IRISH CATTLE BREEDING FEDERATION

Genomic Selection: Impact on the Organisation of the Breeding Sector.

The Benefits of taking a National perspective in the Organisation of Breeding Programs.

Dr. Andrew Cromie, ICBF.

Joint Interbull/EAAP session

Nantes, 26 Aug 2013

NDP National Development Plan Transforming Ireland

Overview.

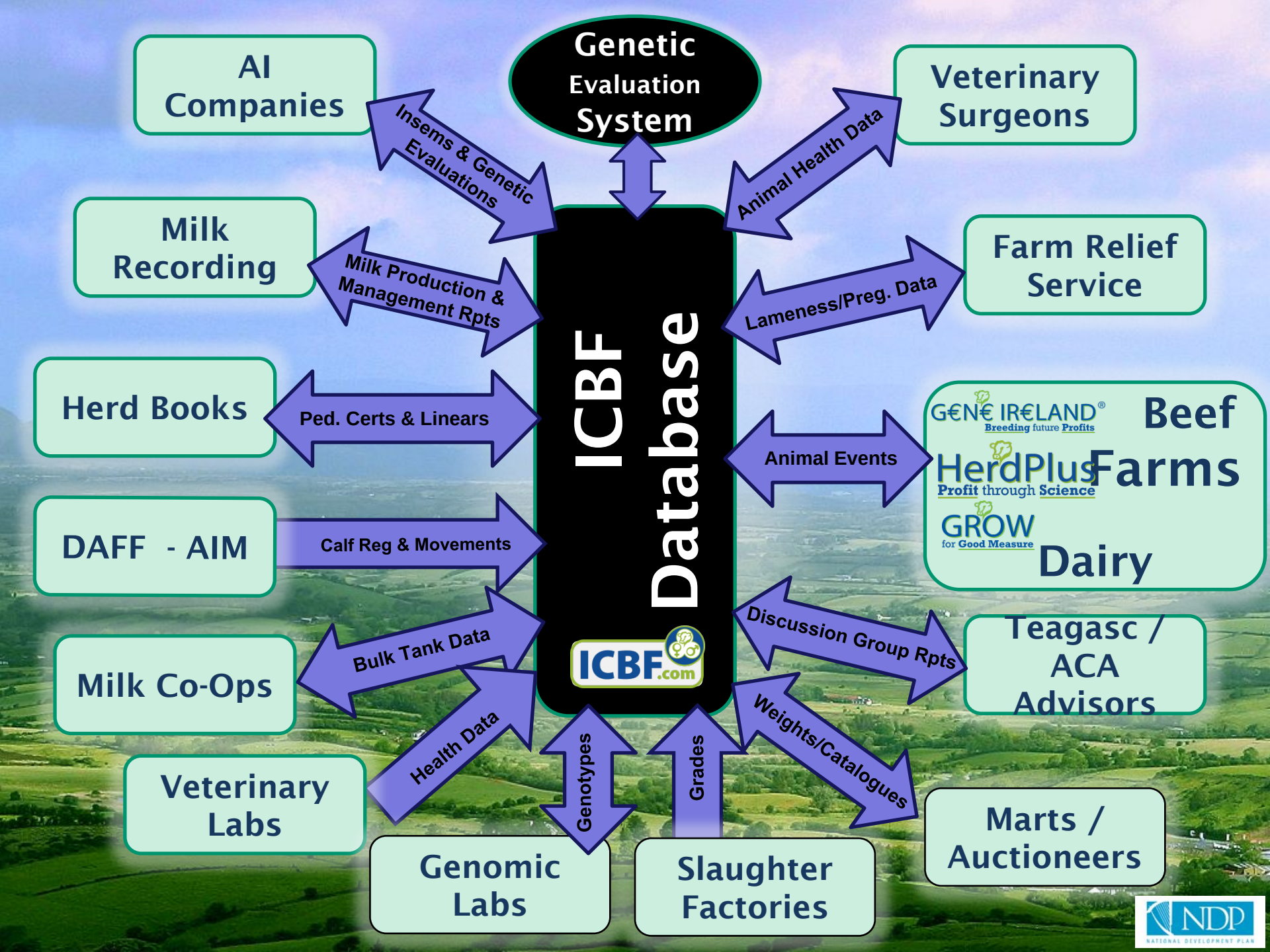
1. A National perspective.
2. Organisation.
3. Breeding Program (G€N€ IR€LAND).
   - Overview, progeny test, young males & bull mothers.
4. Benefits.
   - Genetic gain, new traits, new technologies.
5. Questions.

