EVALUATION OF THE PERFORMANCE OF A NEW GENERATION OF AMS ON DAIRY BUFFALOES

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AMS ON DAIRY BUFFALOES

Automated milking has always been a valid alternative to traditional systems, reducing the burden of the work and improving the efficiency of production

Thanks to the control of quantitative and qualitative production, it is a valid tool for monitoring the health of the herd

- Increse in the numbers of animals
- Difficulty in finding specialized workers

In buffalo breeding however the application of robotic system has struggled to spread

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THE FIRST AMS IN A DAIRY BUFFALOES

The application of the first automatic milking systems in buffalo breeding was introduced in 2008

Initial doubts:

- High investment
- Repercussion on milk quality
- Poor adaptation to the milking robot

The buffalo is traditionally considered more rustic than the cow, with a different milk ejection mechanism and different morphological conformations of udder

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TWO GENERATIONS OF AMS

DELAVAL CLASSIC

The delaval classic has a type of semiautomatic procedure.
The camera technology is digital laser.
It required the presence of an operator to perform the teaching, for the attachment of the milking group

Genetic selection was fundamental to improving performance

TWO GENERATIONS OF AMS

DELAVAL V300

The new model replaced the old model in 2018 and has an automatic procedure

The camera technology becomes 3D -TOF time of flight

Without the need for teaching, there is an immediately increase in the number of attacks

- Better performance
- The burden and the time of work on the operators is significantly reduced
- Better interaction between animals and enviroment

AMS ADVANTAGES

The main advantage concerns the health of the udder

Correct milking practiece

REDUCTION OF OVER MILKING TIMES

Single detachment for quarter

DETECTION OF SUBCLINICAL AND CLINICAL MASTITES

Eletrical conductivity

INFLAMMATORY STATES OR TRAUMA

Colorimetric sensor for blood in milk

QUALITY OF THE FINAL PRODUCT

Abnolmal milk separation

AMS ADVANTAGES

The data collected, allow the management targeted and quick decision-making

The advantages of using Ams :

- Shorter time to identify breast and metabolic pathologies, and the state of environmental well- being
- Reduction of negative effects on production performance
- Increase in the percentage of recovered animals
- Less use of drugs and better sustainability
- Lower management costs
- Precision feeding based on productions and DIM
- Respect for animal welfare

AMS DISADVANTAGES

- High initial costs
- Increase in energy costs
- Presence of a specialized operator
- Lots of information to manage
- Limited number of animals for milking station

Technology evolution, genetic improvement and precision livestock farming allow the initial cost to be reduced through guided management

Today we see what changes in quantitative and qualitative changes after the application of the new V300 model in a buffalo farm.

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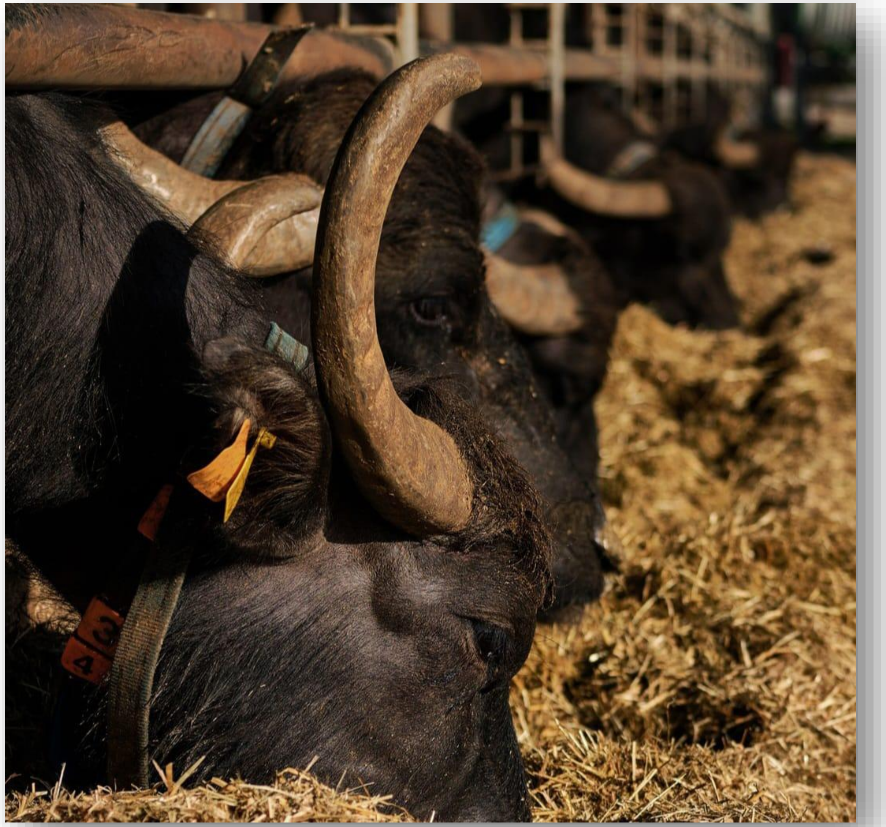
OBJECTIVE OF THE WORK

The objective of the work was to analyze:

- the qualitative characteristics of buffalo milk
- the functioning of robotic milking systems

MATERIALS AND METHODS

- Data were collected during a 22-mo period from January 2021 to October 2022
- The dairy buffaloes were placed in a stall divided into 4 sectors each provided with a robotic milking machine (De Laval Voluntary Milking System 2007, Tumba, Sweden)
- Access to the milking station is guided, in fact the separation gate following the recognition of the animal by reading the transponder allows the animal to enter the waiting room or not, if a minimum of 7 hours have passed since the milking station last milking or direct the animal to the feeding area
- The concentrate feed administered in the milking station to each buffalo ranged between 0.5 and 3.0 kg/d based on daily milk yield



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MATERIALS AND METHODS

In order to create the lactation curve, it was taken into consideration:

- The distance from calving was expressed as 10 classes based on 30 days in milk (DIM) intervals (class A from 1 to 30; class B from 31 to 60; class C from 61 to 90; class D from 91 to 120; class E from 121 to 150; class F from 151 to 180; class G from 181 to 210; class H from 211 to 240; class I from 241 to 270; class L above 271)

- Parity was grouped into 5 classes, where 5+ parity included animals that were in their 5th or greater parity (maximum parity number 9)

THE PARAMETERS

THE FUNCTIONING OF ROBOTIC MILKING SYSTEMS

- Buffalo identification number, date and time of buffalo identification
- Milk yield (kg/milking)
- Milking duration (time between the buffalo identification and the last teat-cup detachment, min)
- Milking interval (time between the beginning of 2 consecutive milkings for the same buffalo, h)
- Average milk flow rate (kg/min)
- Blood milk content (ppm)
- Milk electrical conductivity (mS/cm)
- Milk flow peak (kg/min).

