Dr. Lic. VANGROENWEGHE Frédéric

DVM, MSc, PhD, Dipl. ECPHM

Thursday 4th june 2015

E. coli and PWD in young pigs: importance to the EU sow farmers

Thursday 4th june 2015

Agenda

- What is Post-Weaning Diarrhoea (PWD)?
- What causes PWD and how?
- How can PWD be detected?
- How to treat a PWD outbreak?
- How to control PWD?
- What is the economic impact of PWD?
- Can PWD be prevented?

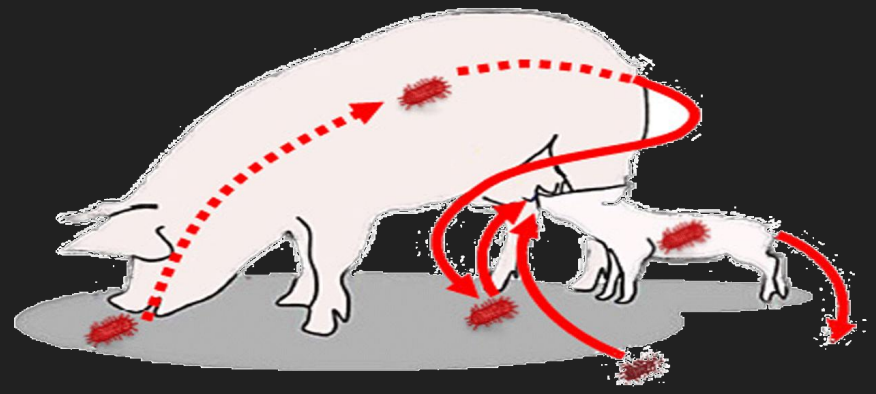
What is PWD?

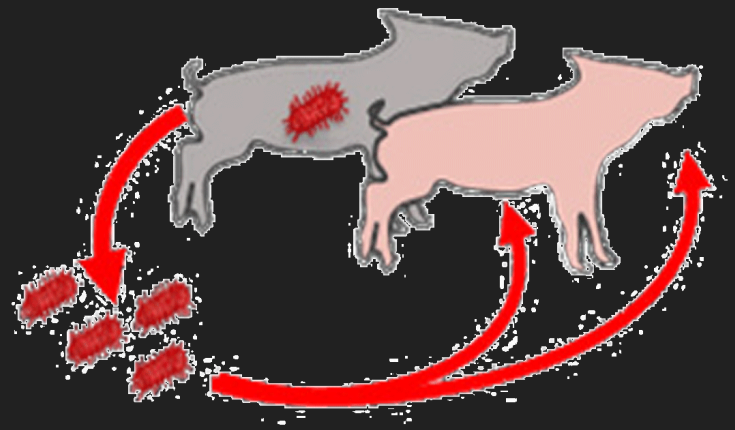
- Important enteric disease characterised by yellowish or grey diarrhea within the first 3 weeks after weaning
- Affected pigs have:
  - Reduced appetite
  - Dehydrated
  - Emaciated
  - Rough haircoat

What is PWD?

Morbidity (how many pigs get affected):

- 20-50 %
- Sows may act as carriers
- Feco-oral transmission
- Mortality (how many pigs die):
  - Classic cases < 10 % [6]
  - Severe cases (no treatment) up to 25 % [2]





What causes PWD?

- A gram-negative bacterial rod, which inhabits the intestinal microflora
- Most are commensals (reside in the intestine, but are not harmful)
- Small proportion are harmful (pathogenic) causing disease

Illustration from Eric Nadeau DWM PhD, VP Scientific Affairs, Prevtec microbia Inc

How does E.coli cause diarrhea?

- They adhere to the intestinal surface by hair-like struktures, fimbriae
  - F4
  - F18
- They produce toxins, which induce the secretion of water and electrolytes into the intestinal lumen

