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SESSION 43

IZSAM G.CAPORALE TERAMO

Assessing the efficacy of improved animal welfare to control Campylobacter contamination in poultry

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Background

- **Faecal shedding** of pathogens can increase after transport and feed withdrawal in poultry
- The existing literature about the impact of farming and slaughtering management on ***Salmonella*** and ***Campylobacter*** shedding is still scarce and results are contradictory
- To date, no evaluation of the effects of **different management systems** on carcass contamination, nor measurement of the level of stress, have been investigated
- No data is available on *Listeria monocytogenes* contamination

Thus, ….

- Could poultry welfare influence *Salmonella*, *Campylobacter* and *Listeria* shedding?
- Are there specific factors (either on-farm and pre-slaughtering) that significantly affect stress in poultry and have impact on faecal shedding of pathogens or carcass contamination?

Aim:

Identify and evaluate on-farm and pre-slaughtering stress factors that could influence shedding of food-borne pathogens in broilers

- Young researchers project funded by the Italian Ministry of Health
- Duration: 3 years (December 2014- December 2017)

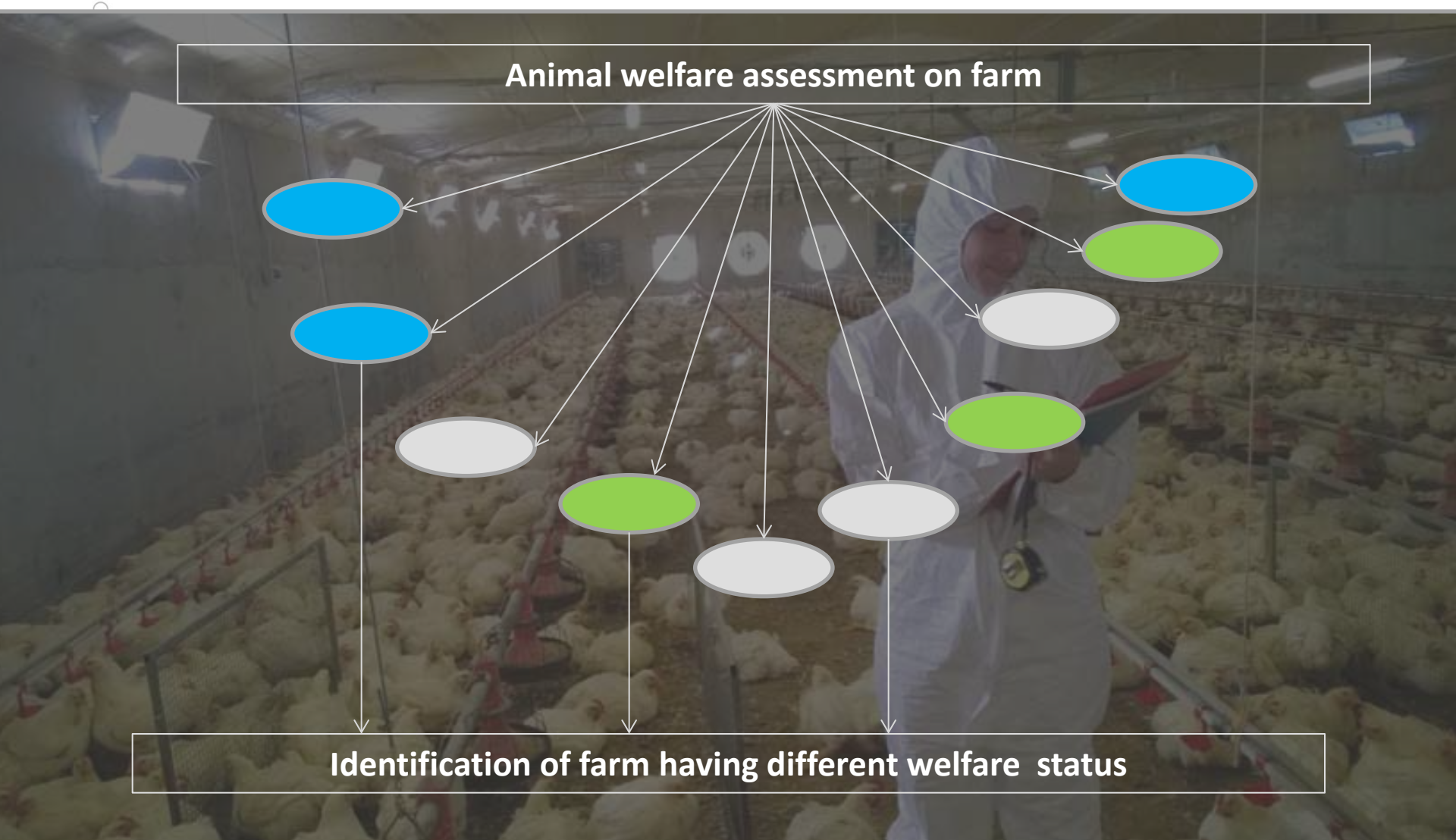
Main phasese

- **Phase1** (farm): Screening and selection of farms with different AW levels

- **Phase2** (farm and slaughterhouse): AW assessment and evaluation of prevalence and carcass contamination by *Campylobacter*, *Salmonella* and *Listeria monocytogenes* at slaughterhouse.

- **Phase3**: Data analysis and identification of possible solutions to control contamination while improving animal welfare.

Phase 1:
Farm screening and selection



Welfare Quality® protocol

On farm measures

Principle	Criteria	Measures
Good feeding	Absence of prolonged thirst	Drinker space
Good housing	Comfort around resting	Plumage cleanliness, litter quality, dust sheet test
	Thermal comfort	Panting, huddling
	Ease of movements	Stocking density
Good health	Absence of injuries	Lameness, hock burn, food pat dermatitis
	Absence of diseases	On farm mortality, culls on farm
Appropriate behaviour	Good human-animal relationship	Avoidance distance test
	Positive emotional state	QBA

Preliminary data: welfare assessment

10 farms (Ross 308 and 708)

Average number of birds: 15,600.

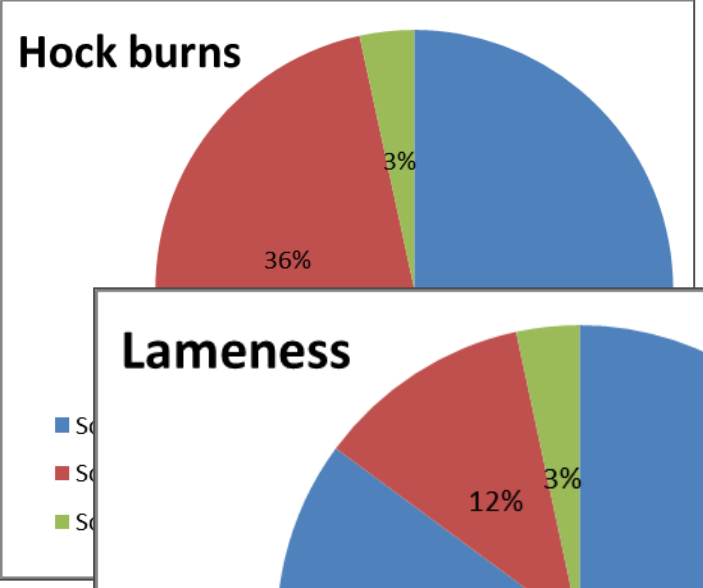
Farm visits: 1-2 days prior to slaughtering (average age=49 days), average weight 2.9kg

