# Leptospirosis

## The case of a non-adapted serovar

**11th ECPHM Workshop for Residents,**

*9th-11th May 2022- Budapest (Hungary)*

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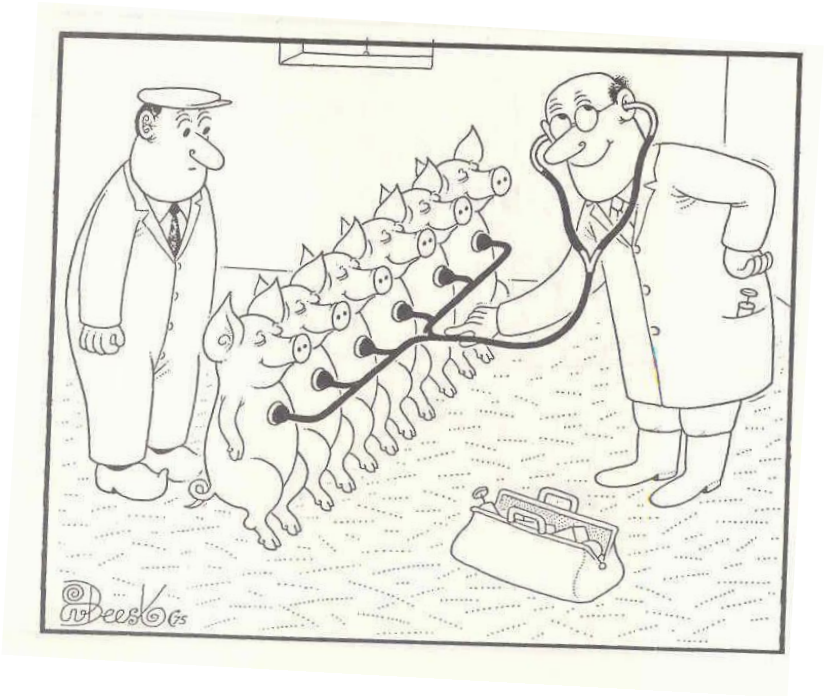
# Situation

- Farm with 1.300 sows
- Southeast of Spain (warm weather)
- LW (pure line)
- External semen (bought)
- Auto-replacement (own multiplier)
- Only piglets up to 4 weeks (weaned at 28 days)
- Weekly batches

# Health status and Productivity

2020

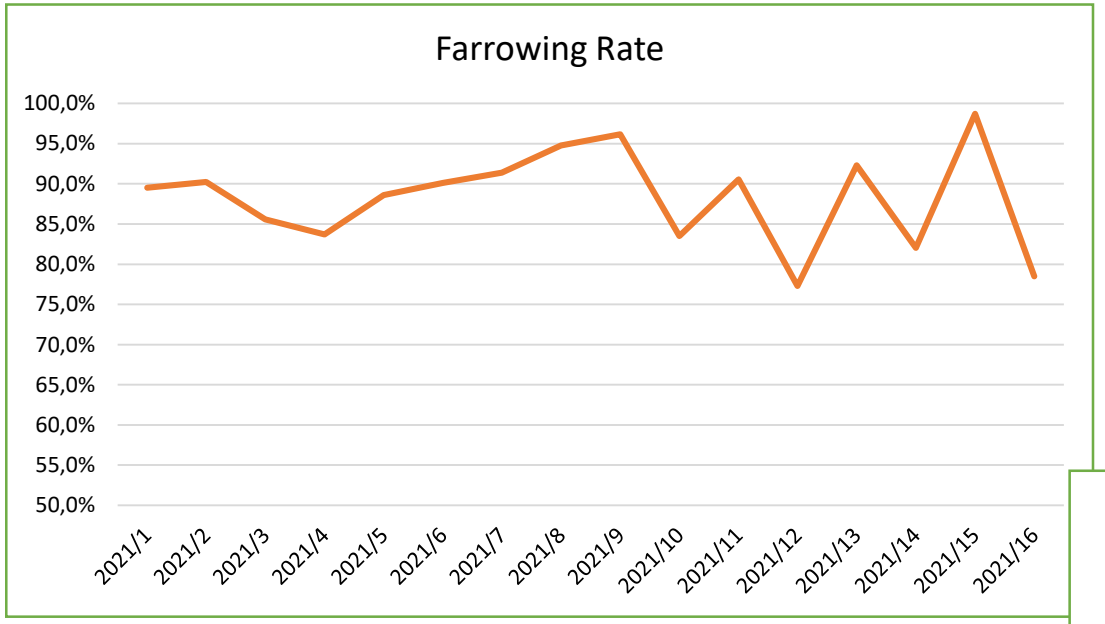
| | |
|---|---|
| Fertility (23d) | 91% |
| Vulvar discharges | 0,66% |
| Abortions | 1,28% |
| Farrowing rate | 87,06% |
| TB | 14,3 |
| TBA | 13,3 |
| SB | 5,68% |
| Mummified | 0,78% |