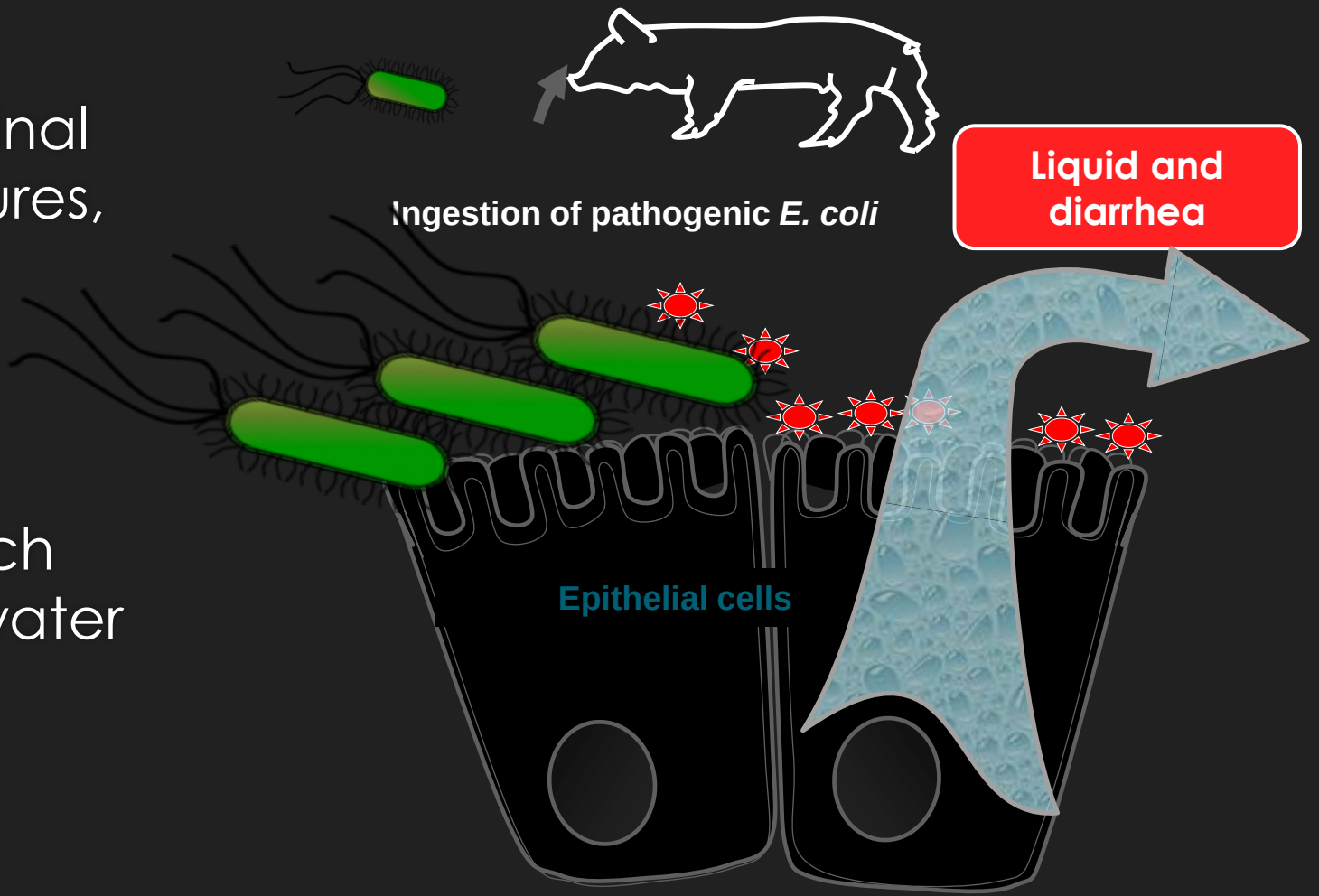


Illustration from Eric Nadeau DWM PhD, VP Scientific Affairs, Prevtec microbia Inc

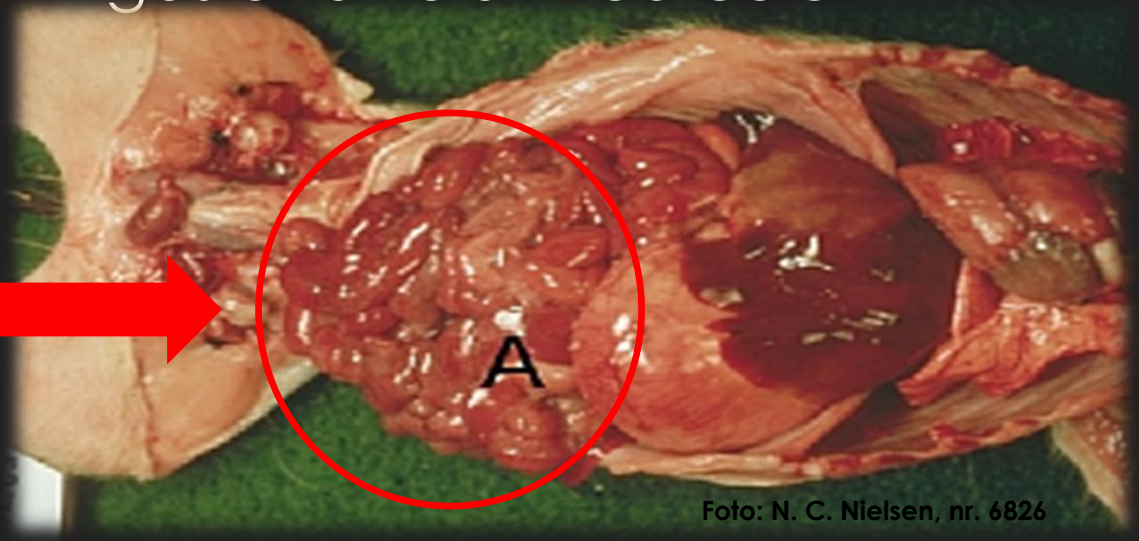
How can PWD be detected?

