

# “Fattori di rischio e conseguenze della trasmissione precoce delle infezioni”

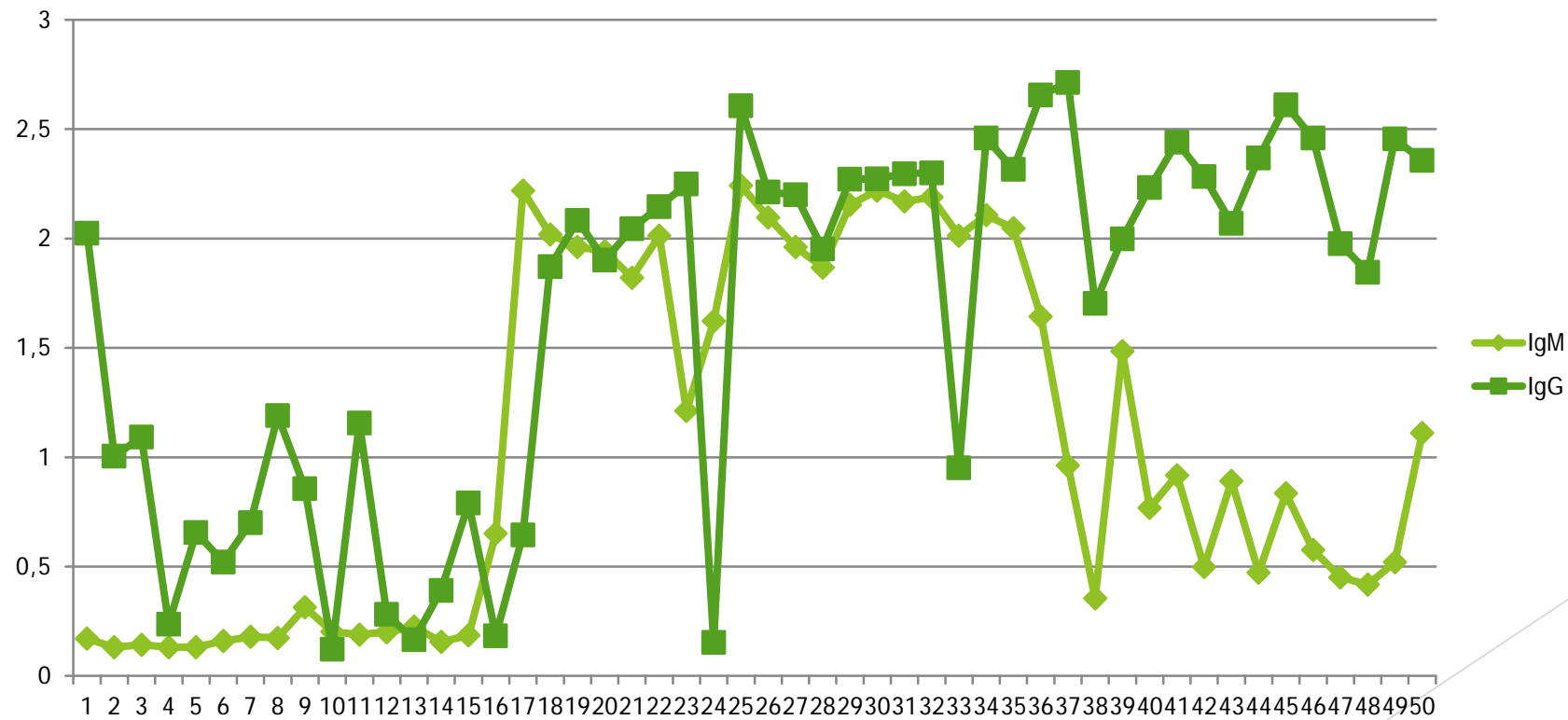
E. Marco

Marco Vetgrup; SLP

# Problemi frequenti

## ► PCV2

### Serología



# Problemi frequenti

## ► PRRS

### PRUEBAS REALIZADAS

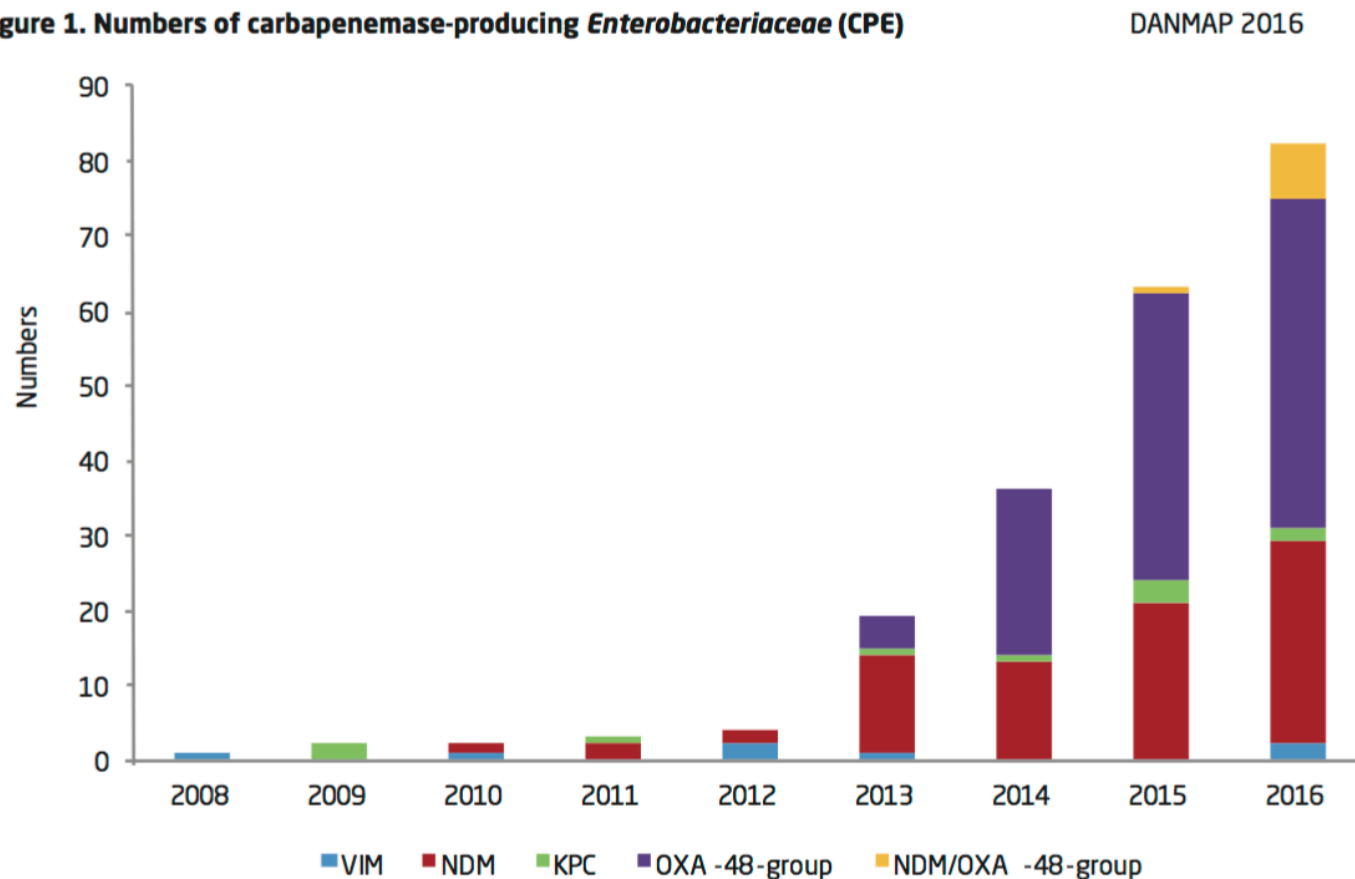
PRUEBA	ELISA	INTERPRETACIÓN
PRRS	IDEXX	POSITIVO: ratio S/P* es igual o mayor de 0,40.
INFLUENZA	HIPRA	POSITIVO: presencia de anticuerpos frente al virus de la gripe porcina.

