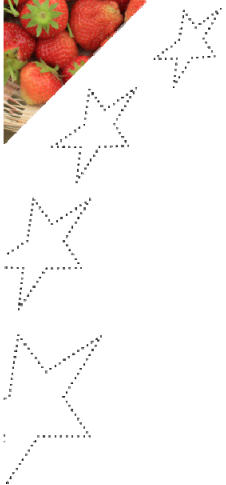




# EFSA mandate on PEDV and PDCoV

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# Porcine epidemic diarrhoea (PED)

## TORs and CONCLUSIONS



The current **epidemiological situation** in North America and Asia and elsewhere in the world as regard PED and the new porcine Deltacoronavirus

### PED in Europe:

- Only **limited active monitoring** is conducted.
- Only a **few** Member States **reported PED clinical cases** and/or PEDV-seropositive animals within the last 10 years.
- **In 2014, some outbreaks** have been reported in Germany and Italy.
- **No vaccination** has been used.





### PED in Asia:

- Only **limited active monitoring** is conducted.
- **Many outbreaks** have been reported in several countries within the last 10 years.
- **Vaccination has been used** in several countries, which might influence the epidemiological situation.

### PED in the Americas:

- Only **limited active monitoring** is conducted.
- The first outbreak was reported in May 2013 in the USA, followed by a **rapid spread** throughout the country and outbreaks reported by several countries in North, Central and South America.
- In 2014, new **vaccines were granted conditional licences** in the USA, which may influence the epidemiological situation.



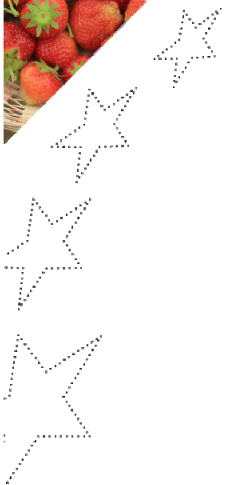


## TOR3 – DIFFERENCES BETWEEN STRAINS

1/2

Possible **differences between** the European classical PED Alphacoronavirus **strains** and the ones currently circulating in the rest of the world, in particular in the Americas, and possible existence of cross protecting immunity

- **Few sequence data from PEDV-EU isolates are available**, limited to historic (1970s and 1980s) and very recent (2014) cases. A high level of sequence identity was found between recent German and Italian viruses (2014) and PEDV-Am viruses.
- **An original and a variant PEDV-Am strain**, both having high nucleotide sequence identity to PEDV-As isolates from 2011-2012, are now co-circulating in the Americas. Retrospective studies indicate that at least two PEDV strains were introduced into the USA at a similar time.





## TOR3 – DIFFERENCES BETWEEN STRAINS

2/2

- **Differences in the nucleotide sequence of PEDVs have been identified, but their effects (if any) on virulence of the virus is currently unknown.** No comparative experimental studies have been conducted or reported.
- **Serological cross-reactivity** between PEDV-EU and PEDV-Am is reported ; however, **no data regarding cross-protection** are available.
- The **evolution of PEDVs in Europe** and the link to PEDV strains circulating in other parts of the world is **not well understood** at present

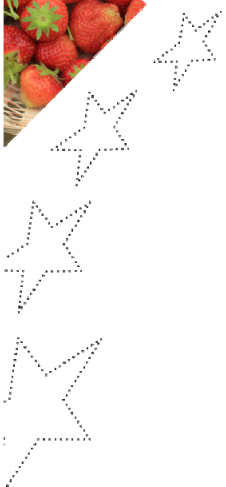






### **Impact** of the different PED Alphacoronavirus strains and of the new porcine Deltacoronavirus in pigs in different immunological scenarios

- The **impact** of recently reported PED outbreaks **in Asia** (after 2010) **and the US seems** to be **more severe than** what has been recently described **in Europe**.
- The **clinical signs of PEDV infections in naive pigs are similar** in different countries indicating that different PEDV isolates induce similar clinical signs.
- The **different impacts of PED outbreaks in different countries cannot be directly compared** owing to variation for instance, in age group of the affected pigs, production systems, biosecurity, farm management, herd size, the immune status of the population and herd sanitary status.
- **Mortality of up to 100% has been reported in suckling piglets** for PEDV-EU, PEDV-Am and PEDV-As.





## TOR4 – IMPACT

2/2

- **An apparent low impact of recent PED outbreaks** caused by viruses that have high sequence identity to US PEDV, has been **reported in Italy and Germany**. Factors which might influence the impact of a possible introduction of a US PEDV and spread of the virus to Member States include the level of cross-protection between different PEDVs and sero-prevalence (population immunity), which are currently unknown but expected to vary between Member States. The recent impact of PED in Europe needs to be **interpreted with care** because only a small number of outbreaks have been described.







## TOR5 – PRESENCE AND SURVIVAL IN MATRICES 1/3

Risk assessment of **potential entry routes** of PED and the new porcine deltacoronavirus in the EU ranking them on the basis of the level of risk with a view to enhance risk mitigation, prevention and preparedness

- **Infected live animals** and **faeces** have been reported to **transmit PEDV**. The infectious virus can survive in slurry, but at present there are no data available on the role of this matrix in PEDV transmission.
- **High levels of infectious PEDV** are shed in **faeces** and **contribute to contamination** of various objects (e.g. vehicles, humans) and feed.
- The **transmission of PEDV via feed has been shown** but **more data are required** to assess the importance of PEDV spread via feed.





