
PARVORUVAX
Suspension injectable
Suspension for injection
50 ml
1
FULL & SUPERIOR
PROTECTION
AGAINST PPV
THE LEADING
VACCINE
IN ITS SEGMENT
2
3
KEEP
ON
PROVING
ITS
FIRST
PLACE
PARVORUVAX
Always one proof ahead!
ceva

PORCINE PARVOVIRUS (PPV) GENOTYPE 1 & 2 STRAINS ARE POTENTIALLY PRESENT IN ANY SWINE FARM ANYWHERE IN THE WORLD.

From an **antigenic point of view**, all PPV clusters can be categorized into **two groups**:

Genotype 1

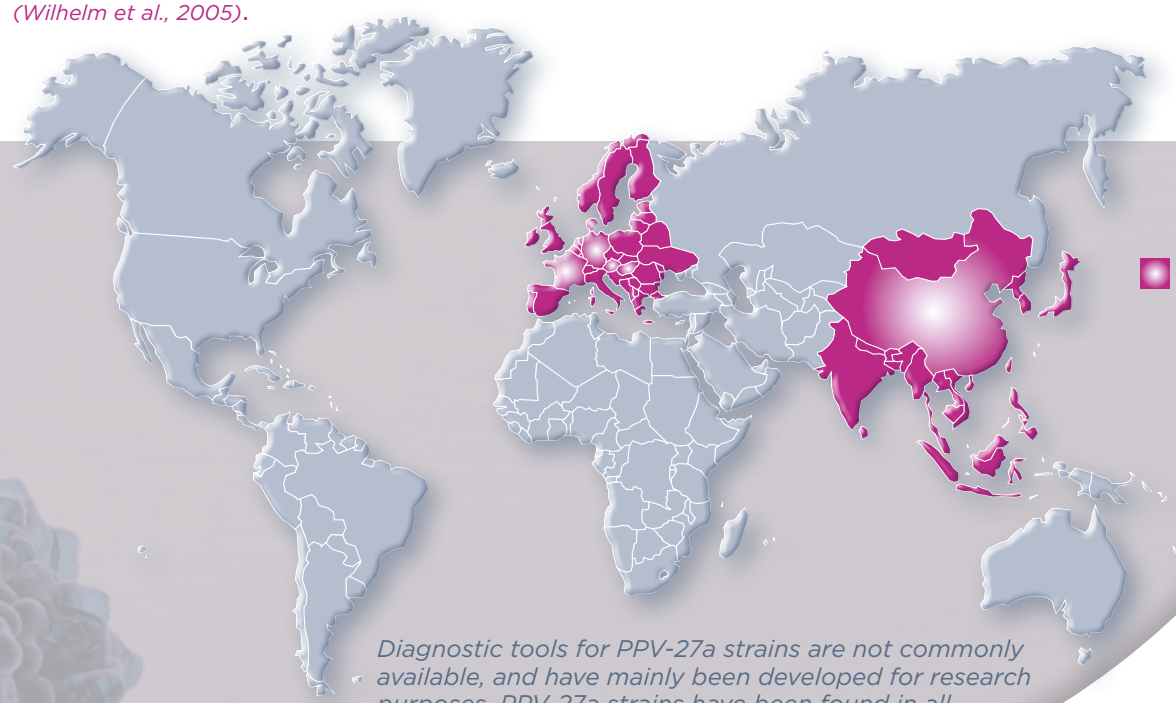
ACCOUNTING FOR MOST OF THE CLUSTERS WORLDWIDE, IN BOTH DOMESTIC PIGS AND WILD BOARS, COVERED IN A HOMOLOGOUS MANNER BY EXISTING PPV VACCINES.

Genotype 2

ACCOUNTING FOR THE **VERY HIGH-VIRULENT** AND LESS NEUTRALIZING ANTIBODY-SENSITIVE **PPV-27a** CLUSTER, COVERED IN A CROSS-PROTECTIVE AND HETEROLOGOUS MANNER BY EXISTING PPV VACCINES.

Isolated for the first time in Germany in 2001, the **PPV-27a STRAIN** is the reference strain of the most recent cluster of the very high-virulent strain.

The **PPV-27a CLUSTER** was defined later on, in 2006.[1] As it was the first cluster defined outside the previous scope of PPV strains, and as it was proven to differ greatly in terms of pathogenicity, tissue tropism and replication speed, it was called **GENOTYPE 2** *(Wilhelm et al., 2005)*.



