



## 63<sup>rd</sup> Annual Meeting EAAP - Bratislava

# Effect of parity and litter size on milk production of sows

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# Factors affecting milk production in sows

## ✓ Litter size

- ✓ Linear increase of total production with litter size
- ✓ Decrease of amount of milk / piglet

## ✓ Parity

- ✓ Lower milk production in young and old sows

## ✓ Environment

- ✓ Decreased milk production in hot climate

## ✓ Nutrition

- ✓ Energy & amino acid supplies

## ✓ Genotype & selection



# Evolution of sow performance in French pig farms

Year	1990	2000	2011	
			average	best 33%
Litter size				
born alive	10.8	11.9	13.20	13.6
weaned	9.4	10.4	11.4	11.8
Litter growth, kg/d	2.020	2.500	2.720	2.850

- => +20% increase in number of piglets weaned/litter
- => +35 % increase in litter growth rate (milk)
- => +11 % increase in piglets growth rate

# Prediction of milk production

## ✓ Prediction equations from piglets growth

✓ Noblet & Etienne (1989)

=> energy, protein, DM...

$f(\text{LS, LG, body comp.})$

## ✓ Prediction models

✓ Whittemore and Morgan (1990)

$f(\text{time})$

✓ Dourmad *et al.* (2008) => InraPorc®

$f(\text{time, LS, LG})$

✓ Hansen *et al.* (2012) => Meta-analyse

$f(\text{time, parity, LS, LG})$

↳ **Important for the determination of sow's nutrient requirements**

# Objectives of the study

## ✓ Evaluate the effects on milk production of :

- ✓ Litter size
- ✓ Parity of sows

**In modern high producing sows**

## ✓ Develop prediction equations

- ✓ to better take account of the variability among SOWS
- ✓ to improve the determination of nutritional requirements

# Material and methods

## ✓ Data from three experimental farms

- ✓ 3500 litters born between 2006 and 2010
- ✓ Crossbred sows : Large White x Landrace
- ✓ Number of piglets after fostering (1d) and at weaning
- ✓ Individual weight of piglets at birth and at weaning

## ✓ Calculation

- ✓ Piglets and litter growth rate
- ✓ from Noblet and Etienne (1989)
  - Milk
  - Energy – Protein – Phosphorus