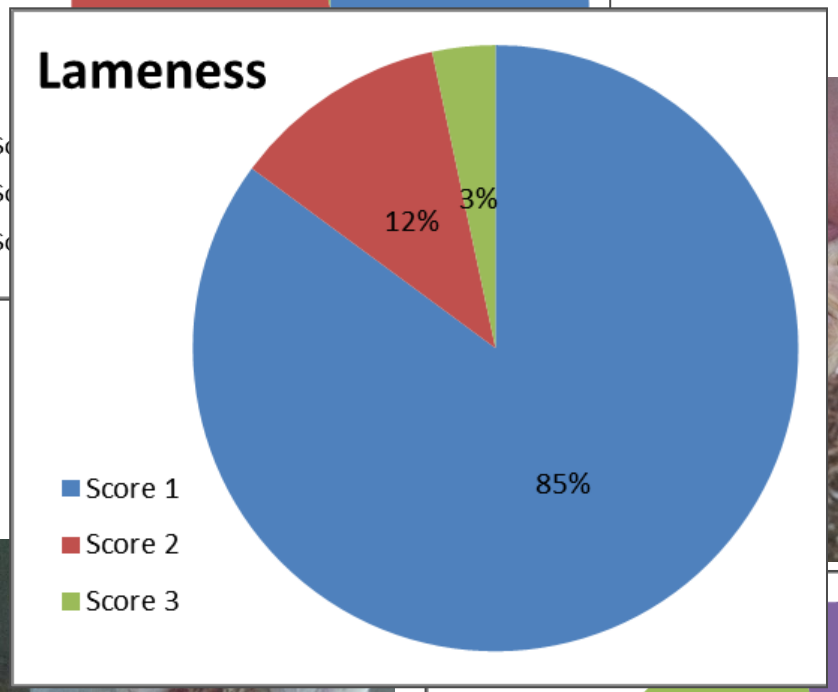
Average mortality: 2.7% (1.6-5.5); average culling rate: 2.8% (1.7-3.9).

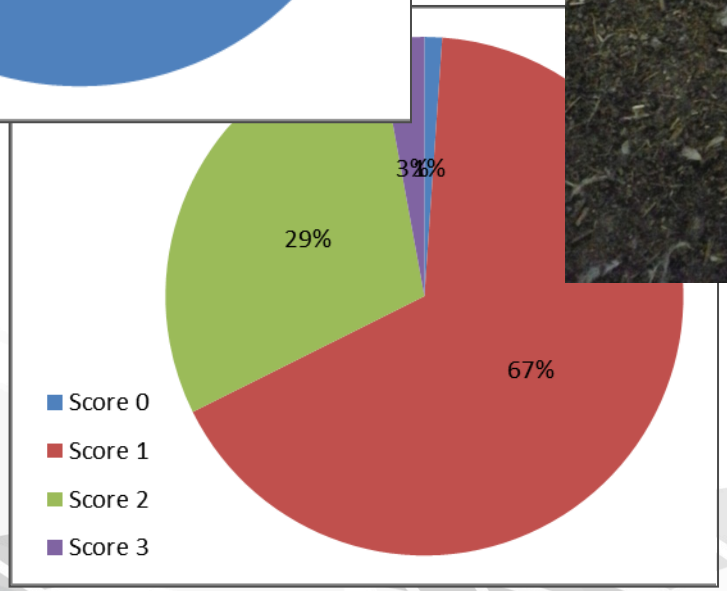
High variations of space allowance, with values ranging from 26.8 to 41 kg/m^2.

Human-animal relationship was evaluated through touch tests: the mean prevalence of touched birds on the number of those being at arm reach was 53.4% (33-70).