Clinical picture

- Age of the piglets (1-3 weeks post-weaning)
- Faecal material around perineum
- Dehydration and emaciation
- Mortality increase

Necropsy

- Characteristic smell
- Small intestine is distended with gas and fluid – red color



How can PWD be detected?

Laboratory diagnostics

- Submit 2-4 dead pigs (or feces samples) to the lab. in Kjellerup
  - Not treated with Ab
- Bacteriological tests are made
  - Non-haemolytic
  - Haemolytic (pathogenic)
- Sero- or virotyping (differentiation)
  - O149 (F4)
  - O138/O141 (F18)

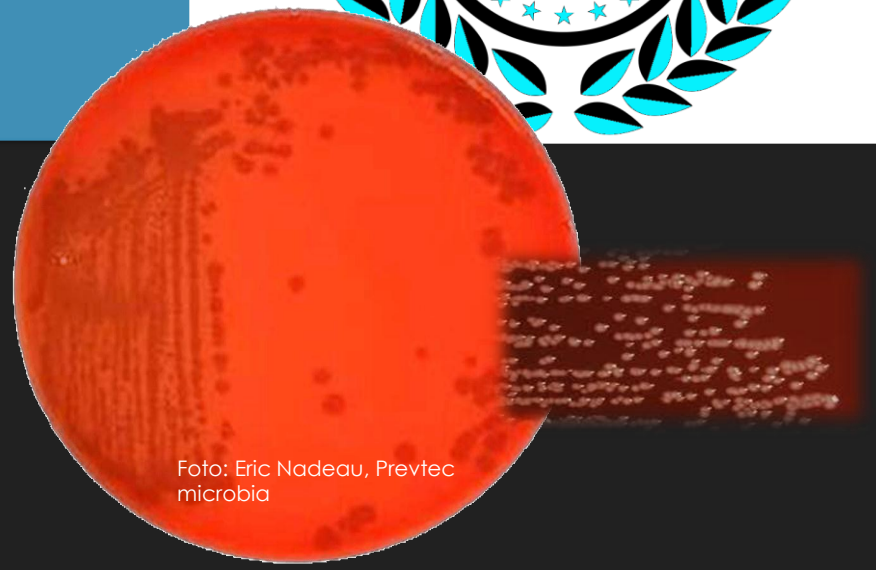


Foto: Eric Nadeau, Prevtec microbia

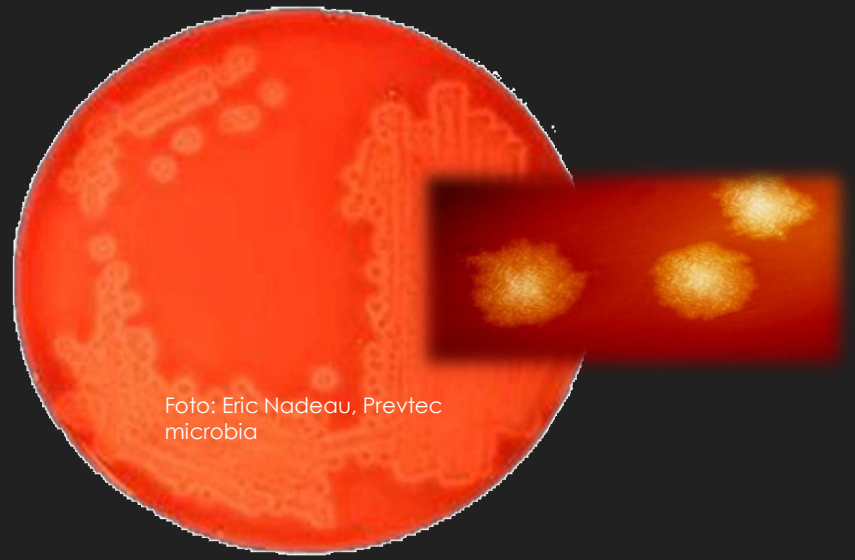
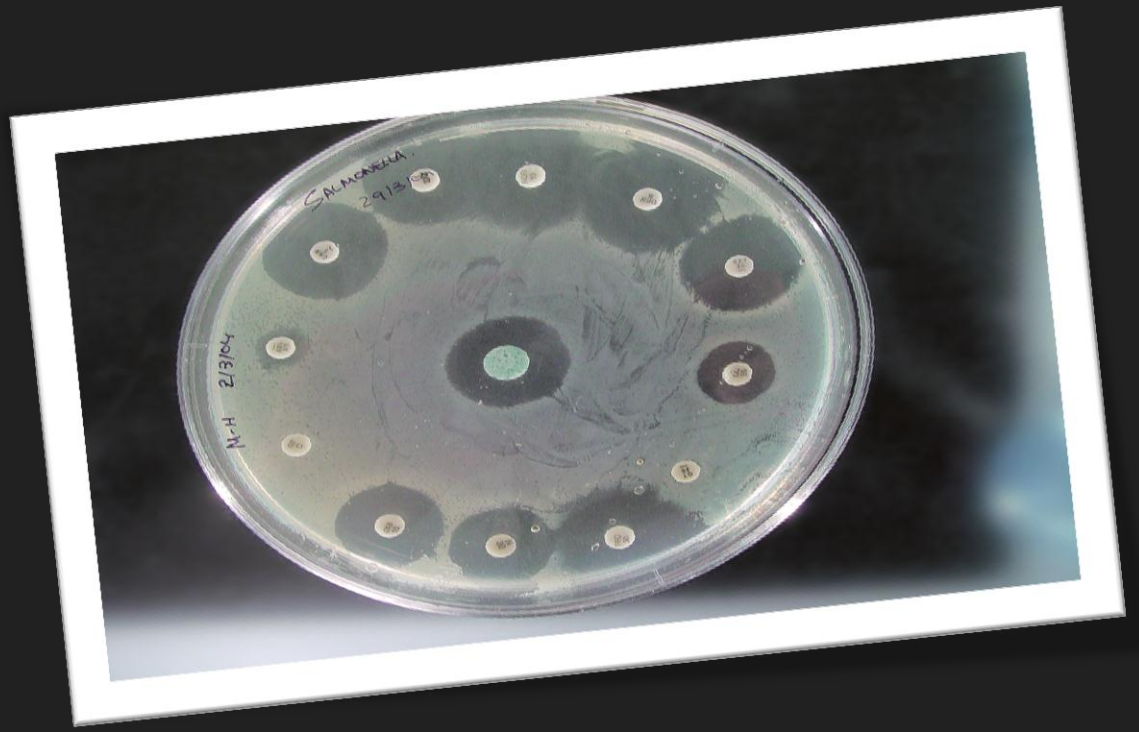


Foto: Eric Nadeau, Prevtec microbia

How to treat a PWD outbreak?

Antibiotic treatment

- E. coli (enterotoxigenic) causing diarrhea show high rate of resistance
- A sensitivity test is therefore needed
- This can be done from the bacteriological test results made on:
  - Sock samples
  - Intestinal content (necropsy)
  - Feces samples



How to treat PWD?

- According to the sensitivity test, you can choose between different types of antibiotics
- The antibiotics must **reach the intestinal lumen:**
  - Apramycin
  - Amoxicillin
  - Amoxicillin/clavulanic acid
  - Colistin
  - Trimethoprim
- Follow the vet´s recommendation
- Rehydration i.e a good supply of water and electrolytes

How to control PWD?

Management

- Weaning age
  - Stress, loss of maternal antibodies, dietary changes
- Hygiene
  - The pens have to be clean and dry when the pigs arrive (E. coli can survive for at least 3 month[3] in the presence of manure)
  - All-in-all-out (no mixing of age groups)
- Temperature
  - Room temperature should be a little higher than in the farrowing unit
  - Normally 28-30 degrees under the cover (with floorheating), avoid too big fluctuations in temperature
- Stocking density
  - Too high density results in more stress

How to control PWD?

Feed

- Highly digestible protein
- Feeding on the floor the first days after weaning (all pigs have access to feed at the same time)
- Restriction of feed intake in case of diarrhea
- High fibre diets

Feed additives

- Zinc Oxide 2500 ppm 2 weeks post weaning
  - Do not change feed simultaneously with taking Zink Oxide out of the feed
- Probiotics
- Organic acids

What is the economic impact of PWD?

