



**CHROMOSOME
REGIONS AFFECTING MIR
SPECTRA INDIRECT PREDICTORS
OF CHEESE-MAKING PROPERTIES IN CATTLE**

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BELGIAN LOCAL PRODUCTS



Cheese



Ham



Beer



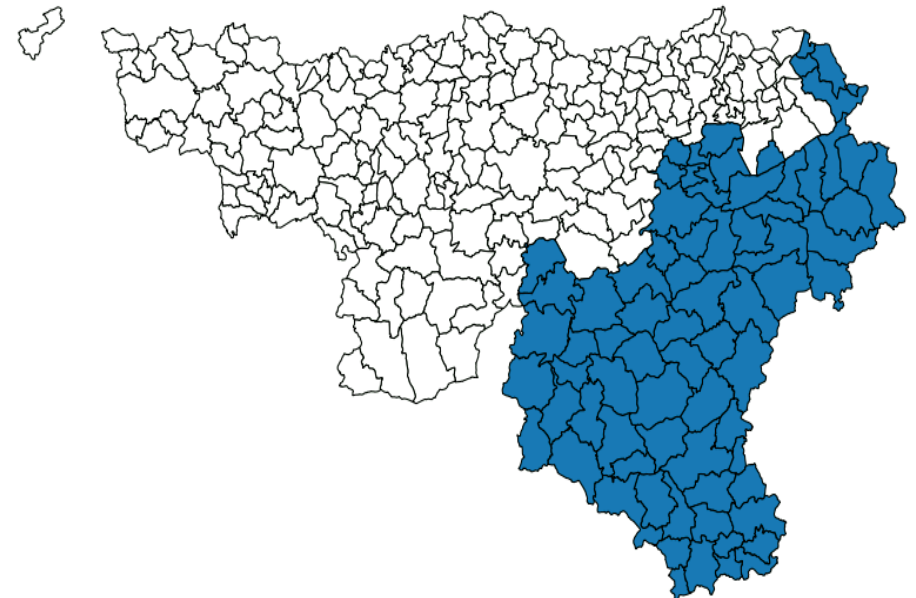
- European protected products:
 - Protected Designation of Origin (PDO)
 - Protected Geographical Indication (PGI)
 - Traditional Specialities Guaranteed (TSG)



CHEESE-MAKING IN WALLONIA



- Long and distinguished tradition of cheese-making
- Cheeses are numerous, diversity (~700) and appetizing
- Milk price usually drops below production cost



MIR SPECTRA AVAILABILITY

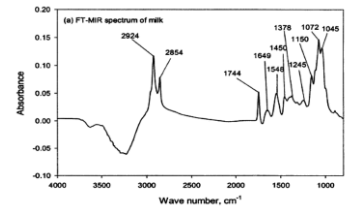


Genotype plus Environment
Integration for a more sustainable dairy production system



Calibration equations

Quantification:
major, minor and biomarker traits



Raw data = MIR spectra



Wallonie



MIR BIOMARKERS AS INDIRECT PREDICTORS

"Genetic analysis of milk MIR predicted blood and milk biomarkers linked to the physiological status"

"Potential use of MIR spectrometry to assess the origin of milk produced in a PDO area"

"Multi-omics data integration approach for resilience of dairy cattle to heat stress"

"Early-programming of dairy cattle, a potential explanation to the adaptation to climate change"

"Defining and using novel milk composition based heat stress resilience traits in the context of genomic selection for more robust dairy cows in Wallonia"



Wallonie



GENOME WIDE ASSOCIATION STUDIES (GWAS)