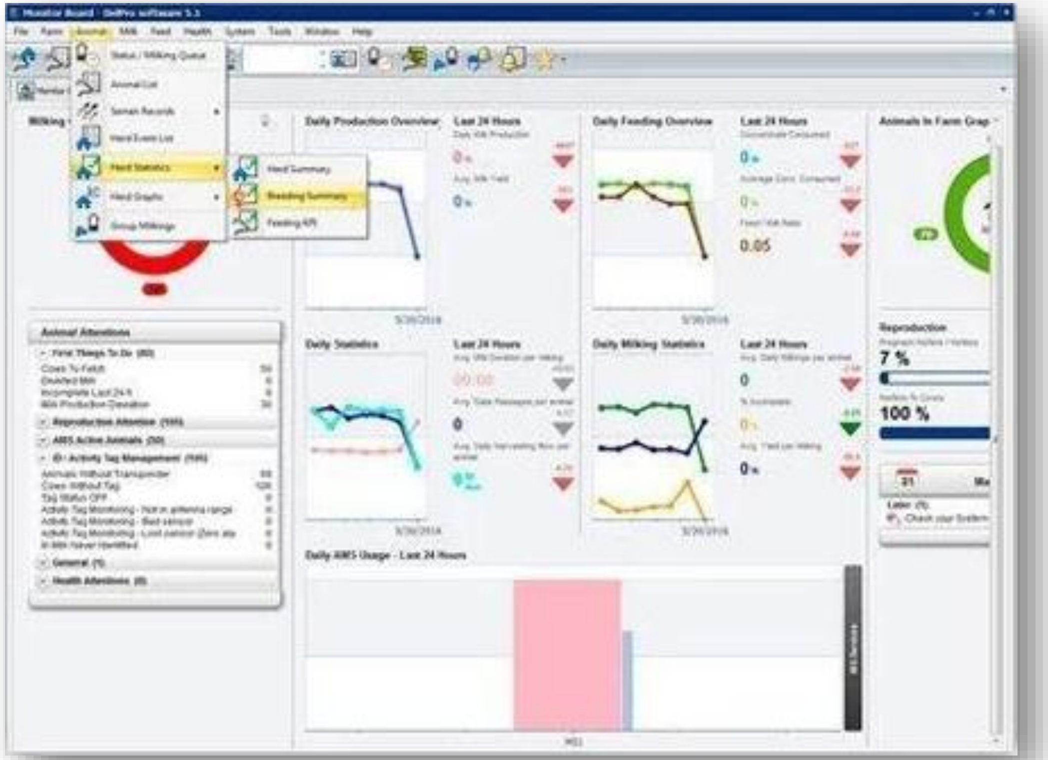
THE QUALITY OF THE MILK

- Milk yield (as daily yield and as effective yield (kg))
- Fat and protein content (expressed as daily percentage and as effective yield (kg))
- Energy corrected milk (ECM)
- Somatic cells count (SCC)
- Somatic cells score (SCS))

MATERIALS AND METHODS

The parameters set in the milking robot were:

- 42 kPa vacuum
- 60 cycles/min pulsator rate
- 60% pulsator ratio



MATERIALS AND METHODS

- To determine the somatic cell score was used the formula proposed by Ali and Shook

$$SCS = \log_2\left(\frac{\mathrm{SCC}}{100}\right) + 3$$

- Energy corrected milk (ECM = 740 kcal) was calculated according to the formula from Campanile et al. (1998):

$$ECM = milk\ yield\ \times \{[fat\ (g/kg) - 40 + protein\ (g/kg) - 31] \times 0.01155\}\ +\ 1$$

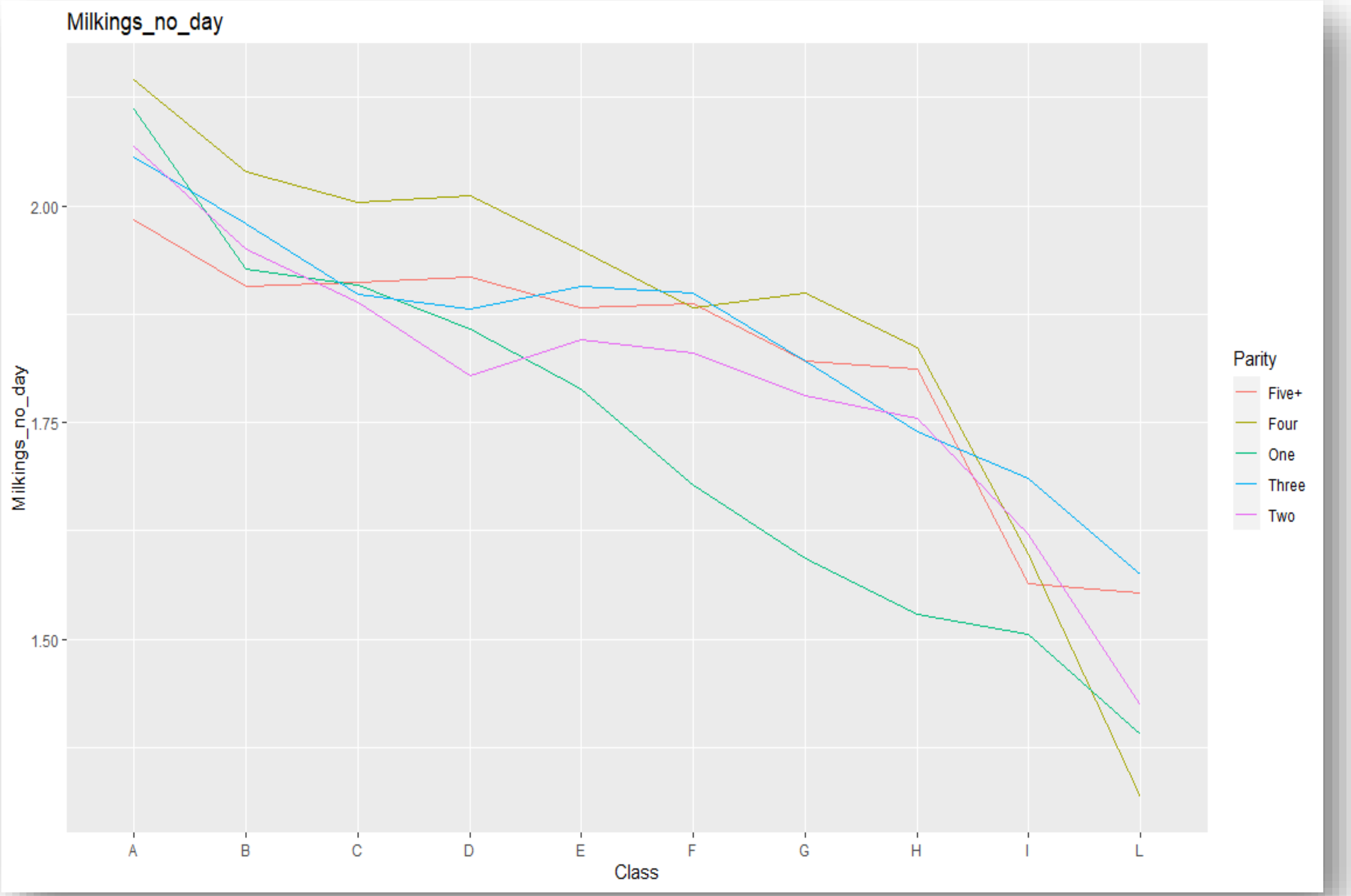
MATERIALS AND METHODS

A DESCRIPTIVE STATISTIC OF THE PARAMETERS RECORDED BY THE OFFICIAL MILK RECORDING

Variables (n = 4403)	Arithmetic mean	Standard deviation
Parity	2.72	1.76
Days in milk	154.65	97.26
Milk yield (kg/die)	9.15	4.33
Fat content (%, die)	7.97	2.01
Protein content (%, die)	4.81	0.53
SCS	1.92	0.43
SCC	105.59	292.91
Energy Corrected Milk	14.61	6.16
Effective milk yield (kg)	1648.78	1009.19
Effective fat content (%)	7.09	1.03
Effective fat content (kg)	120.92	78.25
Effective protein content (%)	4.61	0.36
Effective protein content (kg)	76.42	47.21