### RESULTADOS

Nº		PRRS	INF	Nº		PRRS	INF
27s	1	1.02	-	7s	4	-	-
	2	2.53	+		9s	5	1.30
	3	2.74	+	1		2.29	-
	4	2.89	+	2		1.06	-
	5	2.32	+	3		1.11	+
	6	3.45	-	4		1.18	-
	7	2.14	+	5	0.65	-	
	8	2.86	-	11s	1	1.54	-
	9	1.38	+		2	1.47	-
	10	1.24	-		3	2.36	+
3s	1	-	+		4	2.46	-
	2	-	-		5	1.03	-
	3	1.55	+	25s	1	0.49	-
	4	0.95	+		2	0.77	-
	5	-	+		3	-	-
7s	1	-	-		4	1.62	-
	2	-	-		5	1.89	-
	3	-	-				

# Pressione per ridurre l'uso di antibiotici

Figure 1. Numbers of carbapenemase-producing *Enterobacteriaceae* (CPE)



DANMAP 2016 - Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark. Oct, 2017. [www.danmap.org](http://www.danmap.org)

# Problemi frequenti

- ▶ Diarrea post-svezzamento



# Problemi frequenti

- ▶ Poliserosite post-svezzamento



# Problemi frequenti

- ▶ Meningite post-svezzamento



# L' ideale

- ▶ Lavorare con maiali sani
  - ▶ Eliminazione di malattie infettive
    - ▶ Diarrea Rossa
    - ▶ PRRS
    - ▶ Rinite Atrofica
    - ▶ *M. hyopneumoniae*
    - ▶ Rogna
    - ▶ App

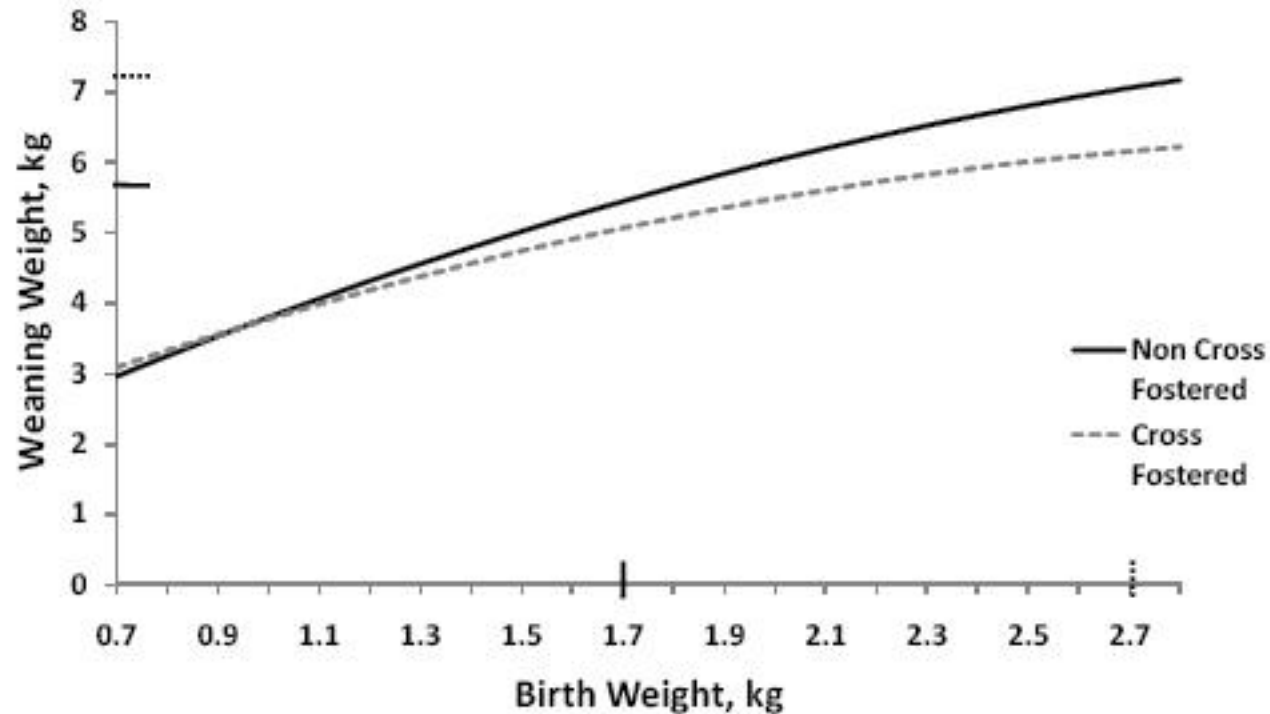


# Fattori di rischio

- ▶ Non rispettare l'integrità della nidiata

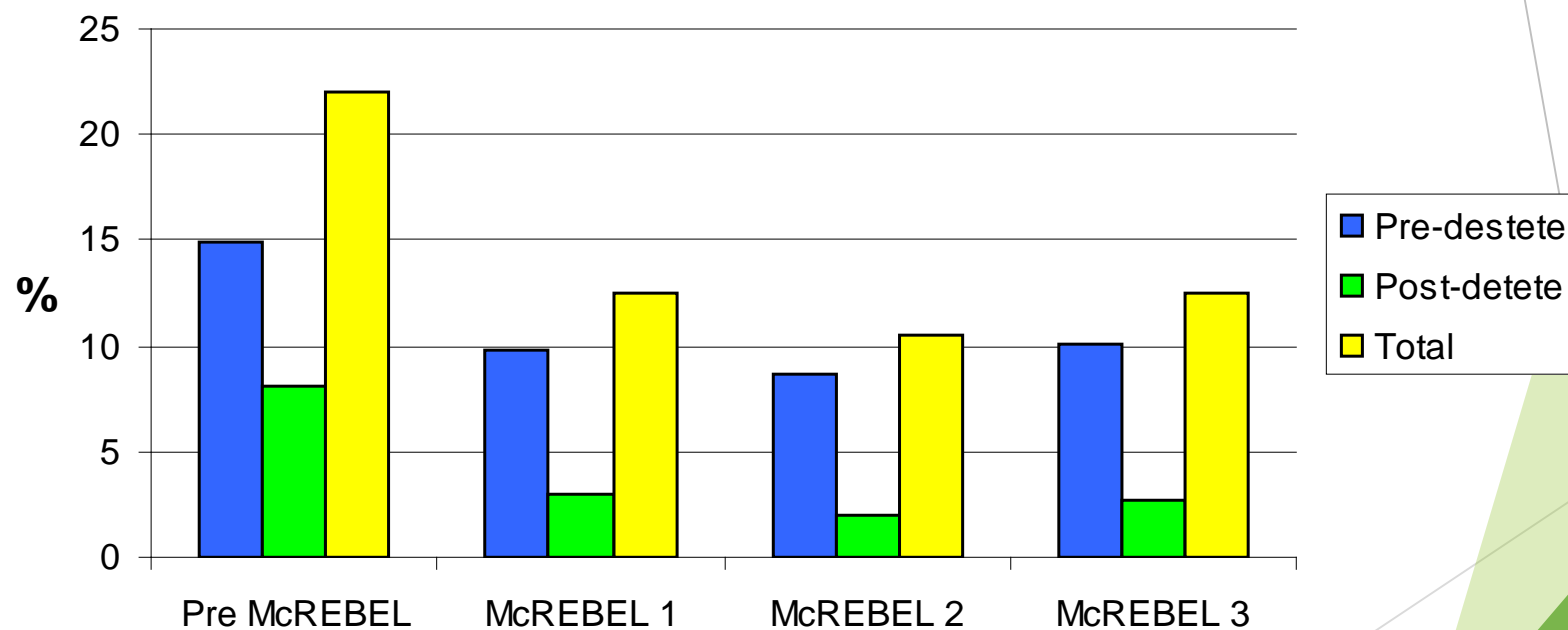
# Effetto sfavorevole dei baliaggi

Relación entre el peso al nacimiento y al destete segun hayan o no sido adoptados por otra cerda