Large population
Wide range of environments



Phenotypes

Phenotypes based MIR
spectra, milk biomarkers



Genotypes



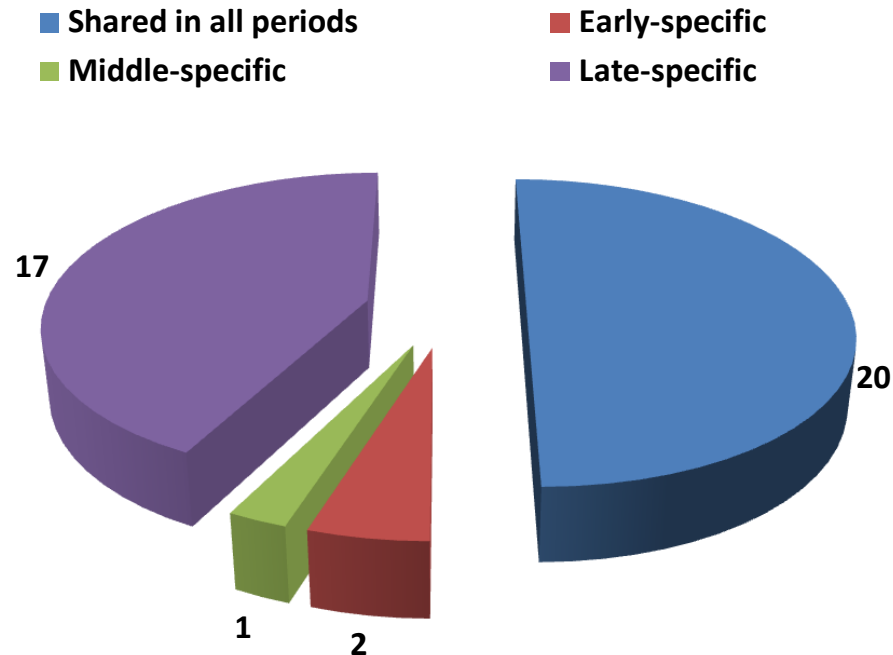
Pedigree

