



AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority



Improving reproductive efficiency in the beef cow herd

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Key reproductive targets for beef cow herds

- **365 day calving to calving interval**
- **<5% cows culled annually as barren**
- **>95% of cows calving to wean a calf**
- **Compact calving with 80% of cows calved in 42 days**
- **Replacement rates 16-18%**
- **Heifers calving at 24 mths old; early in calving season**

Current Reproductive Performance of Irish Suckler Herds

Trait	Target	Irish Herds
Calving Interval	365 days	407 days
Calves/cow/yr.	1.0	0.82
Age at calving	24 months	<20% heifers @ 22-26mts

ICBF 2015

An All Ireland epidemiological study of the key factors affecting reproductive efficiency of beef cow herds

(Preliminary findings)



Introduction

Objective

Conduct a comprehensive All-Ireland epidemiological study of the factors affecting reproductive efficiency in beef cow herds.

Effects investigated

- Seropositivity (antibodies)
 - IBR,
 - Leptosporosis,
 - BVD
 - Neospora Canium
- Blood concentrations of trace elements
- Copper selenium and iodine



Leptospirosis



- Bacterial disease
- Linked to abortions, stillbirths and weak calves
- In cattle, *hardjo-bovis* and *-prajitno* genotypes (i.e. sub-serovars) are responsible for host-adapted persistent infections.

Effects on cattle fertility

- These host-adapted serovars cause reproductive losses throughout gestation (abortion rates of 3–10%)
- Reduced conception rate in seropositive dairy cows (Dhaliwal et al., 1996; Guitian et al., 1999)

Bovine viral-diarrhoea virus

- Pestivirus endemic in cattle populations and is responsible for a wide range of clinical conditions
 - Foetal resorption & Abortion,
 - Mummification,
 - Immunotolerant PI calves

Effects on fertility

- Unclear whether BVDV is having is associated with reproductive performance in beef cows
- Interactions with other pathogens?



IBR



- Viral Disease
- Bovine herpes virus 1 (BHV-1) primarily associated with clinical syndromes such as rhinotracheitis, pustular vulvovaginitis, abortion, infertility and conjunctivitis in cattle (Straub, 1991; Nandi et al., 2009)

Effects on fertility

- Intrauterine inoculation with IBR at insemination
- Associated with localised inflammation in the corpus luteum (Vanroose, 1999).
 - >50% reduction in CR
 - ~300% increase in services per conception (Parsonson and Snowdon 1975)



Neosporosis



- Coccidian parasite – *Neospora canium*,
- Canids (Dogs and foxes) the definitive host

Effects on fertility

- Infection is a major cause of reproductive failure in cattle in many countries (Dubey, 2003; Almeria et al., 2012).
- Abortions may occur any time throughout gestation.
- Infected cattle two to seven times more likely to abort (Romero et al., 2005; Van Leeuwen et al., 2010).



Materials & Methods



- 5554 cows from 155 spring calving suckler cow herds across the island of Ireland were blood sampled during breeding season (2014 and 2015)
- All cows were body condition scored (BCS)
- A short questionnaire conducted on
 - Vaccination policy for Leptospirosis, BVDV and IBR
 - Trace element supplementation
- All samples were tested for antibodies using commercially available diagnostic tests at the Department of Agriculture, Food and Marine and AFBINI research centre Hillsborough
- Reproductive and other herd performance data collected





Participating Herds

	No. farms	Cows
Teagasc/IFJ BETTER farms (ROI)	17	954
Focus farms (NI)	8	349
Research farms (ROI & NI)	5	392
Commercial farms (ROI & NI)	125	3859
Total:	155	5554



BCS



- All cows were body condition scored (BCS) at blood sampling (Scale 0-5; Lowman et al., 1976)

Mean	Range
2.57 ± 0.01	1.00 – 4.50

Pathogens

Pathogen	Sero-prevalence % Vaccinating	No. of herds	Within - herd Range %	Sero-prevalence % Non vaccinated	No. of herds	Within - herd Range %
Lepto	88% (2685/3041)	76	0 - 100%	71% (1779/2513)	79	0 – 100%