RESULTS

TREND FOR NUMBER OF MILKINGS ACROSS CLASSES OF DAYS IN MILK AND PARITY



The pluriparous buffaloes compared to primiparous buffaloes had a higher number of milking entries

The number of milking trend to riduce across lactation

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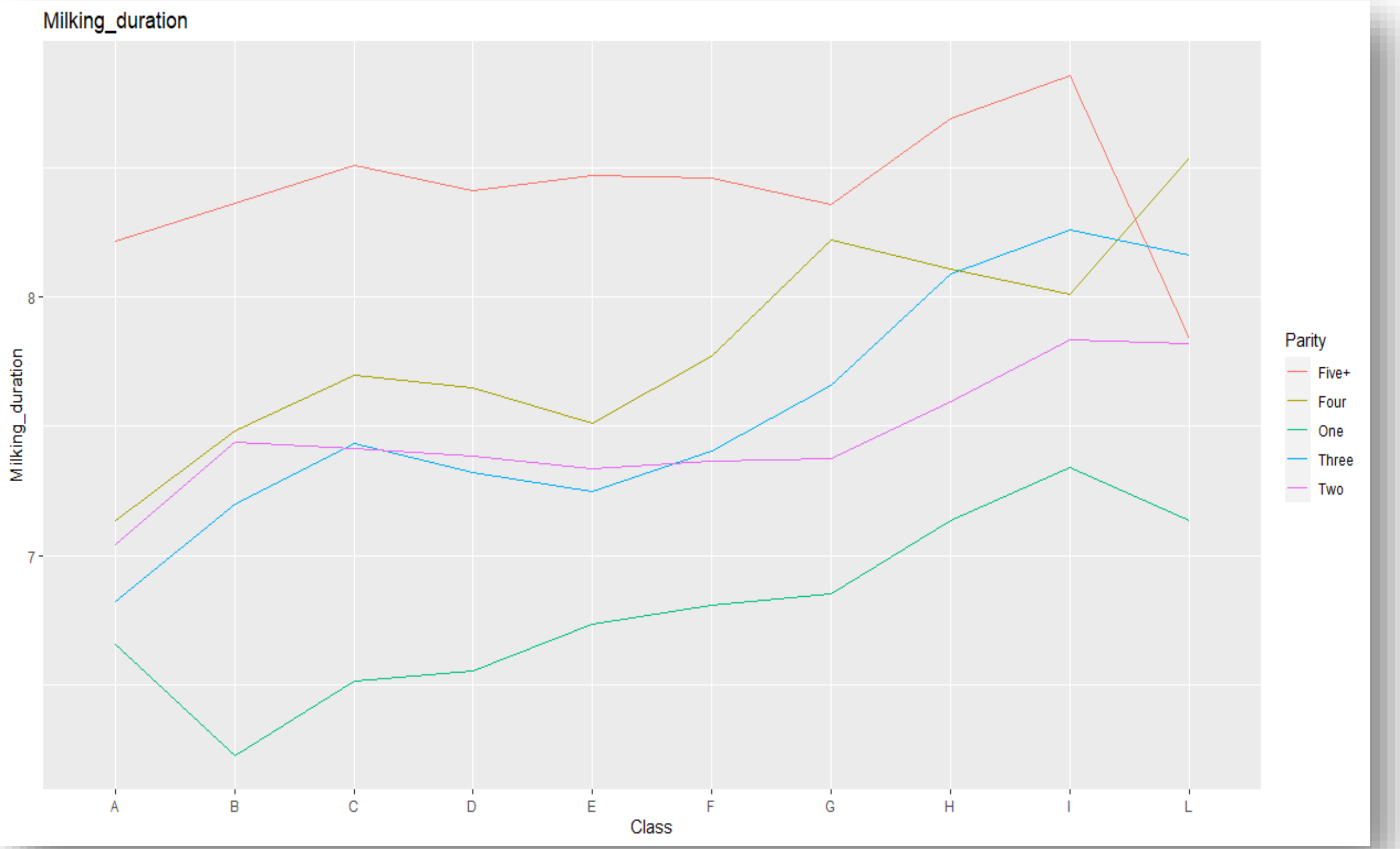
RESULTS

TREND FOR MILKING DURATION ACROSS CLASSES OF DAYS IN MILK AND PARITY



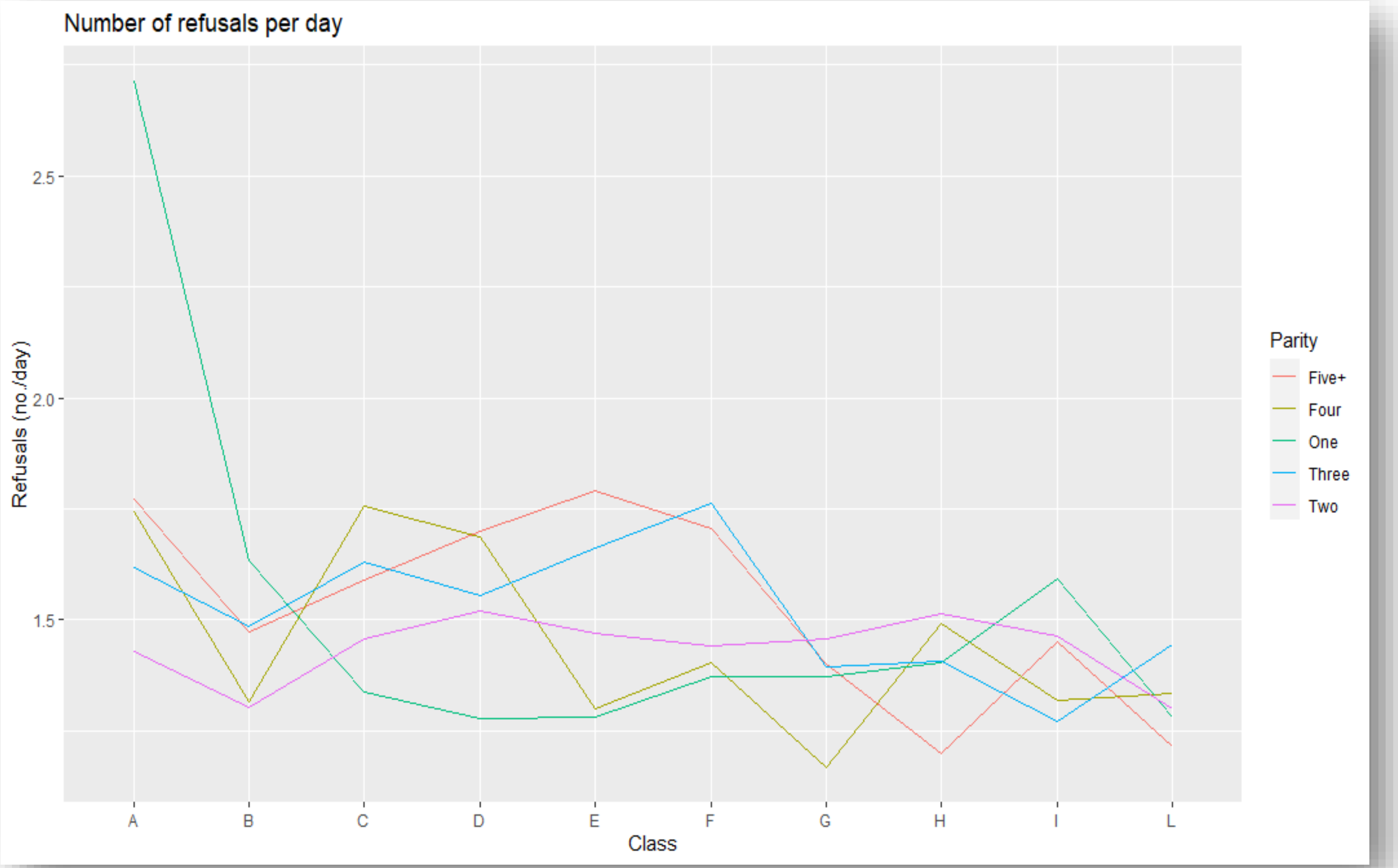
The averaged milking duration was on 7.36 min/milking for all the milking sessions considered in the trial