Finding specific major genes

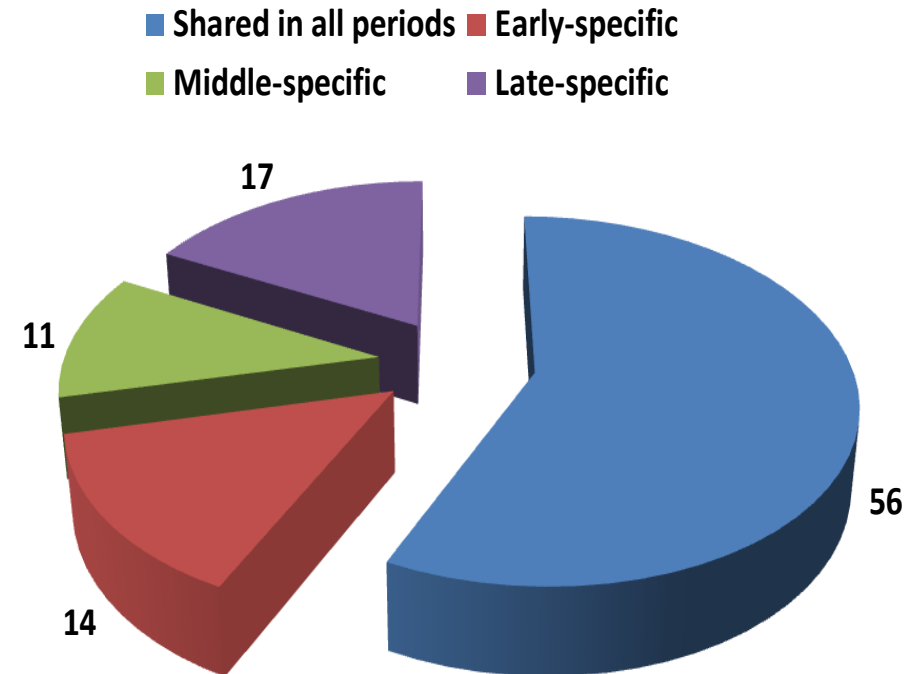


LACTATION STAGE SPECIFIC GENES

Milk yield

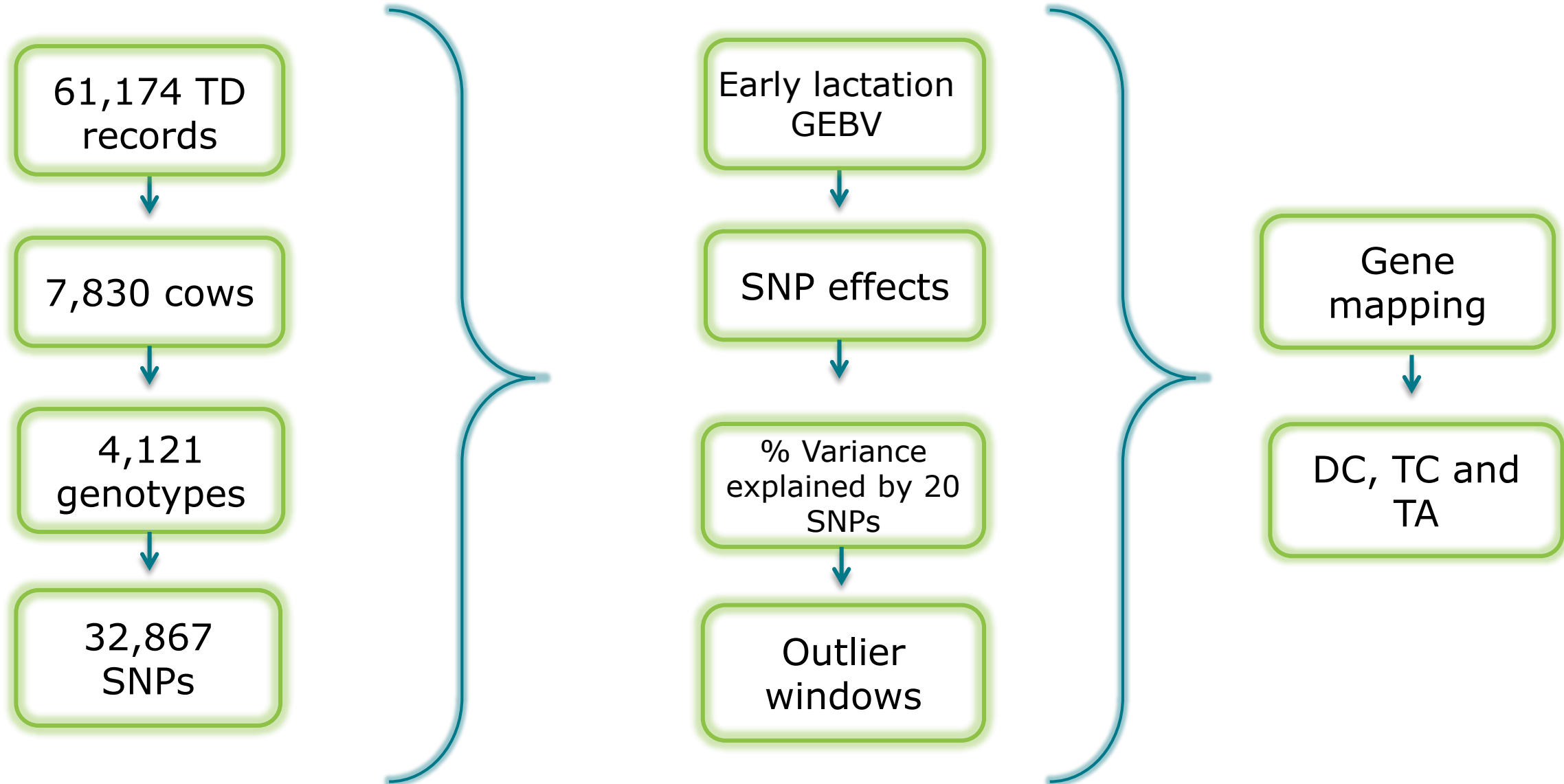


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