1. A National Perspective; Ireland

- Agri-food is important.
  - 8% of GDP & multiplier effect.
- Close working relationship amongst key stakeholders -> common goal.
  - Harvest 2020 – ambitious growth targets.
- Supportive government providing frame-work (not subsidy!).
  - DAFM -> ICBF -> Industry.

2. Organisation; Irish Cattle Breeding Federation.

- Cattle breeding "organised" around Irish Cattle Breeding Federation.
  - Shareholders (AI, HB, MRO's & farmers) & stakeholders, e.g., Teagasc & processors.
  - Responsible for; database, genetic evaluations & breeding programs.
  - Funding model covers short (e.g., service) & long-term (e.g., genomics).


Genetic Evaluation System
AI Companies
Insems & Genetic Evaluations
Veterinary Surgeons
Animal Health Data
Milk Recording
Milk Production & Management Rpts
Farm Relief Service
Lameness/Preg. Data
ICBF Database
Herd Books
Ped. Certs & Linears
Animal Events
GENE IRELAND Breeding future Profits
Beef
HerdPlus Profit through Science
Farms
GROW for Good Measure
Dairy
DAFF - AIM
Calf Reg & Movements
Discussion Group Rpts
Bulk Tank Data
Milk Co-Ops
ICBF.com
Teagasc / ACA Advisors
Health Data
Weights/Catalogues
Veterinary Labs
Genotypes
Grades
Marts / Auctioneers
Genomic Labs
Slaughter Factories
NDP
NATIONAL DEVELOPMENT PLAN

3. Breeding Programs; G€N€ IR€LAND.

- ICBF offers breeding program services to industry;
  - (i) “Optimal” design, (ii) Progeny test service, (iii) Young male program & (iv) Bull mother program.
- Covers AI companies, herdbooks & breeders.
  - NCBC, Dovea AI, Eurogene & Genus/ABS.
- Covers dairy & beef.

i. Optimal Design.

- Objective; “high level” direction.
  - 2001 – 100 bulls & 100 daughters (Veeerkamp et al.) = €11.5/cow/year.
  - 2009 – Impact of genomics (Meuwissen et al.) = ~30-50% more gain.
  - 2010 – Impact of females & breeding advice (Amer et al.) = + ~30-50% gain.
- 2013 – Suggests we could be achieving ~€20/cow/year…?!

ii. Progeny Test Service.

- Objective; Improve efficiency.
- ICBF sign up herds, dispatch semen, collect data, compute genetic evaluations.
  - Target; 100 bulls, 700 straws/bull & 100 MR daughters/bull.
  - Achieved (2008 & 2009); 76 bulls, 690 straws/bull & 90 MR daughters/bull.