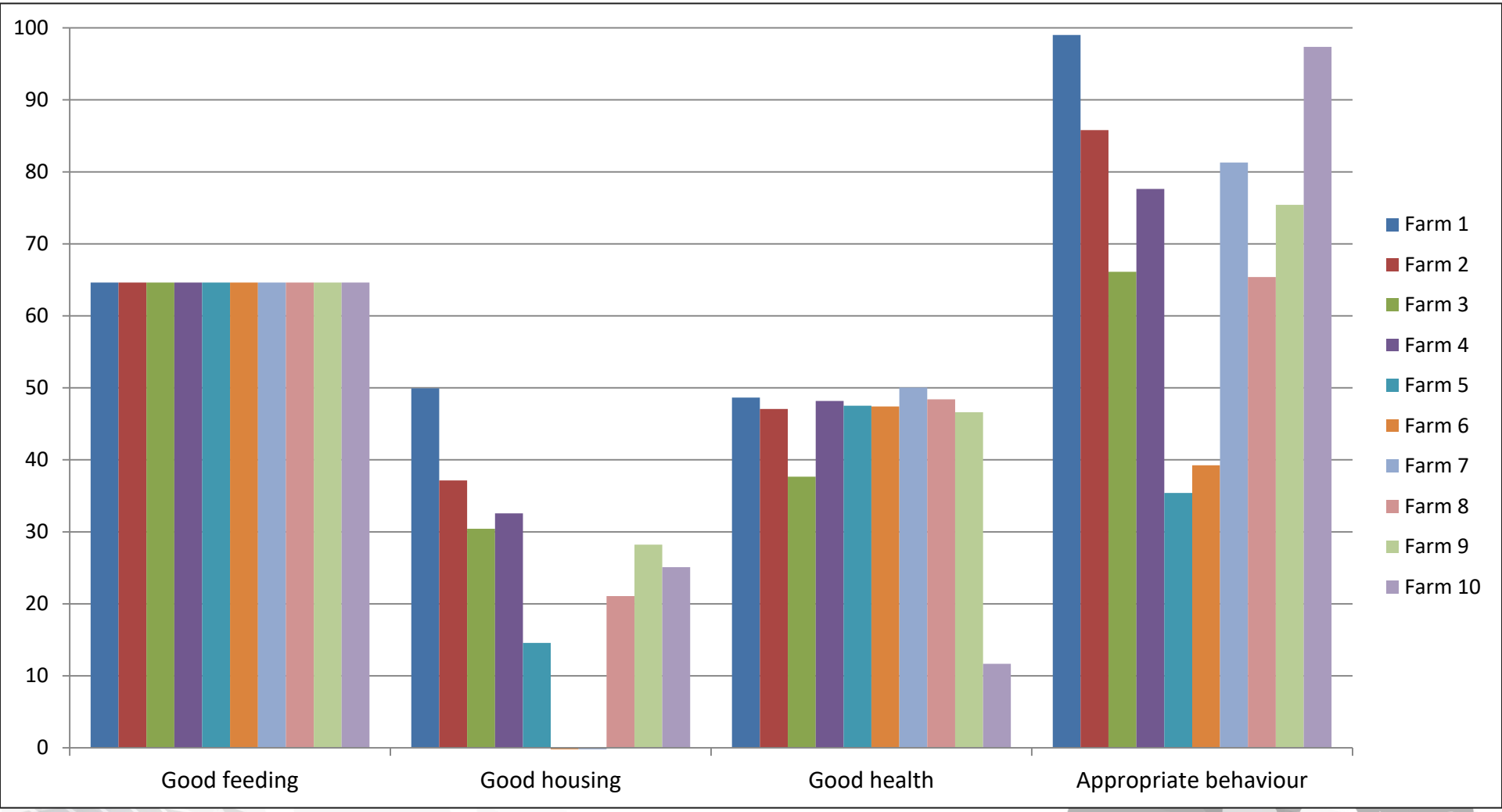
Preliminary data: welfare assessment







Preliminary data:
On farm welfare assessments



6 'Improved welfare' **2 'Acceptable'** **2 'Non classified'**

Phase 2:
Evaluation at slaughterhouse

Three level of assessment:

On farm

- screening at 30d to confirm *Campylobacter* presence
- WQ (as in phase 1, day before slaughtering)

Pre-slaughter

- WQ (DOA, panting, pre-stun shock, etc..)
- Faecal sampling (pre-transportation)
- Faecal sampling (post-transportation)
- Blood sampling (eterophils / lymphocytes ratio)

Post-slaughter (carcasses)

- WQ (lesions, bruises, broken wings, ascites)
- Sampling of caeca
- Sampling of skin

Preliminary data: food safety

First sampling (FARM 8) in farm and slaughterhouse on May 2016:

- Farm at 3 km from slaughterhouse (**short transport**)
- '**Improved welfare**' WQ score
- Slaughtering on day 48
- Preliminary screening (day 30) at the farm to choose a **Campylobacter positive batch**