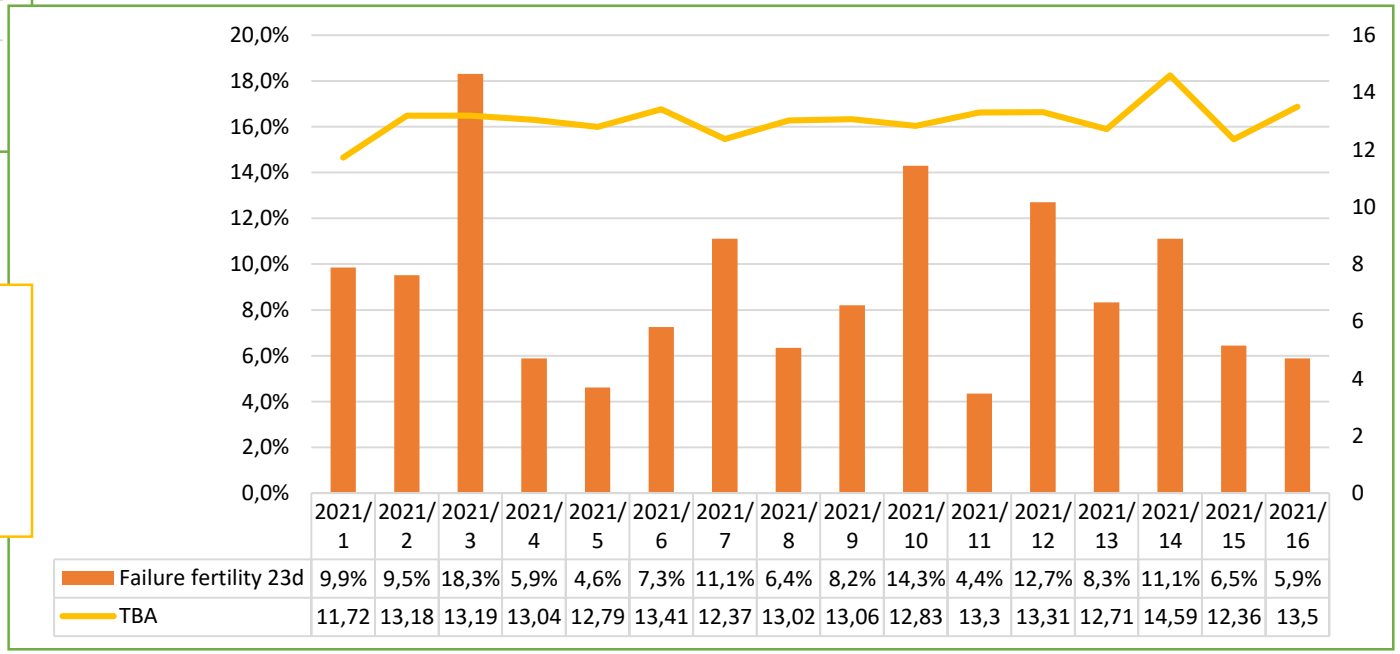
| | Sows | Gilts |
|---|---|---|
| PRRS MLV | χ | χ |
| Aujesky | χ | χ |
| Influenza | χ | χ |
| Coli/clostridium | χ | |
| Parvo+ Erysipela | χ | χ |

- Piglet mortality: <10%
- Last PRRSv outbreak: in early 2019 (semen)
- Influenza diagnosis and vaccination start: autumn 2018

# April 2021

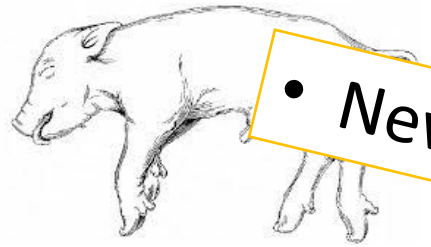



- No fever
- Lates abortions
- **Vulvar discharges: 9 in March (3%)**




| | 2021/1 | 2021/2 | 2021/3 | 2021/4 | 2021/5 | 2021/6 | 2021/7 | 2021/8 | 2021/9 | 2021/10 | 2021/11 | 2021/12 | 2021/13 | 2021/14 | 2021/15 | 2021/16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Failure fertility 23d | 9,9% | 9,5% | 18,3% | 5,9% | 4,6% | 7,3% | 11,1% | 6,4% | 8,2% | 14,3% | 4,4% | 12,7% | 8,3% | 11,1% | 6,5% | 5,9% |
| TBA | 11,72 | 13,18 | 13,19 | 13,04 | 12,79 | 13,41 | 12,37 | 13,02 | 13,06 | 12,83 | 13,3 | 13,31 | 12,71 | 14,59 | 12,36 | 13,5 |

# Is something happening?



**Muestras Recibida**

| Cantidad | Material | Categoría |
|---|---|---|
| 8 | Animal muerto | Lechones |

**Resultados:**

**NECROPSIA**

*Animal muerto - Lechones - 0 Dias*

***Código necropsia: 001***

Fetos de 23 cm. No se valoran lesiones.