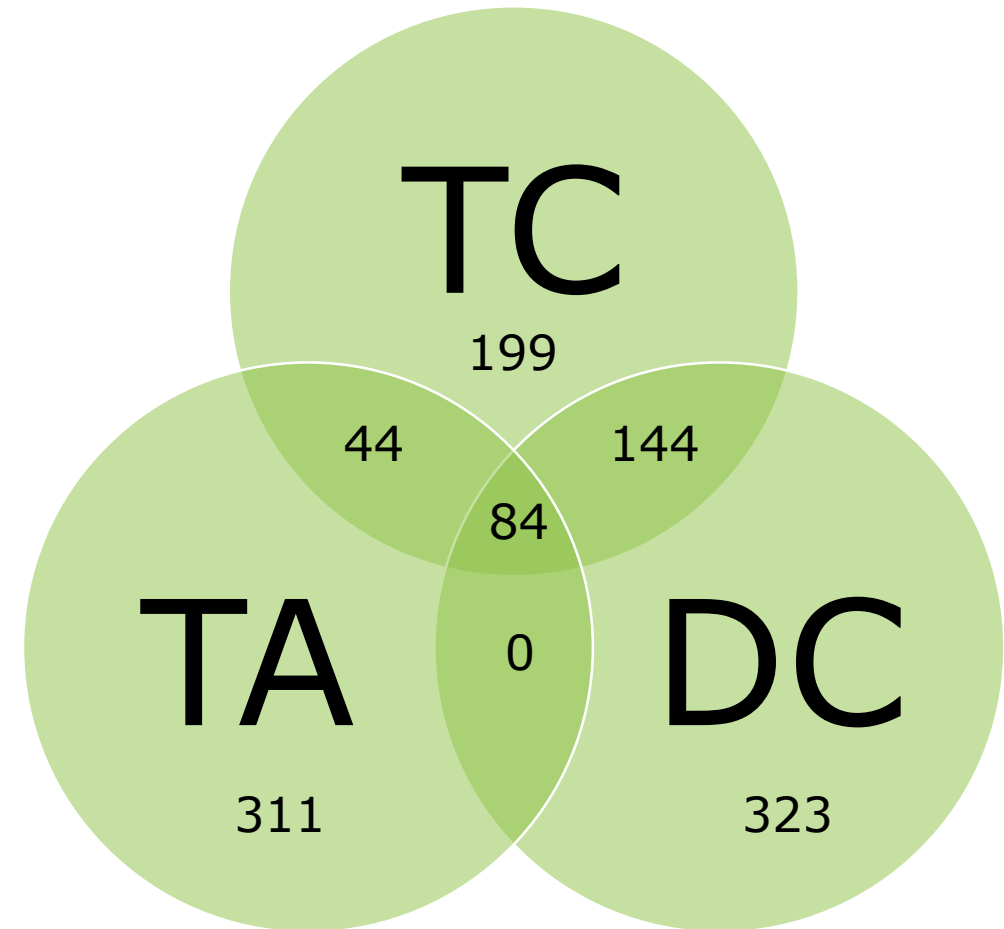
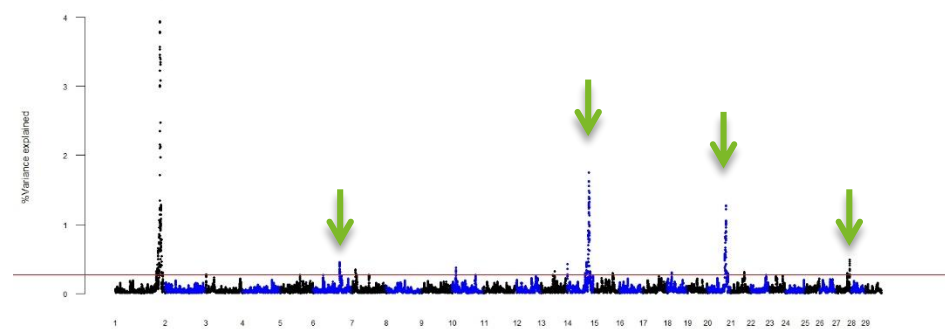
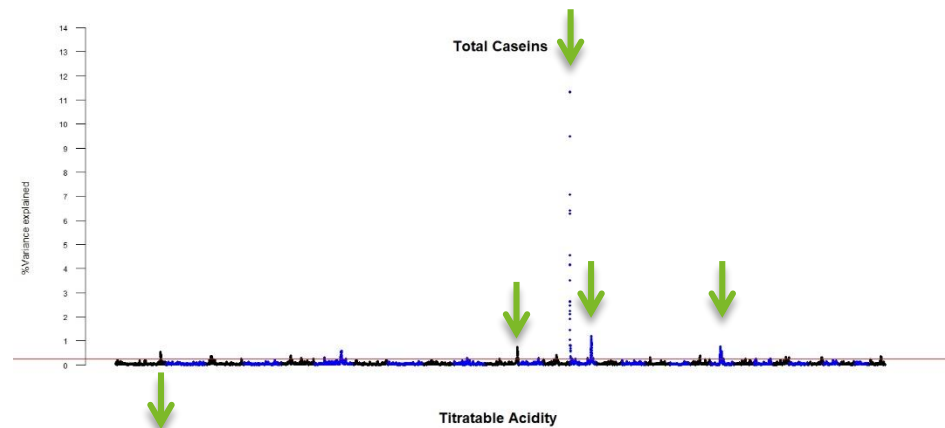
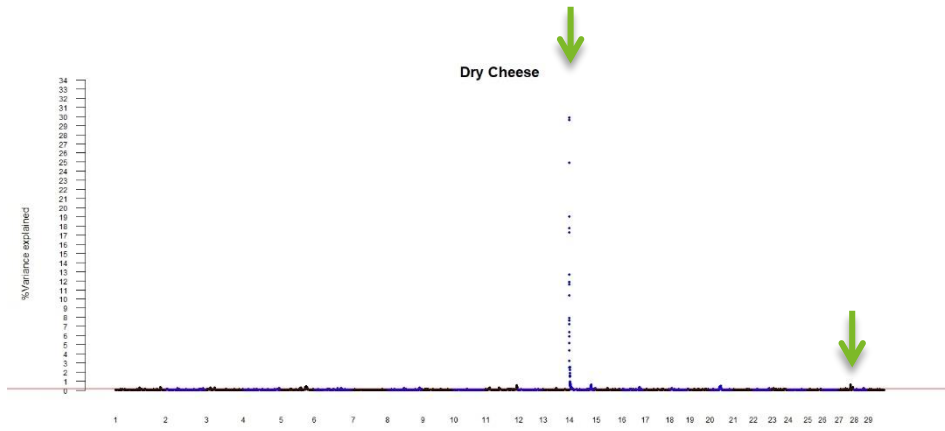