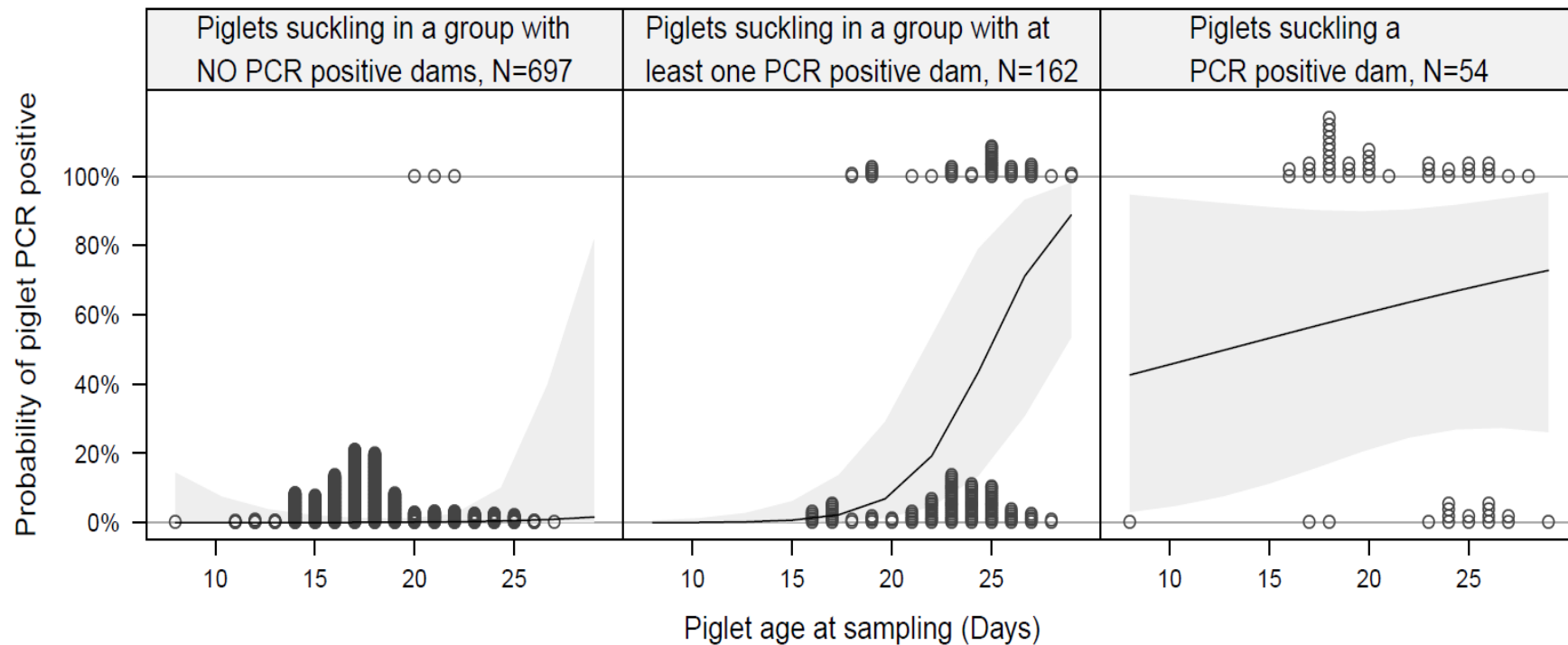


# Effetto sfavorevole dei baliaggi

## ► Mc REBEL



# Dinamica *M. hyopneumoniae*



Pieters M. 2014. *Risk factors for M. hyopneumoniae piglet colonization during the lactation period.* Proceedings 23rd International Pig Veterinary Society, Cancun, Mexico;93

# Adattamento scrofette: *M.hyo*

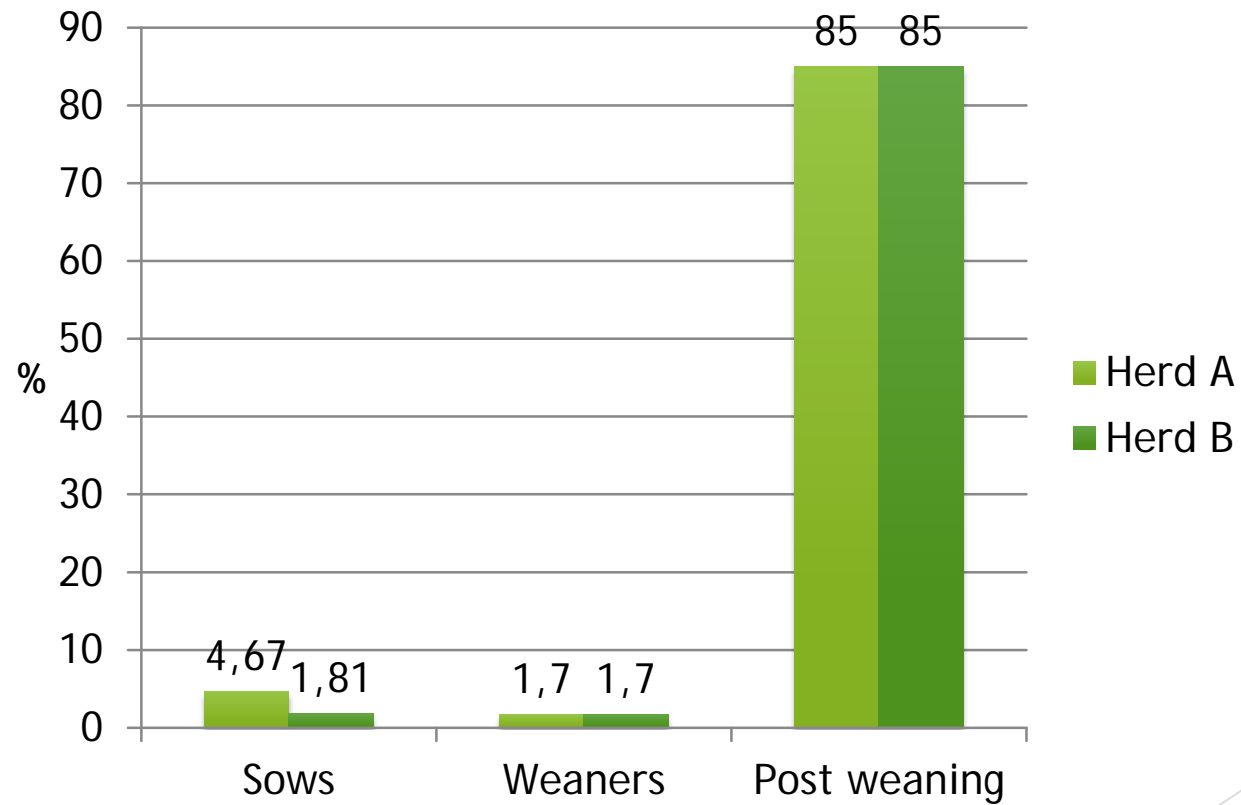
## :: *Mp. hyopneumoniae* - PCR

realtime PCR

sample no	sample ID	result
1000114381	1/ 20224/ Sow	negative
1000114382	2/ 20224/ Sow	negative
1000114383	3/ 20224/ Sow	negative
1000114384	4/ 20224/ Sow	negative
1000114385	5/ 20224/ Sow	negative
1000114386	6/ 20224/ Sow	negative
1000114387	7/ 20224/ Sow	negative
1000114388	8/ 20224/ Sow	negative
1000114389	9/ 20224/ Sow	negative
1000114390	10/ 20224/ Sow	negative
1000114391	11/ 20224/ Gilts	positive !
1000114392	12/ 20224/ Gilts	positive !
1000114393	13/ 20224/ Gilts	positive !
1000114394	14/ 20224/ Gilts	positive !
1000114395	15/ 20224/ Gilts	positive !
1000114396	16/ 20224/ Gilts	positive !
1000114397	17/ 20224/ Gilts	positive !
1000114398	18/ 20224/ Gilts	positive !
1000114399	19/ 20224/ Gilts	positive !
1000114400	20/ 20224/ Gilts	positive !

Fluidi orali

# Dinamica *M. hyorhinis*



M.J. Clavijo *et al.* 2012. *Dynamics of infection of Mycoplasma hyorhinis in two commercial swine herds*. Allen D. Lemay Swine Conference 2012.

# Alternativa ai baliaggi

	Scrofa	Latte artificiale
Suinetti inizio	118	131
Suinetti/scrofa	13,1 (9 scroffe)	13,1 (10 scroffe)
Peso inizio (kg)	1,56	1,55
Suinetti finale	111 (12,3/scroffa)	126 (12,6 scroffa)
Peso finale (kg)	7,08	8,05
Mortalidade (%)	7 (6)	5 (3,8)
Suinetti < 6Kg (%)	24 (21,6)	12 (9,5)