***Submuestras necropsia: 001***

**DIAG. MOLECULAR**

**PRRS**

*Pulmón y timo - Porcina -*

S/R - **NEG**

| Id.Neiker | Id.Cliente (§) | Tipo Muestra | MAT Brat | MAT Icte | MAT Pomo |
|---|---|---|---|---|---|
| 001.00 | LC5382 | Suero sanguíneo | Neg | Neg | Neg |
| 002.00 | T 1 | Suero sanguíneo | Neg | Neg | Neg |
| 003.00 | L6717 | Suero sanguíneo | Neg | 1/100 | Neg |
| 004.00 | T 2 | Suero sanguíneo | Neg | 1/50 | Neg |
| 005.00 | P252 | Suero sanguíneo | Neg | Neg | Neg |
| | | Suero sanguíneo | 1/50 | 1/50 | Neg |
| | | Suero sanguíneo | Neg | Neg | Neg |
| | | uíneo | 1/50 | 1/50 | Neg |
| 009.00 | T286 | | Neg | Neg | Neg |
| 010.00 | T812 | | | 1/100 | Neg |
| 011.00 | T393 | Suero sangu | | | Neg |

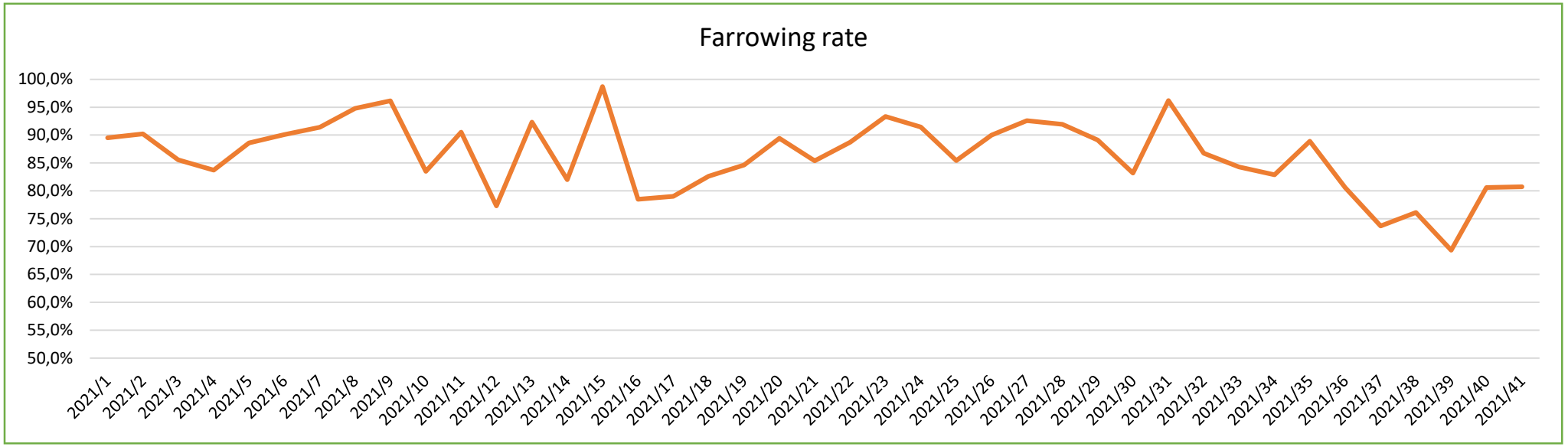
- New mass vaccination PRRSv (2021/19)