The milking duration in pluriparous buffaloes was longer than in primiparous buffaloes

The milking time was longer in the first classes of lactation and decreased throughout lactation

RESULTS

TREND FOR REFUSALS ACROSS CLASSES OF DAYS IN MILK AND PARITY



The refusals were higher in primiparous buffaloes only in the first 30 days of milk

This was probably due to the training period that is carried out in this parity -milking permits greater than pluriparous

Subsequently no differences in the number of refusals were recorded between pluriparous and primiparous buffaloes

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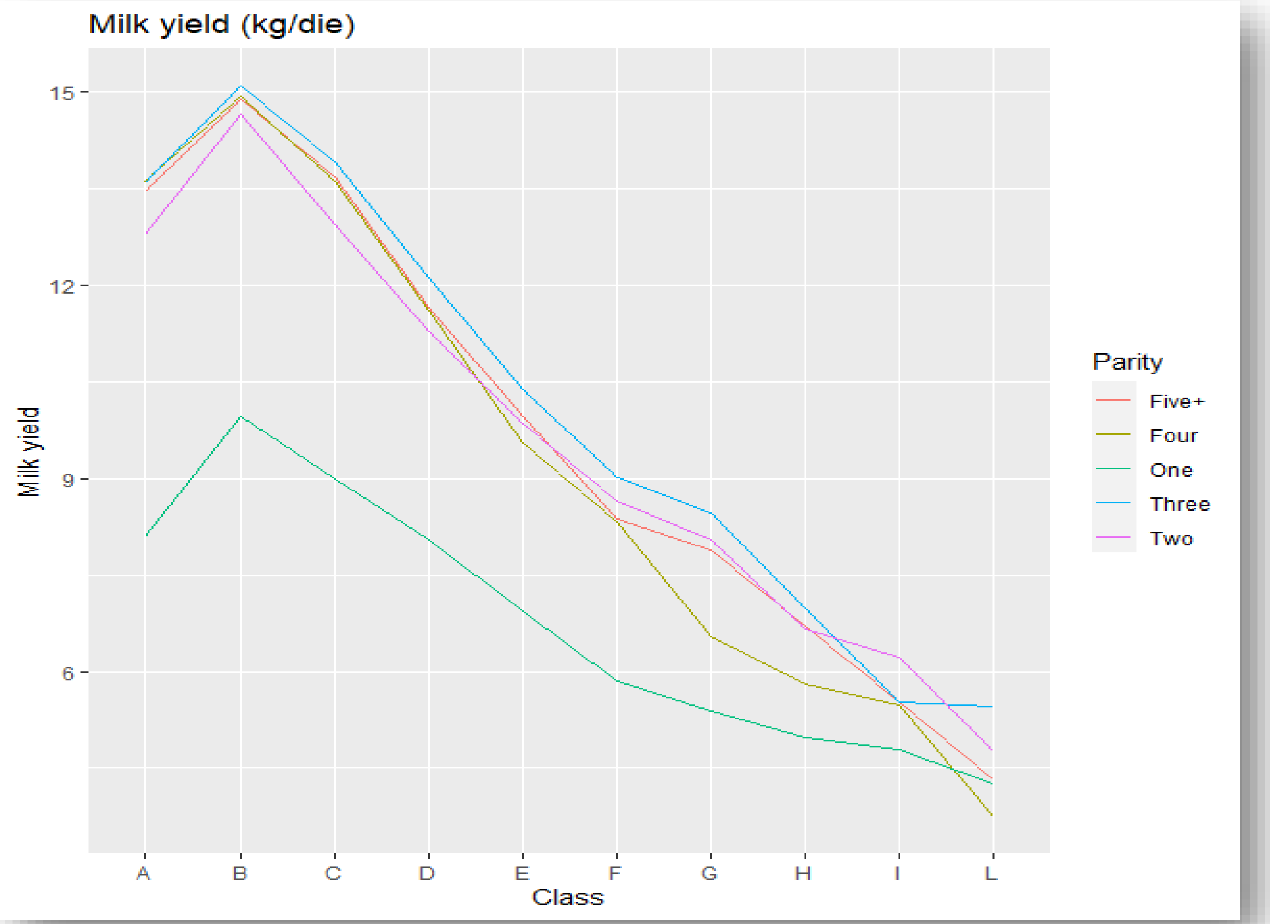
RESULTS

