Dealing with post weaning diarrhea

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Diarrhea in post weaning facilities in France

- **Diarrhea = colibacillosis**
  - F4 / F18 strains
- Lawsonia intracellularis / brachyspira spp.
  - Very few cases
    - One found in 10 years at the practice (organic production without cleaning/disinfection procedures)
- PEDv (InDeL strains)
  - 6 clinical cases all bound with piglets importation or transport
  - Serological study (5399 on 540 farms, 37 + (FP ?)) (*Corrégé et al., 2018)*

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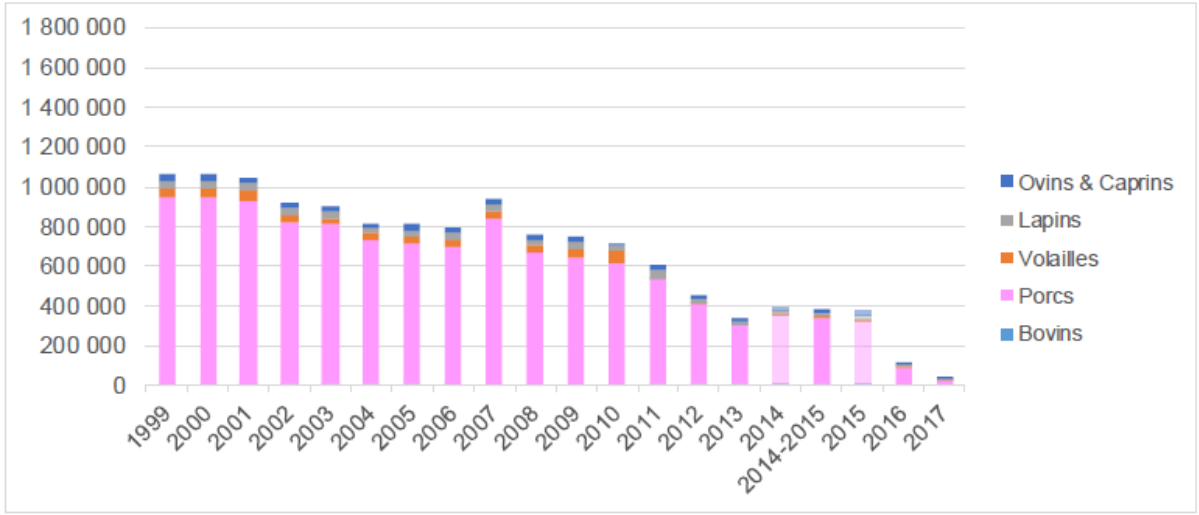
Historical way of colibacillosis management

- Use of antibiotics in starter diet
  - Colistin in 1st intention
    - Low cost
    - Good efficacy
  - Other antibiotics if resistance to colistin
    - Aminosid (neomycin, apramycin, spectinomycin)
- Other ways
  - Powders containing ZnO in top feeding → illegal

Weight of animal treated through the feed with colistin (tonnes) (Rapport Anmv, 2018)



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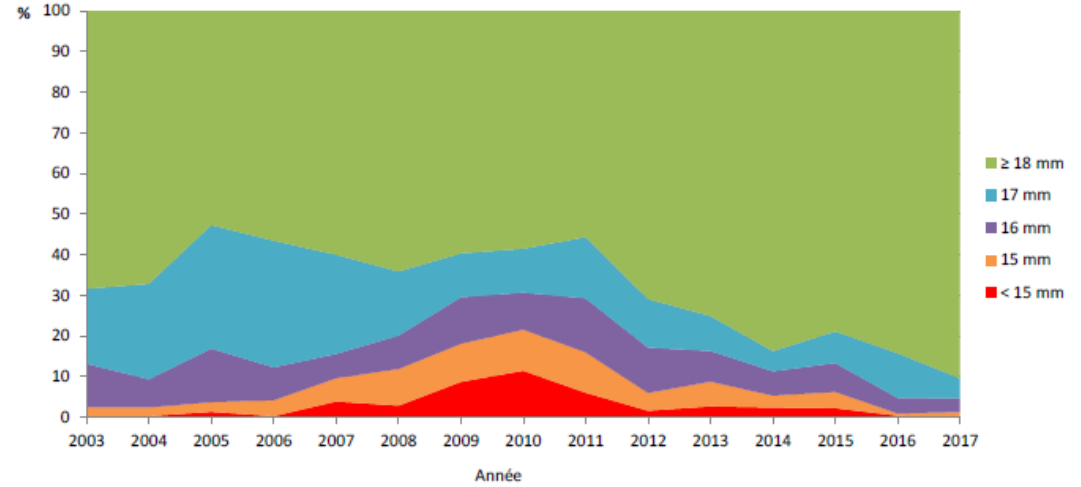
2016 : a big change in the French legislation