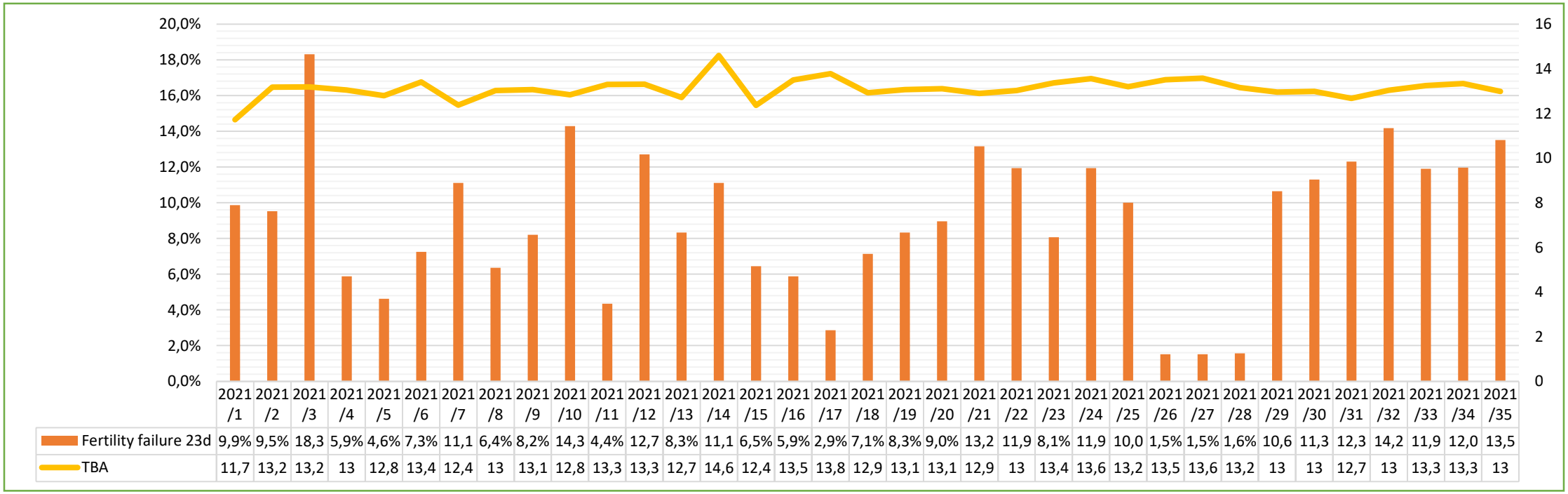
| MUESTRAS | | PRRS Indirecto | PCR PRRS | | PPV | MAL ROJO | INFLUENZA |
|---|---|---|---|---|---|---|---|
| | | | EU | NA | | | |
| 1 | 1803 | 0.284 - | NEGATIVO | NEGATIVO | 3013 + | 0.583 + | 2.73 + |
| 2 | 2266 | 2.716 + | | | 372 + | 0.859 + | 5.69 + |
| 3 | 4306 | 2.134 + | | | 327 + | 0.450 + | 5.10 + |
| 4 | 4314 | 2.475 + | | | 674 + | 1.044 + | 5.31 + |
| 5 | 1767 | 0.726 + | | | 2129 + | 0.494 + | 5.11 + |
| 6 | 1952 | 2.233 + | | | 380 + | 0.370 DD | 5.28 + |

# September 2021

+4% repetitions

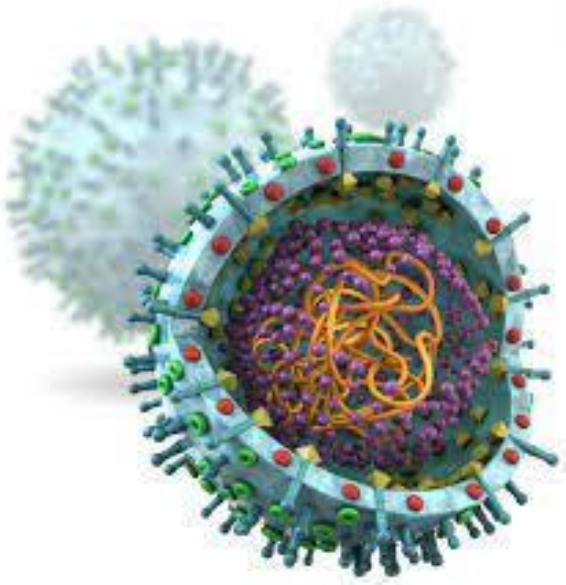
VD 2%

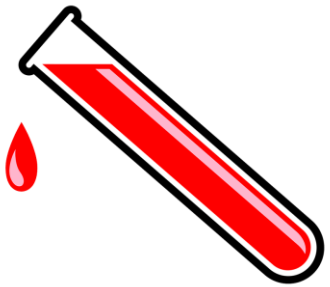



| | 2021/1 | 2021/2 | 2021/3 | 2021/4 | 2021/5 | 2021/6 | 2021/7 | 2021/8 | 2021/9 | 2021/10 | 2021/11 | 2021/12 | 2021/13 | 2021/14 | 2021/15 | 2021/16 | 2021/17 | 2021/18 | 2021/19 | 2021/20 | 2021/21 | 2021/22 | 2021/23 | 2021/24 | 2021/25 | 2021/26 | 2021/27 | 2021/28 | 2021/29 | 2021/30 | 2021/31 | 2021/32 | 2021/33 | 2021/34 | 2021/35 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fertility failure 23d | 9,9% | 9,5% | 18,3 | 5,9% | 4,6% | 7,3% | 11,1 | 6,4% | 8,2% | 14,3 | 4,4% | 12,7 | 8,3% | 11,1 | 6,5% | 5,9% | 2,9% | 7,1% | 8,3% | 9,0% | 13,2 | 11,9 | 8,1% | 11,9 | 10,0 | 1,5% | 1,5% | 1,6% | 10,6 | 11,3 | 12,3 | 14,2 | 11,9 | 12,0 | 13,5 |
| TBA | 11,7 | 13,2 | 13,2 | 13 | 12,8 | 13,4 | 12,4 | 13 | 13,1 | 12,8 | 13,3 | 13,3 | 12,7 | 14,6 | 12,4 | 13,5 | 13,8 | 12,9 | 13,1 | 13,1 | 12,9 | 13 | 13,4 | 13,6 | 13,2 | 13,5 | 13,6 | 13,2 | 13 | 13 | 12,7 | 13 | 13,3 | 13,3 | 13 |

- NEW: some aborted sows FEVER (>39’5°C)
- Other mass PRRSv vaccine (week39).