TREND FOR MILK YIELD ACROSS CLASSES OF DAYS IN MILK AND PARITY



Average milk yield 21.5 q/lactation

Pluriparous buffaloes : 23 q/lactation

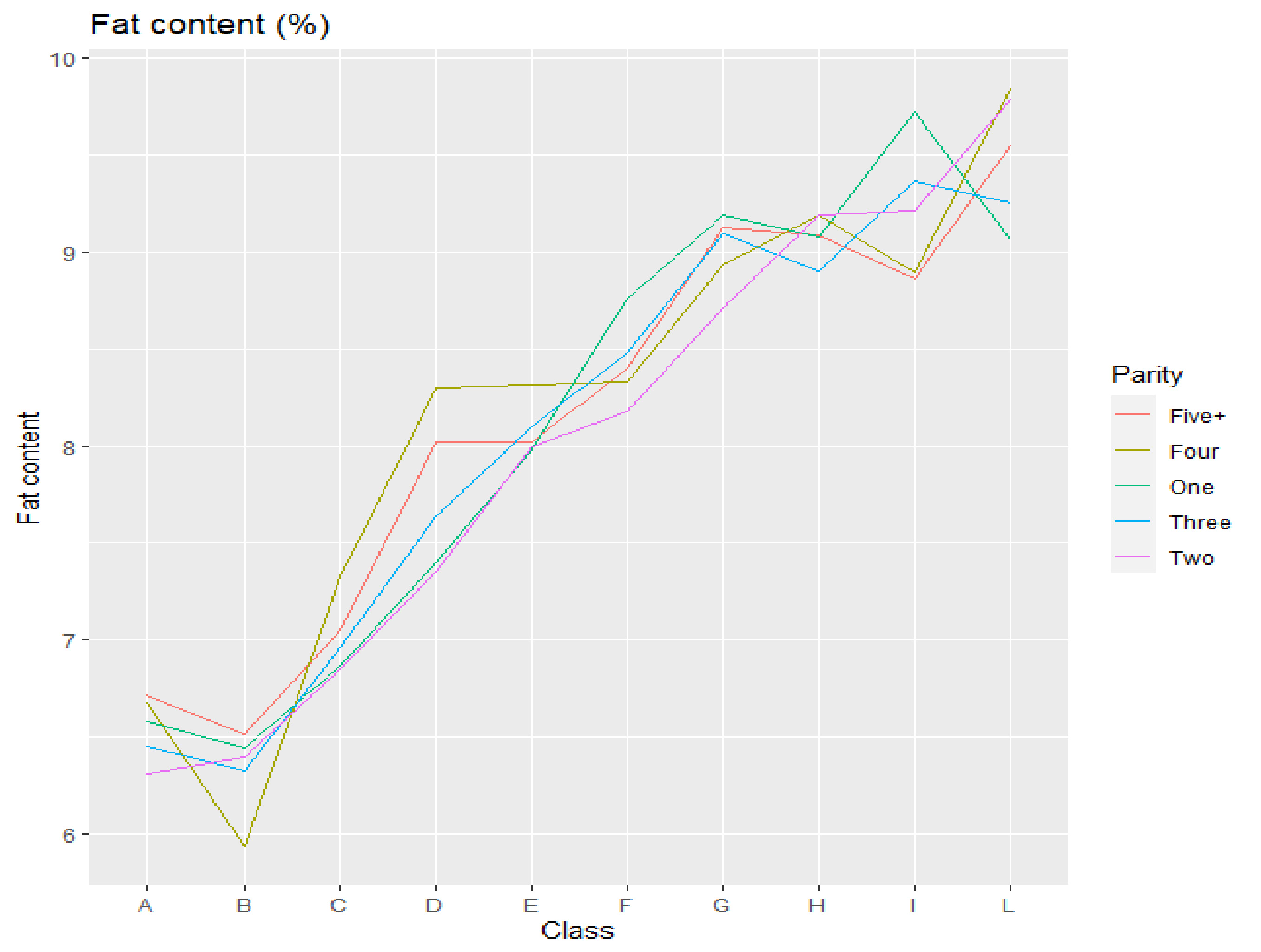
Primiparous buffaloes : 17 q/lactation

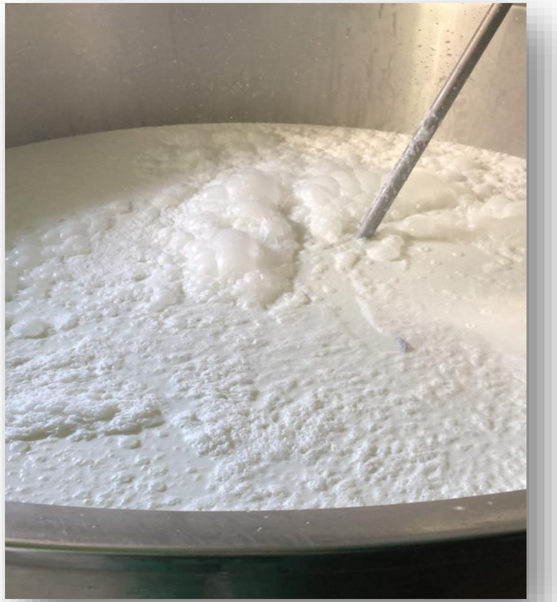
Pluriparous peak : 27 days in milk

Primiparous peak : 58 days in milk

RESULTS