## ✓ Statistical analysis

- ✓ GLM : Farm – Parity – Litter size - Month of farrowing

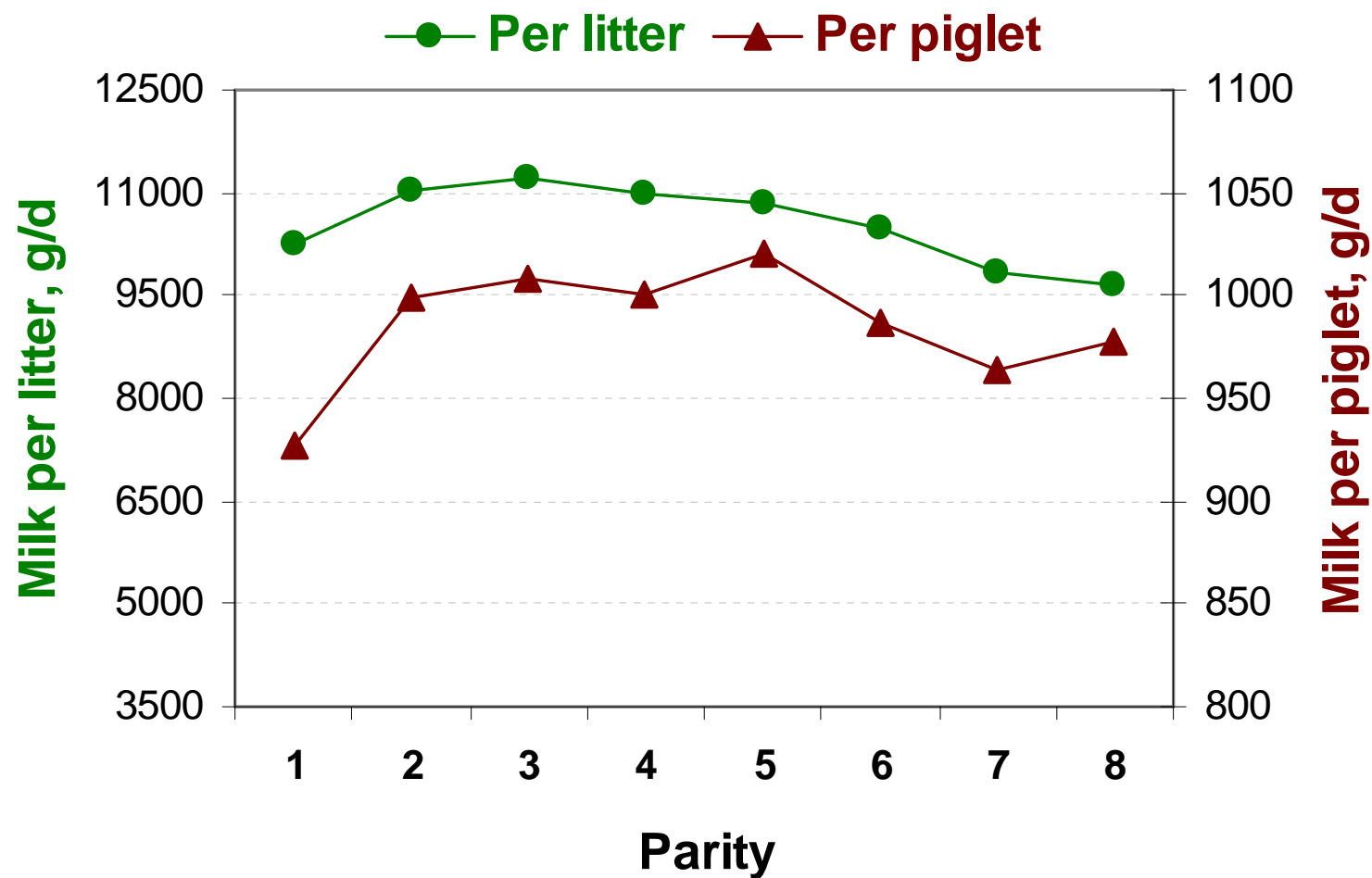
# Performance of litters

	Average	Farm	Parity	LS
N° litters	3510	-	-	-
Parity	3.2	***	-	-
Age at weaning	27.8	***	*	-
Piglets weaned/litter	11.0	***	***	-
Weaning weight, kg	8.60	***	***	***
Piglets gain, g/d	256	***	***	***
Litter gain, g/d	2800	***	***	***

