



Partenaire de vos innovations

Do pig farms reconcile sow prolificacy, pre-weaning survival and weaned litter size ?

Typology and results of french herds

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Context

- Pre-weaning mortality > 20% Total Born in pig farms on average (*Aubry et al, 2021*)
- Piglet survival remains a key issue for economic, technical, societal and ethical reasons (*Baxter et al, 2020*)
- Negative impact of large litters and poor adjustment to teat numbers are regularly blamed (*Badouard et Boulot, 2023*)
- - Mortality = Multifactorial causes, many other factors
- - Variations according to farms, management, housing



Objectives of the study

- ✓ Analysis of large **variability of pre-weaning mortality** between french farms
- ✓ Identification of **herd profiles with optimum combinations of weaning performances and piglet survival according to litter sizes**
- ✓ Take into account **diversity of housing and management**



Data

Data base : French Management of Sow Herds (GT-PORC)

1013 farms with their average results in 2022

Criteria:

- Litter sizes : weaned, total born, born alive
- Mortality rates : %Total born, % Live born, % Stillborn, % Mummies
- Litter management: % nurse sows, % artificial milk support
- Others: gestation length, age at weaning, % fertility...

Main herd characteristics:

- Region, Size, Conventional vs Organic
- Housing Indoor, vs Outdoor...
- Specific management : free farrowing, farrowing lift cages

Statistical analysis



R Core Team, 2020

Correlations + Principal Component Analysis (PCA)

Factor Analysis of Mixed Data (FAMD) :

- 15 Quantitatives variables + 5 Qualitatives
- 2 additional variables (lifts, free farrowing) without contributions

Hierarchical ascendent classification (k- means consolidation)

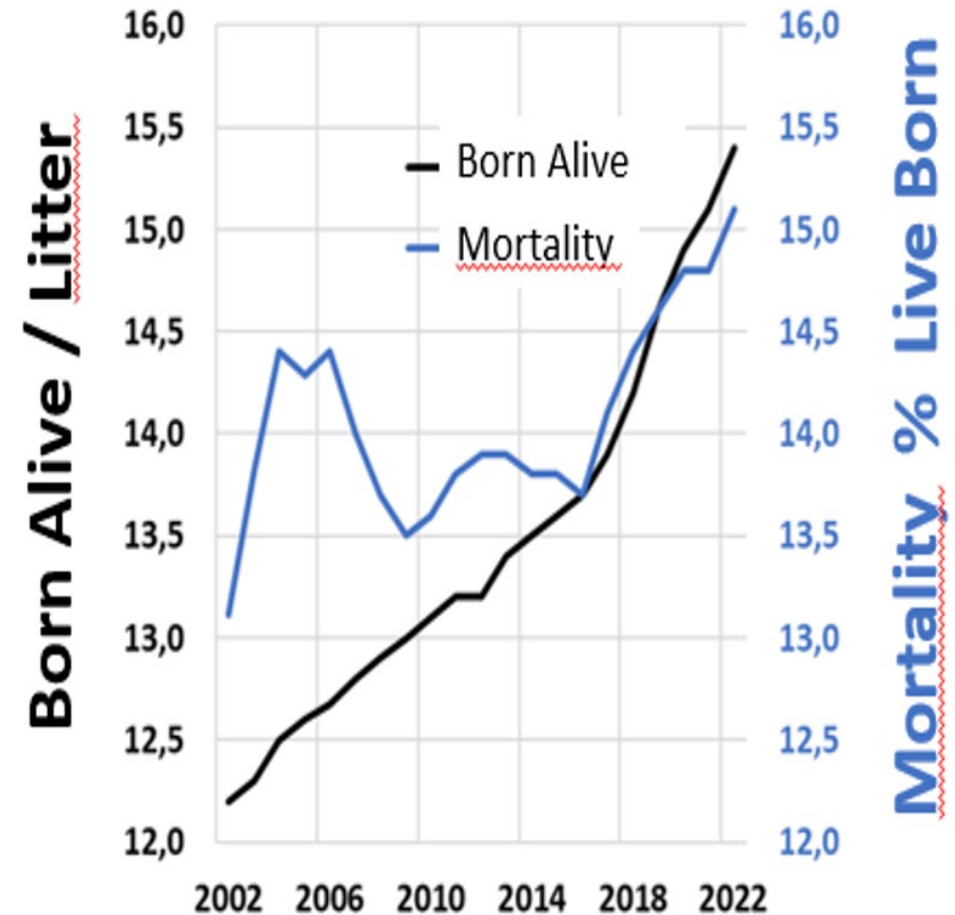
- **Number of groups** (analysis of variances, contributions of main criterias)
- **Group characteristics & comparisons** (Welch, Student/Wilcoxon, Khi2/Fisher)