Countries where PPV-27a strain has been isolated.

Diagnostic tools for PPV-27a strains are not commonly available, and have mainly been developed for research purposes. PPV-27a strains have been found in all countries where thorough investigations have been performed.[5-10]

VERY HIGH VIRULENT PPV-27a CLUSTER STRAINS

Very different in terms of sensitivity to neutralizing antibodies, pathogenicity, tissue tropism and replication speed[2]

The amino acid positions in the capsid are related to the virulence of the strains.

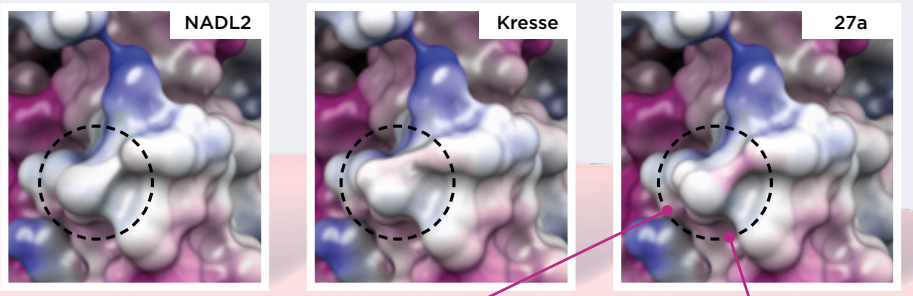
Virulence factors are related to the capsid built from the VP1 & VP2 proteins. Very few specific amino acid substitutions in the right position on VP1 & VP2 strongly affect virulence and antigenicity.

COMPARING THE VP2 PROTEINS OF:

a low-virulent strain, PPV-NADL-2 | **a high-virulent strain, PPV-Kresse** | **a very high-virulent strain, PPV-27a**

some differences can be observed in the PPV-27a strains: increase of the surface polarity causes a structural modification of the capsid surface, generating a unique electrostatic profile, responsible for an increased virulence.

Fig 1:
3-D model of the surface of the fourth loop (3-fold spike center) of PPV-VP2. Electrostatic surface potentials are shown in color: pink is positive, white is neutral and blue is negative. The site 436 is marked.[3]
(Adapted from Streck et al., 2015)



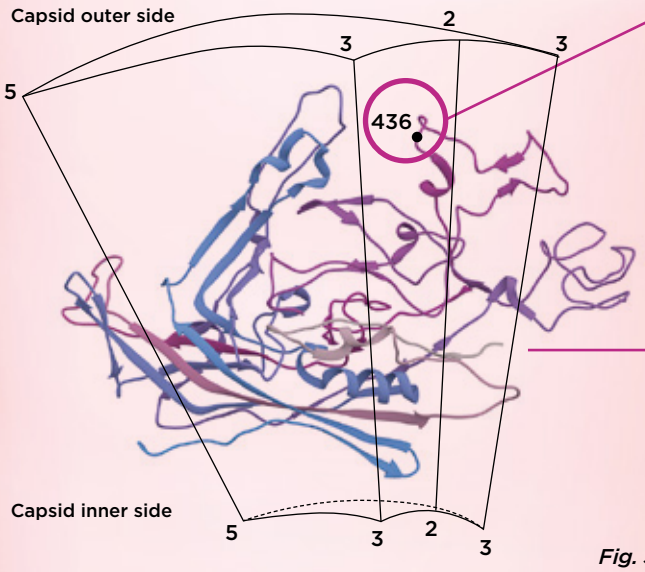


Fig. 2 *- 3D model of a PPV VP2 capsid protein.*
(Adapted from Streck et al., 2011)

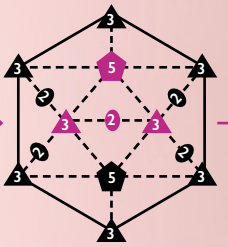


Fig. 3 *- Schematic model of the assembly of the xx capsid proteins into a capsid.*
(Adapted from Mietzsch et al., 2019)

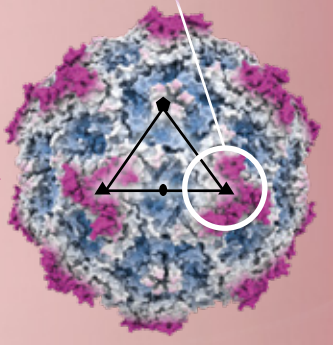


Fig. 4 *- 3D model of a PPV capsid showing the position of a VP2 protein and an aa-436.*
(Adapted from Mietzsch et al., 2019)