Pathogens

Pathogen	Sero-prevalence % Vaccinating	No. of herds	Within - herd Range %	Sero-prevalence % Non vaccinated	No. of herds	Within - herd Range %
BVDV	92% (2134/2314)	54	43 - 100%	78% (2518/3240)	101	0 -100%

Pathogens

Pathogen	Sero-prevalence % Vaccinating	No. of herds	Within - herd Range %	Sero-prevalence % Non vaccinated	No. of herds	Within - herd Range %
IBR	33% (454/1380)	27	0 – 84%	44% (1847/4174)	128	0 – 100%

Neosporosis

Pathogen	Sero-prevalence %	No. of herds	Within - herd Range %
Neospora Canium	5% (289/5554)	155	0 - 29%

Trace Elements

	All	Range	Lower limit	Upper limit	Rogers
Copper	11.91 uM	0.48 – 38 uM	8	16	12.51
Iodine	30.37 ug/L	3 – >150 ug/L	60	300	44.22
Selenium	0.52 uM	0.01 – 3.7 uM	0.2	4.2	-



Conclusion



- First comprehensive study to-date on the prevalence of reproductively important pathogens in both vaccinating and non-vaccinated beef cow herds on the island of Ireland.
- On-going investigation to determine the association of these pathogens and trace minerals with reproductive and performance measures in beef cow herds.
 - Calving Interval
 - Calves per cow/year
 - Calf mortality



Breeding management and the use of AI



Breeding Plan

Replacement Heifers



- Too few beef herds with defined breeding plan
- Breed replacement heifers from within the herd using “maternally” tested sires (BDGP requirement for high genetic merit cows and heifers)
- Role for sexed semen in heifers
- Terminal sires on cows not required to produce replacements
- Genetic progress is slow but it's permanent



Benefits of AI



- Only ~20% of suckler calves sired by an AI bull
- Access to high reliability bulls with superior genetics
- Proven easy calving sires
- High fertility semen
- Herd health: minimises the risk of introducing or spreading disease
- Eliminates requirement for additional bulls
- Health and safety: eliminates a potential hazard



Breeding Management

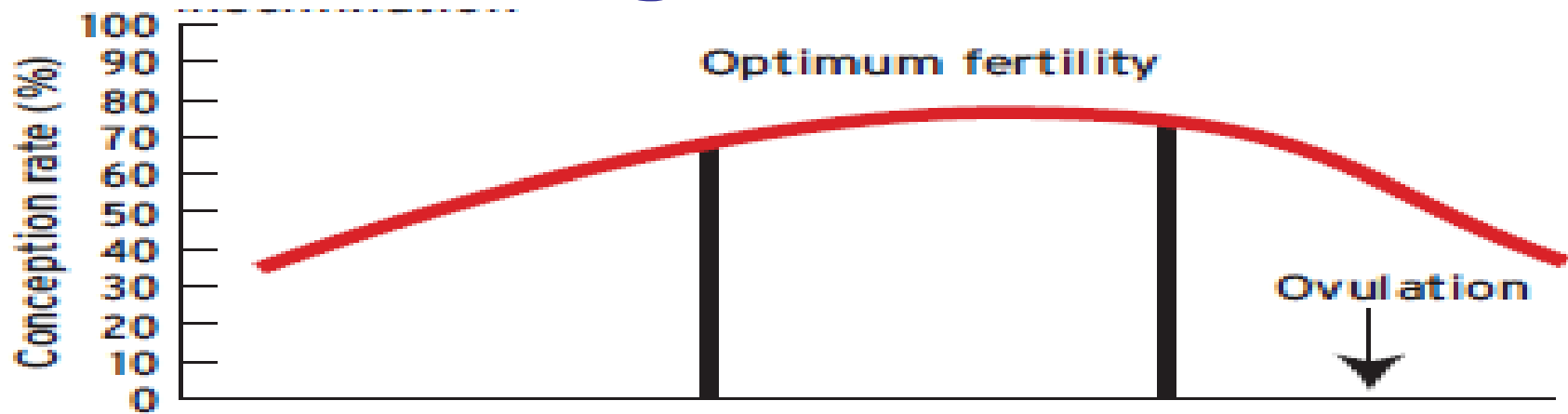


- AI for first 6 weeks of the breeding season
- Heat check at least three times daily
- Observe cows for up to 30 minutes