Farm Results 2022 (Ifip-GTTT GT-PORC)

- 16.7 Total Born / litter
- 15.4 Born Alive / litter
- 13.0 Weaned / litter
- % Mortality Total Born : 21.6 %
- % Mortality Born Alive : 15.1 %
- % Stillborn Total Born : 7.6 %

➤ Litter sizes in 20 years :

- 😊 + 3.5 TB, + 3.2 BA
- 😊 + 2.4 Weaned
- 😞 + 2% Mortality Born Alive

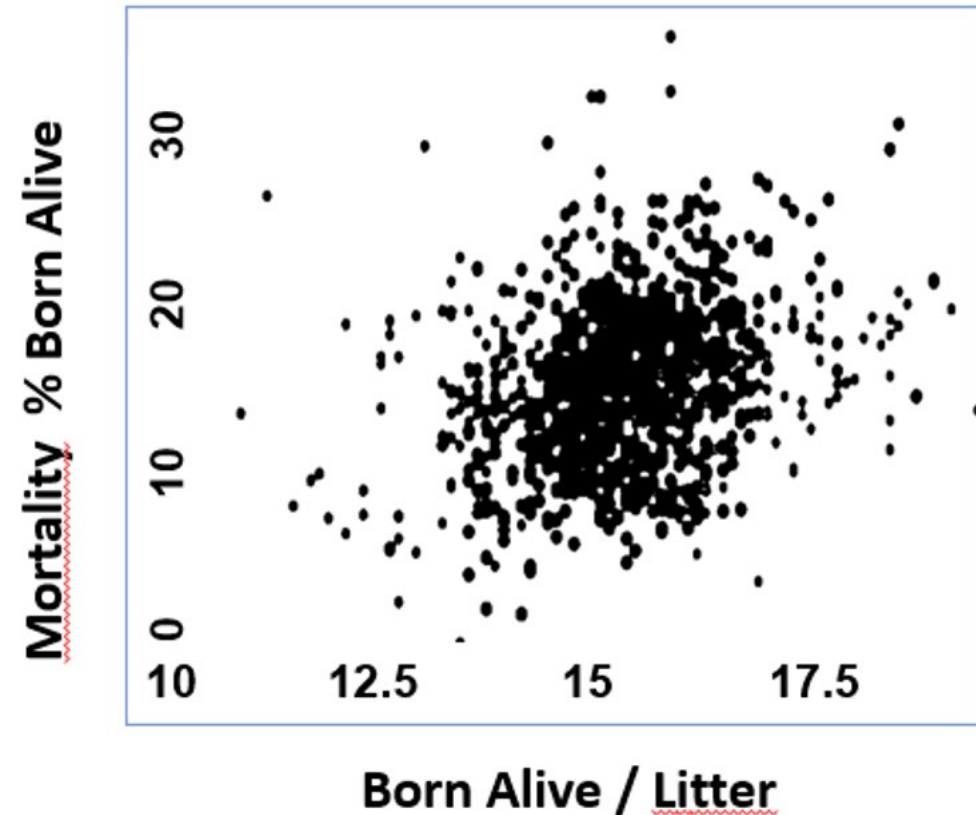


Large differences according to farms

Litter size CV % = 7 to 8 %

Mortality rates CV% = 24 to 30%

Litter size alone will not explain variability



Correlations Piglets Born , Weaned, Mortality

N= 1013	Weaned	TB	BA	Mortality TB %	Mortality BA %	SB %
TB: Total Born	0.63					
BA : Born Alive	0.72					
Mortality TB%	-0.42	0.44	0.37			
Mortality BA%	-0.45	0.38	0.29	0.94		
SB: Stillborn %	-0.14	0.38	0.10	0.61	0.32	
Nurse Sows+Artif %	0.45	0.37	0.38	-0.09	-0.12	NS

