



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ICBF Record AI Natural Event - Microsoft Internet Explorer

http://www.icbf.com/aua/ai_natural_event_tour.php

ICBF Web Application PAT CRONIN
Logged in at: 18-Jun-2008 21:50

HOME - HerdPlus CONTACT SUPPORT LOG OUT

FERTILITY

Record AI Natural Event Pregnancy Check Fertility Report Fertility Profile Due 1st Serve Due Repeat

Record AI Events

If you entered serve data incorrectly
Please click [here](#) to delete.
Note: Help on entering multiple serves, click [here](#)

Total: 77 animals
Selected: 0 animals

FB Junks	Animal Number	Lact No	Last Calved Date	Last Served Date	Num Serves	Last Served Bull	DATE Day / Mth / Year	Bull Used	Sire Check
54	IEFFT20054R	9	26-MAR-08	22-MAY-08	1	DZJ			
55	IEFFT20055P	9	16-MAR-08	25-APR-08	1	BUJ			
68	IEFFT20068E	9	22-APR-08		0				
90	IEFFT20090M	9	01-MAR-08	20-MAY-08	1	NYB			
127	IE141763820127	8	19-MAY-08		0				
157	IE141763880157	7	22-MAY-08		0				
188	IE141763860188	7	19-FEB-08	25-APR-08	1	KSI			
217	IE141763810217	5	12-FEB-08	30-APR-08	1	UYC			
219	IE141763820219	6	05-FEB-08	06-MAY-08	1	UYC			

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ICBF Herd Fertility Profile - Microsoft Internet Explorer

http://www.icbf.com/aua/fer_ai_inventory_tour.php

ICBF Web Application PAT CRONIN
Logged in at: 18-Jun-2008 21:50

HOME - HerdPlus CONTACT SUPPORT LOG OUT

FERTILITY

Record AI Natural Event Pregnancy Check Fertility Report **Fertility Profile** Due 1st Serve Due Repeat

Fertility Profile for Herd Total Number of animals: 73

[Download File](#)

FB Junks	Animal Number	Calving Date	Lact Num	Last Served	Last Bull	Num Serves	Last Preg Diag	Days in Call	Days in Milk	Dry Date	Exp Calving Date
302	IE141763820302	29-JAN-08	3	16-APR-08	KSI	1		83	141		23-JAN-09
407	IE141763810407	09-FEB-08	2	16-APR-08	LEV	1		83	130		23-JAN-09
463	IE141763890463	29-JAN-08	1	18-APR-08	UYC	1		81	141		25-JAN-09
470	IE141763880470	05-FEB-08	1	18-APR-08	DZJ	1		81	131		25-JAN-09
499	IE141763830499	01-MAR-08	1	18-APR-08	KSI	1		61	109		25-JAN-09
411	IE141763860411	22-JAN-08	2	19-APR-08	KSI	1		60	148		26-JAN-09
475	IE141763840475	18-MAR-08	1	19-APR-08	DZJ	1		80	92		26-JAN-09
405	IE141763880405	18-FEB-08	2	21-APR-08	UYC	1		58	121		28-JAN-09
464	IE141763810464	06-FEB-08	1	21-APR-08	UYC	1		58	133		28-JAN-09
496	IE141763890496	07-FEB-08	1	21-APR-08	LEV	1		56	132		28-JAN-09
415	IE141763810415	12-FEB-08	2	22-APR-08	UYC	1		57	127		29-JAN-09
420	IE141763870420	03-MAR-08	1	22-APR-08	DD	1		57	107		29-JAN-09
474	IE141763830474	31-JAN-08	1	22-APR-08	LEV	1		57	138		29-JAN-09
538	IE141763870538		0	22-APR-08	LEV	1		57			29-JAN-09