Depends on:

- Mortality
  - up to 25 % [2]
- Performance loss (reduction of growth rate)
  - 10-35 % for 3 weeks[1,8]
  - Additional feedcost
- Medical costs:
  - Veterinary fee
  - Diagnostics
  - Cost of treatment

Overall economic cost[7]

- From € 2 to 4.5 per weaned piglet
- An additional 10 days to slaughter

Can PWD be prevented?

Breeding

- Long term solution
- Breeding for resistance of less susceptability for F4
- DanBred
  - Yorshire and Duroc
  - Landrace, a little behind[4]

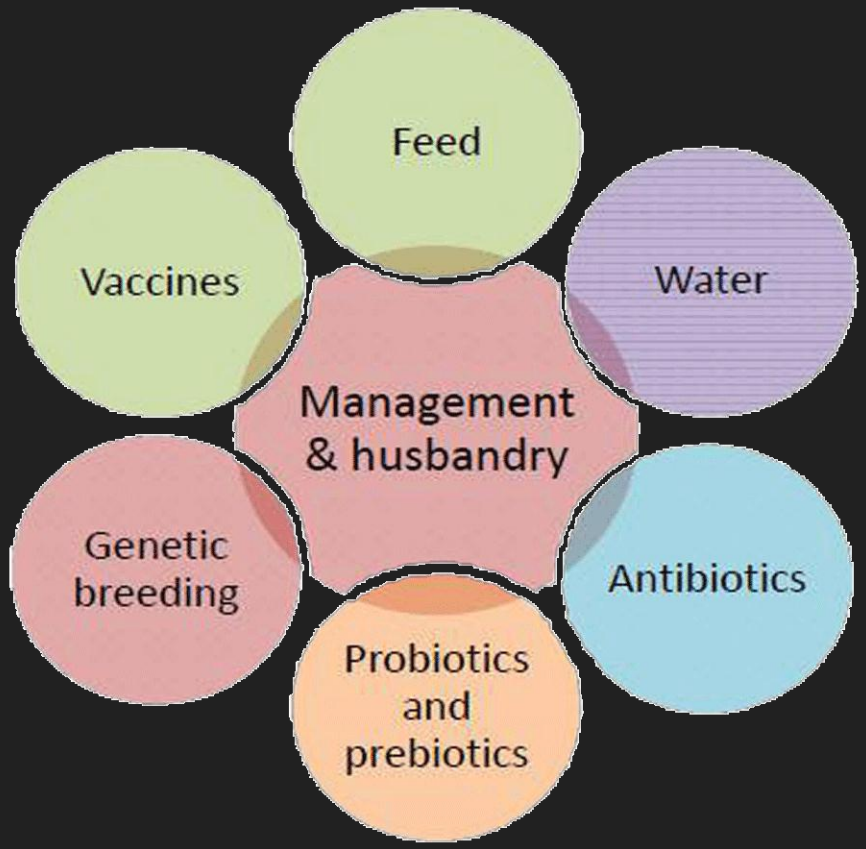
Vaccination

- Live non pathogeneic E. coli oral vaccines has shown effective
- Available on the market for PWD caused by E. coli F4
  - EU registration by Elanco

Treatment, prevention & control

Not a single strategy has proved to be totally effective

Most succesful approach involves a combination of management, diet modification and preventive measures



Thank you for your attention!

References

1. Ding MX. *et al.* 2006. J. Anim Sci. 84:2367-2373.
2. Fairbrother JM. and Gyles LG, 2012. Colibacillosis. In: Diseases of Swine. Zimmerman JJ, Karriker LA, Ramirez A, Schwartz KJ and Stevenson GW, Editors. 10th Edition. John Wiley and Sons, Inc. Chapter 53, p 723-749.
3. Lothigius A. *et al.* 2009. J Appl Microbiol. 108:1441-1449.
4. Nielsen, B., bni@lf.dk, Magasinet Svin, 2013.11, p. 39
5. Sjolund M. et al 2014. Proceedings of the 6th European Symposium of Porcine Health Management, Sorrento, Italy, p 189.
6. Taylor DJ. 1999. Post weaning enteritis. In: Pig diseases. 7th Edition. p 143-144.
7. Tokach LM. *et al.* 2000. Swine Health Prod. 8:229-233.
8. Trckova M. *et al.* 2009. Veterinarni Medicina, 54: 47-63.