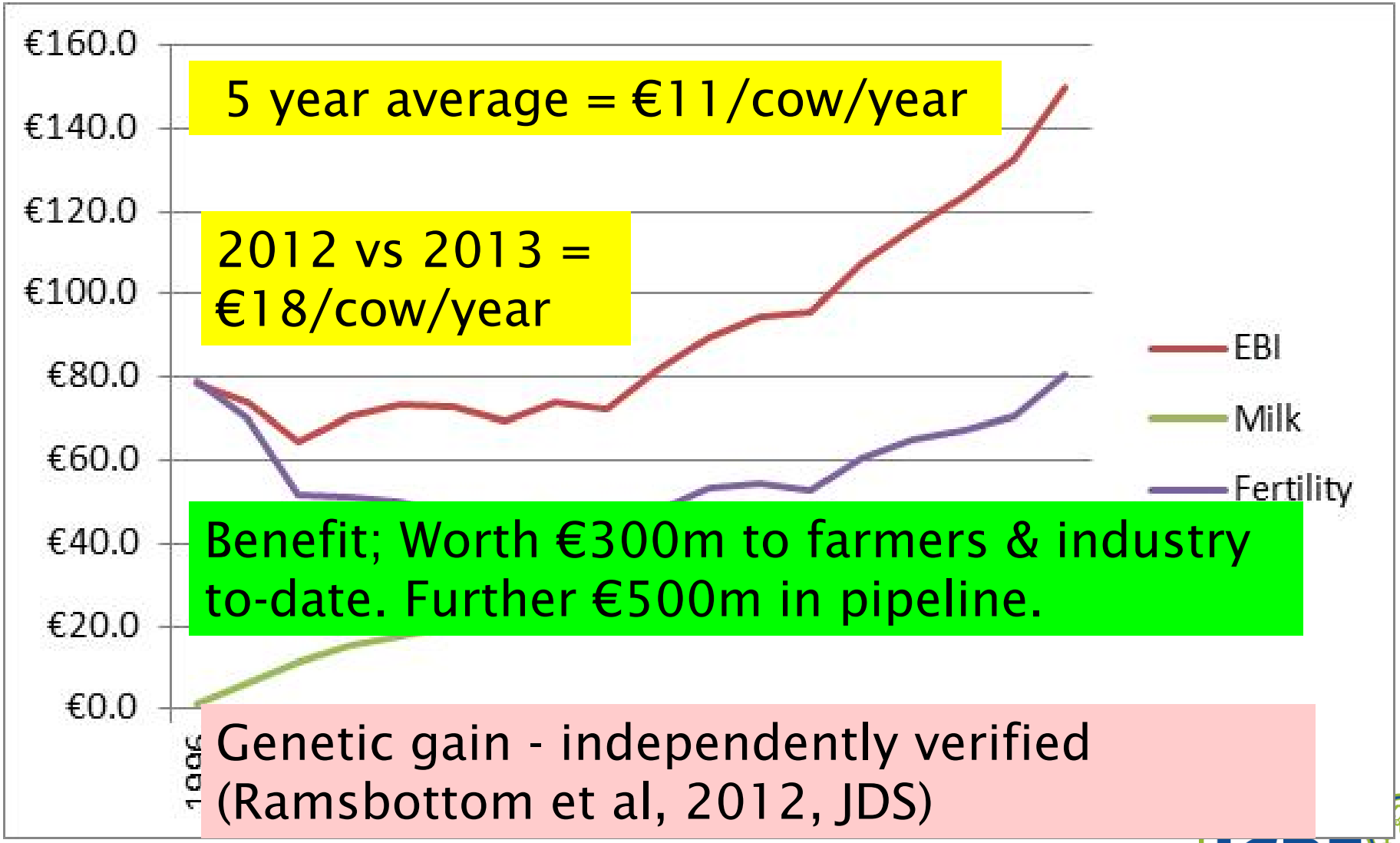
iii. Young Male Program

- Objective; Increase Genetic Gain.
- ICBF provides AI companies with "weekly" bull file.
- AI companies use ICBF genomics service to identify & genotype bulls.
  - 5k bulls genotyped (further 7k bulls genotyped by breeders) -> purchase ~100
    - Genomic evaluations available to everyone.
  - 17/20 top EBI bulls are Irish GS.

iv. Bull Mother Program.

- Objective; Increase genetic gain.
- ICBF & stakeholders identify bull mothers & sires of sons. Communicate with breeders.
- AI companies follow up with individual “contracts”.
- Majority calves still sourced from weekly file, some move to contracts.

4. Benefits; (i) Genetic Gain (€)



5 year average = €11/cow/year

2012 vs 2013 = €18/cow/year

Benefit; Worth €300m to farmers & industry to-date. Further €500m in pipeline.

Genetic gain - independently verified (Ramsbottom et al, 2012, JDS)

Benefits; (ii) New traits e.g., BVD incidence*.

* Based on ~2m animals with BVD records.

Benefit; Breeding the "invisible" cow!

Benefits; (iii) New technologies, e.g., Sexed semen.

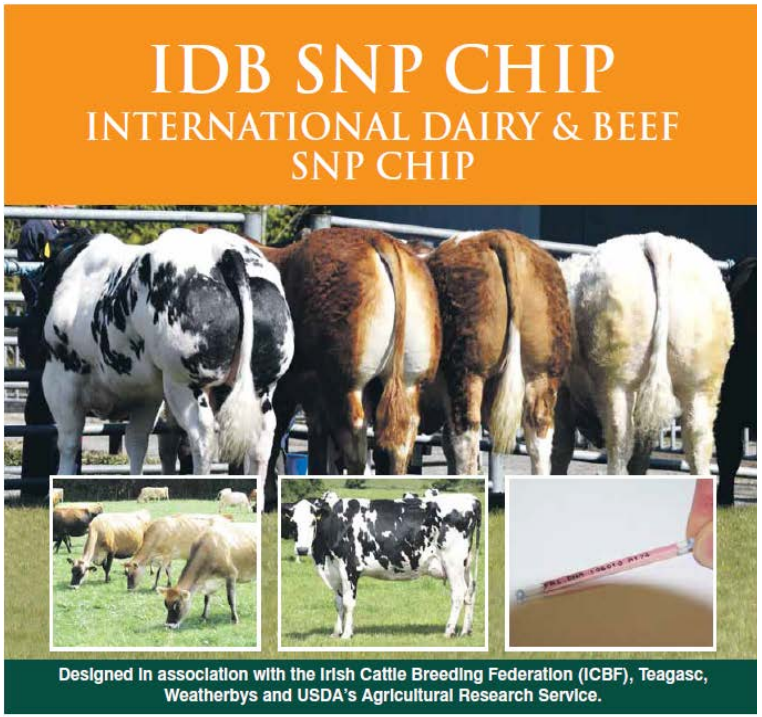
Table 1. % pregnant to first service.