- Colistin
  - Can only be used if presence of clinical signs (prevention forbidden)
    - Not anymore possible to treat in starter diet
  - Distribution length
    - Maximum 7 days
- Zinc Oxide
  - Allowed at the same time
  - EU authorization for Gutal
    - Used in 15% of the herds
    - But we know this won't be available for a long time
- Vaccination
  - Development of Coliprotect
    - F4 in the 1st period
    - F4/F18 lately → Temporary authorization

***Figure 14** : Proportions relatives des diamètres de zone d'inhibition <15 mm, à 15 mm, 16 mm, 17 mm et ≥18 mm autour du disque de colistine (50 µg) pour les E. coli isolés au cours de **pathologie digestive chez le porcelet** (n min. : 296 (2005) ; n max. : 776 (2011))*



Digestive E. Coli resistance to colistin (Resapath, 2018)

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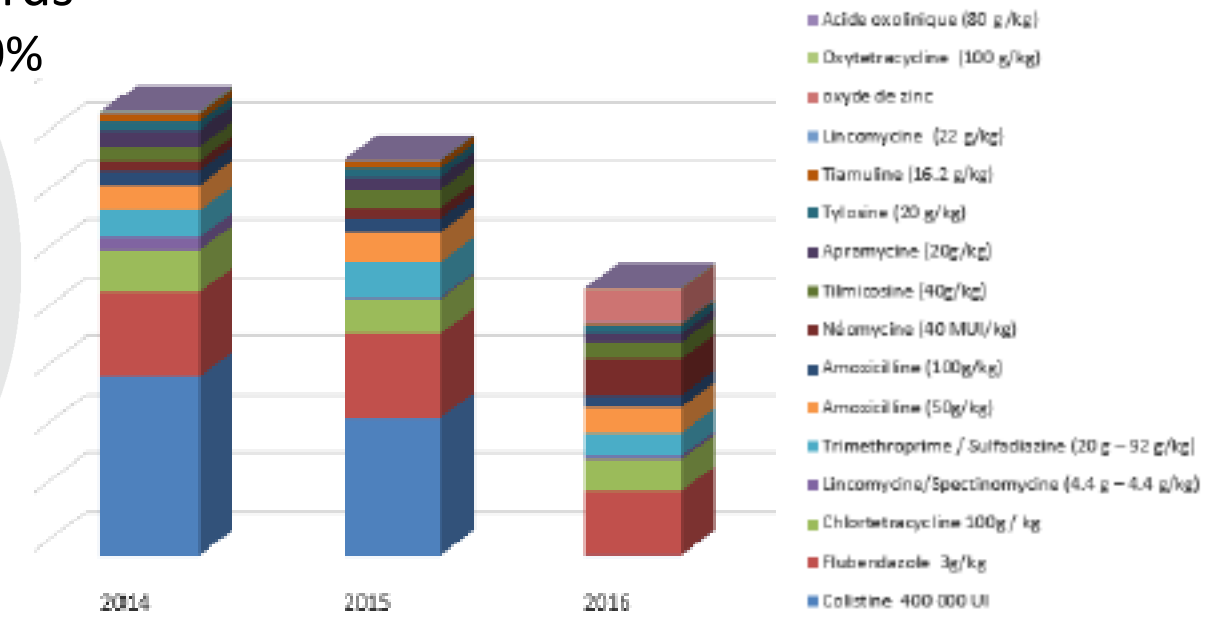
What is the actual situation ?

