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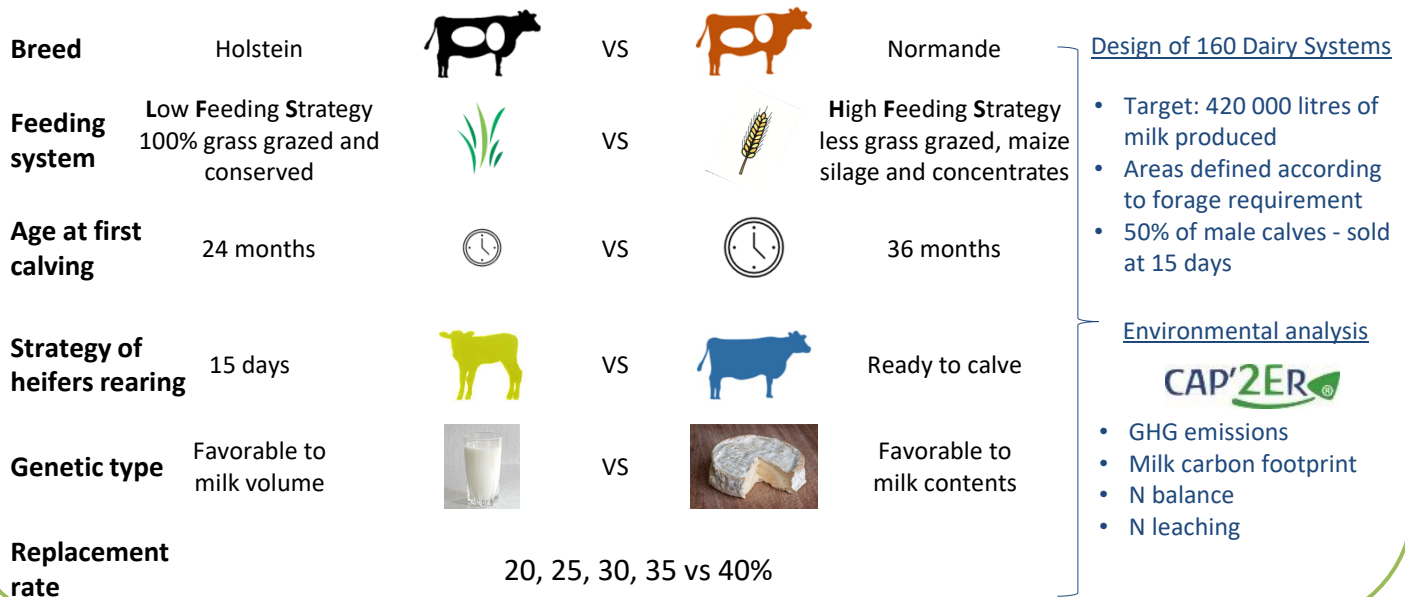
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Which pasture-based dairy system is the most beneficial from an environmental impacts perspective?

Pasture-based dairy systems are often highlighted from an environmental point of view. In grassland, nitrogen losses are limited and less dependent on imported protein or nitrogen resources. These systems also compensate a part of their GHG emissions by helping to maintain the carbon stock in soils. However, the intensification of production in these pasture-based systems can lead to significant environmental impacts...

Materials and methods

Data and performance of « The cow for the system ? » experiment - INRAE Domaine du Pin - 2006-2015



Results and discussion

Indicators	Mean	SD
Agricultural area (ha) (AA)	68.9	19.4
Permanent grassland (ha)	67.2	20.8
No. of milking cows	69	15
Milk production (l ha ⁻¹ year ⁻¹)	6,901	2,170
Nitrogen balance (kg N ha ⁻¹)	146	10
GHG gross emission (kg eqCO ₂ l ⁻¹ milk)	1.18	0.08
Milk carbon footprint (kg eqCO ₂ l ⁻¹ milk)	0.91	0.12

Factors	Gross GHG emission (kg eqCO ₂ l ⁻¹ milk)		Milk carbon footprint (kg eqCO ₂ l ⁻¹ milk)		Nitrogen balance (kg N ha ⁻¹ AA)	
	Holstein	Normande	Holstein	Normande	Holstein	Normande
Breed	1.12	1.25	0.86	0.96	143	149
	p-value < 0.001		p-value < 0.001		p-value = 0.002	
Feeding system	LFS	HFS	LFS	HFS	LFS	HFS
	1.21	1.15	0.81	1.01	149	143
	p-value < 0.001		p-value < 0.001		p-value < 0.001	
Age at 1st calving	24 months	36 months	24 months	36 months	24 months	36 months
	1.16	1.20	0.92	0.90	154	138
	p-value = 0.001		NS		p-value < 0.001	



Gross GHG emissions



Carbone storage and reduction of nitrate leaching



It remains difficult to define the most relevant system from an environmental point of view by integrating all the indicators used. This study confirms the interest in a global and integrated approach to the different factors involved in the functioning of dairy systems in the evaluation of their environmental performance.