



Comparing Peak of Lactation from Automatic Milking Systems and Conventional Milking Systems

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1 National Data base
DHI data, benchmarking,
Genetic evaluations

20 Innovation & Development Experts
nutrition, forages, welfare, organic production,
robots, calves & heifers, goats, economists,
veterinarians, data scientists, spectral
data, knowledge transfer
Support to staff, producers and industry

7300 dairy farmers in
6-time zones

4 Laboratories
5.2 M samples / year

55 Nutrition
& Management advisors
(35,000 h / year)

Montréal

Guelph

Software solutions,
Animal Traceability

Knowledge transfer



Do cows in robotic milking systems get off to the same start as those in conventional milking system (2x)?

Context

- Robotic milking is the only system that allows having variable number of milkings
- Achieving an optimal milking interval for all cows will ensure that milk secretion is not impaired:
 - Maximizing individual production
 - Minimizing any risk of negative effects on udder health

(André et al., 2010).

Context

Beginning of the lactation



More frequent milking: to stimulate the mammary gland to produce more milk during the peak of lactation

Late lactation



Decrease gradually the number of milkings





The aim of this study was to evaluate the effect of more frequent milkings, as in the automatic milking systems (AMS), on milk yield at lactation peak

Data

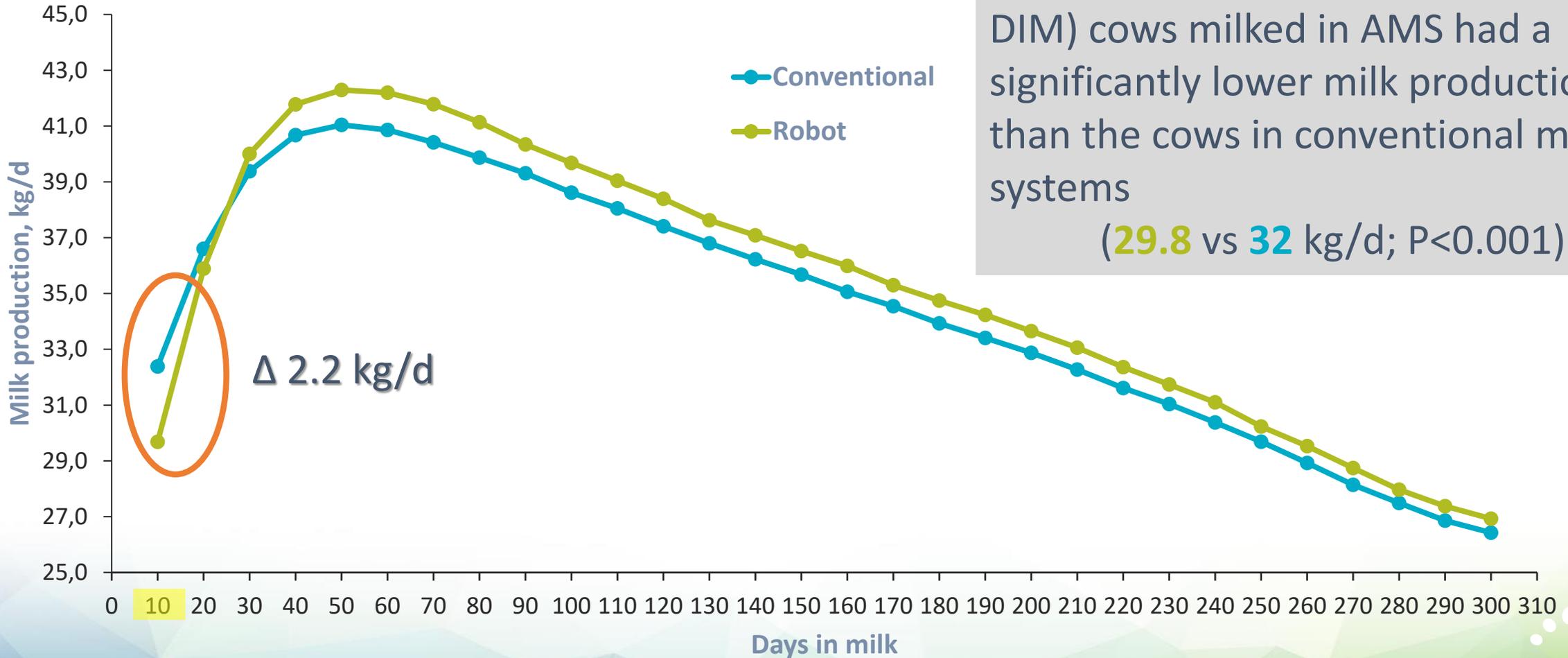
- Lactation records were obtained from the Lactanet database:
 - 7,706,954 records:
 - 516 herds with AMS and 1,766 herds with conventional milking systems (2x)
 - From 2017-2021 (4 years)