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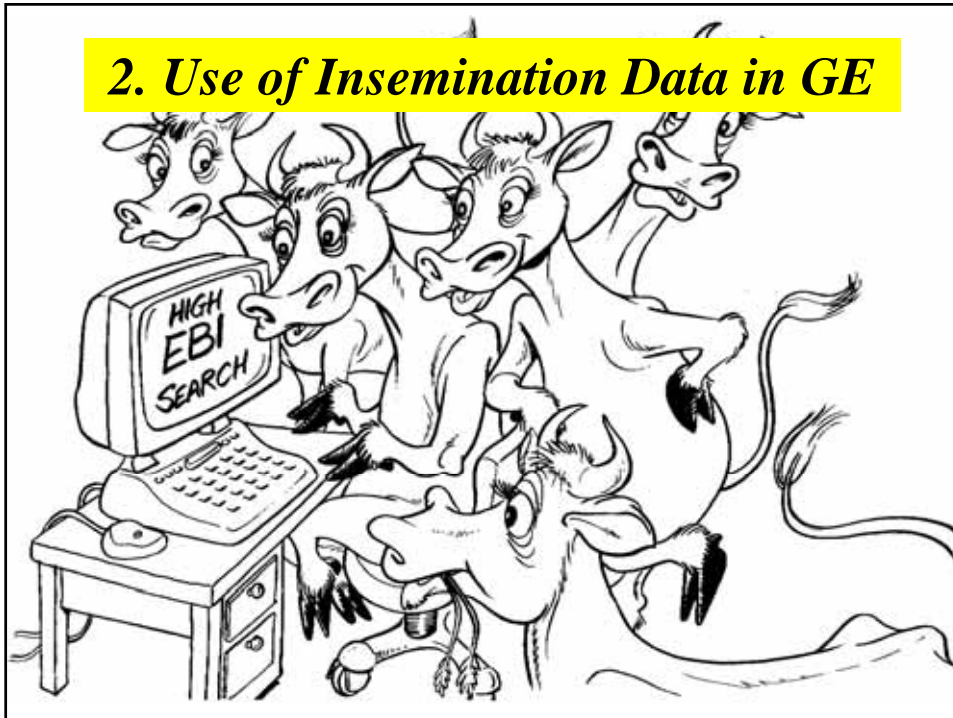
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iv. Future Plans

- Complete roll-out of handheld technology.
 - ~80% of serves.
- Further develop web-based systems
- PDA's & Mobile phones.
- Key driver of uptake is simple recording systems & good information for farmers/industry.

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2. Use of Insemination Data in GE



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2. Use of Insemination Data in Genetic Evals.

- Current;
 - Data edits for female fertility.
 - Genetic Evaluation of Gestation Length.
- Future;
 - Gestation Length Improvements
 - Other Fertility Traits
 - Validation of Sire Births.

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(i) Data edits for fertility

- Female fertility is a trait of major economic importance in Ireland (24% relative weighting in EBI).
- CI Days evaluated on basis of 300-600 days (& 600 days set to missing).
- Poor fertility bulls over-evaluated?
- Use insemination data to identify cows where an “attempt” to breed has been made.

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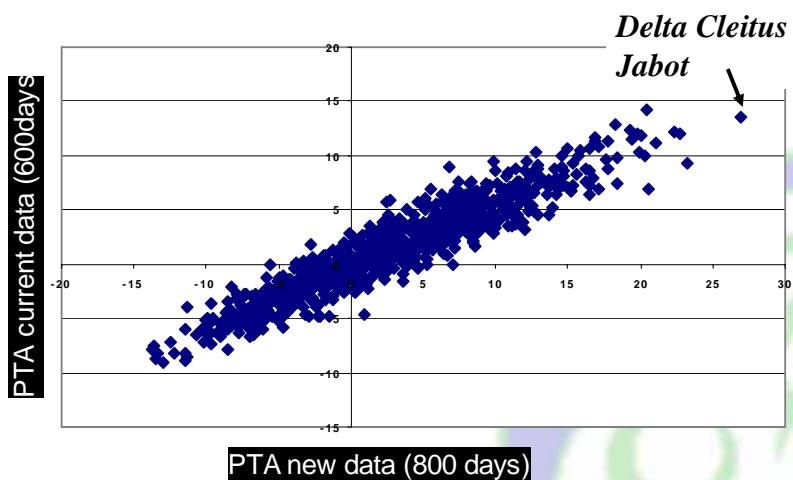
(i) Data edits for fertility

Parity	1	2	3
Old Eval (Nov 07)	805,762	649,783	502,161
New Eval (Nov 07)	834,794	671,959	517,301
Difference	29,032	22,176	15,140

- 3% more records.
- Correlation = 0.93.
- Poor fertility bulls penalised most.

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(i) Data edits for fertility



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(ii) Genetic Evaluation of Gestation Length (direct)

Breed of AI Sire	No. Sires Evaluated	Raw Mean	Genetic Data	
			Mean	St Dev
Holstein	1,796	281.9	-1.0	0.98
Friesian	242	281.5	-1.5	1.07
Limousin	166	289.6	3.6	0.98
Charolais	153	288.5	2.3	0.89
Belgian Blue	131	284.6	-0.3	0.94
Angus	121	283.8	-0.3	0.87
Hereford	119	286.4	0.8	0.91
Simmental	95	288.5	2.3	0.93
Montbelliarde	93	286.9	1.4	1.03

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(i) Future; Gestation Length

	1 st Parity (Direct)	Later Parity (Direct)	1 st Parity (Maternal)	Later Parity (Maternal)
1 st Parity (Direct)	0.36	0.74	0.01	-0.03
Later Parity (Direct)		0.44	0.03	-0.24
1 st Parity (Maternal)			0.04	0.89
Later Parity (Maternal)				0.08

- High heritability (dir=.40, mat=0.06)
- High correlations between parities
- No correlation between direct & maternal.
- Multi-trait calving evaluation for Gestation Length, Calving Difficulty & Calf Mortality.