Large Litters = ambivalent rôles

R Pearson p <0.05

- **Positive favorable impact on weaned numbers**
- **Unfavorable contribution to mortality**

Typology 1013 farms

Classification → 5 Different Groups

Contrasting numbers of weaned piglets

Different characteristics & combinaisons of results

Weaned x Litter Size x Mortality

G1 1% Farms: Organic production and/or Outdoor

	Groupe 1	Groupe 2	Groupe 3	Groupe 4	Groupe 5
Farm number	14 (1%)				
Weaned / litter	11.4				
Total born / litter	16.6				
Born alive / litter	14.8				
Mortality Total Born %	30.9				
Mortality Born Alive %	2.6				
Stillborn rate %	10.6				
Fertility 1st AI%	86.2				
Nurse sows + Artif milk %	0.1				
Size	Small				
Region	Not Brittany				
Outdoor	8 (57%)				
Organic production	13 (93%)				
Collective breeding	0 (0%)				
Free Farrowing	14 (100%)				
Lift farrowing cages	0 (0%)				



- Lowest Weaned piglets
- Highest Mortality rates
- Average Total Born

G2 12% Farms : Ultramarine and /or Smallest litters

	Groupe 1	Groupe 2	Groupe 3	Groupe 4	Groupe 5
Farm number	14 (1%)	121 (12%)			
Weaned / litter	11.4	11.7			
Total born / litter	16.6	14.8			
Born alive / litter	14.8	13.8			
Mortality Total Born %	30.9	21.2			
Mortality Born Alive %	2.6	15.4			
Stillborn rate %	10.6	6.9			
Fertility 1st AI%	86.2	86.8			
Nurse sows + Artif milk %	0.1	0.0			
Size	Small	Small			
Region	Not Brittany	DOM / not Brittany			
Outdoor	8 (57%)	0 (0%)			
Organic production	13 (93%)	0 (0%)			
Collective breeding	0 (0%)	0 (0%)			
Free Farrowing	14 (100%)	2 (2%)			
Lift farrowing cages	0 (0%)	18 (16%)			



- Low Weaned piglets
- Average Mortality rates
- Low Total Born

Despite Lift cages ...

G3 42% Farms : Average Weaned & TB, High mortality

	Groupe 1	Groupe 2	Groupe 3	Groupe 4	Groupe 5
Farm number	14 (1%)	121 (12%)	427 (42%)		
Weaned / litter	11.4	11.7	12.4		
Total born / litter	16.6	14.8	16.7		
Born alive / litter	14.8	13.8	15.3		
Mortality Total Born %	30.9	21.2	25.6		
Mortality Born Alive %	2.6	15.4	18.7		
Stillborn rate %	10.6	6.9	8.5		
Fertility 1st AI%	86.2	86.8	89.0		
Nurse sows + Artif milk %	0.1	0.0	0.5		
Size	Small	Small	Average		
Region	Not Brittany	DOM / not Brittany	All		
Outdoor	8 (57%)	0 (0%)	0 (0%)		
Organic production	13 (93%)	0 (0%)	0 (0%)		
Collective breeding	0 (0%)	0 (0%)	9 (2%)		
Free Farrowing	14 (100%)	2 (2%)	11 (4%)		
Lift farrowing cages	0 (0%)	18 (16%)	15 (5%)		