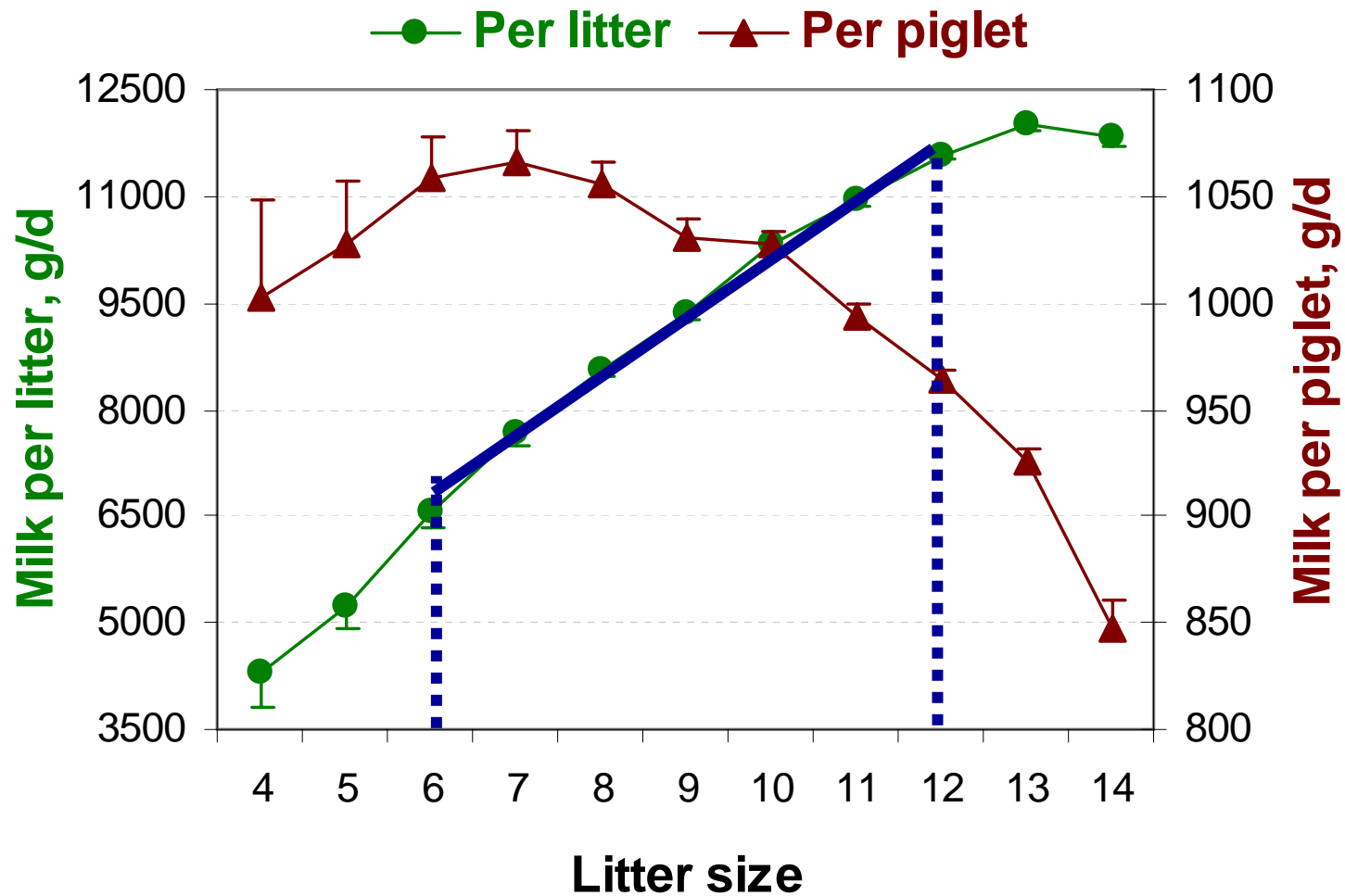
# Milk production

	Average	Farm	Parity	LS
Milk, kg/d				
per litter	10.7	***	***	***
per piglet	1.00	***	***	***
Energy, MJ/d	53.3	***	***	***
Protein, g/d	487	***	***	***
Phosphorus, g/d	15.1	***	***	***

