

66<sup>th</sup>  
**EAAP**  
ANNUAL MEETING



# INNOVATION IN LIVESTOCK PRODUCTION: FROM IDEAS TO PRACTICE



31 AUGUST - 4 SEPTEMBER 2015  
**WARSAW, POLAND**

## Genomics, sexed semen: changes in reproduction choices in French dairy herds

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# New innovative tools for genetics and reproduction strategies

2009



## Genomics:

GEBV available for young ♂  
GEBV available for ♀ in 2011

High reliability for all traits

Possibility to increase genetic progress, especially for functional traits

## Sexed semen:

Success: 90% ♀ calves after sexed ♀ AI

Possibility to select females on farm

x

**For farmers** : changes in herd management and reproduction strategies

2015

**In breeding programs:** changes in genetic orientations, because of the genetic progress allowed for functional traits; changes in the selection designs for males and for females

# The French dairy population for breeding and insemination

- Available bulls per year – Breeding programs

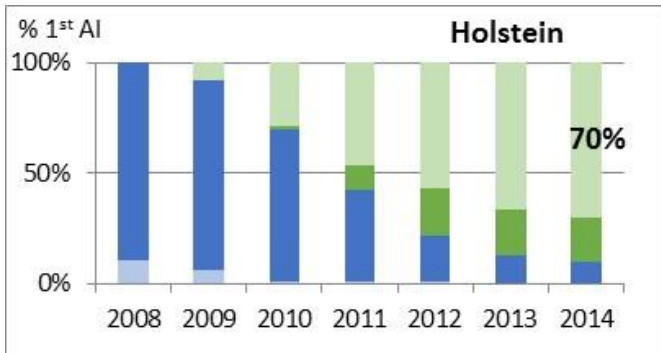
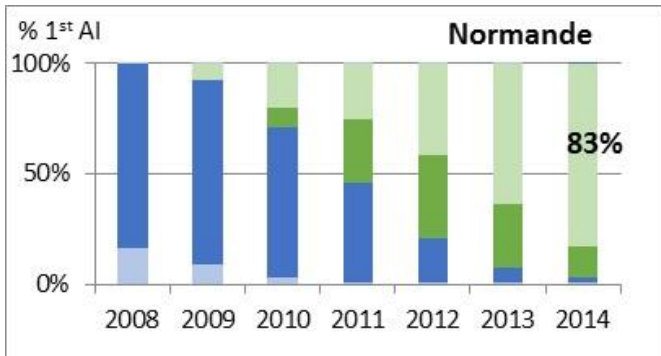
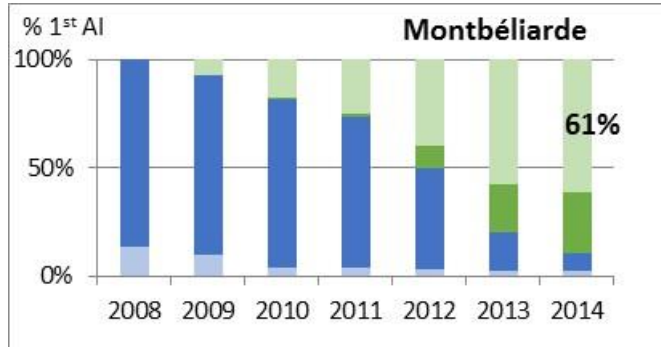
	2009		2014
	Progeny testing	Proven bulls	Genomic EBV without progeny
Holstein	600	50	180
Montbéliarde	180	20	130
Normande	150	15	80

- Inseminations (AI) – Main dairy breeds

2014	Number AI	Number of bulls >1000 AI	Number of inseminated cows and heifers
Holstein	4,050,774	527	2,450,032
Montbéliarde	828,105	201	634,263
Normande	523,453	135	340,550