TREND FOR FAT CONTENT OF DAYS IN MILK AND PARITY

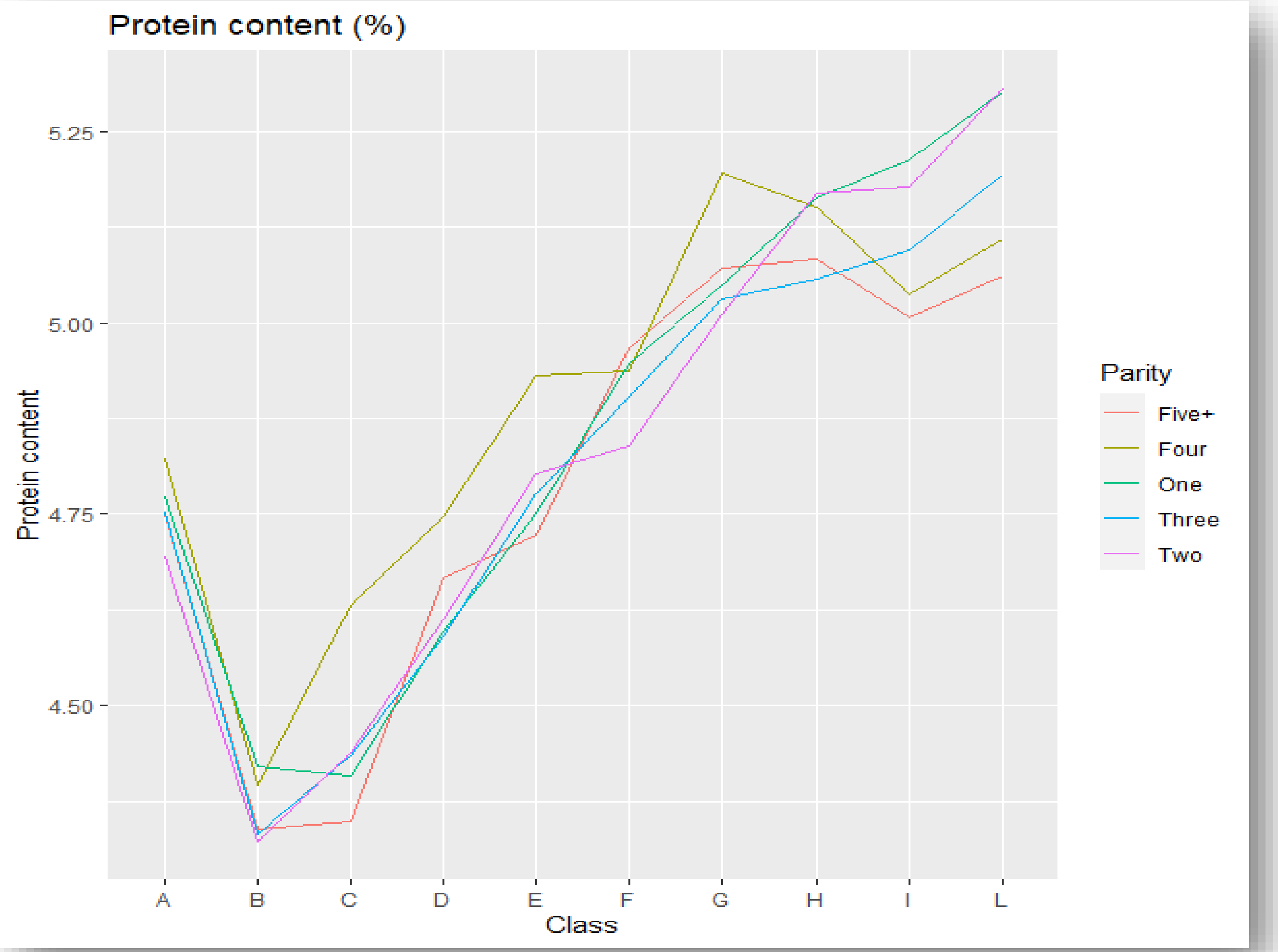




Fat content increased across lactation

RESULTS

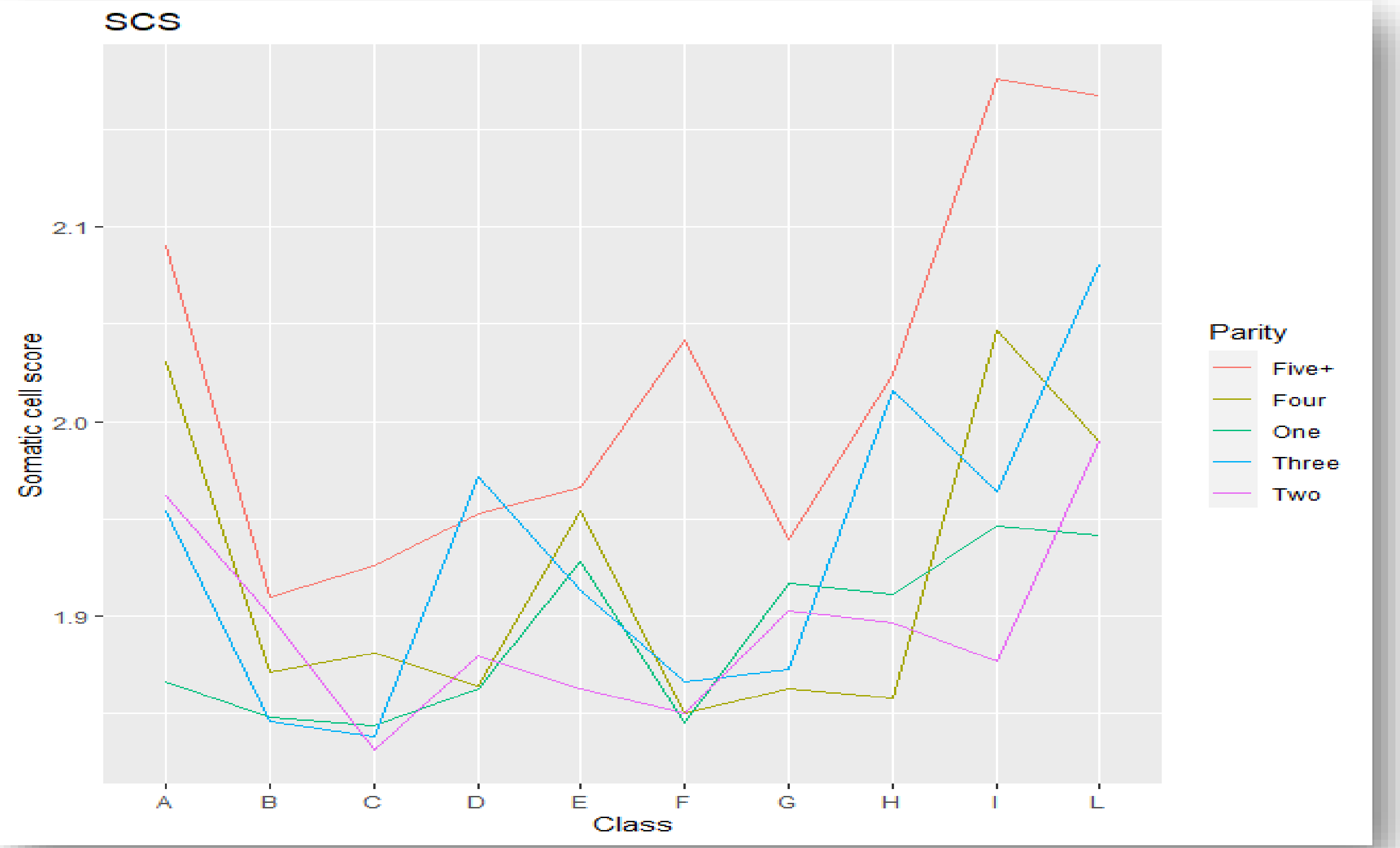
TREND FOR PROTEIN CONTENT OF DAYS IN MILK AND PARITY



The trend for protein content was specular to milk yield with a nadir around 60 DIM and highest values from class H on