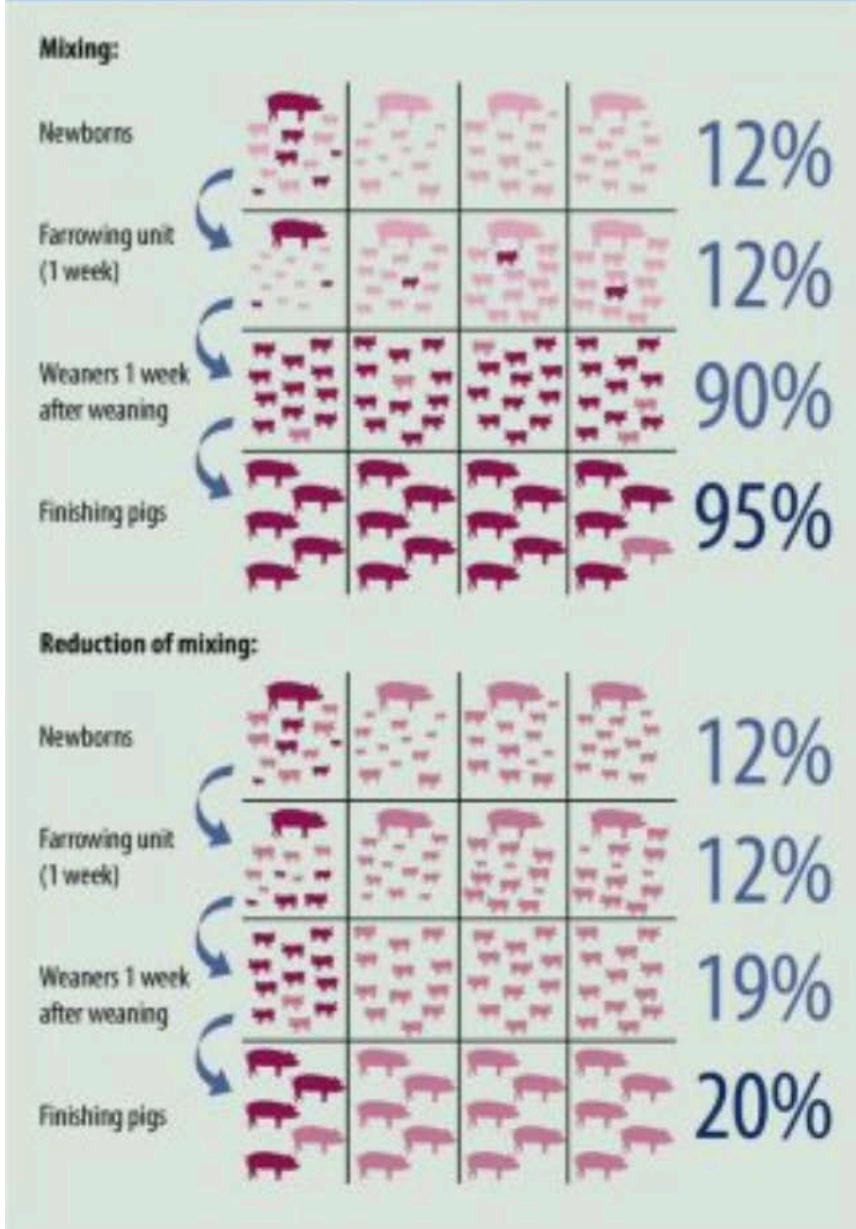
Sanjoaquin y Vela-Think in Pig-Prueba de leche en maternidad. 2015.







Figure 1. The effect of mixing of pigs on disease spread. The red pigs represent infected pigs. Source: Research farm Sterksel, Utrecht University and Veterinary Centre Someren, the Netherlands.



Non mischiare

Dr Albert van Dijk. *Prevention of disease is better than cure.* Mar 13, 2012 last update: Apr 12, 2012

# Non mischiare

	Mischiati	Non Mischiati
N Lungs	404	386
Lungs with pneumonia (%)	28,7	13,7*
Normal lymph nodes (%)	74,3	86,3*
Average Daily gain (g.)	810	826*

\*  $p < 0,001$

# Fattori di rischio

- ▶ Non rispettare l'integrità della nidata
- ▶ Non rispettare l'integrità della banda

# Conduzione in bande

Table 3. Serological results (expressed as % positive animals per disease and animal category) of 10 Belgian farrow-to-finish pig herds at the different sampling times (T0 – before transition, T1 – 12 months after transition and T2 – 24 months after transition to a four or five week batch management system) and the difference (expressed in % improvement or decline) as compared to T0. Significant differences ( $P < 0.05$ ) between T0–T1 and T0–T2 are indicated with an asterix (\*)

Disease	Animal category	T0	T1	T2	T1–T0 (%)	T2–T0 (%)
<i>Lawsonia intracellularis</i>	gilts	76	86	81	+13	+7
	piglets	7	9	2	+28	-71
	growers (45 kg)	43	22	19	-49*	-56*
	finishers (> 85 kg)	50	61	51	-20	+2
PRRSv	gilts	88	82	83	-6	-5
	piglets	55	45	61	-18	+11
	growers (45 kg)	71	83	72	+16*	+1
	finishers (> 85 kg)	80	84	89	+5	+11
<i>Mycoplasma hyopneumoniae</i>	gilts	56	53	49	-5	-12
	sows (> 2 <sup>nd</sup> parity)	16	23	36	+43	+125*
	growers (45 kg)	49	17	32	-65*	-34*
	finishers (> 85 kg)	70	50	46	-28*	-34*
<i>Actinobacillus pleuropneumoniae</i>	piglets	57	44	65	-22	+14
	growers (45 kg)	34	22	35	-35*	+2
	finishers (> 85 kg)	67	52	51	-22*	-24*

F. Vangroenweghe, et al. *Health advantages of transition to batch management system in farrow-to-finish pig herds. Veterinarni Medicina, 57, 2012 (2): 83-91*

# Conduzione in bande

**Table 5.** Association between the checked advantages of their currently applied batch management system (BMS) and this currently applied BMS on the pig farm.

	Currently applied BMS							P-value
	1-BMS	2-BMS	3-BMS	4-BMS	5-BMS	7-BMS	Other	
Labour efficiency	53.62	56.00	73.60	63.76	79.45	0.00	64.29	<0.05
Hygiene	4.35	20.00	40.80	60.40	67.12	0.00	28.57	<0.05
Other activities	43.48	32.00	40.00	14.09	45.21	100.00	28.57	<0.05
Efficient use of infrastructure	50.72	56.00	43.20	36.24	28.77	0.00	14.29	<0.05
Other reason	21.74	20.00	16.80	18.12	16.44	0.00	35.71	0.6584

# Conduzione in bande

**Table 7.** Significant association ( $P < 0.05$ ) between the currently applied batch management system (BMS) and the appreciation of this currently applied BMS on the pig farm.

	Currently applied BMS						
	1-BMS	2-BMS	3-BMS	4-BMS	5-BMS	7-BMS	Other
Not satisfied	4.35	4.00	1.60	1.34	1.37	0.00	0.00
Satisfied	63.77	52.00	51.20	54.36	32.88	100.00	35.71
Very satisfied	31.88	44.00	47.20	44.30	65.75	0.00	64.29

# Evitare contaminazione incrociata





# Fattori di rischio

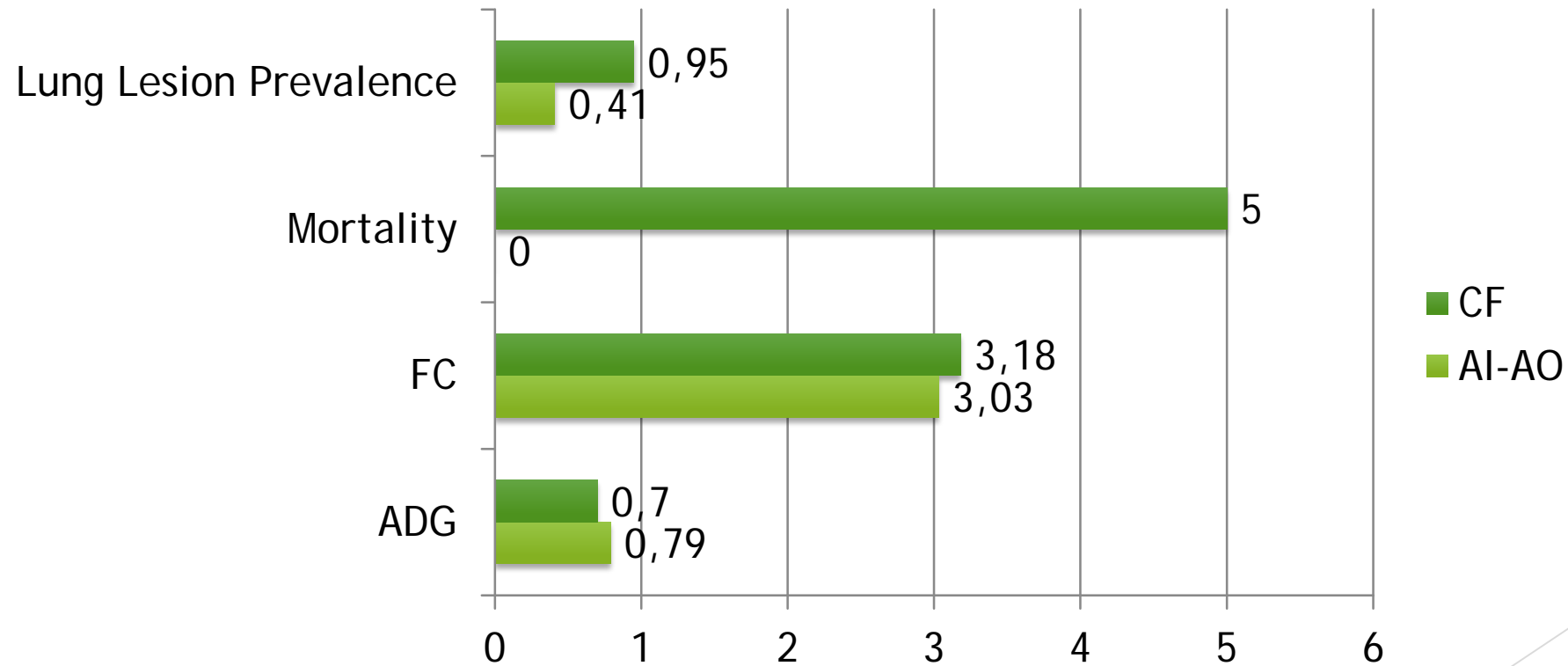
- ▶ Non rispettare la integrità della nidiata
- ▶ Non rispettare la integrità della banda
- ▶ Non fare il tutto pieno tutto vuoto

# Tutto pieno-Tutto vuoto

<b>Parameter</b> productivo	<b>AI- AO.</b>	<b>CONTINUOUS</b>
<b>Mortality (%)</b>	<b>1,8</b>	<b>3,4</b>
<b>ADWG (g/day)</b>	<b>548</b>	<b>512</b>
<b>FE</b>	<b>3,84</b>	<b>4,1</b>

**Jourdaum, 1972**

# Tutto pieno-Tutto vuoto



Scheidt AB, Cline TR, Clark LK, Mayrose VB, Van Alstine WG, Diekman MA, Singleton WL, 1995. *The effect of all-in-all-out growing-finishing on the health of pigs.* J Swine Health Prod;3(5):202-205.