# A reversal in the use of AI bulls

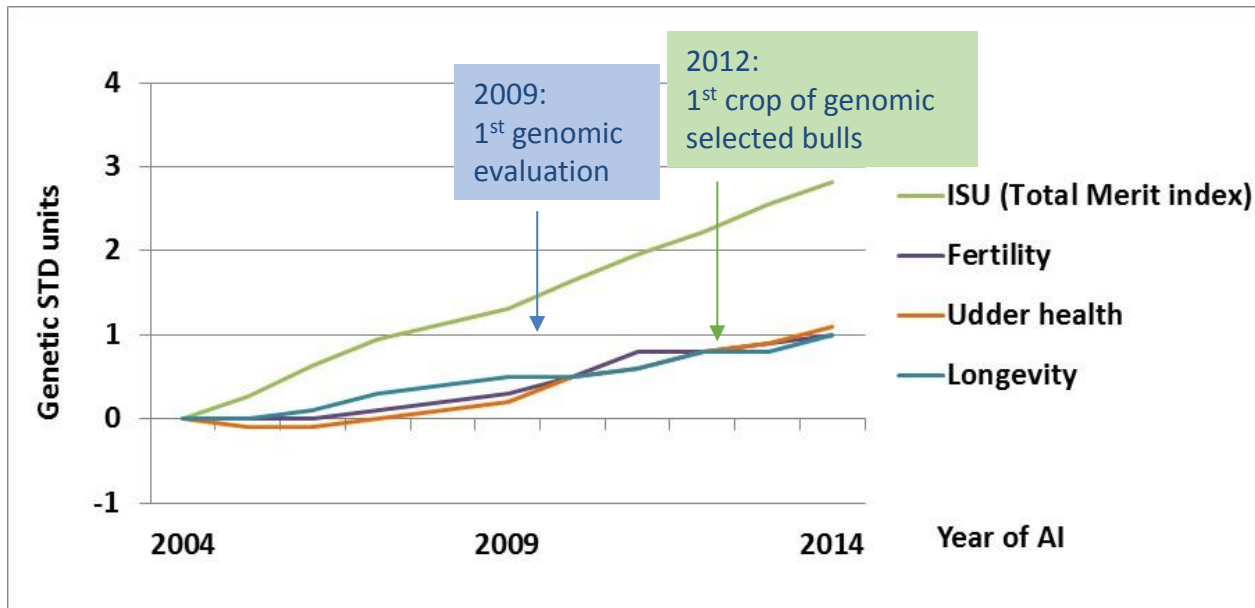
2014: 70% AI with genomic evaluated young bulls



definition	use
<b>Classical evaluation</b>	
<b>Proven bulls (progeny tested)</b>	<b>Few bulls, thousands of AI</b>
<b>Bulls under progeny testing</b>	<b>Lot of bulls, 300 1<sup>st</sup> AI</b>
<b>Genomic evaluation</b>	
<b>Young bulls with genomic EBV without daughters</b>	<b>Hundred of bulls, few AI</b>
<b>Proven bulls with genomic EBV</b>	<b>Dozen of bulls, medium use of AI</b>

# Two phases of bulls contributing to genetic progress

## Genetic evolution of Holstein 1<sup>st</sup> AI - Functional traits and Net Merit

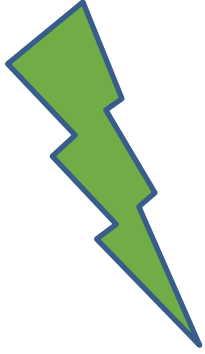


2009: 1<sup>st</sup> genomic evaluation = breeding values available for 4 years of waiting progeny testing dairy bulls. **Large choice, higher precision for functional traits.**

Since 2012: evaluated bulls come from genomic breeding programs. **Higher selection intensity, increased reliability.**