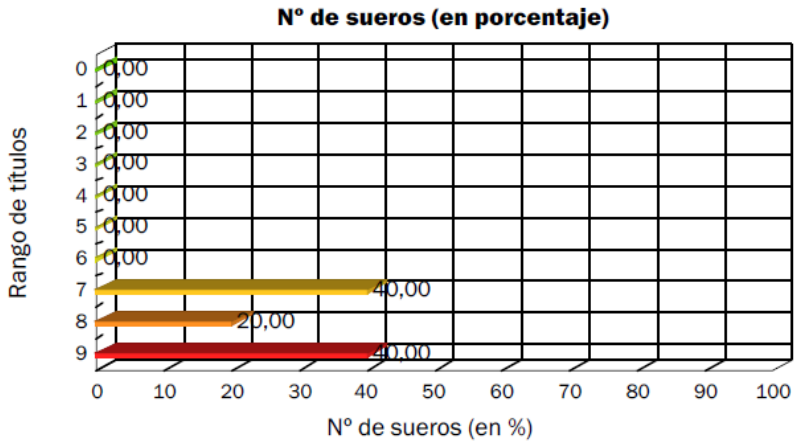
*Sangre - Cerdas -*

1-3225 - **119** 2-S/N - **218** 3-2624 - **109** 4-3808 - **100**

53579 - **147**

**RESUMEN**

| | Rangos | Cant | % |
|---|---|---|---|
| 0 | < 20 | 0 | 0,00% |
| 1 | 20 - 30 | 0 | 0,00% |
| 2 | 30 - 40 | 0 | 0,00% |
| 3 | 40 - 60 | 0 | 0,00% |
| 4 | 60 - 80 | 0 | 0,00% |
| 5 | 80 - 90 | 0 | 0,00% |
| 6 | 90 - 100 | 0 | 0,00% |
| 7 | 100 - 110 | 2 | 40,00% |
| 8 | 110 - 120 | 1 | 20,00% |
| 9 | > 120 | 2 | 40,00% |
| | **Total** | 5 | 100,00% |




**DIAG. MOLECULAR**

S/R: Sin referencia FS: No analizado por falta de muestra.