- No treatment in feed → around 60 % of the herds
  - Punctual treatment through dosing pump → 40%
- Zinc → 15%
  - Restriction on the use (dilution of PS manure…)
  - Reduction of the feed intake
  - Lower growth
- Aminosid in starter diet→ 15%
- Colistin → nearly no treatment anymore in feed



Use of antibiotics and Zno in starter diet in one private company

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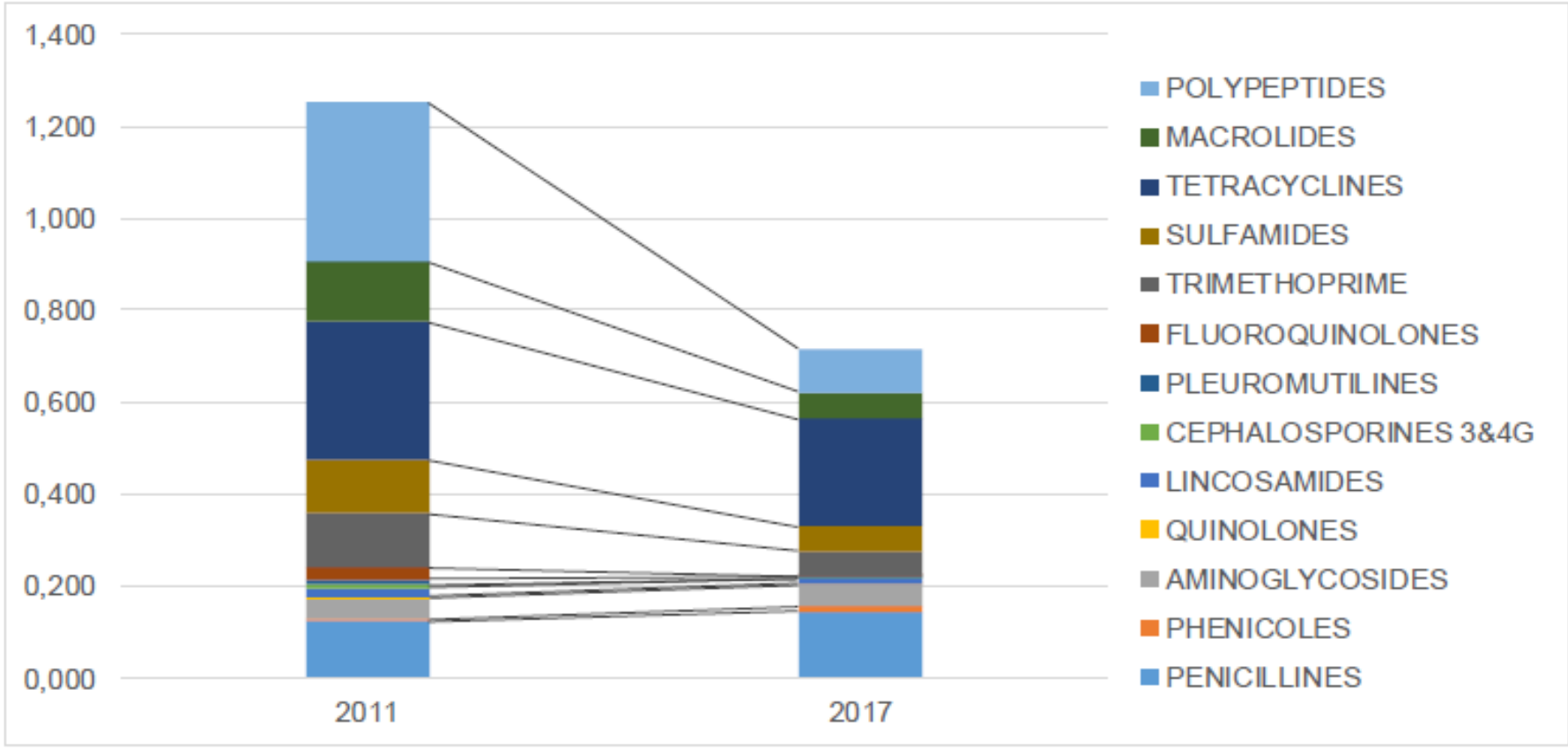
Antibiotics