RESULTS

TREND FOR SOMATIC CELL SCORE ACROSS CLASSES OF DAYS IN MILK AND PARITY



The somatic cells score in milk increases across lactations for all classes

SCS Primiparous 1,88

SCS Pluriparous 1,93

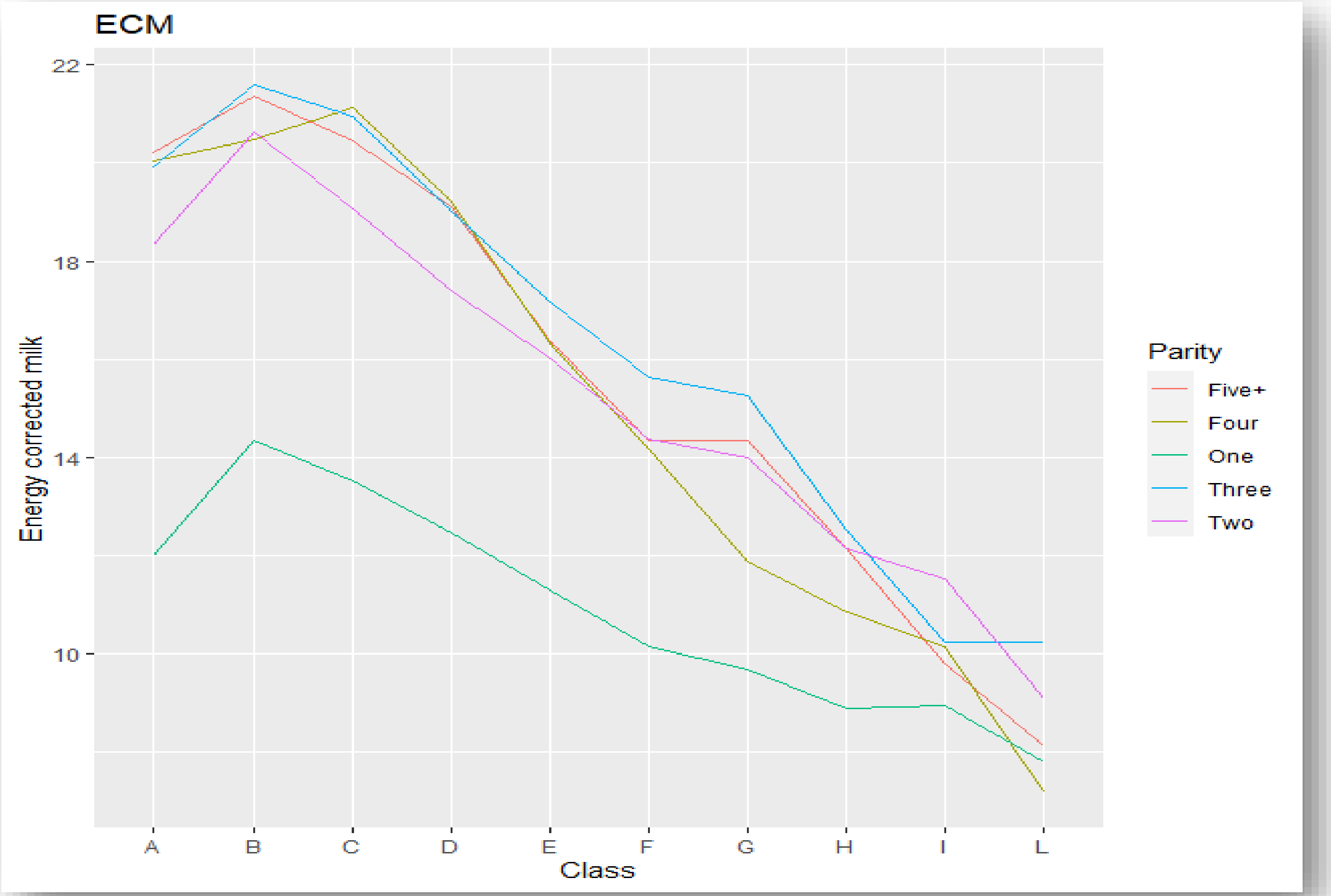
BARN AVERAGE 105.000 SCC

Pluriparous : 111.550

Primiparous : 91.370

RESULTS

TREND FOR ENERGY-CORRECT MILK



The energy corrected milk showed a similar trend to the milk yield, describing a zenith between 60 and 90 DIM and a decreasing pattern afterwards

Pluriparous peak : 33 days in milk
Primiparous peak : 53 days in milk

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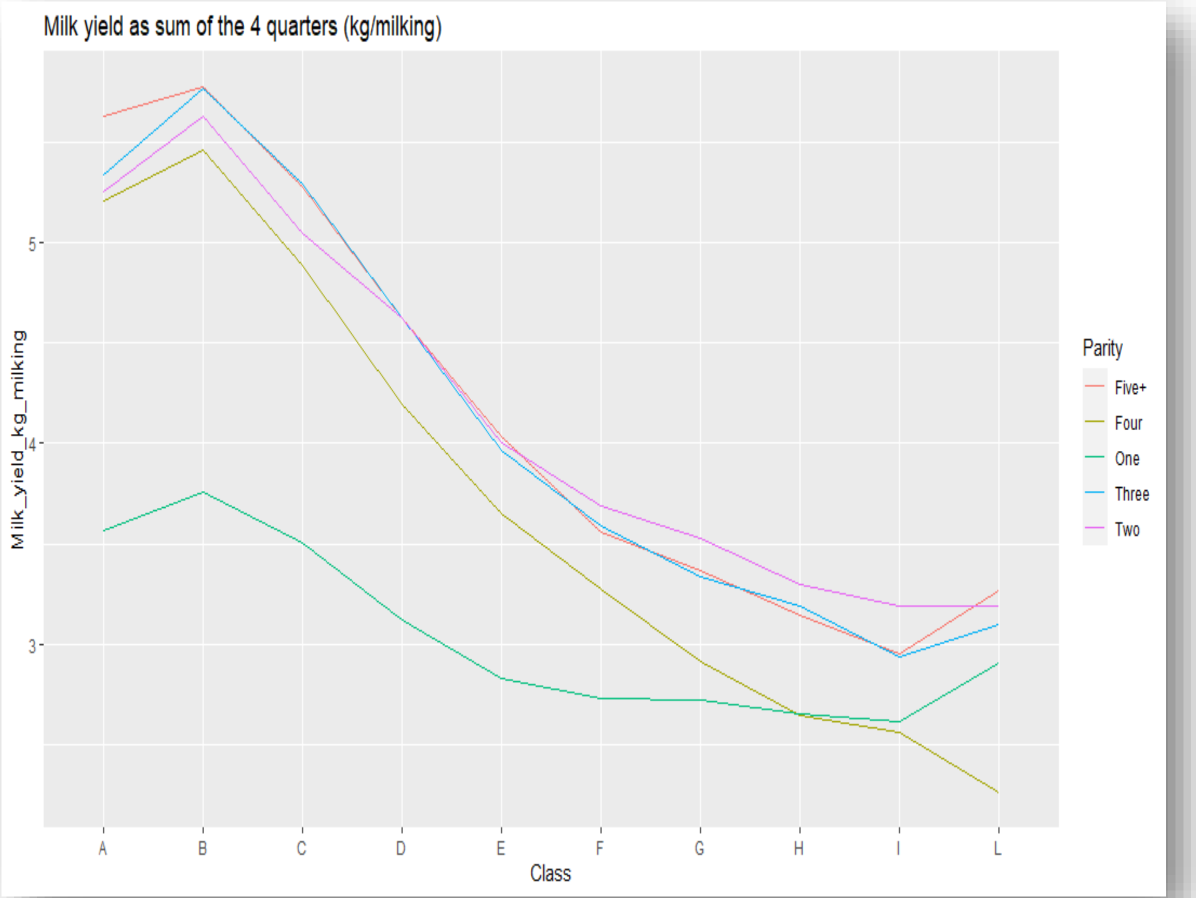
RESULTS

TREND FOR MILK YIELD ACROSS CLASSES OF DAYS IN MILK AND PARITY



Pluriparous buffaloes had higher daily milk yields than primiparous in each class of days in milk