Data

Analysis

- The mean of milk production was calculated by 10 DIM interval (e.g., 10, 20, 30...etc.)
- Regression analysis:
 - To evaluate the effect of the milking system and parity on the milk production

Results



At the beginning of the lactation (10 DIM) cows milked in AMS had a significantly lower milk production than the cows in conventional milking systems

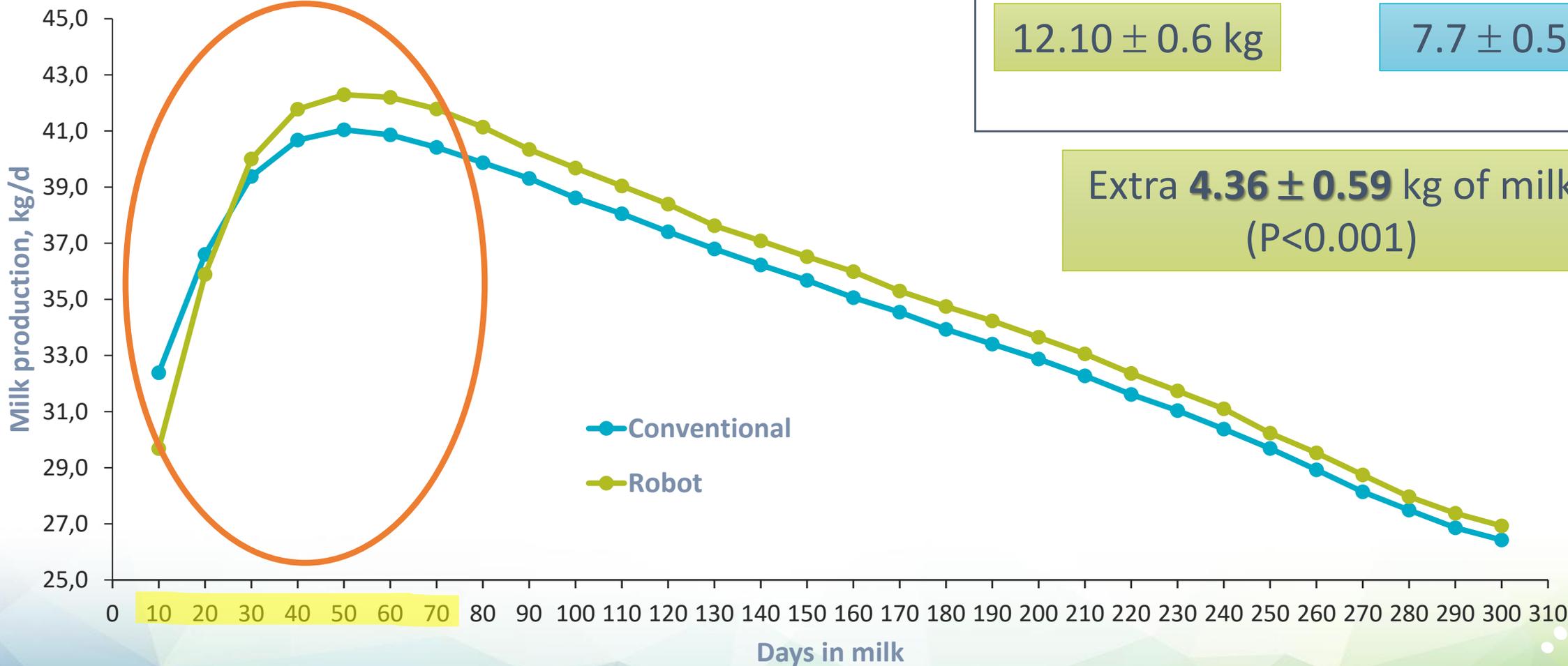
(**29.8** vs **32** kg/d; $P < 0.001$)