Use of antibiotics in pig production (ALEA), Rapport Anmv 2018

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Main risk factors ?

- Management
  - Weaning age ?
    - Not the age in itself but the heterogeneity
  - Weaning weight ?
    - Probably
      - Subpopulation with a poor weight (<5kg)
        - » Adoptions
        - » Neonatal diarrhea
      - Sometimes the big ones !
- Buildings
  - One of our biggest problem
    - Few investments in French herds for the last 20 years
- Feed
  - Lot of improvements done by the feed industry
    - Reduction of the non-digestible part of the protein…
    - Big competition between feed companies. Some are specialized only in starter diet
- Genetic
  - Not a risk factor in my opinion
- Health
  - Co infections (Influenza / PRRS…)

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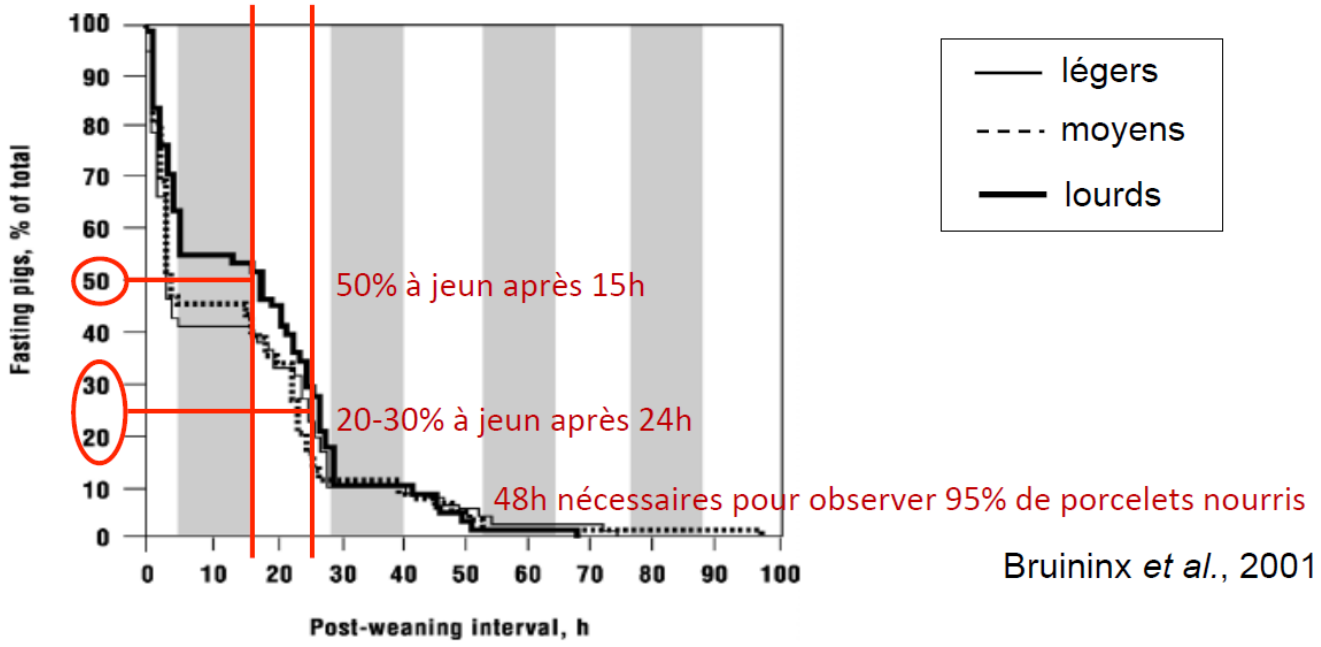
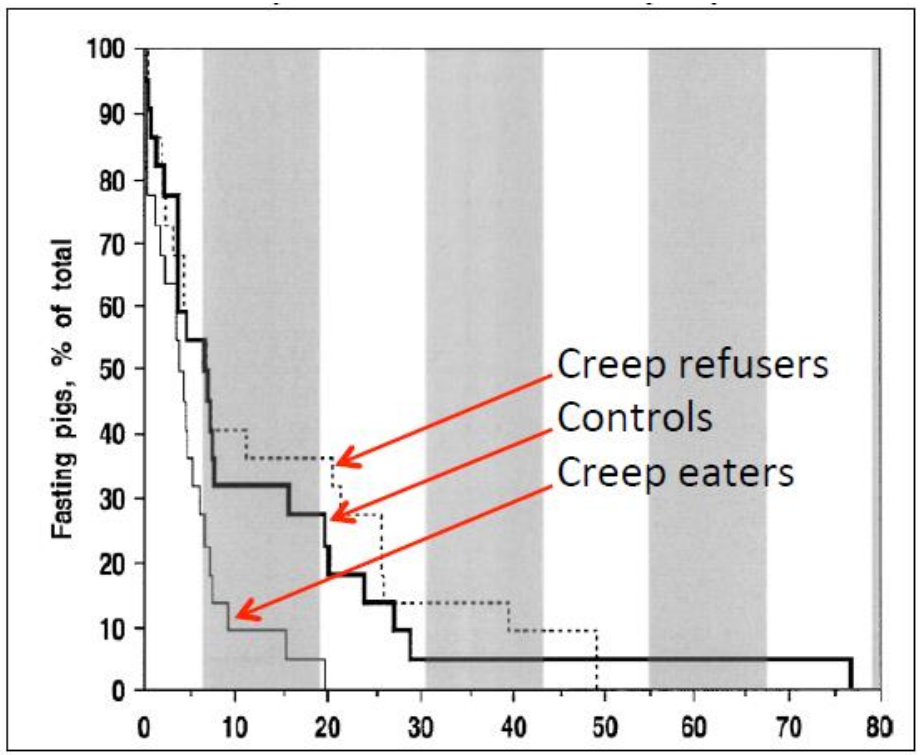
Feeding behavior after weaning



Bruininx *et al.*, 2001



- Importance of feed distribution in farrowing unit
- Importance of the light → pigs sleep during the night
- The biggest do not obviously eat the fastest

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Feed

- The piglets have to start eating as soon as possible
  - Teach them in farrowing unit
    - 3 times per day with low quantities
    - Same feed as in PS for 5 days before weaning
  - Appetence of the feed
    - Use of gruel (mix water and feed) to enhance the appetence of feed → pay attention not to delay the problems
    - Check the water access on all pipe
  - Intake objectives
    - 21d : 450 – 500g/piglet
    - 28d : 800g/piglet

- In PW
  - Specific attention to the smallest ones
  - Elimination at weaning of the piglets that should not be weaned
  - The feeders have to be « closed » at the maximum
    - Just a line of feed at the base of the feeder
    - Especially if diarrhea on big pigs
  - Continuous access the feed → no restriction during the day
  - Appetent feed
    - Pellet
    - Gruel

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Feed

- Formulation
  - On piglets with a low weaning weight
    - 21d old piglets (obj : 6kg) → 20% < 5 kg
    - 28d old piglets (obj : 8kg) → less than 5% < 5kg
  - Use of pre starter diet up to 6 – 7 kg more and more common in France
    - Low levels of protein
    - Highly digestible raw material (plasma, fish protein, biscuits)