Challenge Trial 1

PARVORUVAX® PROTECTS AGAINST REPRODUCTIVE FAILURE CAUSED BY PORCINE PARVOVIRUS-27a CLUSTER STRAIN[11]

1st PROOF

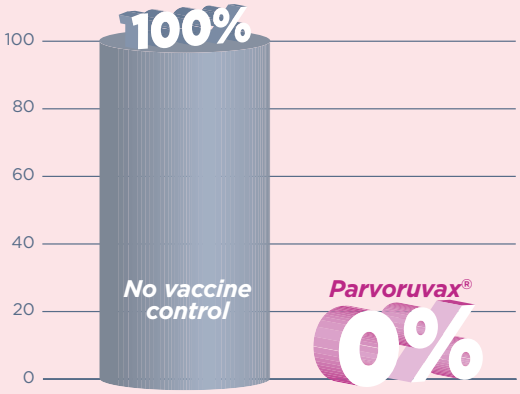
Summary: **Eight gilts** (the study ended up with <8 gilts in each group) were vaccinated twice with PARVORUVAX® at 6 and 2 weeks prior to mating. A similar number of gilts was injected with PBS to serve as controls • **At day 40** of pregnancy, all gilts were challenged intranasally and i.m. (2-2 mL) with a PPV-27a genotype virus strain (PPV1-HUN) having a titer of 6.97 log TCID50/1mL • **At day 90** of pregnancy, all gilts in both groups were euthanized and all fetuses were aseptically delivered and euthanized, then photographed and evaluated as mummified, dead or alive.

RESULTS:

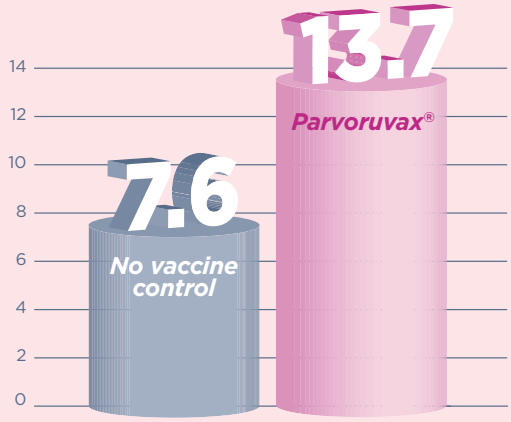
no clinically affected litters in the PARVORUVAX® treatment group compared to 100% of clinically affected litters in the control group.

Non vaccinated

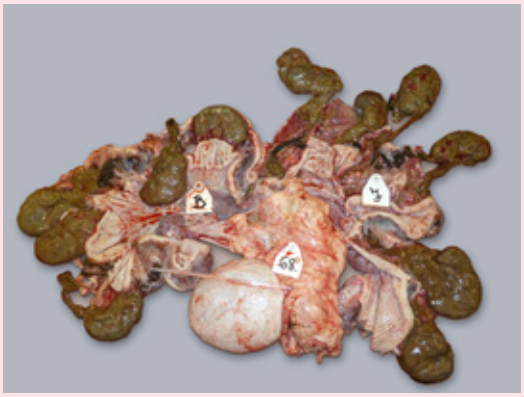
PARVORUVAX®



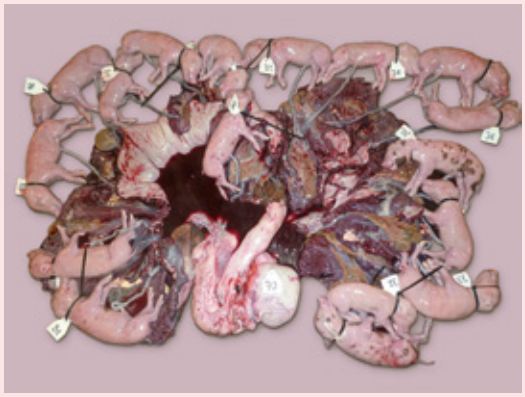
Clinically affected litters *(%)*



Average litter size *(number of piglets)*



Litter of non-vaccinated control mother



Litter of Parvoruvax® vaccinated mother

CONCLUSION

PARVORUVAX® provided excellent protection against the effect of PPV-27a cluster strain challenge by:

- completely preventing reproductive failure in vaccinated sows,
- providing a significantly higher number of live piglets/litter.