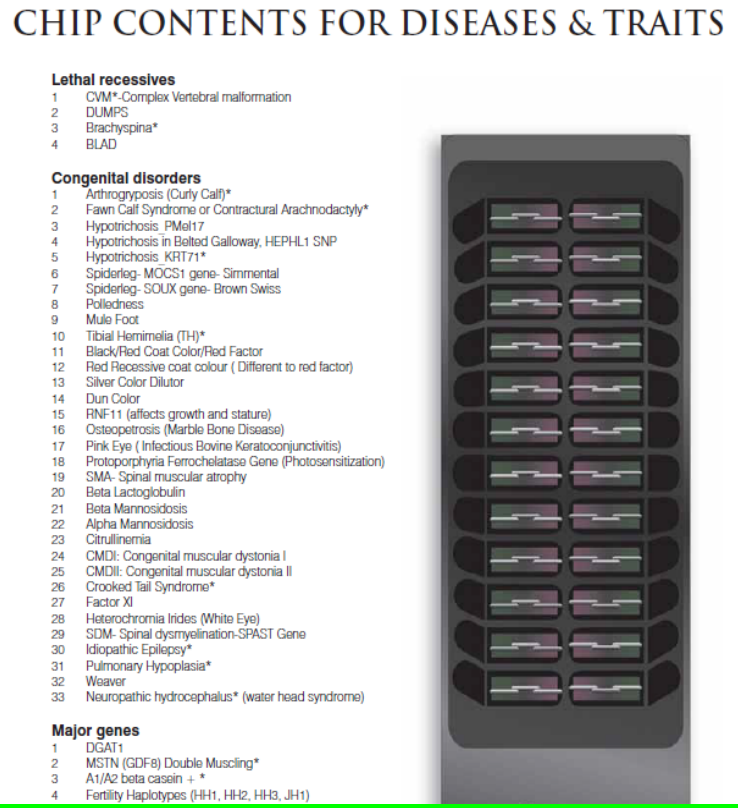
Treatment	Heifers	Cows
Fresh semen not sexed (control)	58%	54%
Fresh sexed (2m)	50%	48%
Fresh sexed (1m)	47%	44%
Frozen sexed (3m)	52%	49%

- 15k 1st inseminations (400 herds), 9 HF bulls & split ejaculates. Performance of sexed frozen & cows a major outcome.
- Benefits; ~€50m+ from females and/or beef

Sexed Semen Research Partners

Benefits; (iv) New technologies, e.g., IDB Chip.





- Benefits; All animals genotyped at birth; genetic gain, traceability & quality assurance.

Some other benefits.

- No loner reliant on imported semen.
  - Strong indigenous program.
- Cattle breeding trends are all positive -~3-5% increase/year in AI & milk recording.
- Irish cattle industry working together to achieve a common goal.
  - Genetics is a **“key tool”.**

Summary.

- Genomics is having minimal impact on the organisation of the breeding sector.
  - Already in place as a result of ICBF.
- The technology is “driving” genetic gain in Ireland.
- It is (and will be) a key catalyst in “re-organisation” of global breeding.
  - Consortia, Interbull, projects…….
- To be welcomed – especially in context of future global food challenges.

Thank You.

The voice of Ireland's farming industry
Saturday 20 April 2013 S Vol 66 No 16 Price €2.60 (incl. 9% VAT)
www.farmersjournal.ie
IRISH FARMERS JOURNAL

INSIDE

With Punchestown Festival around the corner, Kerry milliner Carol Kennelly talks to us about fashion, family and horses

All smiles as fresh sexed semen trial goes live

Donal O'Leary

Richard Geary, Seamount, Currabinny, Carrigaline, Co Cork, shares a joke with Munster Cattle Breeding Group AI technician Tom Tobin while he inseminates one of Richard's cows as part of the new sexed semen trial which began this week. Over 300 herds, covering some 8,000 cow inseminations and 7,000 heifer inseminations, are involved the project. Despite battling with weather and tight fodder supplies, the farming calendar continues, with the breeding season about to kick off.

Dairy versus Beef.

- Dairy program launched in 2005, beef in 2008, significant update to beef in 2012.
- Same principles for dairy & beef.
- Beef – greater involvement of breeders & herdbooks, as well as AI companies.
  - Lack of AI & lack of profitability.