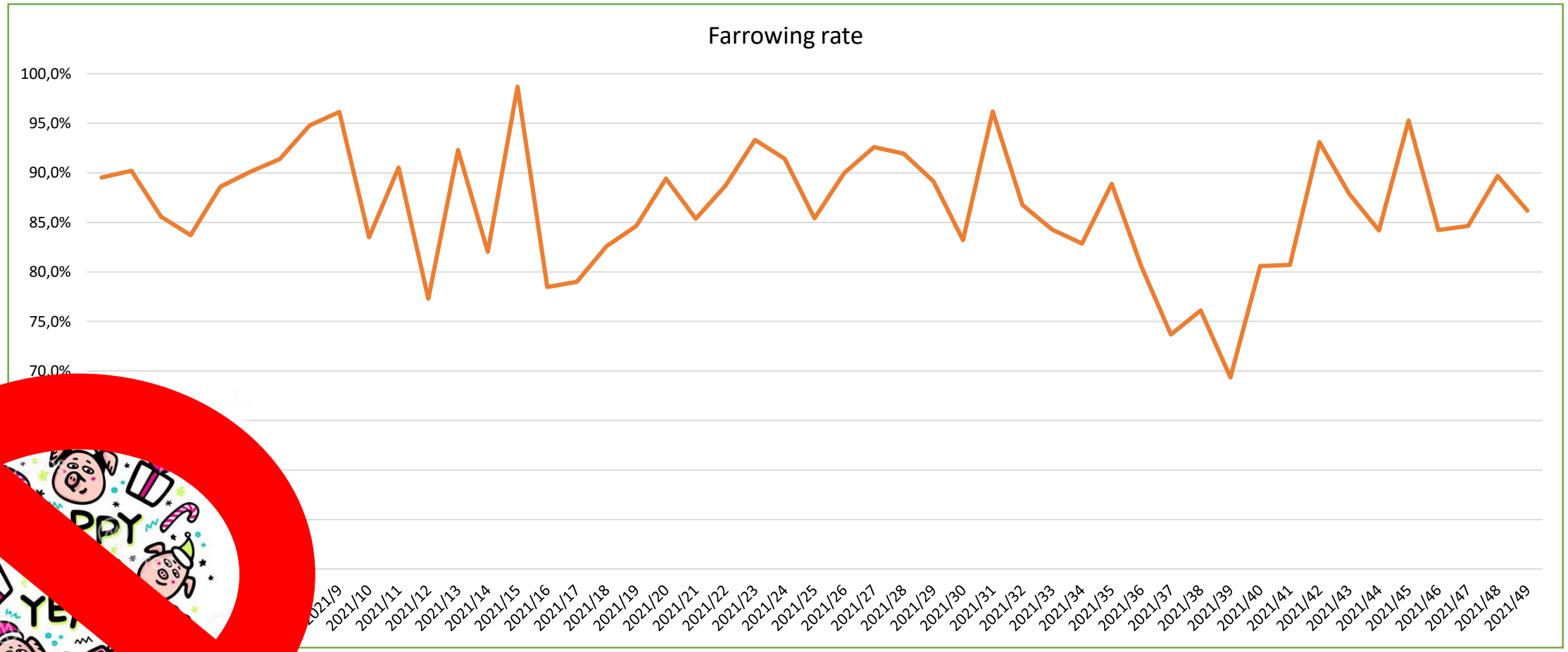
**PRRS**

*Sangre - Cerdas -*

| Pool | Referencias | R |
|---|---|---|
| 1 | 1-3225, 2-S/N, 3-2624, 4-3808, 53579 | POS (++ |

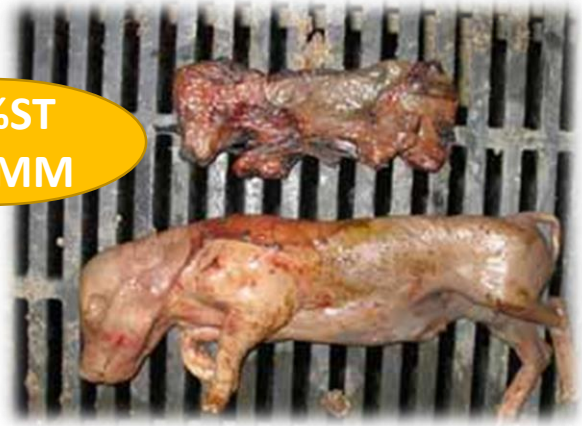
Re-circulation own strain

# November 2021




# December 2021/January 2022

+3%ST
+2%MM



+22% Litter scatter

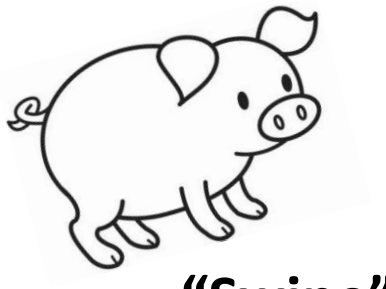
| Id.Neiker | Id.Cliente (§) | Tipo Muestra | MAT Brat | MAT Icte | MAT Pomo |
|---|---|---|---|---|---|
| 001.00 | ABORTO | Suero sanguíneo | Neg | 1/50 | Neg |
| 002.00 | ABORTO | Suero sanguíneo | Neg | 1/100 | Neg |
| 003.00 | ABORTO | Suero sanguíneo | 1/100 | 1/100 | Neg |

| Id.Neiker | Id.Cliente (§) | Tipo Muestra | MAT Brat | MAT Icte | MAT Pomo |
|---|---|---|---|---|---|
| 001.00 | <10 | Suero sanguíneo | Neg | >=1/800 | Neg |
| 002.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 003.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 004.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 005.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 006.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 007.00 | <10 | Suero sanguíneo | Neg | 1/200 | Neg |
| 008.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 009.00 | <10 | Suero sanguíneo | Neg | 1/200 | Neg |
| 010.00 | <10 | Suero sanguíneo | Neg | Neg | Neg |
| 011.00 | >14 | Suero sanguíneo | Neg | 1/100 | Neg |
| 012.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 013.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 014.00 | >14 | Suero sanguíneo | Neg | 1/200 | Neg |
| 015.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 016.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 017.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 018.00 | >14 | Suero sanguíneo | Neg | >=1/800 | Neg |
| 019.00 | >14 | Suero sanguíneo | Neg | Neg | Neg |
| 020.00 | >14 | Suero sanguíneo | Neg | 1/200 | Neg |
| 021.00 | Abortos | Suero sanguíneo | Neg | 1/400 | Neg |

| Id.Neiker | Id.Cliente (§) | Tipo Muestra | MAT Brat | MAT Icte | MAT Pomo |
|---|---|---|---|---|---|
| 022.00 | Abortos | Suero sanguíneo | Neg | 1/100 | Neg |
| 023.00 | Abortos | Suero sanguíneo | Neg | 1/400 | Neg |
| 024.00 | Abortos | Suero sanguíneo | Neg | 1/100 | Neg |
| 025.00 | Abortos | Suero sanguíneo | Neg | 1/200 | Neg |
| 026.00 | Abortos | Suero sanguíneo | 1/50 | 1/100 | Neg |
| 027.00 | Abortos | Suero sanguíneo | Neg | 1/100 | Neg |
| 028.00 | Abortos | Suero sanguíneo | Neg | 1/200 | Neg |