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(ii) Future; New Fertility Traits

Trait	Number of records	Mean	h2
Calving to 1st Service	45,370	83.16	0.0579 (0.0105)
Calving Interval	55,910	395.4	0.0187 (0.0054)
Submission Rate (21d)	36,224	0.6466	0.0160 (0.0057)
Number serves	45,370	1.535	0.0120 (0.0044)
Pregnant to first service	29,656	0.5166	0.0082 (0.0052)
Pregnancy rate (42 days)	29,646	0.6233	0.0355 (0.0096)

- Range of new fertility traits being examined – using insemination data.
- Calving to 1st service – promising.
- Currently looking at correlations with goal traits (CI Days) as an early predictor trait.

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(iii) Future; Validation of Sire ID (insem vs. birth)

Month of Insemination	Number of insemination & birth records*	Number of sire errors	Error rate
Apr	17,341	488	2.8%
May	25,102	1,769	7.0%
Jun	6,192	914	14.8%

* Within 280-290 days

- 6% errors between sire identified at birth & insemination record.
- Increases with season (stock bulls)
- What to do next?

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3. Use of Insemination Data in Decision Support



3. Use of Insemination Data as a Support Tool

- Farmers;
 - Farm fertility management reports
 - Sire Advice Information
- AI Companies;
 - AI Management Information
 - Invoicing & semen stock.
- Future Plans.

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Farmer Fertility Reports

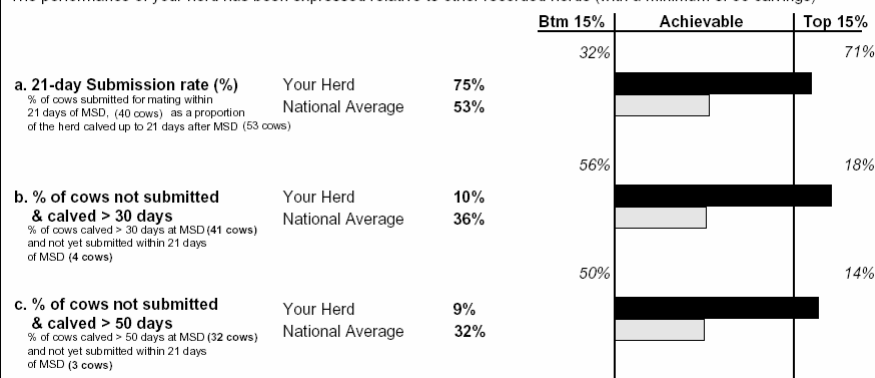
- Range of reports
 - During season (3 weeks, 6 weeks & 9 weeks)
 - End of breeding season.
- Key performance statistics & Action Lists for cows.
- Available by web or paper.

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Fertility Reports; 3 weeks

2. Herd Performance

The performance of your herd has been expressed relative to other recorded herds (with a minimum of 30 calvings)



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Fertility Reports; Problem Cows

4. Action List

Do not return this sheet to the Animal Events office.

The following cows may have reproductive problems and should be investigated further. Note that this list may include cows to be culled.

Cows not yet submitted for service that have calved greater than 30 days.

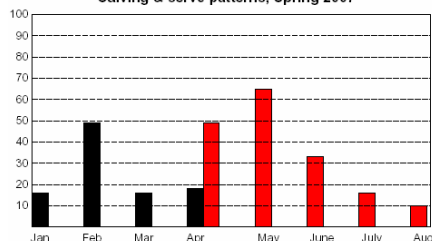
FB	Cow ID	Lactation	Calving Date	Days in Milk	Problems/Treatments
68	IEFFTZ0068E	9	22/04/2008	39 days	
264	IE141763880264	5	01/04/2008	60 days	
267	IE141763820267	5	28/03/2008	64 days	
478	IE141763870478	1	11/04/2008	50 days	
483	IE141763840483	1	15/02/2008	106 days	

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Fertility Reports; End of Season

Calving		Mating	
Calving period		Mating period	
Start	29/01/2007	Mating Start Date (MSD)	20/04/2007
Median	16/02/2007	Finish/Last serve	16/08/2007
Finish/Last calving	30/04/2007	Length breeding season	16 weeks 6 days
Related events		Cows calved and served	49
Total cows calved during the calving period	49	Number of serves	91
Calving interval (days)	371 days	Cows confirmed pregnant	44
% cows calved by 6 weeks	74%		

Calving & serve patterns, Spring 2007



- Farmer friendly reports for end of breeding season.