- Formulation

Par kg d'aliment	1er âge	2ème âge
Age, jours Poids, kg	< 40-45 j < 12	< 65-70 j < 25-35
ED, kcal		
EN moyenne, MJ mini maxi	10,5 10 11	10 9 10,5
Cellulose brute, g Matières grasses, g	30 - 35 < 50	30 - 40 < 100
Mat. azotées totales, g	210 - 230	180 - 210
Lysine dig. /EN, g/MJ	1,25 - 1,30	1,15 - 1,20
Lysine digestible, g(2)	13,1	11,5
Méthionine + cystine dig., g	8,0	7,0
Thréonine dig., g	8,5	7,5
Tryptophane dig., g	2,5	2,2
Calcium, g	10	10
Phosphore total, g	7	7
Phosphore digestible, g	3,5	3,5

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Water

- Access to water
  - Bowel → 1/18piglets
  - Nipples → 1/10 piglets
  - Water flow (1l/min), pressure…
- Water quality
  - Bacteriology
  - Choice of the water treatment
- Water lines
  - Regular flushing of water lines
  - …

MANAGEMENT

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French production

- Farrow to finish herds mainly
  - Objective : to get the good number of pigs / batch to fill up the buildings
    - No less
    - No too much to avoid overload and performance reduction
  - Low prices of 8 and 30 kg pigs if small numbers

Few examples

- Herd A
  - 600 sow herd (Axiom genetic), 7 batches weaning at 28d (12,8 weaned / litter) , no collective medication
    - Weaning weight : 8,2kg/pig
    - No adoptions after 48h
    - 1 starter diet standard (3,5kg/piglet)
  - Diarrhea issues
    - Colitoxicosis → sudden deaths between 42 and 49d (0,5 – 2%) (F4 strain)
    - Reduction of the cases
      - Work on 2nd diet formulation (decrease of Protein – 19,5% → 18,5%; same level of digestible lysin)
      - Acidification of water
    - Actual situation : 0,2% of death due to colibacillosis
    - ADG 8-30kg : 535g/d

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Few examples

- Herd B
  - 600 sow herd, Danavl (for 3 year), 7 batches (14,5weaned /litter), weaning at 28d, problems of diarrhea in PS
    - Weaning weight : 7,3kg
    - Adoption after 48h : 7% of the piglets
    - 2 starter diet (one up to 7,5kg)
  - Historical program for colibacillosis
    - Colistin when diarrhea
    - Coliprotect F4/F18 for 2 years (2016 – 2017)
  - Actual situation
    - No more cases, no vaccination
    - Work on water quality (water treatment adapted to the water quality, water lines disinfection between batches…)

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Few examples

- Herd C
  - 700 sow herd (Nucleus), 7 batches, weaning at 21d (13,2 weaned/sow) , no problem of diarrhea
    - Weaning weight : 6,3kg
    - No adoption after 48h
    - One starter diet (6kg/piglet)

Quality of the piglets at weaning

- Hyperprolificity
  - Limit → quality of the piglet
    - More than the weight in itself, the main problem in my opinion is the heterogeneity in one batch
      - Colostrum intake
      - Heterogeneity in the age
        - » Amplified if weekly farrowings
      - Cross fostering / early weaning / inversion of litters…
        - » *Danish guidelines : 6 sheets in your guidelines*
    - In this case, insurance are sometime needed
      - ZnO
      - Vaccination
      - *Antibiotics…*

