

# NOVEL INSIGHTS IN THE PREVALENCE OF *ASCARIS SUUM* IN COMMERCIAL PIG FARMS IN EUROPE

Vandekerckhove Elise, Geldhof P.

Faculty of veterinary medicine, Department of Virology, Parasitology & Immunology, Merelbeke, Belgium.

## Background & objectives

Although several studies have already shown that infections with the roundworm *Ascaris suum* are still highly prevalent in intensive pig production systems, farmers are most often unaware of worm infections on their farm and the economic losses caused by this parasite. The **first goal of this project** was to assess the prevalence of *A. suum* infections in fatteners throughout Europe using the serological SERASCA®-test. The **second objective of this research project** was to investigate whether serology could also be used to measure exposure of piglets to *A. suum* during the nursery period. To achieve this, three different serological tests were used and evaluated on samples from artificially infected piglets and the best test subsequently used in a small scale seroprevalence study.

## Materials, Methods & Results

### 1. Seroprevalence of *Ascaris suum* in fattening farms in Europe

#### Materials and methods:

- Blood samples were collected on 2463 different farms in Europe from fattening pigs at the end of their fattening period.
- Serum was analyzed on the SERASCA®-test that is based on the recognition of a hemoglobin molecule of the parasite by antibodies of an infected animal.

Of these farms 41,5% tested serological as 'positive'.

Country	Nr. Of farms	<i>Ascaris</i> infection	
		Negative/low	Positive
Belgium	328	191 (58,2%)	137 (41,8%)
The Netherlands	130	84 (64,6%)	46 (35,4%)
France	1694	997 (58,9%)	697 (41,1%)
Poland	8	5 (62,5%)	3 (37,5%)
Denmark	218	130 (45,1%)	88 (54,9%)
Germany	41	28 (68,3%)	13 (31,7%)
Italy	44	7 (15,9%)	37 (84,1%)
<b>TOTAL:</b>	<b>2463</b>	<b>1442 (58,5%)</b>	<b>1021 (41,5%)</b>

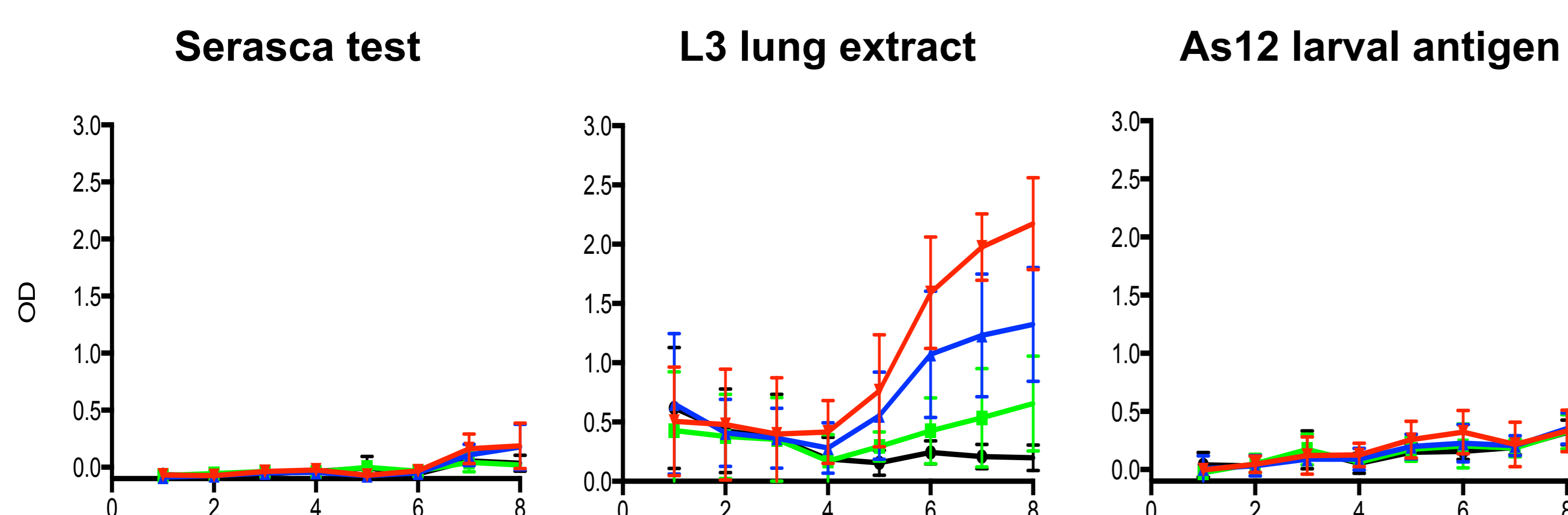
### 2. Evaluation serological assays for *Ascaris suum* in piglets