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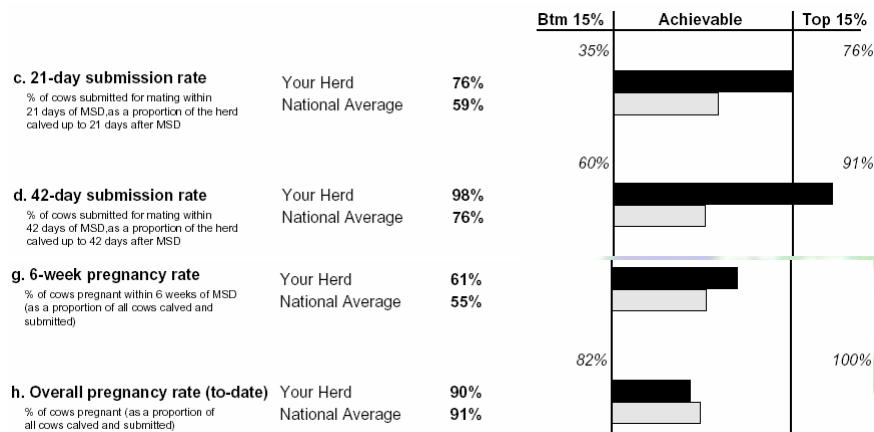


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Fertility Reports; End of Season



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Sire Advice for Farmers

- Run by farmer, AI company or "default."
 - Max EBI, min inbreeding, min cost of semen
- All bulls & breeds.
- Allocated to cows.
- Bull selection saved – loaded to AI handheld + included on breeding chart.
- Completing the loop;
 - Cow calves.....Genetic evaluation.....Sire Advice.....Information to farmers....Recorded insemination.....Due Calving....Cow calves....

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The screenshot displays the ICBF Web Application interface in Microsoft Internet Explorer. The main content is a table titled "Suggested Bulls List" with the following columns: Bull, Name, HO %, EBV, Milk Fertility Best, Calv Health, M kg F %, P %, CI Days, and Supplier. The table lists several bulls with their respective values and suppliers. A mobile PDA device is shown on the right side of the screen, suggesting the application is accessible on handheld devices. Below the table, there are buttons for "Allocate Bulls to Cows" and "Edit Suggested Bulls".

Bull	Name	HO %	EBV	Milk Fertility Best	Calv Health	M kg F %	P %	CI Days	Supplier		
GBOR	GBOR	92	€191	€74	€25	€14	479	0.18	-0.01	-2.85	Dovea
			€88	€-6			7.5	15.2		4.80	
WINDSOR MANOR DURHAM ZEUS	WINDSOR MANOR DURHAM ZEUS	100	€167	€40	€14	€6	308	-0.19	+0.00	-4.70	Munstar / Progress
			€107	€-6			2.2	11		4.51	
RUUD 96	RUUD 96	100	€163	€74	€25	€0	397	+0.06	-0.01	-3.16	Munstar / Progress
			€53	€1			18.5	12.5		1.35	
CORBOYS HACKETT	CORBOYS HACKETT	89	€147	€55	€31	€-8	102	+0.11	+0.08	-3.94	
			€93	€-14			9.5	7.5		3.22	
ZANDER KEET	ZANDER KEET	100	€141	€16	€39	€-8	95	+0.22	+0.09	-2.56	
			€50	€-7			15.5	8		1.75	
TITTENSER HYLKE	TITTENSER HYLKE	FR	€136	€17	€24	€-4	-340	+0.17	+0.23	-6.40	Dovea
			€106	€-7			-5.5	-1		-2.59	

AI Management Information

- Fertility management reports
 - Bull, technician, region.
- Semen invoicing & stock control
 - No "docket processing" – real-time information.
 - Timely invoicing.
 - Better stock control management
- ***Better for AI company & farmers.***

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AI Management Data - Future Plans

- More reports for AI companies.
- Getting reports back to farmers;
 - 3 weeks, 6 weeks, 9 weeks....but paper based?
 - Key performance indicators & SMS text messaging.
- ICBF Active Bull List.
 - Availability of AI bulls.

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Summary

- Insemination data is a key component of effective breeding.
 - Cow calves.....Genetic evaluation....Sire Advice.....Information to farmers....Recorded insemination.....Due Calving....Cow calves....
- ICBF; 2-pronged strategy;
 - Better data collection (handhelds & web)
 - Better reports (high value & timely)
- Results in better data for genetic evaluation.
- **More profit for Irish farmers (v)**

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