# More genetic progress for functional traits

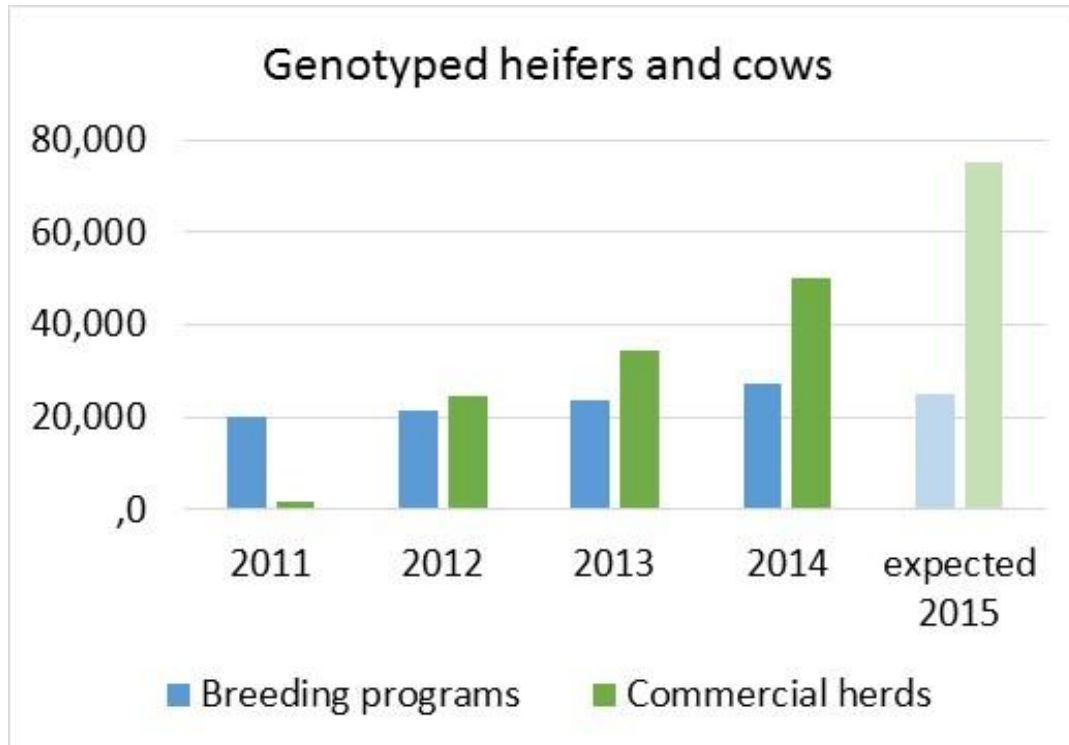
2004-2014 Genetic trends for Holstein 1<sup>st</sup> AI in France:

	2004-2009	1 <sup>st</sup> genomic EBV	2009-2014	2004-2014
Functional traits	↗ +0.3 EBV STD		↗↗ +0.8 EBV STD	+1.1
Production traits: Milk Protein Contents	↗ +0.7 EBV STD ↘ -0.2 EBV STD		→ 0 EBV STD ↗ +0.5 EBV STD	+0.7 +0.3
Type	↗↗ +1.0 EBV STD		↗↗ +1.3 EBV STD	+2.3
ISU = Total Merit index	↗↗ +1.3 EBV STD		↗↗ +1.5 EBV STD	+2.8

In 2012, the composition of the Total Merit Index (ISU) was updated with more weight for functional traits: **37.5%** ↗ **50%** (Holstein)

# Genotyping females

**2014: 100,000  
genotyped  
females on farms  
(cumulated)**



## Commercial dairy farms:

- More than 100,000 females with genomic EBV
- Expected 75,000 new genotyped females in 2015
- 96% under 18 months old
- About 6,000 farms tried genotyping

*Increasing ++*

## Breeding programs in dairy breeds:

- About 25,000 genotyping /year *Stable =*

# New tools to put emphasis on females

- French breeders **ask and pay** genotyping for their **own use**

- Allowed by

The availability of the **LD chip** since 2012

The **low price**

- More tools for mating advices:

A **early** genetic information for females

A **complete** genetic information for females (for all traits)

