

# Assessing the role of feed as a risk factor for *Salmonella* in Irish pig production

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# Outline

1. Background & objectives
2. On-farm prevalence of *Salmonella* in pigs & feed
3. *Salmonella* in feed ingredients and compound feed
4. Molecular tracking of *Salmonella* from feed mill to farm
5. Conclusions

# 1. Background

- 45% of pigs *Salmonella*-positive at slaughter (caecum)
- 15 - 20% contamination on pre-chill carcasses
- DAFM National *Salmonella* Control Programme - Jan 2010
- 18% of herds - *Salmonella* prevalence exceeding 50%
- Feed a potential source of *Salmonella* infection (EFSA and DAFM)
- As *Salmonella* prevalence in pigs reduces, feed becomes more important

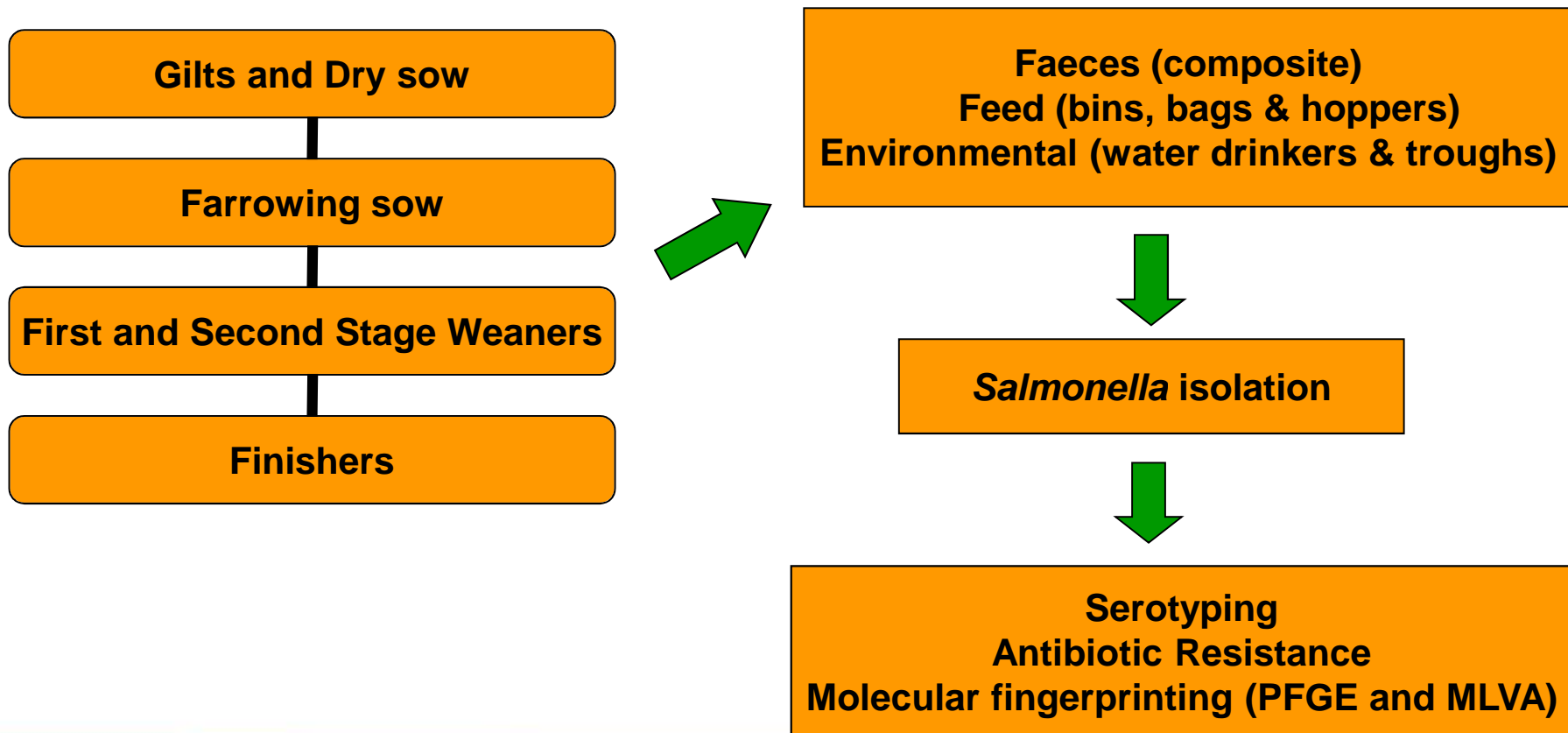


# Objectives

- Assess role of feed in the transmission of *Salmonella* to pigs on 10 high *Salmonella* prevalence farms
  - Identify production stages that harbour *Salmonella*
  - Assess prevalence of *Salmonella* in feed on-farm
- Assess prevalence in feed ingredients and compound feed in commercial feed mills
- Examine link
- Evaluate control measures during feed production and storage

## 2. On-farm prevalence of *Salmonella* in pigs & feed

- 10 commercial pig farms
- >50% seroprevalence in National Pig *Salmonella* Control Programme



## 2. On-farm prevalence of *Salmonella* in pigs & feed

- 2,985 samples taken
- 14.9% faeces *Salmonella*-positive on 9 of 10 farms
  - 21% second stage weaners
  - 20% finishers
  - 19% gilts
- 9.2% environmental *Salmonella*-positive
- 2.4% feed *Salmonella*-positive on 6 of 10 farms
  - 43% positives from farms using liquid feed
  - 57% positives from farms using dry feed
  - Greatest prevalence in dry sow feed



## 2. On-farm prevalence of *Salmonella* in pigs & feed

- Serotypes recovered
  - 8 different serotypes recovered from pigs
  - 8 different serotypes recovered from environmental samples
  - 5 different serotypes recovered from feed samples
- Monophasic variants of Typhimurium (4,[5],12:i:-) predominated in all samples
  - 43% of pig isolates
  - 42% of environmental isolates
  - 43% of feed isolates
- Other serotypes in feed in order of recovery included Derby, Typhimurium, Typhimurium Copenhagen, and Tennessee.
- All feed isolates had multiple antibiotic resistance