Challenge Trial 2

2nd PROOF

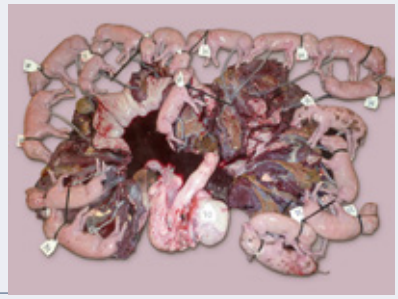
COMPARATIVE TRIAL TO EVALUATE THE EFFICACY OF DIFFERENT PPV/ERY VACCINES AVAILABLE IN THE MARKET[6]

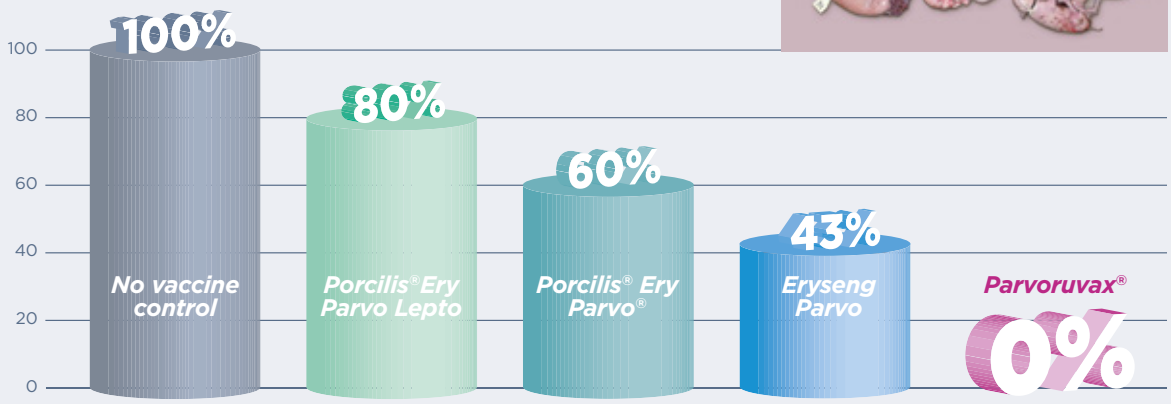
Summary: **Eight gilts** (the study ended up with <8 gilts in each group) were vaccinated twice prior to mating with equivalent commercial vaccines following the vaccination schedule proposed by each manufacturer. A similar number of gilts was injected with PBS to serve as the control group • **At day 40** of pregnancy, all gilts were challenged intranasally and i.m. (2-2 mL) with a PPV-27a genotype virus strain (PPV1-HUN) having a titer of 6.97 log TCID50/1mL • **At day 90** of pregnancy, all gilts in both groups were euthanized and all fetuses were aseptically delivered and euthanized, then photographed and evaluated as mummified, dead or alive • The general condition of fetuses, their size and weight were recorded.

RESULTS:

no clinically affected litters in the PARVORUVAX® treatment group compared to 100% of clinically affected litters in the control group.