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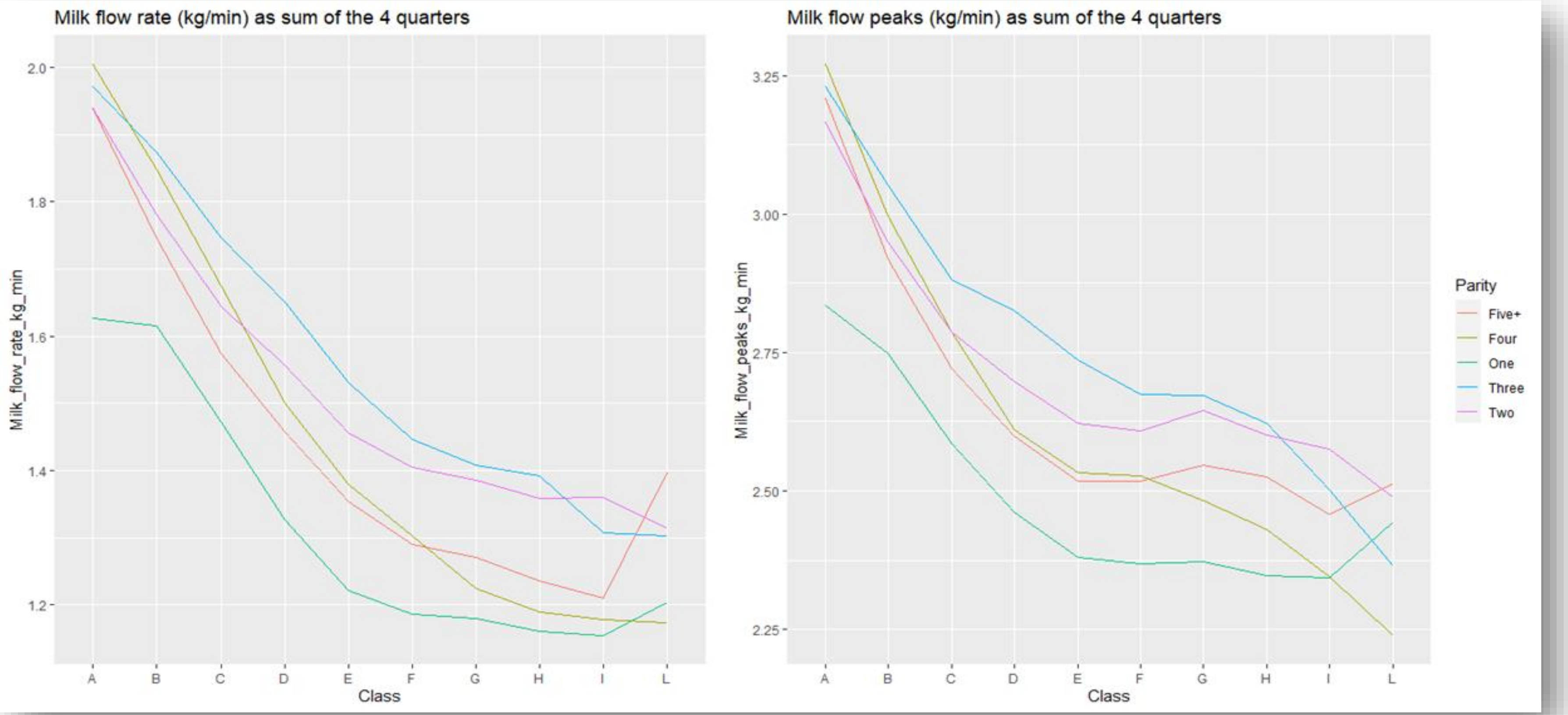
RESULTS

TREND FOR MILK FLOW PEAKS AND MILK FLOW RATE ACROSS CLASSES OF DAYS IN MILK AND PARITY



This is the average trend for milk flow rate (A) and milk flow peaks (B) across DIM and parity

CONCLUSIONS

THE AMS MAY BE A PROMISING ALTERNATIVE TO CONVENTIONAL MILKING FOR BUFFALOES, OPENING NEW OPTIONS FOR THE MANAGEMENT OF DAIRY BUFFALO FARMS

CONCLUSIONS

EXCELLENT QUALITY OF MILK

< MILKING TIMES

> NUMBER OF MILKING VISITS

< SCC

> ANIMAL WELFARE

CONCLUSIONS

THE AUTOMATION OF PROCEDURES RESULTS IN :

Reduction of the burden of work

Reduction of management times and costs

Greater efficiency

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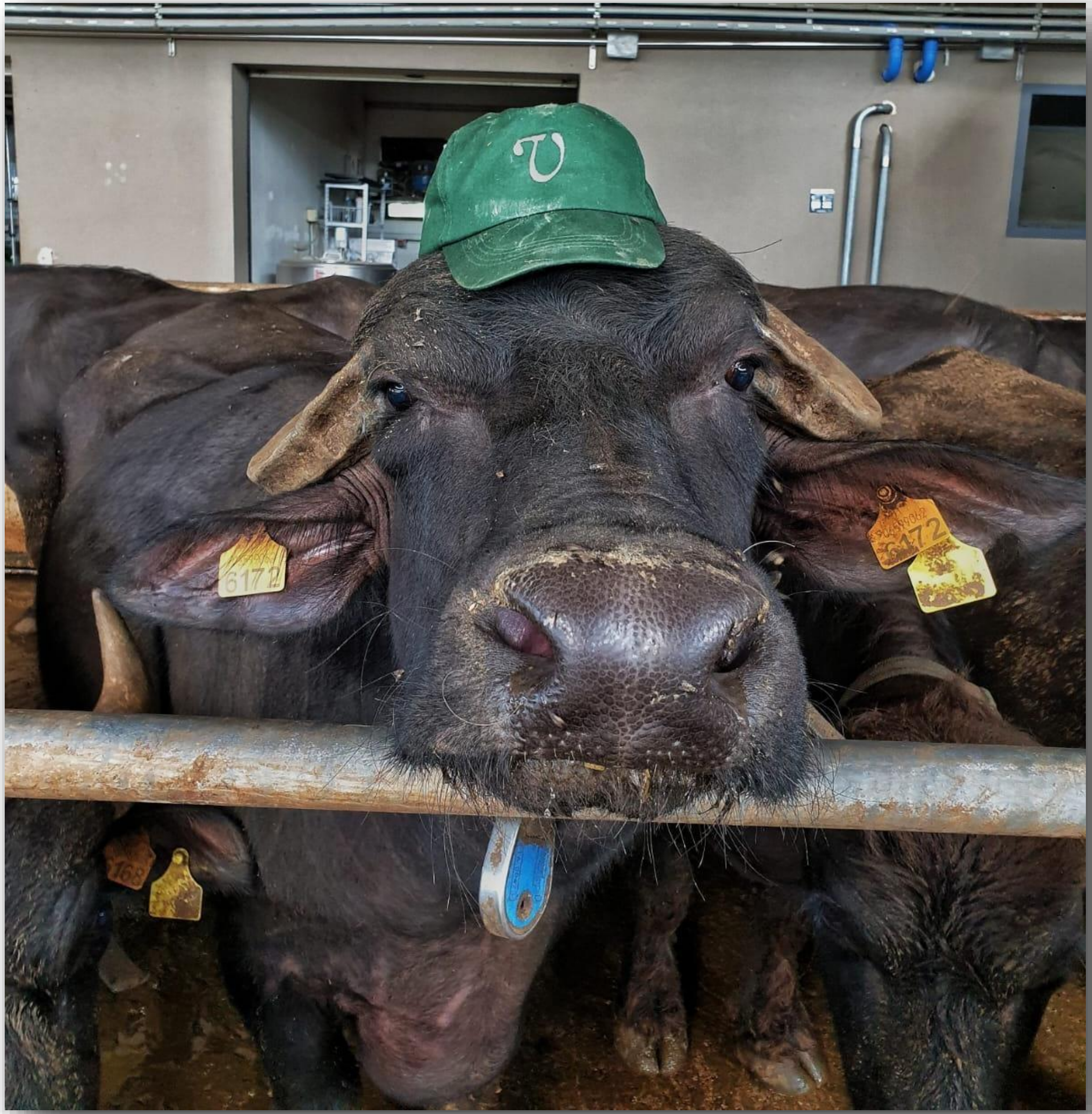
CONCLUSIONS

THE USE OF AMS PRODUCES A GREATER ENVIRONMENTAL, SOCIAL AND ECONOMIC SUSTAINABILITY



THANK YOU FOR YOUR ATTENTION

PLF

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