Increase of milk production during the first 60 DIM

12.10 ± 0.6 kg

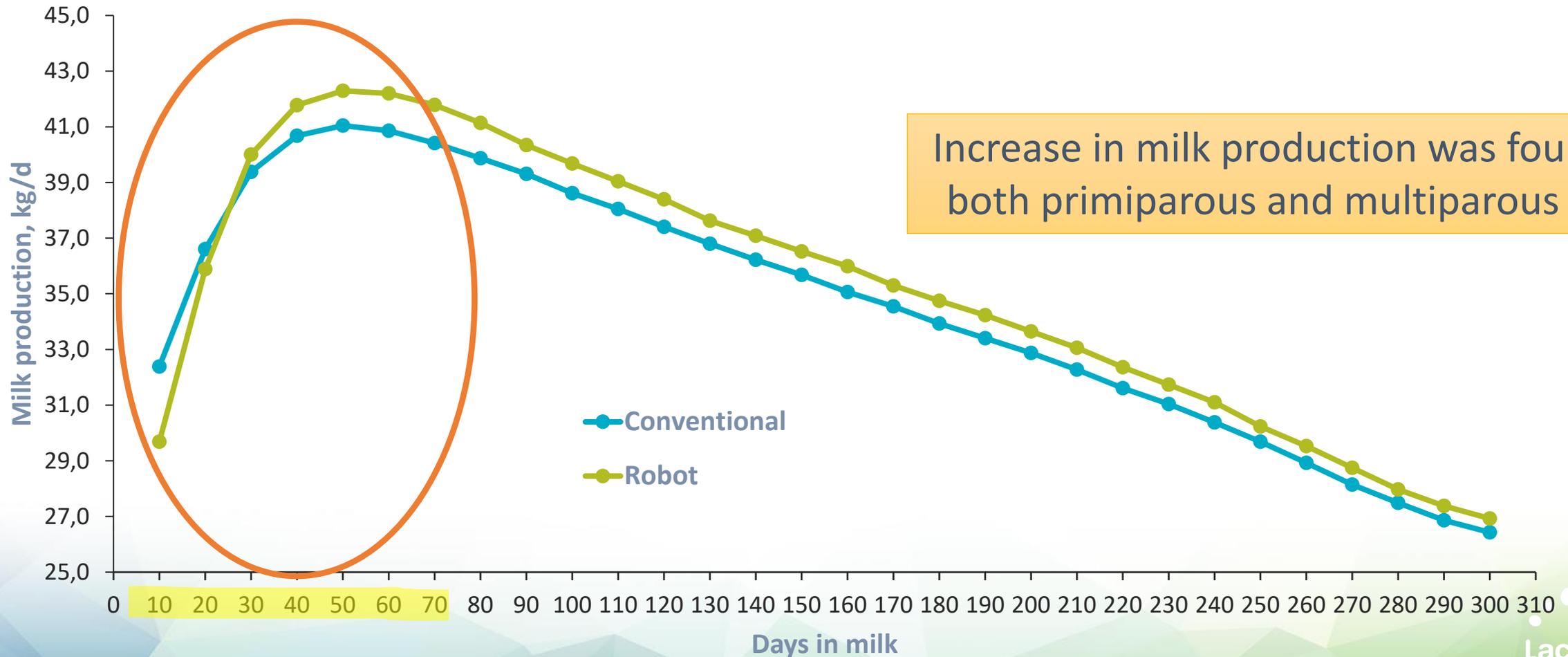
7.7 ± 0.58 kg

Extra **4.36 ± 0.59 kg** of milk
(P<0.001)