# Buone pratiche

- ▶ Animali sani
- ▶ Conduzione in bande
- ▶ TPTV
- ▶ Igiene
  - ▶ Pulizia e disinfezione

# Fattori di rischio

- ▶ Non rispettare la integrità della nidiata
- ▶ Non rispettare la integrità della banda
- ▶ Non fare il tutto pieno tutto vuoto
- ▶ Mancanza di una igiene corretta



# Igiene e disinfezione

Pen Floors			Enterobacteriaceae <sup>a</sup>				Salmonella <sup>b</sup>			
Category	Farm	Samples Tested (n)	Before washing		After washing		Before washing		After Washing	
			Range	Median	Range	Median	Positive samples (n)	Range	Positive samples (n)	Range
3	A	64	1.7-6.6	4.5	0-5.8	0.8	– <sup>c</sup>	–	– <sup>c</sup>	–
High 2	B	64	3.5-6.1	4.6	0-1.6	0	– <sup>c</sup>	–	– <sup>c</sup>	–
High 2	C	72	0-5.1	1.2	0-1.6	0	1	1.1	– <sup>c</sup>	–
1	D	84	2.6-6.1	4.6	0-3.6	0.8	26	36->106	1	7.2
1	E	84	0-3.6	1.6	0-3.2	0	– <sup>c</sup>	–	– <sup>c</sup>	–
1	F	60	1.2-5.1	3.3	0.7-4.2	2.9	– <sup>c</sup>	–	– <sup>c</sup>	–
1	G	72	0-6.0	2.0	0-3.6	0	– <sup>c</sup>	–	1	0.36
1	H	48	0.8-4.2	3.7	0.7-4.1	2	– <sup>c</sup>	–	– <sup>c</sup>	–

Table 1. Effect of cleaning procedure on levels of *Salmonella* and *Enterobacteriaceae* on the pen floors. <sup>a</sup>Log10 cfu/cm<sup>2</sup>. <sup>b</sup>MPN/cm<sup>2</sup>; detection limit, 0.36 MPN/cm<sup>2</sup>. <sup>c</sup>Negative for *Salmonella* (detection limit, <0.36 MPN/cm<sup>2</sup>).

# Igiene e disinfezione

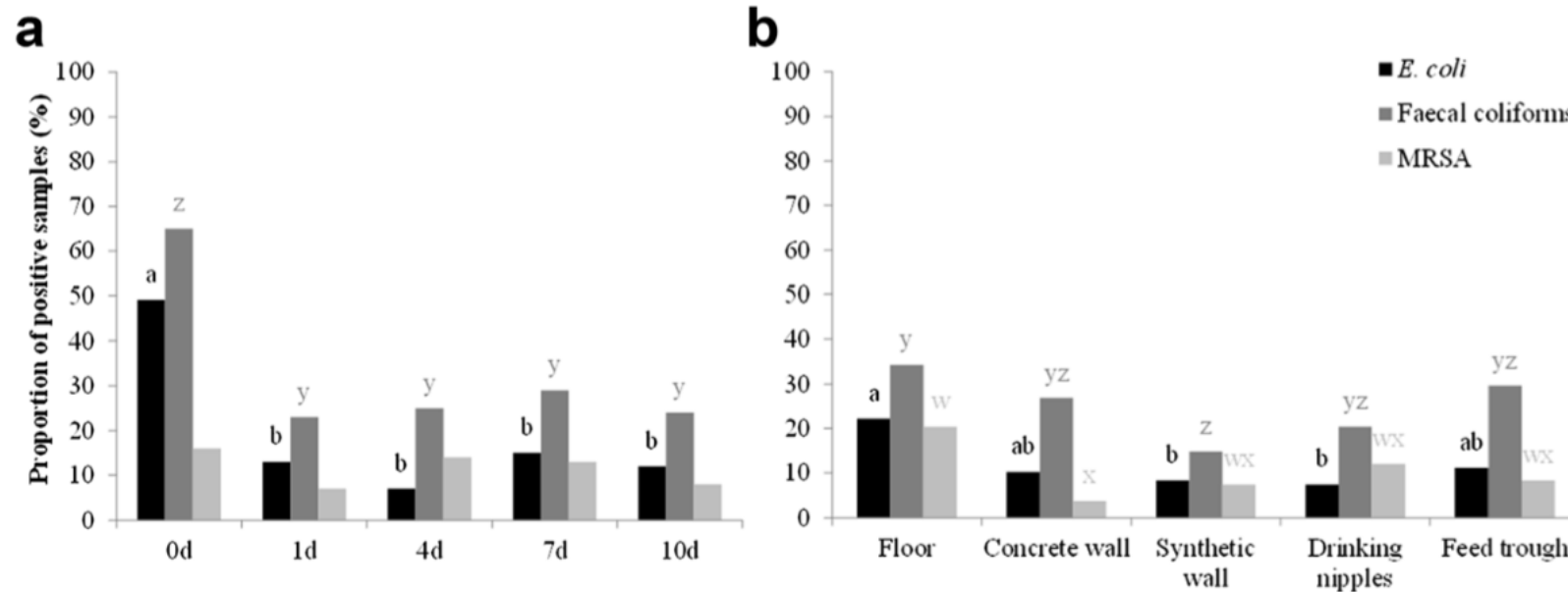
Feeder/Drinker Units			Enterobacteriaceae <sup>a</sup>				Salmonella <sup>b</sup>			
Category	Farm	Samples Tested (n)	Before washing		After washing		Before washing		After Washing	
			Range	Median	Range	Median	Positive samples (n)	Range	Positive samples (n)	Range
3	A	16	3.0-5.6	4.4	2.4-6.8	5.2	— <sup>c</sup>	—	1	4600
High 2	B	16	3.7-5.7	5	0.7-6.8	5.6	— <sup>c</sup>	—	3	11-240
High 2	C	24	0-6	2	2.0-6.0	5	— <sup>c</sup>	—	— <sup>c</sup>	—
1	D	27	3.7-6.1	5.5	0-6.1	4.9	6	0.92-105	2	0.6-7.2
1	E	36	1.5-4.9	3.4	0-5.5	3	— <sup>c</sup>	—	— <sup>c</sup>	—
1	F	24	0.5-4.9	3.5	3.2-5	4.4	— <sup>c</sup>	—	— <sup>c</sup>	—
1	G	24	0-5..5	2.8	0-4.1	2.8	— <sup>c</sup>	—	— <sup>c</sup>	—
1	H	20	3.4-4.9	3.9	3.3-6	4	— <sup>c</sup>	—	— <sup>c</sup>	—

Table 2. Effect of cleaning procedure on levels of *Salmonella* and *Enterobacteriaceae* in feeder/drinker units  
<sup>a</sup>Log10 cfu/cm<sup>2</sup>. <sup>b</sup>MPN/cm<sup>2</sup>; detection limit, 0.36 MPN/cm<sup>2</sup>. <sup>c</sup>Negative for *Salmonella* (detection limit, <0.36 MPN/cm<sup>2</sup>).