**L. interrogans**
**ICTEROHAEMORRHAGIAE**

# Leptospira interrogans



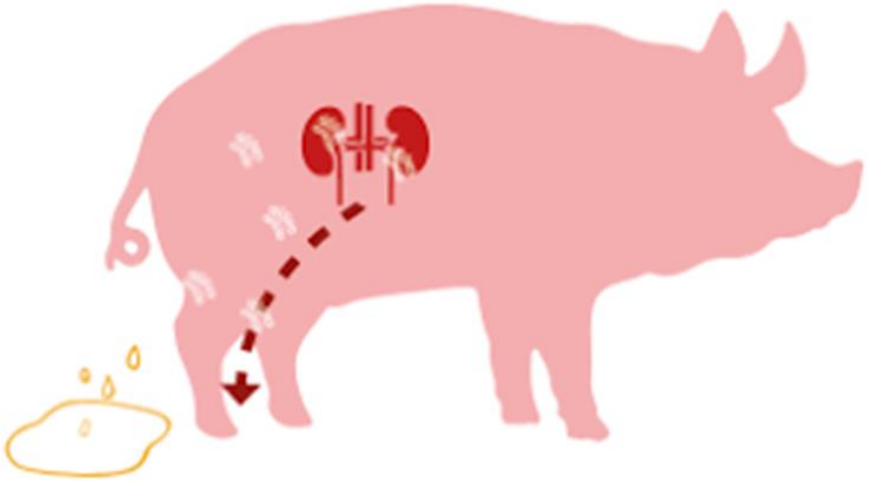
Pomona
Australis (Bratislava)

**“Swine” serogroups (Adapted)**

- Endemic/chronic clinic.
- Persistence in kidneys: multiply and excreted in the URINE (intermittently).

**Incidental infections (Non-adapted)**

- Acute clinic (“storm abortions”).
- Anorexia and pyrexia.
- Jaundice and hemoglobinuria.
  (few reports: Icterohaemorrhagiae)

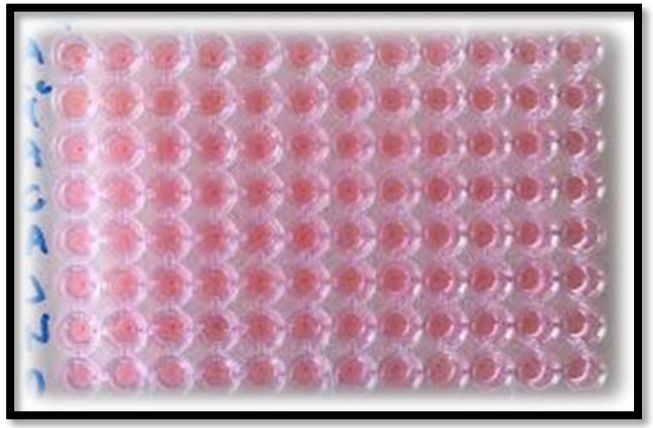


Icterohaemorrhagiae

Incidental infection

# Diagnosis

- PRRSv
- Influenza
- Brucella
- Parvovirosis
- Erysipelas



## Serological tests: MAT

- Standart test (OIE 2008).
- Antileptospiral agglutinins 5-10d (peak 3w). Paired simples.
- Minimum 10% of the herd tested.
- Very useful: acute infection.
- Abortion: presence antibody in fetal serum.
- Limited: chronic and individual infection/ carriers.
- Min. significant titer 1:100. (Ellis et al. 1986)
- Others: ELISA.