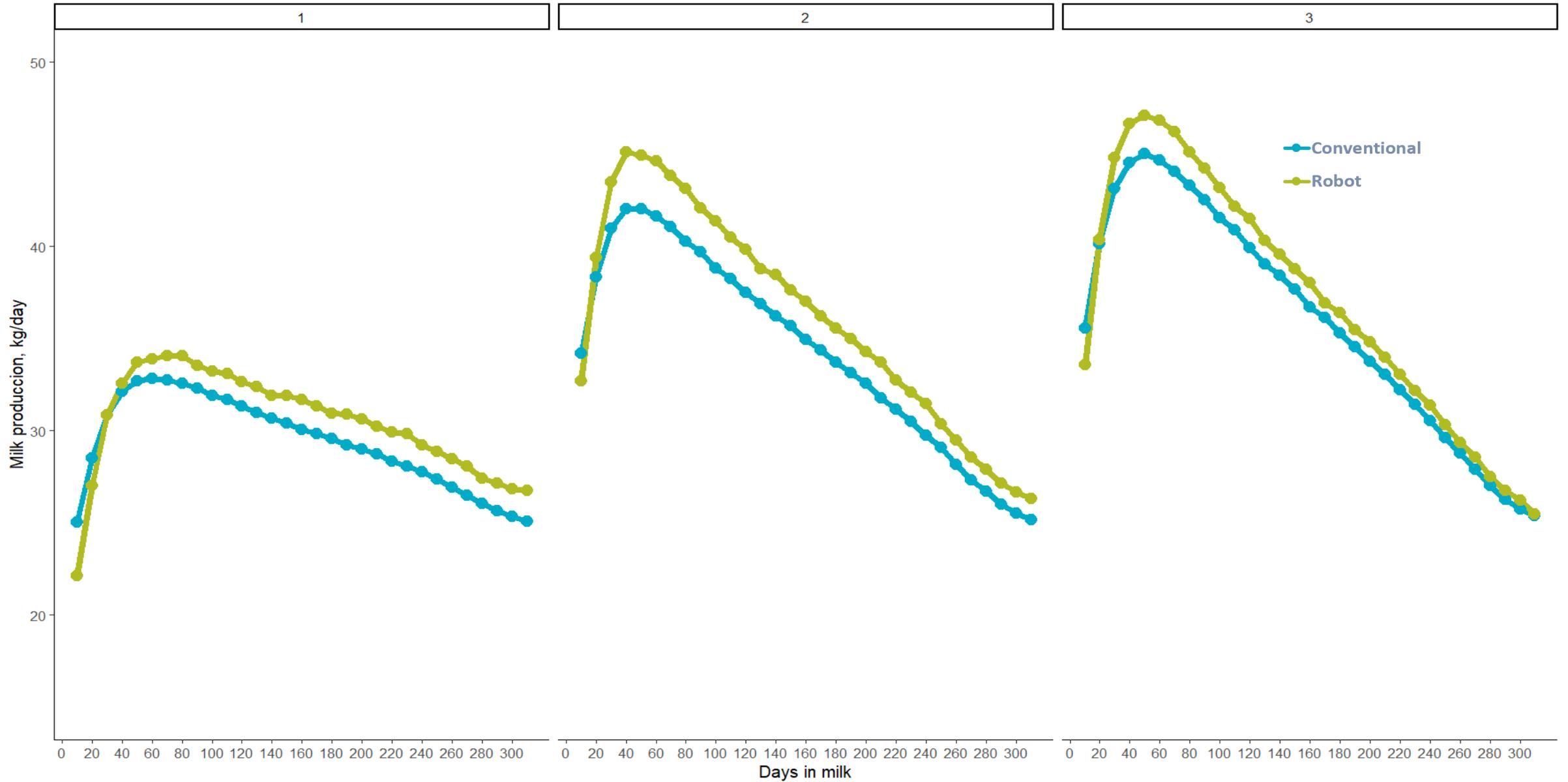
Significant differences between **milking systems** ($P < 0.001$) but no differences among parities ($P = 0.639$)