# Vuoto sanitario



**Fig. 2** Proportion of positive samples given for detection of *E. coli*, faecal coliforms and MRSA, respectively. Proportions are given for each sampling moment (a) and location after disinfection (b), in percentage. Samples ( $n = 135$ ) were taken before disinfection (0d) and 1 day (1d), 4 days (4d), 7 days (7d) and 10 days (10d) after disinfection. Samples ( $n = 108$ ) were taken from each location. Significant differences between sampling moments/ locations per bacteriological parameter are indicated by different letters above bars

# Igiene e disinfezione

- ▶ Pulire le scrofe
- ▶ Pulire e disinfettare il materiale



# Igiene dall'acqua

Qualità dell'acqua nel deposito generale (21/6/13)

PARAMETRO	VALOR	REFERENCIA
E. coli (UFC/100 ml)	0	0
Aerobios a 22°C (UFC/1 ml)	1	< 100
Cl. perfringens (UFC/100 ml)	0	0
Pseudomonas aeruginosa (UFC/250 ml)	0	0
Enterococos (UFC/100 ml)	0	0
Coliformes totales (UFC/100 ml)	0	0

# Igiene dall'acqua

Qualità dell'acqua nel abbeveratoio dalla sala parto

PARAMETRO	5/6/13	21/6/13	18/9/13	REFERENCIA
E. coli (UFC/100 ml)	0	136	0	0
Aerobios a 22°C (UFC/1 ml)	298 /345	283	66	< 100
Cl. perfringens (UFC/100 ml)	23 /45	364	9	0
Pseudomonas aeruginosa (UFC/250 ml)	0	0	0	0
Enterococos (UFC/100 ml)	12 /1	140	11	0
Coliformes totales (UFC/100 ml)	0/8	158	0	0



Limpieza con dióxido de cloro



# Igiene giornaliera

**Table 4:** Cumulative percentage of weaned pigs<sup>1</sup> from which *Escherichia coli* strain M1823B (challenge strain) was isolated during sample collection periods on Day 0 (prior to exposure), and Days 2, 4, 7, and 11 after initial exposure by inoculation (Inoculated Pigs) or direct (Pen Sentinels) or indirect exposure to the Inoculated Pigs.<sup>2</sup>

Treatment Group	n	No. of pigs (%) from which <i>E coli</i> strain M1823B was isolated <sup>3</sup>				
		Day 0 (prior to exposure)	Day 2	Day 4	Day 7	Day 11
Inoculated Pigs	20	0 (0)	18 (90)	19 (95)	20 (100)	20 (100)
Pen Sentinels	5	0 (0)	2 (40)	5 (100)	5 (100)	5 (100)
Direct Sentinels	25	0 (0)	0 (0)	12 (48)	17 (68)	20 (80)
Hand-wash Sentinels	25	0 (0)	0 (0)	0 (0)	13 (52)	23 (92)
Shower Sentinels	25	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Non-exposed Pigs (negative controls)	25	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

<sup>1</sup> Inoculated Pigs were orally inoculated Days 0 and 2, and Pen Sentinels were housed with them except during inoculation procedures. On Days 1 through 10, Direct, Hand-wash, and Shower Sentinel groups (Table 1) were contacted according to the schedule in Table 2. When diarrhea was observed (except in Inoculated Pigs), affected pigs were immediately euthanized for cultural and histological examination. Pigs determined to be positive on a designated sample collection day or on the day of euthanasia were counted as positive for all subsequent sample collection periods.

<sup>2</sup> Inoculated Pigs were individually offered  $1.36$  to  $8.92 \times 10^{10}$  colony forming units of *E coli* M1823B in liquid strawberry gelatin.

<sup>3</sup> Strain M1823B was identified on the basis of antimicrobial sensitivity.

# Evitare la trasmissione attraverso le iniezioni

- ▶ Maiali infetti da PRRS e non infetti, vaccinati contro M. hyo con la stessa siringa.
- ▶ In 2 su 4 studi relativi a PRRS, l'infezione è stata trasmessa al 100% dei suini negativi.







# Fattori di rischio

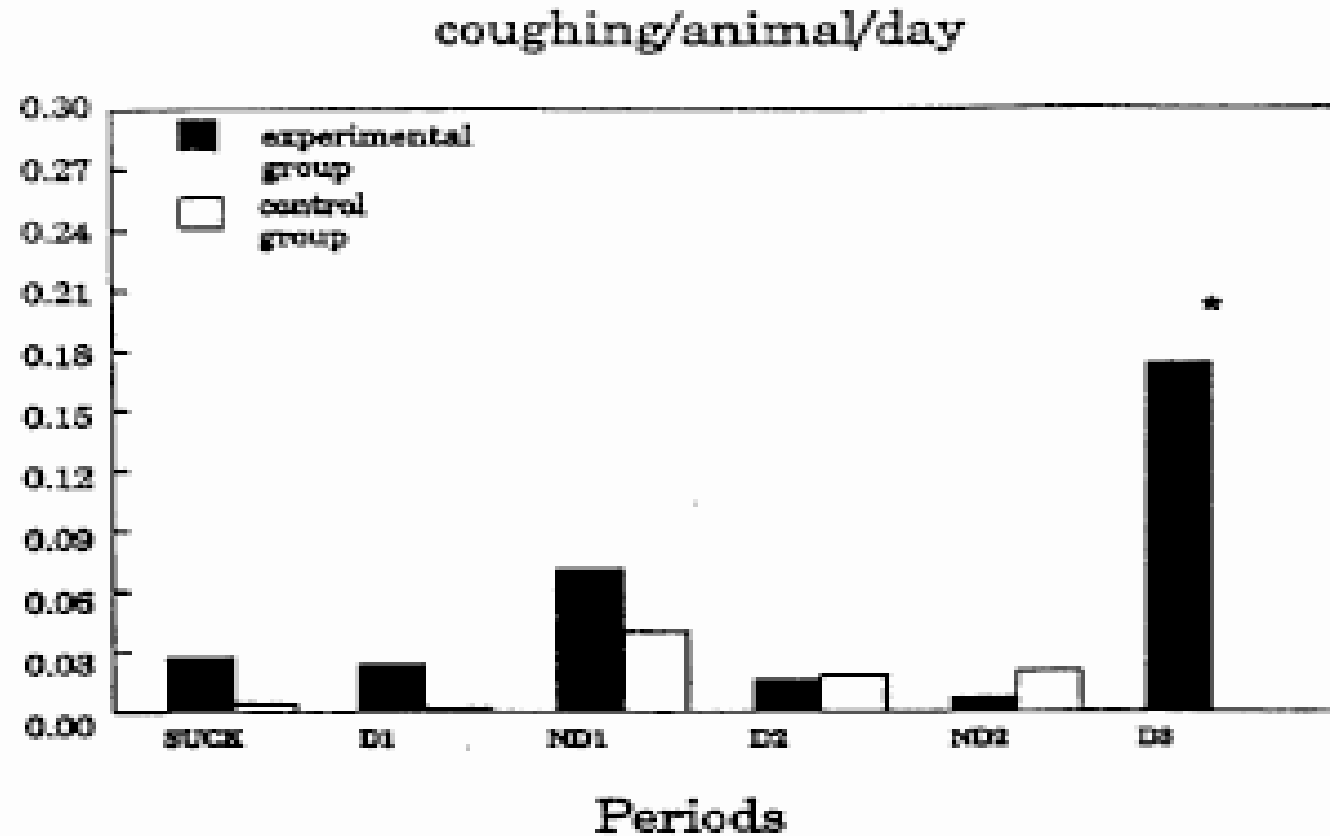
- ▶ Non rispettare l'integrità della nidiata
- ▶ Non rispettare l'integrità della banda
- ▶ Non fare il tutto pieno tutto vuoto
- ▶ Mancanza di una igiene corretta
- ▶ Condizioni ambientali non adeguate