- Low Weaned piglets
- High Mortality rates
- Average TB

+

- Some lift
- Some Free Farrowing

G4 34% Farms : Lowest Mortality , Good weaning

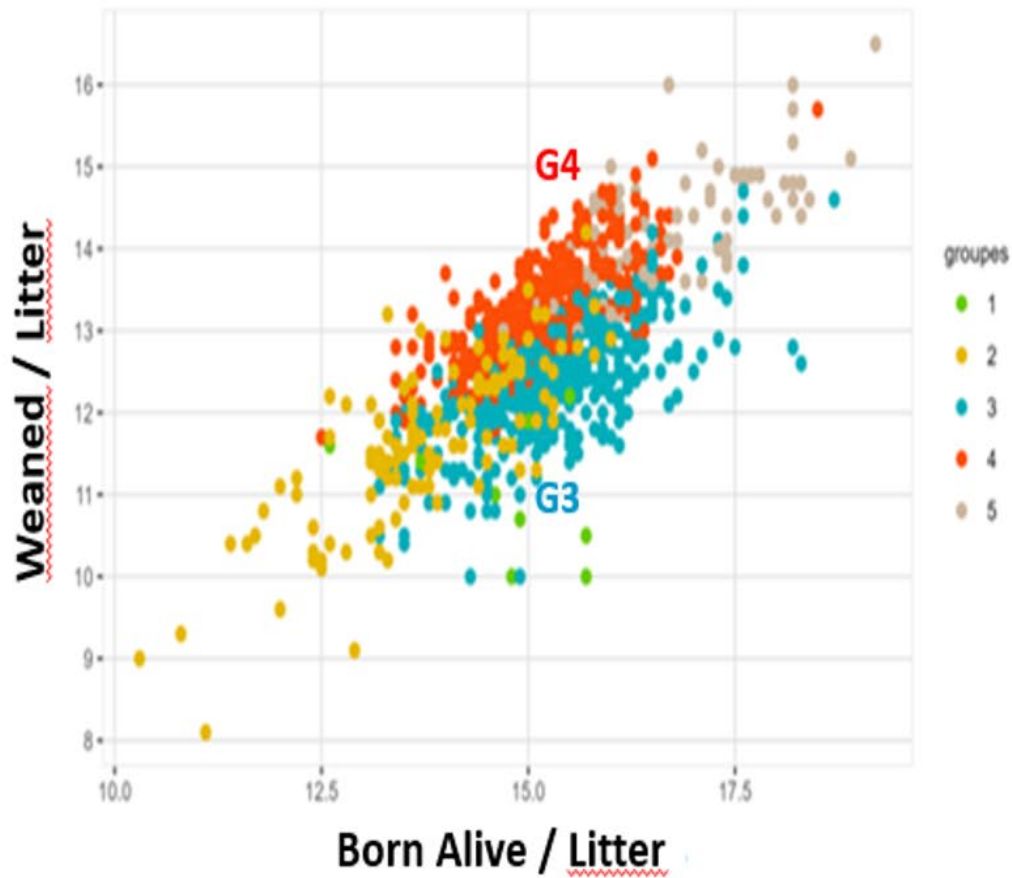
	Groupe 1	Groupe 2	Groupe 3	Groupe 4	Groupe 5
Farm number	14 (1%)	121 (12%)	427 (42%)	342 (34%)	
Weaned / litter	11.4	11.7	12.4	13.2	
Total born / litter	16.6	14.8	16.7	16.2	
Born alive / litter	14.8	13.8	15.3	15.1	
Mortality Total Born %	30.9	21.2	25.6	18.1	
Mortality Born Alive %	2.6	15.4	18.7	12.3	
Stillborn rate %	10.6	6.9	8.5	6.7	
Fertility 1st AI%	86.2	86.8	89.0	91.6	
Nurse sows + Artif milk %	0.1	0.0	0.5	1.2	
Size	Small	Small	Average	Large	
Region	Not Brittany	DOM / not Brittany	All	Brittany	
Outdoor	8 (57%)	0 (0%)	0 (0%)	0 (0%)	
Organic production	13 (93%)	0 (0%)	0 (0%)	0 (0%)	
Collective breeding	0 (0%)	0 (0%)	9 (2%)	40 (12%)	
Free Farrowing	14 (100%)	2 (2%)	11 (4%)	14 (7%)	
Lift farrowing cages	0 (0%)	18 (16%)	15 (5%)	26 (13%)	