Based on the high prevalence of infections with *A. suum* observed in fattening pigs, the questions arise whether exposure to *A. suum* mainly occurs in the fattening units or earlier on in farrowing and nursery units and whether serology could be used to detect exposure to *A. suum* in piglets. To achieve this, 3 different serological tests were evaluated on serum samples from artificially infected piglets.

#### Materials and methods:

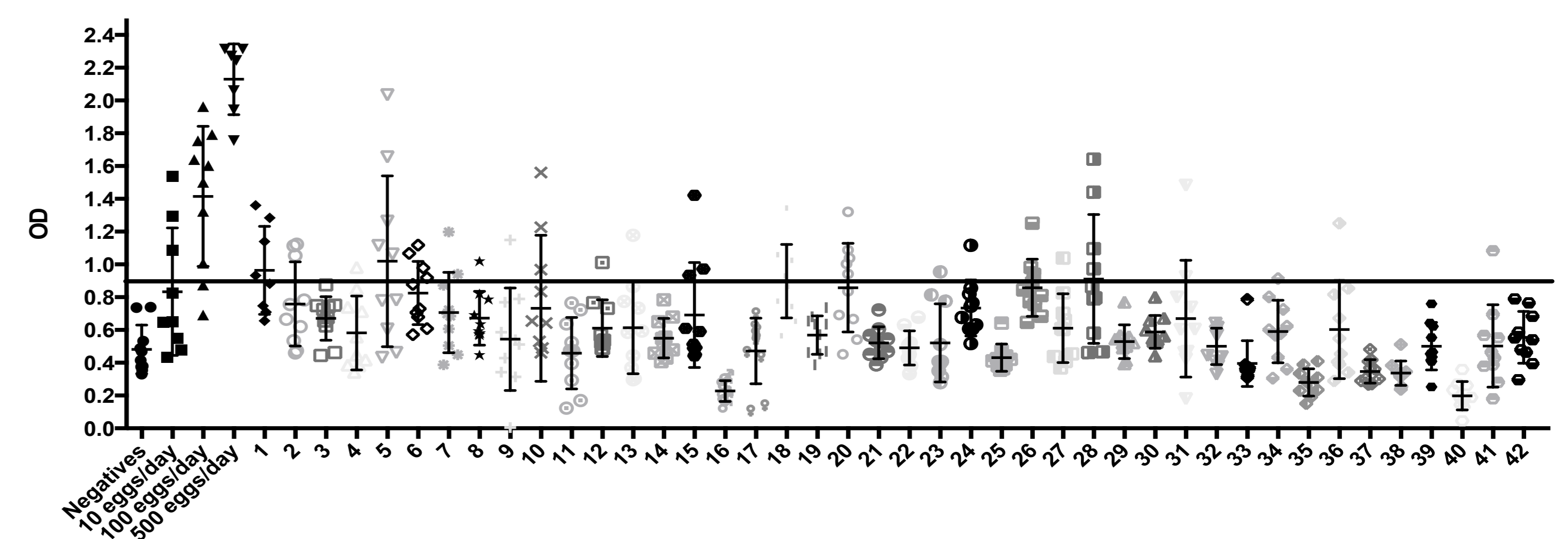
- 40 piglets were weaned at the age of 3 weeks and divided into 4 groups of 10 animals. One group served as a negative control group, the other groups received a challenge infection of 10, 100 and 500 *A. suum* eggs/day during 7 consecutive weeks. Blood was taken on a weekly base.
- Sera were individually analyzed on three different ELISA's based on the recognition of several *A. suum* antigens: Hemoglobine Ag used in SERASCA (1), As-12 Ag present on the surface of the infective L3 larvae (2) and the complete extract of L3 larvae migrating through the lungs (3).

**Results:** The results of the assays are shown in the graphs below (black: negative controls, green: 10 eggs/day, blue: 100 eggs/day, red: 500 eggs/day). A clear seroconversion was visible on the ELISA test using complete homogenate of the lung stage larvae, whereas no to low seroconversion was detectable with the Serasca test and the As-12 based ELISA.