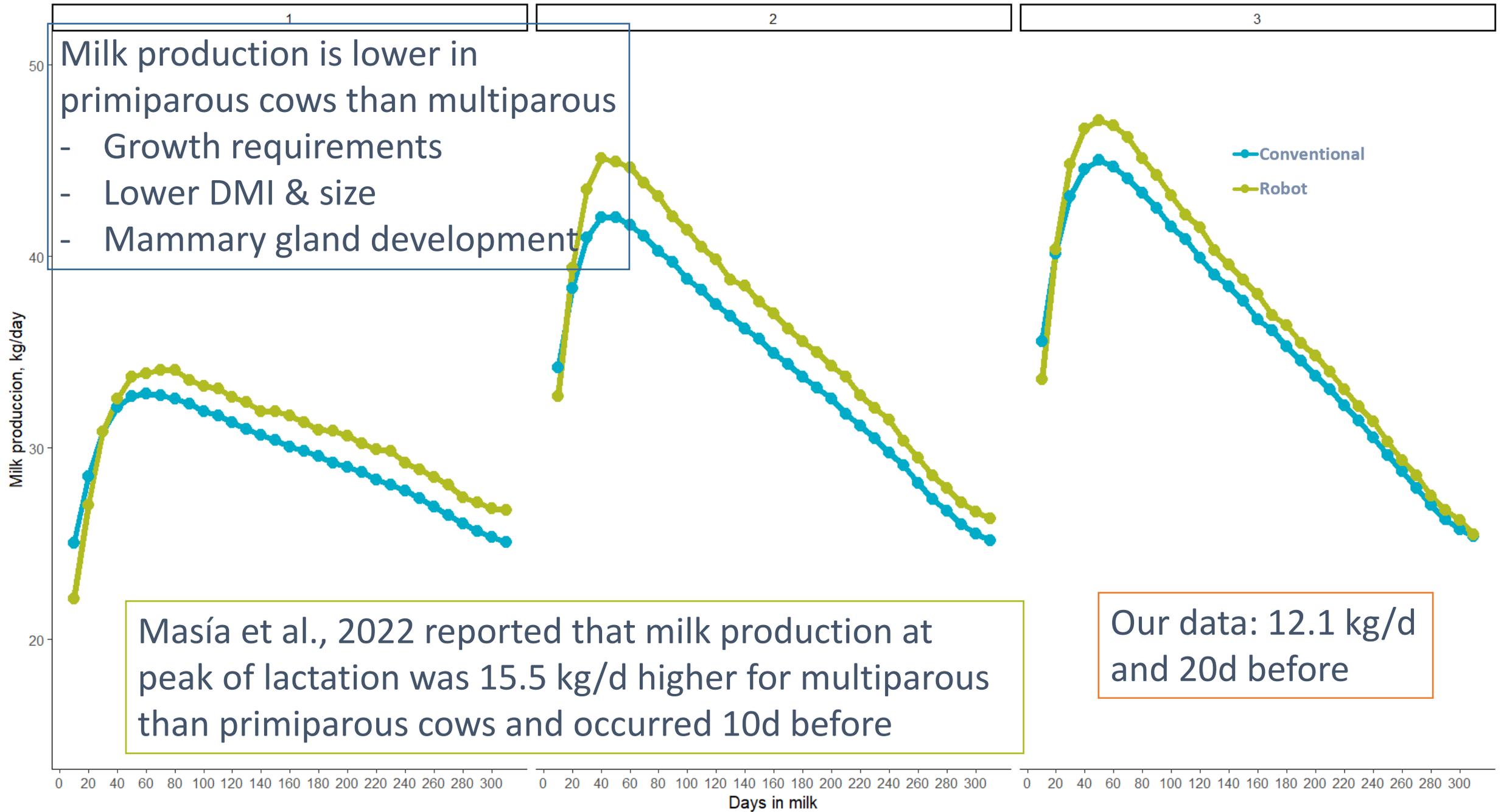
Extra **4.36 ± 0.59** kg of milk ($P < 0.001$)



Increase in milk production was found for both primiparous and multiparous cows

Milk lactation curves by parities (1, 2 and 3+)





Milk production is lower in primiparous cows than multiparous

- Growth requirements
- Lower DMI & size
- Mammary gland development

Masía et al., 2022 reported that milk production at peak of lactation was 15.5 kg/d higher for multiparous than primiparous cows and occurred 10d before

Our data: 12.1 kg/d and 20d before

These findings highlight the importance of monitoring the start and peaks of lactation in AMS to ensure a high milk production and reducing the negative risks in health and reproduction

Monitoring the peak of lactation: why is important?

It has been reported that the incidence of ketosis is 1.45 times greater in AMS compared with other milking systems

(Tatone et al., 2017)

High concentrations of beta-hydroxybutyric acid (BHB) at the beginning of lactation have negative effects on production, reproduction and health

(Ospina, 2010; Chapinal et al., 2012; Santschi et al., 2016)

Cows with elevated BHB (0.20 mmol/l) on the 1st test (5-35 DIM) have:

An extra **24** days open
154 vs 130

Are **2x** risk of displaced abomasum and **+1.8%** clinical ketosis

Are **27%** less likely to be pregnant at 150 DIM (55% vs 70%)

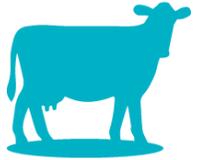
Are **2x** more likely to be culled by 100 DIM

Produce **2.4** kg less milk on test day

Are **1.4x** more likely to never calving again

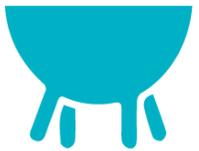


Implications



Cows milked in AMS produce less milk at the beginning of the lactation, but then they exceed the production of cows in conventional milking system (2x)

- Significant effect of milking system



Rapid increase in milk production in AMS cows must be monitored to prevent health problems, reproduction and milk production losses



Review the lactation curves predictions for AMS - management decisions and predictions used by DHI agencies

- ↑ Evaluate milk components curves



Merci/Thank You