→
Reconciliation
 also
 Nurse sows
 Lift cages
 Free
 farrowing

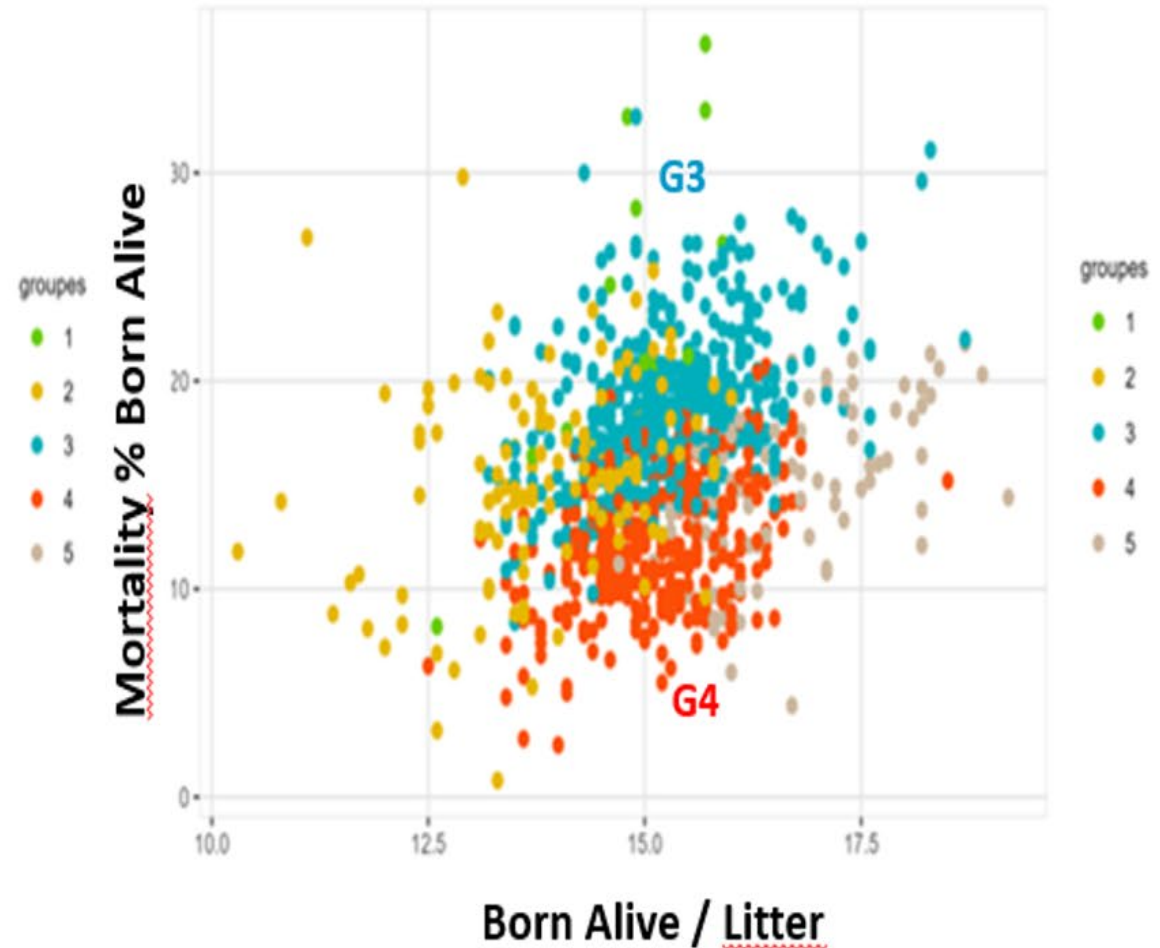
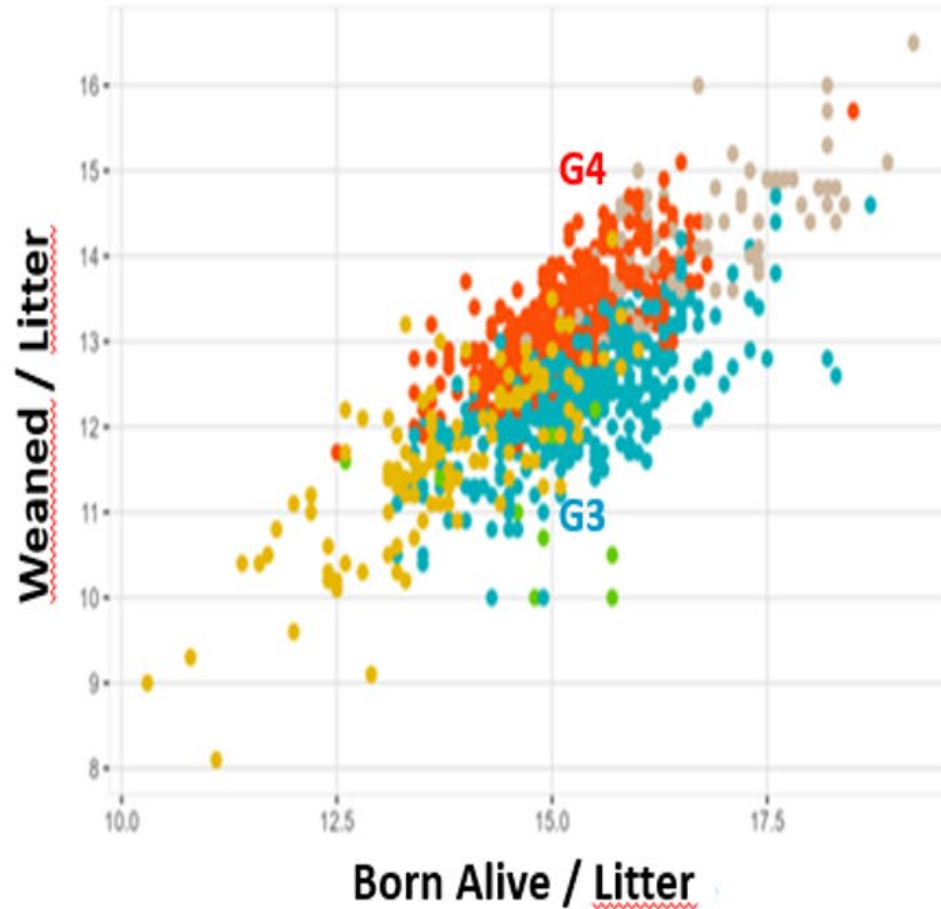
G6 10% Farms : Maxi Weaned & TB, Maxi Mortality