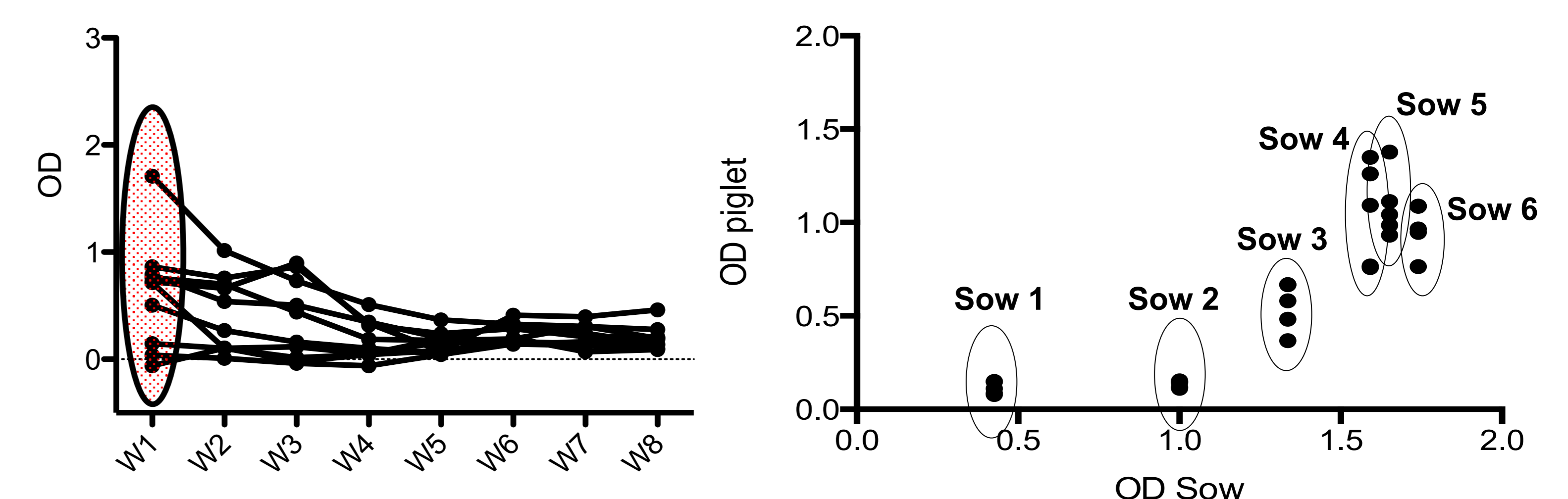
### 3. Seroprevalence of *Ascaris suum* in the nursery

The graph below shows the outcome of a small scale seroprevalence study for *A. suum* on 42 nursery farms in Flanders (Belgium), based on the L3 lung extract ELISA. Although on the majority of the farms the piglets tested low for anti-*Ascaris* antibodies, on some farms several piglets tested positive, suggesting previous exposure to *A. suum*.



### 4. Maternal transfer of anti-*Ascaris* antibodies

Serological results obtained in piglets during the nursery period (see left figure below) indicated that at the time of weaning (week 1) some piglets already test positive for anti-*Ascaris* antibodies, as measured on the L3-lung ELISA. In the following weeks, anti-*Ascaris* antibody levels further dropped till 5 weeks post weaning after which the levels remained stable. Further analysis of anti-*Ascaris* antibody levels in 6 sows and 4 of their piglets (at the time of weaning) showed that the antibody levels in the piglets correlated significantly with the levels in their respective sows, suggesting maternal transfer (see right figure below).



## Conclusions

- The outcome of the serological analysis indicates that *Ascaris suum* is still highly prevalent in fattening farms across Europe with nearly 42% of the farms analyzed testing positive.
- Serum analysed on the ELISA test based on the recognition of L3 lung extract makes it possible to detect an early *A. suum* infection/exposure in piglets.
- Serological analysis indicated the presence of Anti-*Ascaris* antibodies in piglets at the time of weaning of which the levels correlated significantly with the anti-*Ascaris* antibody levels in the sows, suggesting maternal transfer. To what extent this maternal derived immunity confers protection in the piglets is still unclear and is currently under investigation.