## TOR5 – PRESENCE AND SURVIVAL IN MATRICES 2/3

- **PEDV RNA** has been detected at low levels in the **serum** fraction of whole blood, but, to date, no data exist on the infectious virus in this matrix.
- **Faecal cross-contamination** of blood during collection at slaughterhouses cannot be excluded.
- It is reported that **spray-drying of porcine plasma can inactivate PEDV**. However, the influence of variations in spray-drying processes has **not been sufficiently validated** for PEDV.
- **Infectious PEDV has been detected in SDPP** in one study, but the **origin** of the infectious PEDV in SDPP **is not clear** (cross-contamination or inadequate spray-drying).
- The **infectious virus** has been detected in **air** collected under experimental conditions and so PEDV may be transmitted via the air for **short distances**.

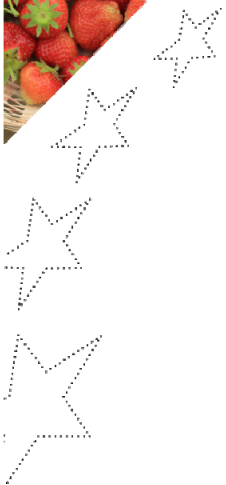




## TOR5 – PRESENCE AND SURVIVAL IN MATRICES 3/3

- Low levels of **PEDV RNA** have been detected in **semen**, but there are no data available on the presence of infectious virus in this matrix.
- There are currently **no data** available on the presence of PEDV in **embryos, pork meat or other porcine-derived feed components such as red blood cells, hydrolysed proteins, fat, gelatine and collagen.**
- **Porcine swill**, particularly including untreated pig intestines, **can contain infectious PEDV** but there are **no data** available at the moment on the role of this matrix in PEDV transmission.





# Porcine deltacoronavirus(PDCoV)

## TORs and CONCLUSIONS



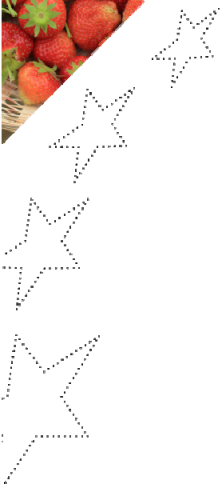
## CONCLUSIONS PDCOV TOR1 AND TOR4

### TOR1 – epidemiological situation

- Diagnostic capabilities are limited in many countries and, hence, **only very limited testing is carried out.**
- PDCoV has only been reported from **Hong Kong, US, Canada and China**

### TOR4 - impact

- **Diagnostic tools to detect PDCoV-specific antibodies have recently been developed** and are currently in the process of validation
- Based on the currently available field observations from the USA, the **current view is that PDCoV infections would have a lower impact than PEDV.**





## TOR2 – PDCOV AN EMERGING DISEASE?

**Characterization** of the new porcine **Deltacoronavirus** as an **emerging disease**, especially as regards the severity of the disease induced

An **emerging disease** is **defined by OIE** as a new occurrence of a disease, infection or infestation in an animal, causing a **significant impact** on animal or public health resulting from (1) a change of a known pathogenic agent or its spread to a new geographic area or species; or (2) a previously unrecognized pathogenic agent or disease diagnosed for the first time

- At present, there is **no clear evidence that PDCoV infections is causing a significant impact** on animal or public health.







## CONCLUSIONS PDCOV TOR5

### TOR5 – presence and survival in matrices

- There is a **lack of data** on the presence and survival of PDCoV in different matrices. It could be **anticipated** that the presence and survival of PDCoV in different matrices is **comparable to that of other intestinal porcine coronaviruses** such as PEDV and TGEV.





# **PED and PDCoV**

# **RECOMMENDATIONS**



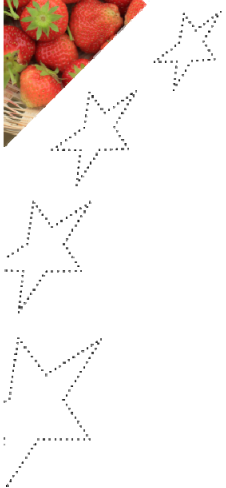
## RECOMMENDATIONS

### TOR1 – epidemiological situation

- Promote **harmonized diagnostic tools** for PEDV as well as for PDCoV

### TOR3 – differences between strains

- The **genetic sequence of further recent PEDV-EU isolates** should be determined to understand PEDV evolution in Europe and the possible link with PEDV-Am and/or PEDV-As strains.
- **Comparative animal studies** including PEDV-EU, PEDV-Am and PEDV-As strains should be performed to **obtain knowledge on their differences in virulence.**
- More knowledge is required regarding the cross-protection between PEDV-EU, PEDV-Am and PEDV-As strains, which could be acquired by performing **cross-infection experiments.**





## RECOMMENDATIONS

### TOR4 - impact

- The assessment of the possible impact of PEDV infection in the EU would require monitoring of the **PEDV-seroprevalence level** in Europe.

### TOR2 – PDCoV as emerging disease

- **Experimental studies** are needed to obtain more knowledge on **the pathogenesis and clinical signs of PDCoV infection**.





## RECOMMENDATIONS

### TOR5 – presence and survival in matrices

- More knowledge is required to assess the **importance of feed components, blood and semen** in the spread of PEDV.
- **Cross-contamination** of any object or feed with intestinal contents and faeces from PEDV-infected pigs **should be prevented**.
- The influence of variations in **spray-drying processes** **should be validated more extensively** for PEDV.





Any questions?