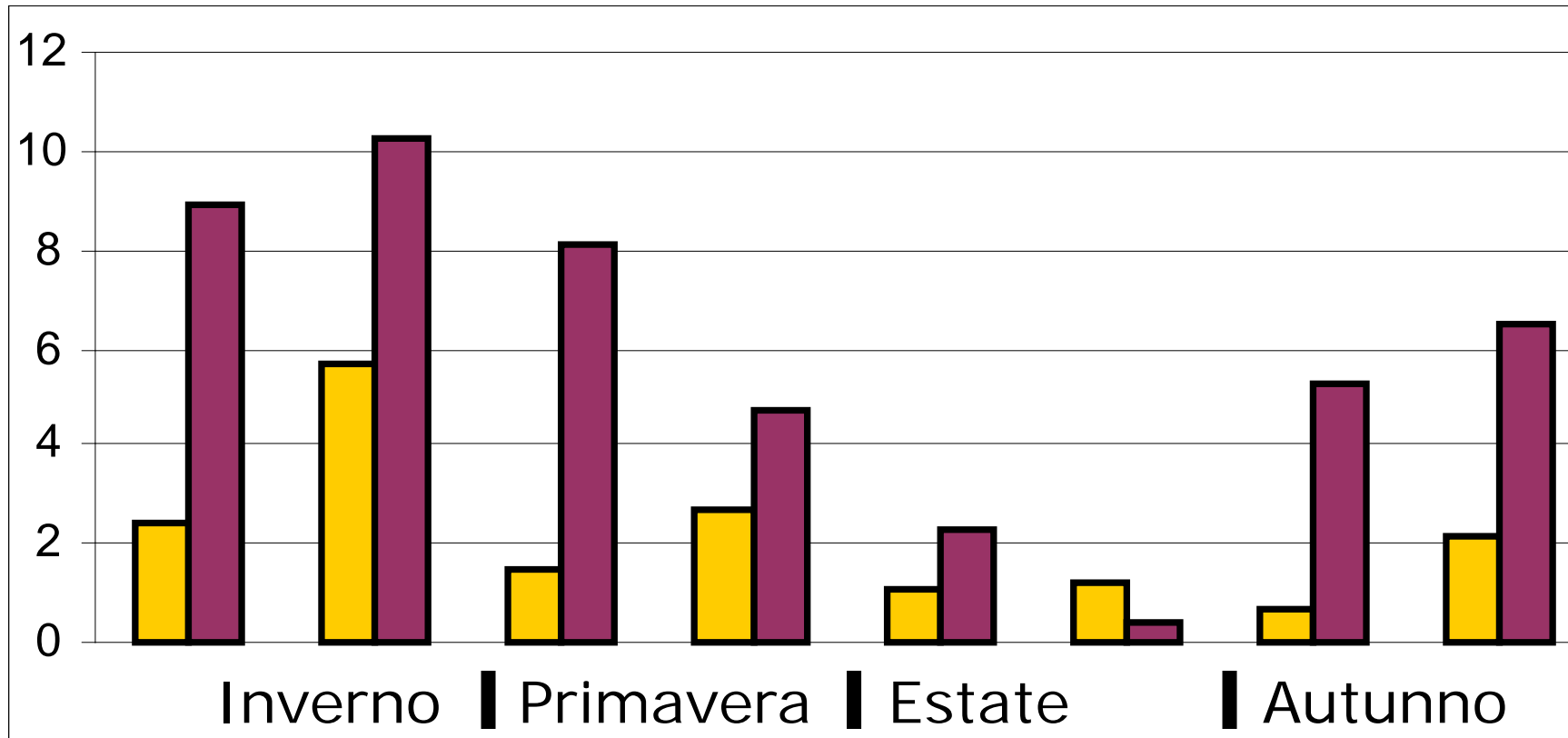


# Flusso d'aria

**Fig. 2 - Coughing frequency of weaned pigs intermittently exposed (black columns; n=45) or not exposed (open columns; n=45) to draught (\* Chi-square,  $P < 0.05$ )**