Second sampling (FARM 10) in farm and slaughterhouse on July 2016:

- Farm at 331 km from slaughterhouse (**long transport**)
- '**Improved welfare**' WQ score
- Slaughtering on day 42
- Preliminary screening (day 30) at the farm to choose a **Campylobacter positive batch**

Preliminary data: pathogens in cloacal swabs (shedding)

First sampling (FARM 8)

- ***Campylobacter spp.*** prevalence in cloacal swabs **60% before transport** and **75% after transport**
- Cloacal swabs negative to *Salmonella* and *Listeria monocytogenes*

Second sampling (FARM 10)

- ***Campylobacter spp.*** prevalence in cloacal swabs **25% before transport** and **55% after transport**
- Cloacal swabs negative to *Salmonella* and *Listeria monocytogenes*

Preliminary data: pathogens in caeca

First sampling (FARM 8)

- Prevalence of ***Campylobacter spp***. in caecal contents: **52.5**% (21/40)
- *Campylobacter coli* sharply prevalent on *Campylobacter jejuni*
- Levels of contamination between 6.6 and 9.2 log10 UFC/g, mean 8.72 log10 CFU/g
- Absence of *Salmonella* and *Listeria monocytogenes*

Second sampling (FARM 10)

- Prevalence of ***Campylobacter spp***. in caecal contents: **97.5**% (39/40)
- Info about *Campylobacter* species identification not yet available
- Levels of contamination between 5.6 and 9 log10 CFU/g, mean 8.63 log10 CFU/g
- Absence of *Salmonella* and *Listeria monocytogenes*

Preliminary data: pathogens on carcass skin (final product)

First sampling (FARM 8)

- Prevalence of ***Campylobacter spp.*** on **carcass skin** after cooling: **85%** (34/40)
- *Campylobacter coli* slightly prevalent on *Campylobacter jejuni*
- Levels of contamination between 40 UFC/g and 25*10^3 CFU/g (mean **2226 CFU/g**)
- Absence of *Salmonella*
- ***Listeria monocytogenes*** detected in 3 samples out of 40 (**7.5**%). Environmental contamination or from other batches? Low levels of contamination

Preliminary data: pathogens on carcass skin (final product)

Second sampling (FARM 10)

- Prevalence of ***Campylobacter spp.*** on **carcass skin** after cooling: **100%** (40/40)
- Info about *Campylobacter* species identification not yet available
- Levels of contamination between 82 UFC/g and 15*10^3 CFU/g (mean **1833 CFU/g**)
- ***Salmonella*** detected in **1** sample (**2.5%,** *Salmonella* typhimurium)
- ***Listeria monocytogenes*** just like in farm 8 detected in 3 samples out of 40 (**7.5**%). Environmental contamination or from other batches? Low levels of contamination

Campylobacter spp. in carcass: comparison with national monitoring program

- Compared to the mean of samples analysed in the same slaughterhouse by the Campylobacter national monitoring programme in 2015, **the mean level of contamination of *Campylobacter* on carcass skin was about 45% lower for farm 8** (2226 vs 3965 CFU/g) and **about 53% lower for farm 10** (1833 vs 3965 CFU/g)

- More sampling sessions are scheduled by the end of 2017, in order to accurately compare the effect of different management systems:

- High WQ score vs low WQ score
- Farm far from the slaughterhouse vs farm close to the slaughterhouse
- Climatic conditions

Some preliminary observations

- **Long transport could influence prevalence** of ***Campylobacter*** contamination of the final product
- Levels of **carcass contamination seem to be mostly related to the caecal content levels** (similar results in both batches)
- ***Caecal (and therefore carcass) contamination levels could be mostly related to «long-term» stress in farm, while changes in prevalence seem to be more sensible to «short-term» stress like long transport***
- More sampling sessions are necessary to confirm these preliminary observations in order to perform statistical analyses
- The final results would help in supporting poultry farms with new tools for controlling food safety

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Thank you for your attention!

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