Pregnancy Rate

Heat Detection x Conception Rate

Signs of Heat



Coming into heat
6-24 hours

Standing heat, average 9 hours, range 3-30 hours

Going out of heat
up to 24 hours

Stands to be mounted

Increase walking, bellowing
and general restlessness

Dirt and skin marks

Mounts other cows

Chin pressing

Swelling of vulva and mucus discharge

Bloody
discharge



Improving Heat Detection

- Commitment and understanding of heat behaviour
- Heat detection aids:
 - Tail paint
 - Oestrus alert patches
 - Vasectomised bull
- Facilities

Heat detection aids





Oestrous Synchronisation



- Labour and heat detection seen as major obstacles to AI use in suckler cows
- Use of synchronisation and fixed time AI gaining much interest abroad
- Need for practical, low labour and effective protocols for grass based herds



Current Research



Development of a robust fixed timed artificial insemination (FTAI) protocol for Irish beef cow herds

Randi et al. (2016)



On-Farm Study (1)



- 3 synchronisation/FTAI protocols
- Spring (2014 & 2015) Autumn 2014
- Total number of cows synchronised: **2205**
- Average no. of cows x farm: **27**
- 74 herds across the island of Ireland



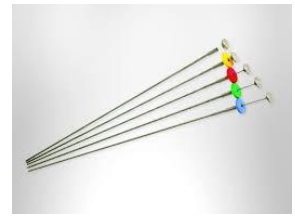
On-Farm Study (2)



- All cows at least 35 days calved
- Cows were scanned before commencement of the treatments
- Farmer covered cost of AI
- Cows were scanned for pregnancy (Day 30)



Protocols Used



Option 3



- All drugs are Prescription Only Medicines (POMs) and are under veterinary control.
- Dosage of drugs: will vary according to drug and drug formulation.

Pregnancy Rates

	Option 1	Option 2	Option 3
Spring 2014	59%	50%	69%
Autumn 2014	52%	54%	49%
Spring 2015	53%	-	55%
Overall	54 %	52 %	57 %

Results

Cow cyclicity (range): 50-70%

Average cost range (Prescription Only Medicines): €22-32

AI cost 1st Service (average): €25-30

Average cost range per cow: €47-62

Stock Bull (30 cows)

Total cost per cow/year €52



Calving the synchronised cows
Farmer experience:
Mr. Artie Birt

National Beef Conference 2015



On farm Research-Synchronisation



- In 2014 and 2015, we signed up to the Teagasc/AFBNI run research project which examined different protocols for synchronisation and FTAI

Year	No of Cows Synchronised	Pregnancy % (No of cows)
2014	81	68% (55 cows)
2015	68	72% (49 cows)



Calving synchronised COWS



Positives

- Spring 2015: Greatest number of cows that calved in one day was 7
- Calving spread: Not all cows inseminated on the same day will calf on the same day
- Compact calving – easier to manage calves after birth – tagging, dehorning and weaning

Problems

- No problems.. but the stockperson must be dedicated to the stock only





Main Outcomes



- Simple procedure(s) to carry out and has a low labour input
 - No heat detection necessary
 - Only 3 handlings (including AI)
- Reliable, cost effective and facilitates FTAI
 - 100% Submission rate
- Effective in cyclic and non cyclic cows at any stage of the oestrous cycle.
 - Good pregnancy outcomes



Breeding and Reproductive Management Survey



Breeding and reproductive management survey

Objectives

- To gain a greater understanding of the reproductive, nutrition and herd health management strategies currently being employed on Irish suckler herds
- To gain a greater understanding of farmer up-take of new knowledge and technology (specifically reproductive management tools)

Outcomes

- Disseminate information from the survey to all relevant stakeholders
 - Advisory
 - Vets
 - Research
- Influence the research focus on suckler cow fertility
- Influence breeding and reproductive management decisions on Irish suckler farms





Summary- **PROFIT**



- **P**lanning: Plan and record all key events.
- **R**eplacements: Use AI as a replacement strategy
- **O**estrus: Know the signs of heat and monitor cows regularly.
- **F**ixed time AI : The use of fixed time AI reduces heat detection and shortens calving interval.
- **I**nformation: Use all relevant data to make informed decisions.
- **T**echnology: Use existing technologies to aid heat detection and increase AI usage.

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