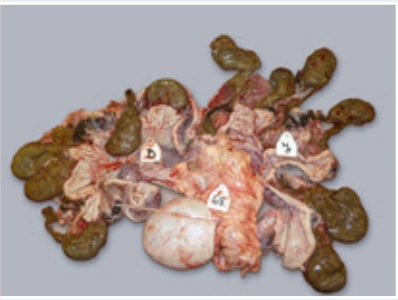
Litter of Parvoruvax® vaccinated mother



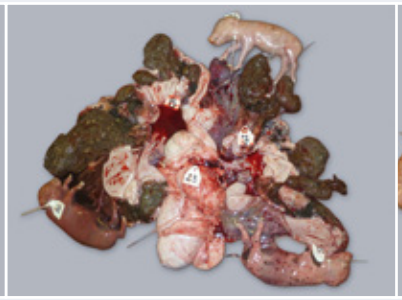


Litters with mummified and/or dead fetuses *(%)*

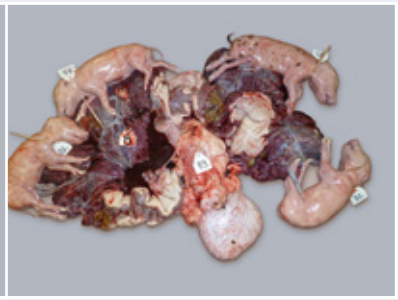
Litter of non-vaccinated control mother



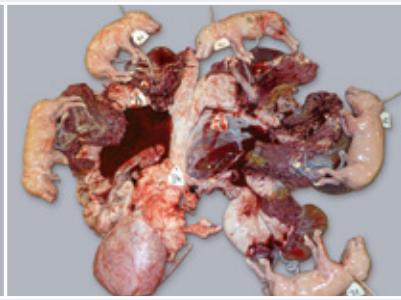
Litter of Porcilis® Ery Parvo Lepto vaccinated mother



Litter of Porcilis® Ery Parvo vaccinated mother



Litter of Eryseng Parvo® vaccinated mother



CONCLUSION

Compared to all other vaccines, **PARVORUVAX®** provided outstanding protection against PPV 27a challenge, providing:

- the lowest number of affected litters (0) with PPV27a-affected fetuses.

PARVORUVAX

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PARVORUVAX® recommended vaccination schedule*

- Primary: **2 times at least 4 & 1 week before mating AND ≥ 6 months old**
- Booster: **3 weeks before each farrowing**
  - > Increases colostral Ery protection to the max
  - > Most detrimental Ery infections happens very young and develop as chronic
  - > PPV protection is strong and will easily last the whole following pregnancy
- Boars:
  - > Primary at the same time as gilts when young
  - > Booster every 6 months

*Vaccination protocol recommended by the Ceva veterinary technical services to achieve the best protection for your animals. In any case, check the vaccination protocol on the SPC of your territory where the vaccine is registered.

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[1] Zimmermann *et al.*, 2006 - VP1 sequences of German porcine parvovirus isolates define two genetic lineages. J Gen Virol 87, 295–301

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[3] Streck *et al.*, 2011 - High rate of viral evolution in the capsid protein of porcine parvovirus. J Genet Virol 92, 2628–2636.

[4] Mietzsch *et al.*, 2019 - 25 years of Structural Parvovirology. Viruses 11 362.

[5] Zimmerman *et al.*, 2016 - VP1 sequences of German porcine parvovirus isolates define two genetic lineages. Journal of General Virology (2006), 87, 295–30, Journal of General Virology (2011), 92, 2628–2636.

[6] Streck *et al.*, 2011 - High rate of viral evolution in the capsid protein of porcine parvovirus

[7] Breum *et al.*, 2011 - Identification of an antigenetically different porcine parvovirus (PPV) isolate in Denmark. International symposium Emerging and Re-emerging pig Diseases 2011.

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[10] Mészáros *et al.*, 2017 - Review: Biology of Porcine Parvovirus (Ungulate parvovirus 1) Viruses 2017, 9, 393; doi:10.3390/v9120393.

[11] Palya *et al.*, 2019 - Parvoruvax protects against reproductive failure caused by porcine parvovirus-27a cluster strain. APVS 2019.

[12] Ceva Internal data 2019.

Parvoruvax® Suspension for Injection contains Inactivated Porcine Parvovirus (K-22 strain) and Erysipelothrix rhusiopathiae (lysed bacterial cells), serotype 2. Also contains aluminium hydroxide and thiomersal. The product is indicated for active immunisation of breeding pigs (sows, gilts and boars) against porcine parvovirosis, to reduce the number of stillbirths and mummified piglets, and against erysipelas to reduce or prevent clinical symptoms. Vaccination can occasionally cause reactions of hypersensitivity in some animals, particularly in those animals sensitised by the erysipelas infection. In such case, appropriate treatment such as adrenaline should be provided. Rarely, vaccination can induce a small local reaction (<1.5 cm) at the site of injection without any effect on the health or productivity of the animal. The vaccination can cause a slight rise in body temperature (<0.2°C) that returns to normal values from 1 to 2 days after vaccination without any consequence to the health or productivity of the animal. Primary vaccination against porcine parvovirosis should not be carried out in the presence of maternally derived antibodies. Only healthy animals should be vaccinated. The vaccine is safe for use during pregnancy and lactation. However, avoid vaccination during the 3 weeks following service mating. **Withdrawal periods**: Zero days. **Pharmaceutical precautions**: Use immediately after opening. Store between 2°C and 8°C, protected from light.

For more details, see the SPC applicable in your country.

Reprotection

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