### 3. *Salmonella* in feed ingredients & compound feed

- 5 commercial feed mills and 1 home compounder
- Monthly samples of all ingredients and finished feed over 6 months
- Feed ingredients
  - 340 samples at intake
  - Two (0.6%) *Salmonella*-positive
  - Wheat from one commercial mill, soybean meal from home compounder
- Compound feed
  - 313 samples (meal & pellets) post-production
  - Three (0.95%) *Salmonella*-positive
  - Dry sow meal & dry sow pellets from one mill, finisher meal from another





### 3. *Salmonella* in feed ingredients & compound feed

- Isolates were all monophasic variants of *Salmonella* Typhimurium
- Resistant to 2-7 antibiotics
- *Salmonella* prevalence in meal samples was 1.6% whereas it was 0.5% in pelleted feed
- *Enterobacteriaceae* detected in 92% of meal samples and 29% of pelleted feed samples
  - Indirect indicator of contamination
  - Measure of feed hygiene
- Higher *Enterobacteriaceae* counts in compound feed than ingredients, suggests post-process contamination within mills

## 4. Molecular tracking of *Salmonella* from mill to farm

- Molecular typing performed to establish if *Salmonella* contamination of pigs originated from **on-farm feed**
  - On some farms strains recovered from feed also found to be shed by pigs
  - One *Salmonella* strain isolated from feed sampled from a feed bin
  - Most probably *Salmonella* originated in the purchased feed in this instance



## 4. Molecular tracking of *Salmonella* from feed mill to farm

- Molecular typing to establish if *Salmonella* contamination of pigs originated from **purchased feed**
  - Two distinct strains common to both feed mills and farms
  - The mill strains were the same as those isolated from two of the farms



## 5. Conclusions

- *Salmonella* prevalence in pig feed and feed ingredients low
- **However**, even minor *Salmonella* contamination in feed has potential to contaminate many herds
- Same strains recovered from feed at mill and pigs on farm
- *Salmonella* in feed is an important risk factor for *Salmonella* in pigs
- Recovery of an emergent *Salmonella* serotype and antibiotic resistant isolates is cause for concern
  
- Pelleting reduced *Salmonella* prevalence & improved feed hygiene
- Post-process contamination in feed mills?



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# Questions?