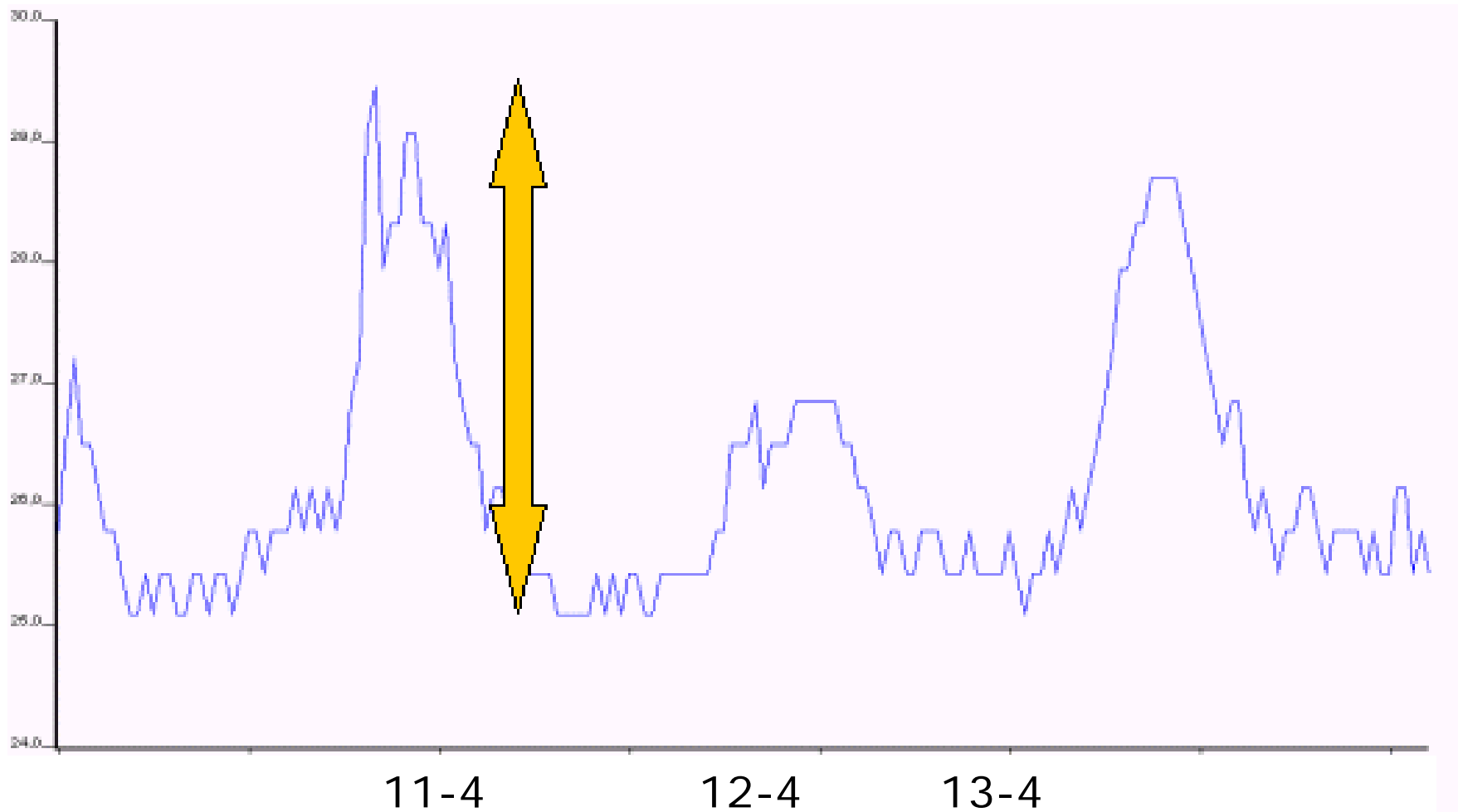


# Differenze tra due sale di svezzamento

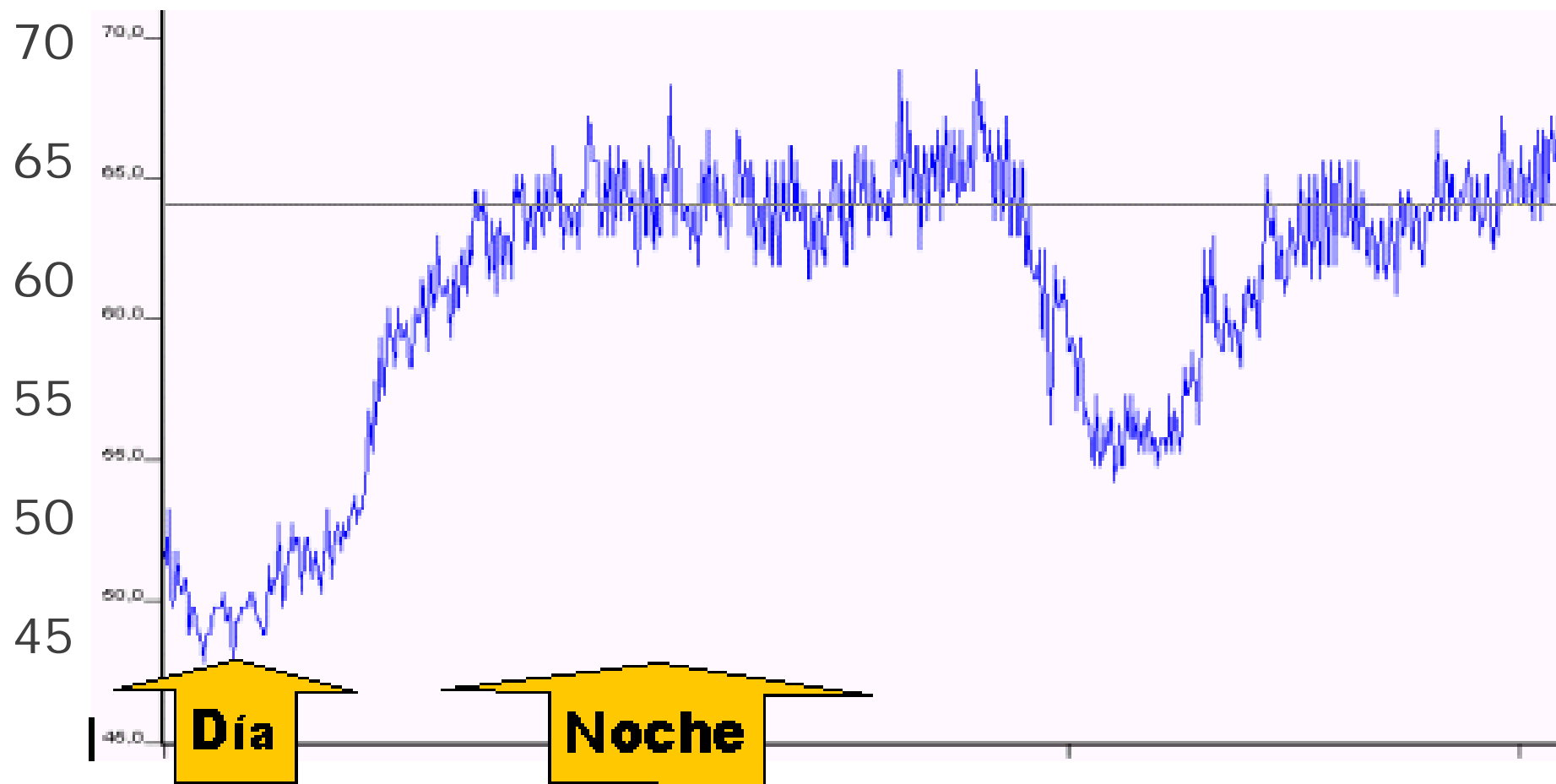


■ Svezzamento 1. 2,24%  
■ Svezzamento 2. 5,75%

# Temperatura

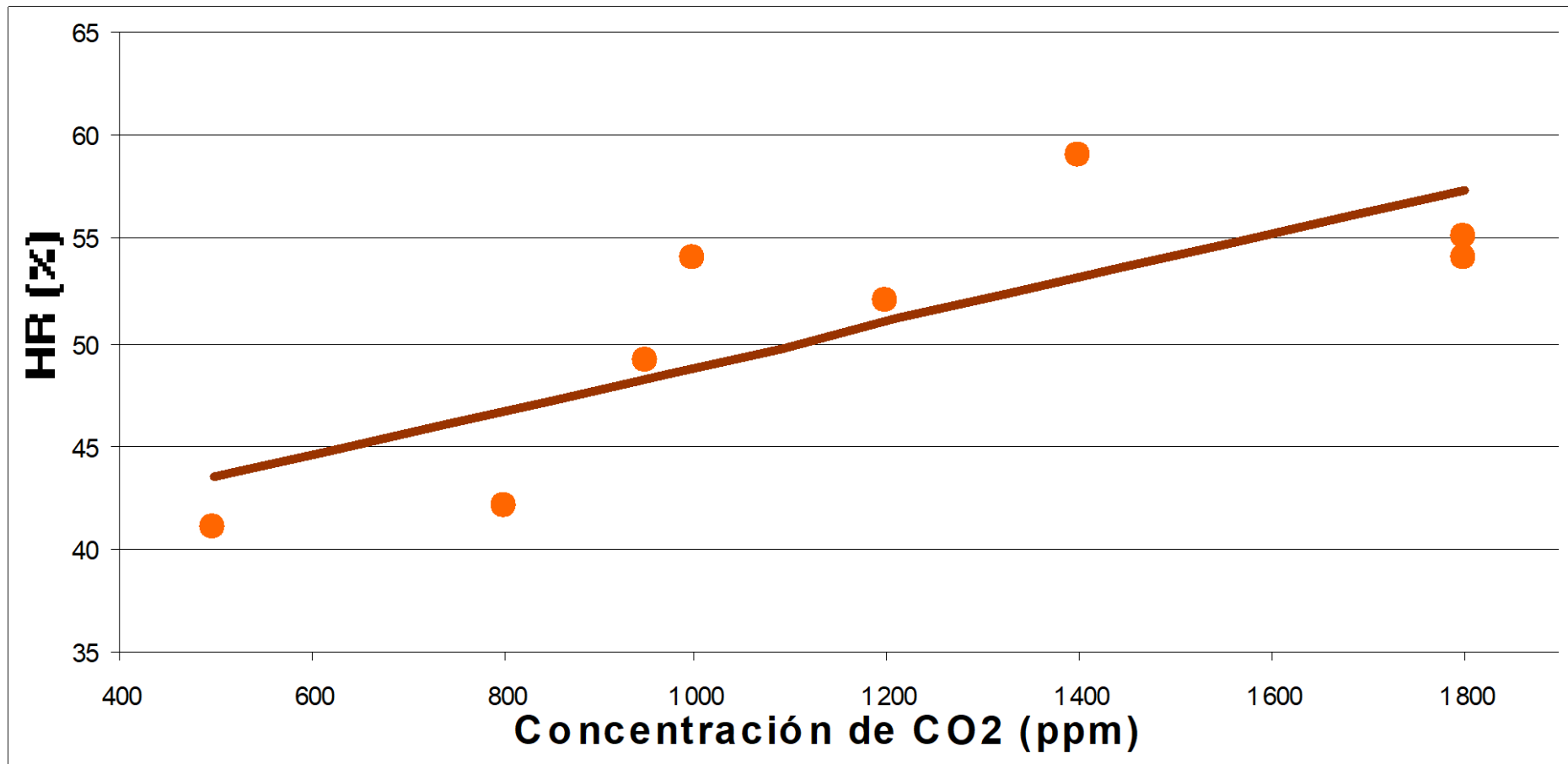


# Umidità relativa





# Rapporto tra Umidità relativa e CO2



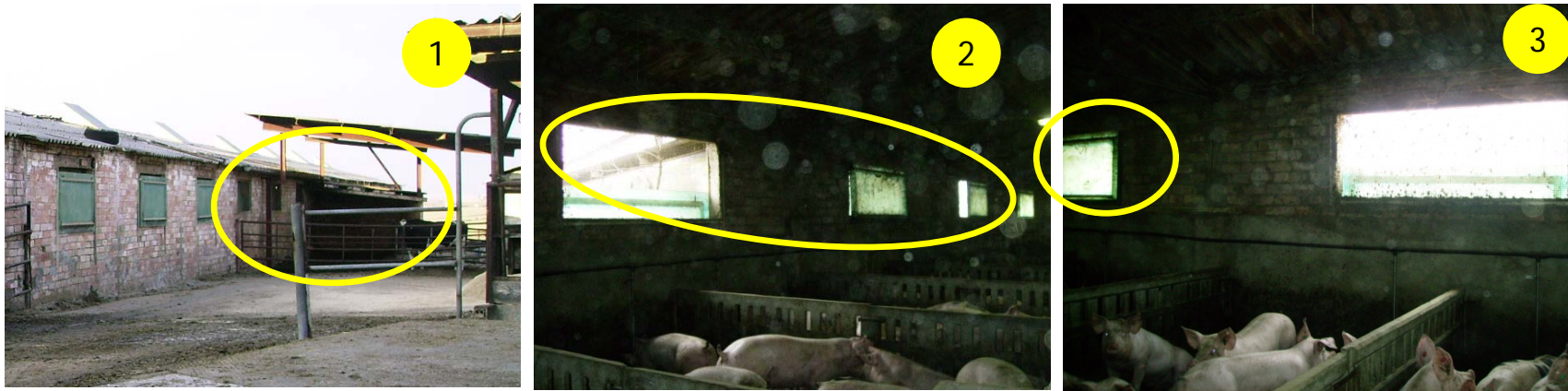
# Ventilazione minima

Número sala	1	2	3	4	5	6	7	8	9	10
Mínima (10%)	442	122	379	311	83	445	429	548	575	460
% desviación	15	-207	1	-21	-352	16	13	32	35	18
Máxima (100%)	1332	1399	1296	1376	1382	1396	1380	1387	1339	1377
% desviación	-3	2	-6	0	1	2	0	1	-3	0





# Problemi respiratori e ventilazione



- ▶ Una parte delle finestre sul lato destro della capannone è fissa a causa della presenza di un magazzino esterno in quella zona, questa area non può essere adeguatamente ventilata (1 e 2).
- ▶ Diverse finestre non funzionano correttamente e restano chiuse quando il resto viene aperto dalla temperatura (3).





# Fattori di rischio

- ▶ Non rispettare la integrità della nidiata
- ▶ Non rispettare la integrità della banda
- ▶ Non fare il tutto pieno tutto vuoto
- ▶ Mancanza di una igiene corretta
- ▶ Condizioni ambientali non corrette
- ▶ Elevata densità







# Conclusioni

- ▶ Iniziare con un buon stato sanitario dei suini quando è possibile
- ▶ Rispettare l'integrità della nidiata
- ▶ Rispettare l'integrità della banda
- ▶ Fare il tutto pieno tutto vuoto
- ▶ Igiene corretta
- ▶ Condizioni ambientali adeguate
- ▶ Corretta densità

Grazie per l'attenzione