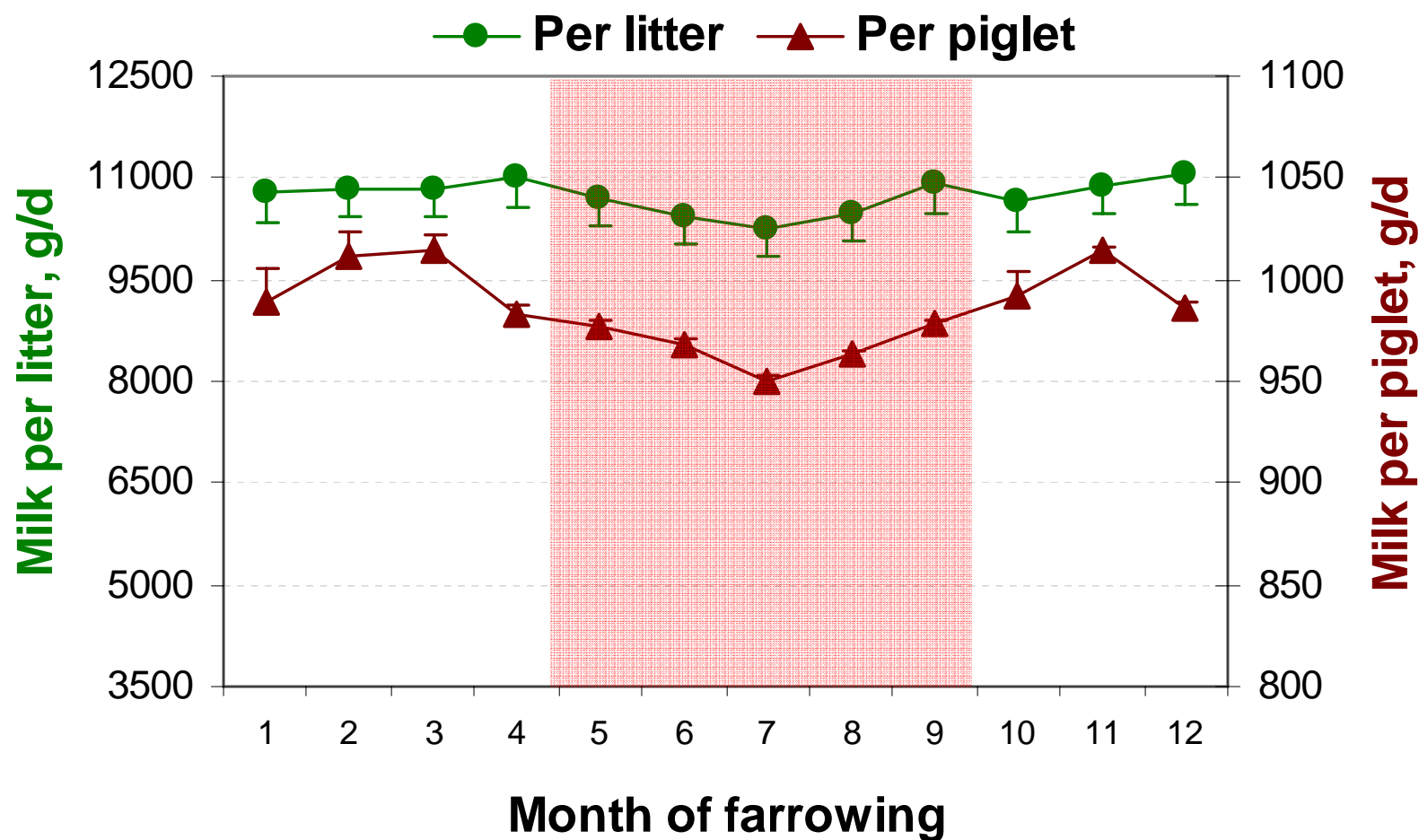
# Effect of parity on milk production



# Effect of litter size on milk production



# Effect of month at farrowing on milk production