	Groupe 1	Groupe 2	Groupe 3	Groupe 4	Groupe 5
Farm number	14 (1%)	121 (12%)	427 (42%)	342 (34%)	93 (9%)
Weaned / litter	11,4	11,7	12,4	13,2	14.1
Total born / litter	16,6	14,8	16,7	16,2	18.1
Born alive / litter	14,8	13,8	15,3	15,1	16.6
Mortality Total Born %	30,9	21,2	25,6	18,1	21.9
Mortality Born Alive %	22,6	15,4	18,7	12,3	15.0
Stillborn rate %	10,6	6,9	8,5	6,7	8.2
Fertility 1st AI%	86,2	86,8	89,0	91,6	9.6
Nurse sows + Artif milk %	0,1	0,0	0,5	1,2	8,0
Size	Petits	Petits	Moyens	Grands	Large
Region	Hors Bretagne	DOM / Hors Bretagne	Toutes	Bretagne	Brittany
Outdoor	8 (57%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Organic production	13 (93%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Collective breeding	0 (0%)	0 (0%)	9 (2%)	40 (12%)	7 (8%)
Free Farrowing	14 (100%)	2 (2%)	11 (4%)	14 (7%)	0 (0%)
Lift farrowing cages	0 (0%)	18 (16%)	15 (5%)	26 (13%)	3 (7%)

G4 : More Weaned piglets, Less Mortality, Same Prolificacy than G3



G4 : More Weaned piglets, Less Mortality, Same Prolificacy than G3



Conclusions (1/2)

Confirmation of large variability of weaning performances and mortality rates according to farms

Large litters :

Have ambivalent (positive/negative) impacts on farm results

Do not fully explain differences of mortality rates between farms

☹ **Mortality risk** increase in very prolific farms, but mortality can occur for all litter sizes even below 14 BA

😊 **Within a range of 14 - 16 Born Alive**, some farms (34%) reconcile good weaning performances, low pre-weaning mortality and large litters

Conclusions (2/2)

Specific successful strategies implemented by these farms can be only suggested (suckling and milk support, housing ...).

They should be further investigated.

Free-farrowing and other alternative sow management should also deserve more data and attention.

This could help to set new farm targets and to support multi-criterial approach in order to reconcile societal demand and technical results.



Many thanks to pig farmers for their contribution to French Benchmarking system GT-PORC managed by Ifip

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