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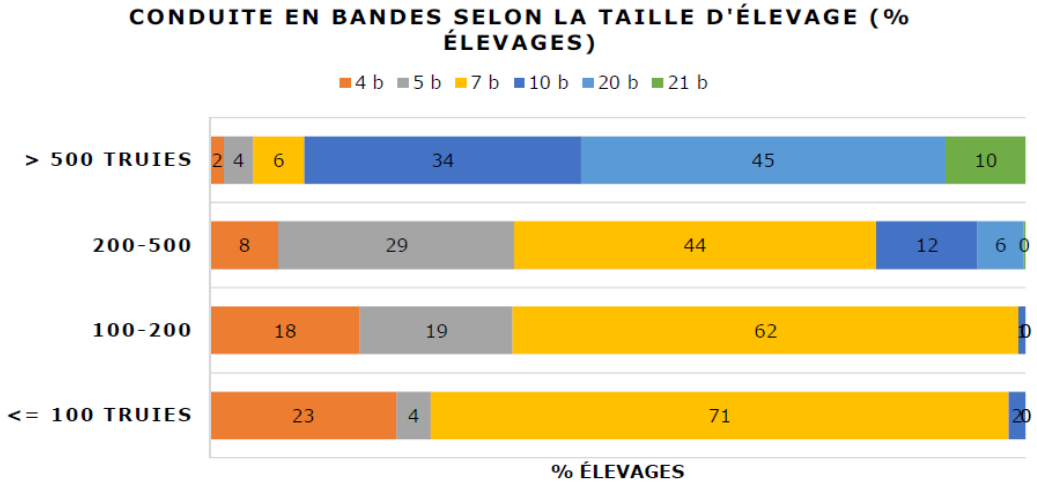
Quality of the piglet at weaning

- Batch management
  - One strength in my opinion of French pig production
  - Piglets with an homogeneous age
    - Sometimes double lactation for foster sows
    - But piglets stay in their batch



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BUILDINGS

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Ventilation

- Many problems in farm
  - Many different system
  - Not always easy to control
  - Digestive problems
    - 1st source of call for ventilation control in PS and farrowing unit
  - Old buildings
    - Do not always fit with the elevation of productivity (overload)
    - Wear-off
    - …

- Ventilation control done at the practice in PW in 2017
  - Reason
    - Cannibalism, ear necrosis : 8
    - Diarrhea: 7
    - Check up : 4
    - Respiratory disease : 4
    - Death percentage : 3
    - Bad climate : 2
  - Percentage ok ?

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Conception

- Small pen / small room
  - Best : 20 - 22 piglets / crate
    - 2 litters / crate and remove the smallest one
- Access to feed
  - 5cm min /piglet (best 7cm)
- Floor
  - Fully plastic slated floor for good comfort (and easy to wash)

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MEDICAL PREVENTION

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Coliprotec F4/F18 ® vaccination

- Clinical case
  - 550 sow herd, 7 batches, weaning at 28d, Danavl (13,8 weaned/litter, mean weaning weight à 26d : 7,4kg). Feed produced on farm
  - Starter diet (bought) for piglets with low weaning weight (1 to 4 kg depending on the weaning weight)
  - But still colibacillosis troubles
    - Controlled with colistin (2 to 4% of death rate)
  - Settlement of coliprotect F4/F18
    - 1st batch : 1,2% death, no treatment
    - 2nd batch : 0,8%, no treatment

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Acidification

- Mix of organic acids
  - Formic, lactic, acetic…
  - Frequent use in water in PS
- A tool in the PW diarrhea management
  - But not 100% efficient

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Other products

- **Examples**
  - **Probiotics :** Yeast, lactic bacteria…
  - **Prebiotics :** Oligosaccharids (starter diets) → link with the microbiot
  - **Phytotherapy :** Algae / vegetables extracts
  - **Essential oils :** Thymol / Carvacol
  - **Immunity and maintenance of gut integrity** : vitamin E, Se, aspirin, paracetamol…
- Efficacy: documented *in vitro* but not always *in vivo*
- Few field study and not always consistent
- Complementary tools but not a solution always efficient

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Conclusion

- Dealing with postweaning diarrhea without ZnO and antibiotics :
  - Easy in 50 – 60% of the herds
  - Ok with short treatment with dosing pump in 20% of the herds
  - Problematic in 20% of the herds mainly because of housing problems

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