→ highlight of the diversity of females

- To **sort** among females with different genetic profiles

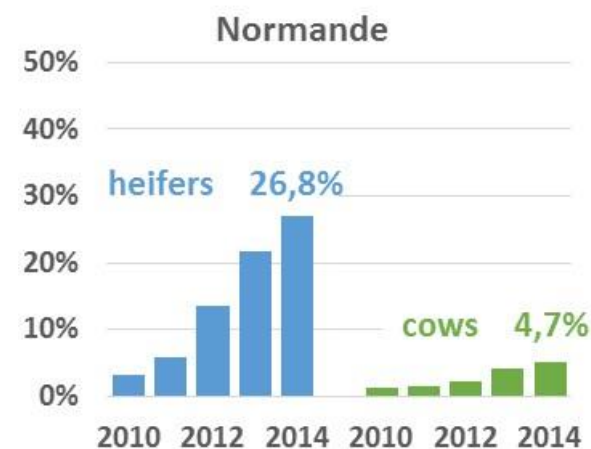
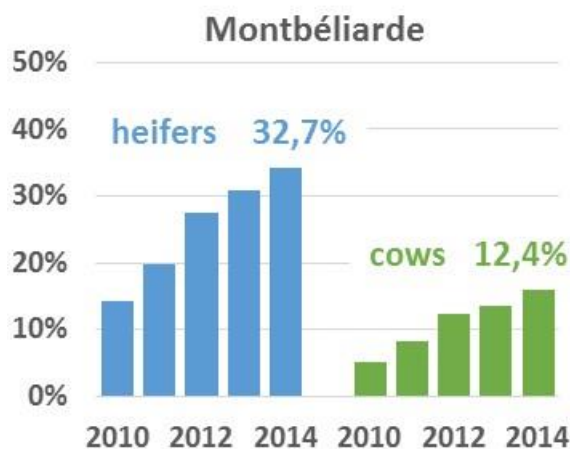
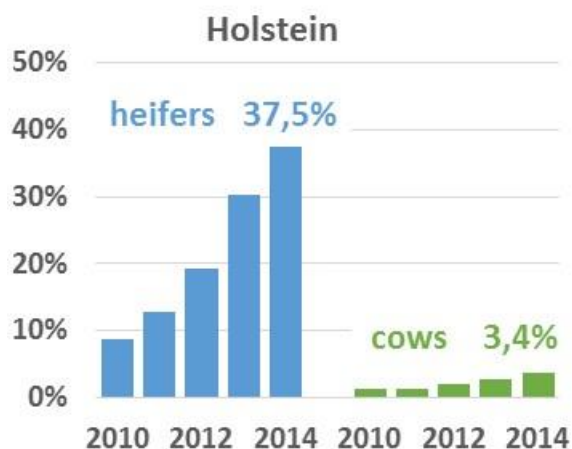
And more services:

- Parentage testing
- Haplotype and mutation tests for genetic characteristics or defects (more than 20 tests / 4 breeds)



# 2010-2014: great increase of sexed semen

2014: 35% dairy heifers with ♀ sexed semen AI



2014: 91% female calves after female sexed AI in 2013 (/115.000 dairy calves)

Montbéliarde cows can sustain sexed AI due to the higher female fertility of the breed

# Sexed semen: not only for genetic purposes

Reasons to use sexed semen with 90% hope of getting a female calf:

- To develop the herd **without buying outside**
  - To sell females when **good market** opportunities
  - To **avoid** heifers **calving difficulties**
  - To **avoid** dairy **males** with a bad economic value
  - To allow **beef crossbreeding** for a part of the herd
- To **sort** among a larger number of females

# Combining sexed semen and genotyping: a new strategy in herds

Developing sexed semen → to **sort** among a larger number of females  
= more selection intensity

Genotyping → to **sort** among females with different genetic profiles  
= more reliable informations

→ to target appropriate bulls and females according to selection objectives at the herd level

2014: 35%  
dairy heifers  
with ♀ sexed  
semen AI

2014: 70% AI  
with genomic  
evaluated  
young bulls

2014: 100,000  
genotyped  
females on  
farms

# Perspectives in France



- Farmers and Breeders are **confident**: they massively **adopt innovations** in order to better match animals and their environment **according to their objectives** and in a **sustainable way**
- **Genetic progress for functional traits is expected** soon at the herd level



- Genomic selection will be extended to **other cattle breeds** (local and beef) and **other species** (dairy sheep and goats) in **2015-2016**

# Thank you for your attention



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