# Prediction equations of litter weight gain (LG)

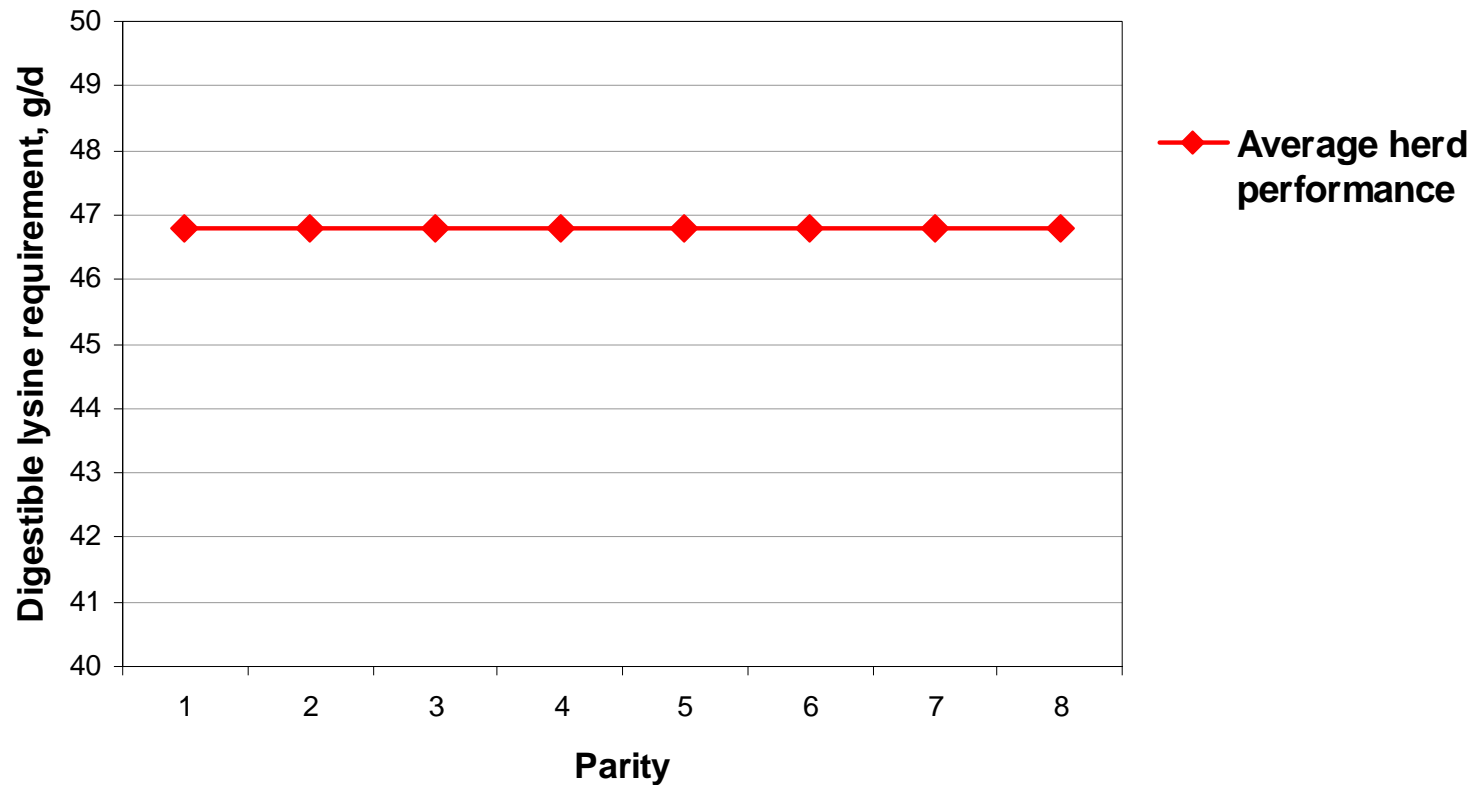
$$LG = \overline{LG} \times \text{Coeff}(\text{Parity}, LS, \overline{LS})$$