## Direct tests (detect leptospires)

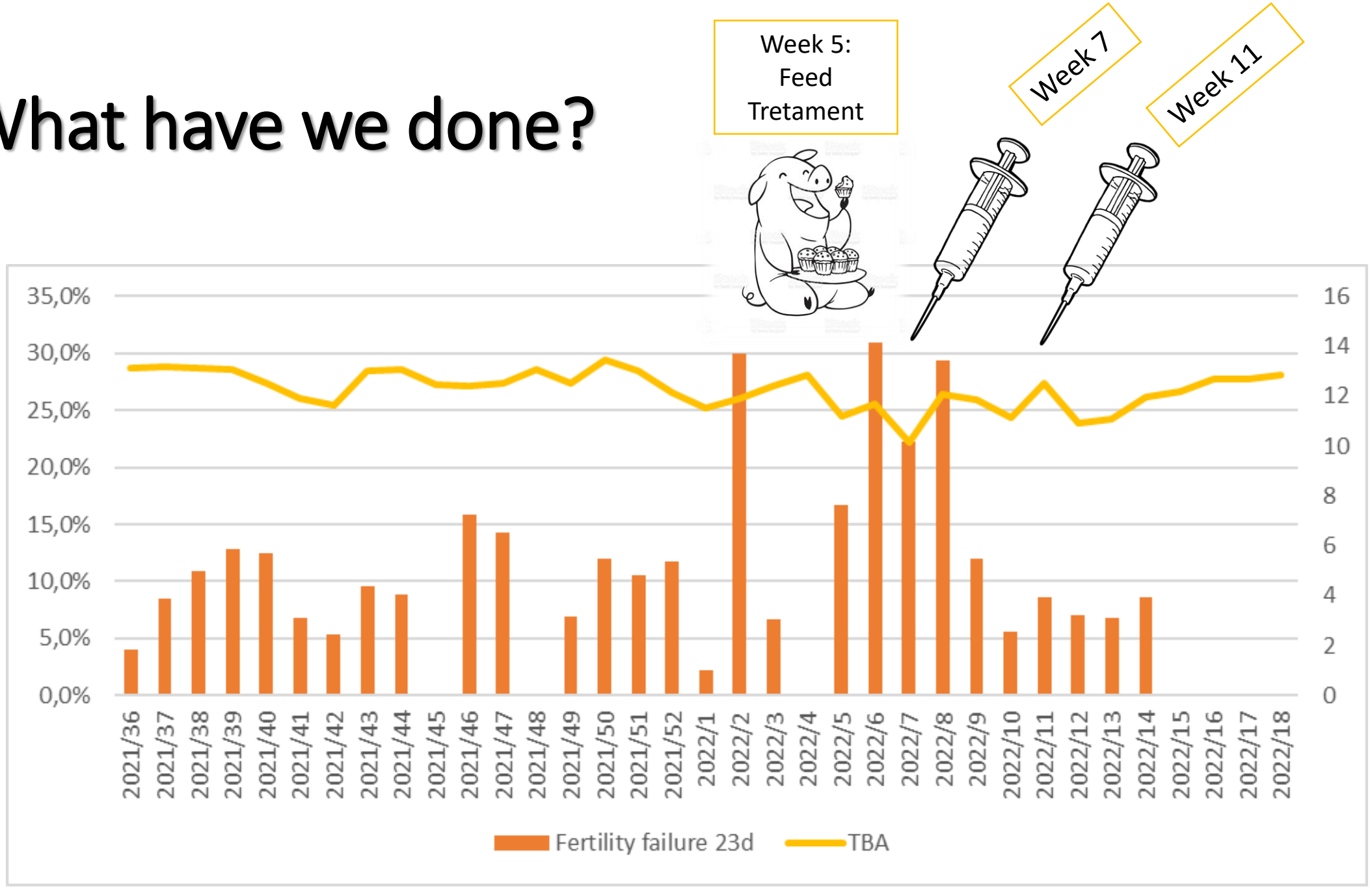
- Organs: liver, lung, brain.
- Fluids: blood, cerebrospinal, thoracic, peritoneal, urine.
- Fetus.
- Useful: carriers and chronic infection.
- PCR.
- Culture: more sensitive method but DIFFICULT (laboratories specializing). 29-30°C at least 12w.

# Treatment: Antibiotic + Vaccination

- Tetracycline in feed (20mg/kg bw), during 1 week.
- Only 1 vaccine registered in Spain (October 2018): *Porcilis Ery+Parvo+Lepto®*.
- Onset of inmunity: 2 weeks.
- Duration of inmunity: 12 months (*Icterohaemorrhagiae* and *Pomona*)/ 6 months (*Bratislava*).
- 1th dose 6-8 weeks before mating and 2nd dose 4 weeks later.

| Cepas inactivadas de: | |
|---|---|
| *Erysipelothrix rhusiopathiae*, serotipo 2 (cepa M2) | ≥1 DPC[1] |
| Parvovirus porcino (cepa 014) | ≥130 U[2] |
| *Leptospira interrogans* serogrupo Canicola serovariedad Portland-Vere (cepa Ca-12-000) | ≥2816 U[2] |
| *Leptospira interrogans* serogrupo Icterohaemorrhagiae serovariedad Copenhageni (cepa Ic-02-001) | ≥210 U[2] |
| *Leptospira interrogans* serogrupo Australis serovariedad Bratislava (cepa As-05-073) | ≥1310 U[2] |
| *Leptospira kirschneri* serogrupo Grippotyphosa serovariedad Dadas (cepa Gr-01-005) | ≥648 U[2] |
| *Leptospira interrogans* serogrupo Pomona serovariedad Pomona (cepa Po-01-000) | ≥166 U[2] |
| *Leptospira santarosai* serogrupo Tarassovi serovariedad Gatuni (cepa S1148/02) | ≥276 U[2] |

# What have we done?



INTERRUPTION OF TRANSMISSION

# Biosecurity
# Rodent control program

- Introduction infected stock
- Exposure contaminated environment
- **Contact alternative vector (material contaminated)**

# References


- **Bolin CA. 1994. Diagnosis of leptospirosis in swine. Swine Health Product, 2: 23-24.**
- **Chappel RJ, Ellis WA, Adler B, Amon L, Millar BD, Zhu SS, Prime RW. 1992. Serological evidence for the presence of Leptospira interrogans serovar bratislava in Australian pigs. Aust Vet J, 69: 119-120.**
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- **Ellis WA, Bolin CA. 1996. Leptospirosis. En: Manual of standards for diagnostic test and vaccines. Office International de Epizooties (O.I.E.), p**
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- **Kingscote BF. 1986. Leptospirosis outbreak in a piggery in southern Alberta. Can Vet J, 27: 188-190.**
- **Little TWA, Hathaway SC. 1983. Leptospirosis in pigs. Vet Ann, 23rd ed. Bristol, England: J Wright &Sons, pp: 116-121.**


Thank you for your attention and your time.