Milk biomarkers → Early lactation (DIM < 130)

MATERIAL & METHODS



GWAS ANALYSES – SNP WINDOWS



GENE MAPPING – TOP 5%



TRAITS	NUMBER	GENES
TC	11	FAM3B; MX1; HSF2BP; RRP1B; CSTB; C21orf2; LRRC3; DSCAM; ADARB1; ITGB2; MX2
TA	20	RPL8; FOXH1; CYHR1 ; OPLAH ; HSF1; CPSF1 ; DGAT1 ; CYC1; GRINA; PARP10; NRBP2; PUF60; RNF19A; RRM2B; C8orf33; FBXO43; LY6H; ANKRD46; NAPRT; LY6E
DC	3	ANKH ; TRIO; OTULIN

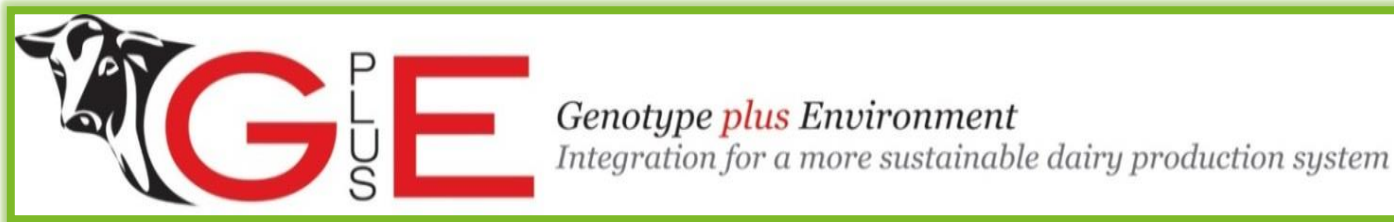
Jiang et al. (2014); Nayeri et al. (2016); Sanchez et al. (2017);
Chen et al. (2018); Dan Wang et al. (2019)

TAKE HOME MESSAGES



- Potential candidate genes affecting cheese-making properties in early lactation were reported
- Further investigation by using high density SNP and foreign data is required
- Cheese-making traits as indirect predictors of traditional traits in breeding programs

ACKNOWLEDGEMENTS



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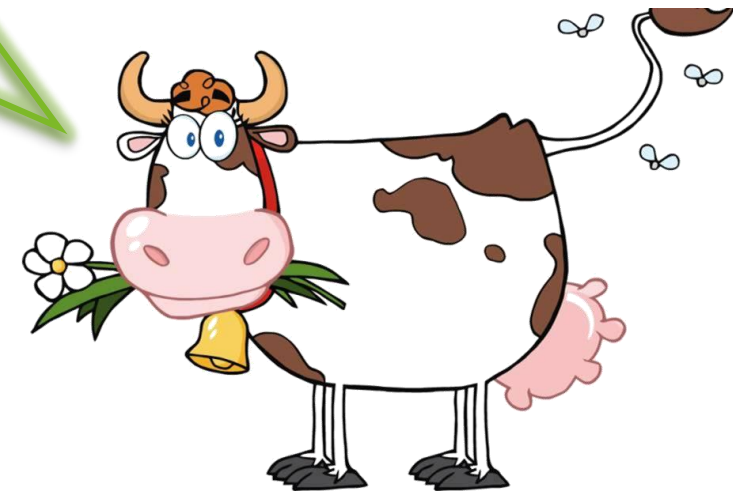


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THANK YOU!



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