$$\begin{aligned} \text{Coeff} = & \text{Const}(\text{Parity}) \\ & + 5.932 \times (LS - \overline{LS}) \\ & - 0.514 \times (LS - \overline{LS})^2 \end{aligned}$$

$$\text{Const}(\text{Parity}_{1..8}) = (97.3, 103.7, 104.5, 103.7, \\ 103.6, 101.2, 97.7, 97.5)$$

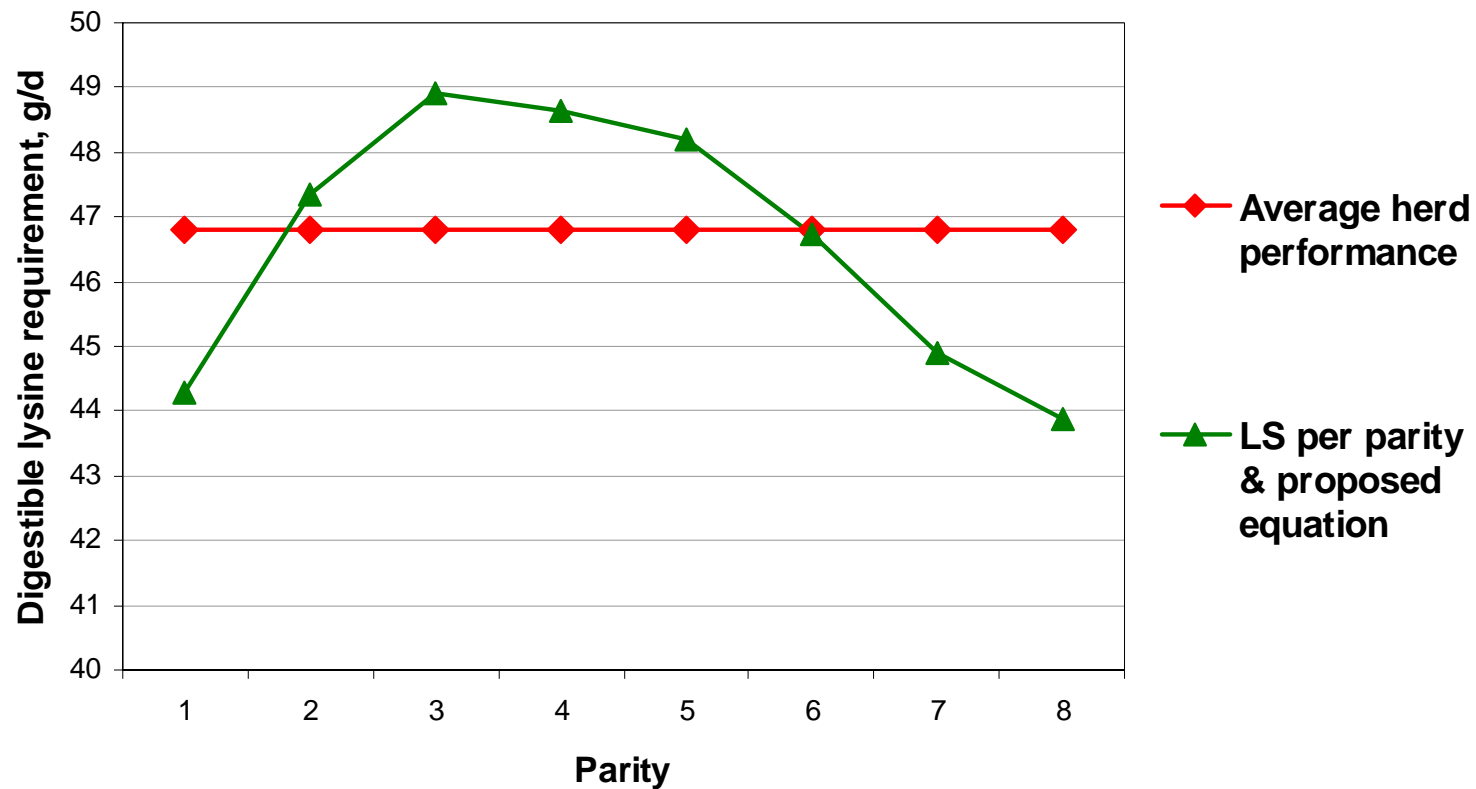
# Effect on nutritional requirements

- example of digestible lysine requirement -



# Effect on nutritional requirements

- example of digestible lysine requirement -



# Conclusion

## ✓ Increase of milk production

- ✓ 3000 g/d average litter growth rate (in the best 2 farms)
- ✓ 12.0 Liters of milk per day

## ✓ Milk production

- ✓ Litter size (linear between 6 and 12 piglets)
- ✓ Parity (highest in parity 2 to 5)
- ✓ Season (lower in summer)

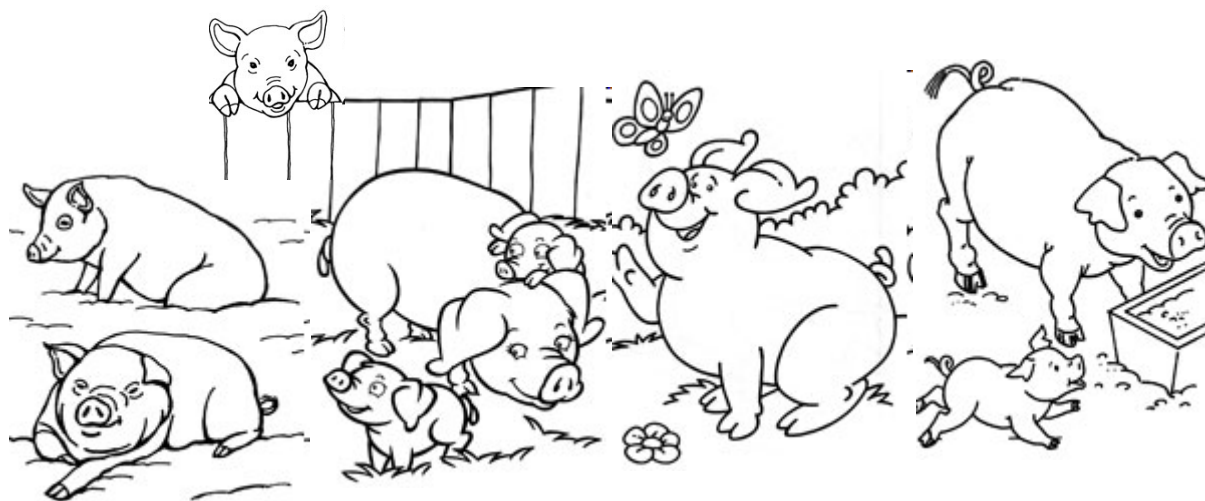
## ✓ 50% of variability in milk production explained by sow parity and LS

## ↳ Improvement of sow's nutrient requirements

- On short term : InraPorc®
- On medium term : precision feeding of lactating sows



*Thank you for your attention*



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