



Enhanced biodiversity and the perceived risk to food safety:

Campylobacter and Poultry

**Josie O'Brien, Lawrence Woodward,
Bruce Pearce,**

**Elm Farm Research Centre
Hamstead Marshall
Nr Newbury
Berkshire
RG20 0HR**



Introduction

- **Organic Farming beneficial to environment**
 - **Increased biodiversity**
- **Possible increased risk to food safety**
- **Problem area *Campylobacter***
 - **Biggest cause of gastroenteritis (different strains)**
 - **Routes of transmission to humans - undercooked poultry**
 - **Non-pathogenic in animals and birds**

Introduction

- **Suggested risk for organics as:**
 - **Wild birds and animals are carriers**
 - **Poultry contact with faecal matter**
 - **Pick up infection from environment**

- **Differences between conventional, free-range and organic poultry in campylobacter loading of table bird flocks**
 - **Conventional – 50% loading**
 - **Free-range – 80% loading**
 - **Organic – 100% loading**

- **Not clear if biodiversity is an issue, or if free-range issue (combined with age)**

Objectives

- **Conduct a preliminary investigation**
- **To establish:**
 - **whether**
 - **how**
 - **when**
 - **where**
- **campylobacter enters the poultry system on organic farms**
- **To establish:**
 - **If present, whether campylobacter is associated with increased biodiversity**

Outline

Location

- UK based organic farm
- Active policy of increasing biodiversity *distinct* from standard free-range and organic systems
- Multi-age poultry enterprise with 22,000 birds at one time

Testing

- Distinct test categories
 - Batch of birds (2x houses) followed (housing & birds 1% sample)
 - All birds (each house on site – multi-age analysis 1% sample)
 - Sites / 'Areas' on farms with different relevant
 - Management and vehicles
 - Livestock
 - Environment and biodiversity

Sites

Management and Vehicles

- 9 areas tested, relating to poultry management
 - Management: processing, feed wagon, poultry team (boots), previous field site, future field
 - Vehicles: quads, tractors, Manitou, trucks

Livestock

- 8 tests, from different livestock groups on the farm
 - pigs, sheep and cattle



Sites

Environment and Biodiversity

- **23 areas, with 43 samples in total**
- **Areas with wild bird and animal activity, some overlap with livestock areas**
- **Samples collected included**
 - **Wild bird faeces– from 20 sites**
 - **Rabbit faeces – from 5 sites**
 - **Rat faeces – from 3 sites**
 - **Badger faeces – from 3 sites**
 - **Fox faeces – from 2 sites**



Results and Discussion

Tests on Poultry

- **Batch of Birds**
 - **Week One : All tests Negative**
 - **Week Two:**
 - **Birds faeces Negative (in both houses)**
 - **Week Four (in field sheds):**
 - **'Feeders and drinkers' in clean sheds and 1 module crate swab**
 - **All Negative**
 - **Bird faeces, clean field sheds ('shed & furniture plus dustbather') and 1 module crate swab**
 - **All Positive**





Results and Discussion

Tests on Poultry

➤ All Birds

Age (weeks)	Result cohort A	Result cohort B
1	-	-
2	-	+
3	-	+
4	-	+
5	+	+
6	+	+
7	+	+
8	+	-
9	+	+
10	+	+

Results and Discussion

Tests on Poultry

- **Batch of Birds**
 - **Birds entered clean environment**
 - **Infection prior to move to field – despite sealed brooder**
 - **Possible infection via water**
 - **Early infection routes similar to those of conventional (40% flock infection)**

- **All Birds**
 - **Earlier than expected – but identification problems**
 - **Week 8, negative**
 - **could be due to 1% sample, and lack of 100% flock infection**

Results and Discussion

Management and Vehicles

- **Positive** results for:
 - Processing, poultry team, and vehicles (including quads, tractors and truck (*5 tests out of 9*))
- Management identified as potential route of transmission, confirms work in conventional systems
- Good management practices and high level of bio-security (multi-aged) could reduce infection loading

Results and Discussion

Livestock

- **Positive** results for:
 - All species of livestock (not in all areas)

- Confirms current research, livestock possible vector for campylobacter

- Reduce impact of this route of transmission by separating livestock and poultry enterprises
 - geographically
 - management

Results and Discussion

Environment and biodiversity

- Majority of tests negative
- **Positive** results for :
 - Wild birds (6)
 - Rat faeces (1)
 - Badger (1)
 - Dog (1)
 - (9 tests out of 43)



Results and Discussion

Environment and biodiversity

- Wild birds reservoir for campylobacter. This is a possible route of infection
- Previously identified in conventional farms
 - But wild birds can carry different genotype campylobacter to poultry
- Other positive results, **NOT** species associated with increased biodiversity
- Could be due to fragility of campylobacter pathogen
 - Samples collected old and degraded
 - Large volume of poultry could overcome this

Conclusions

- **Areas identified as routes similar to conventional**
 - **Management**
 - **Domestic animals**
 - **Livestock**
 - **Dogs**
 - **Vermin / pest species**
 - **NOT** increased biodiversity

- **Campylobacter in the flock is a 'Free-range problem' opposed to a organic or increased biodiversity problem**



Summary

- **No real effect of increased biodiversity**
- **Positive campylobacter results for environment in species known to effect conventional systems**
 - **NOT increased biodiversity**
- **Highlights management and livestock as routes of transmission**
- **Withstanding the fragility of the pathogen in relation to sampling**



Further Research

- **Consider percentage of flock infected**
- **Investigate prevalence of different strains, around farm environment**
- **More detailed investigation into level of infection in the farms biodiversity**
 - **More samples collected**
 - **Identifying samples to bird species**
 - **Attention to insect species**

Acknowledgements

- **Farm staff**
- **English Nature**
- **Wincanton Laboratories**
- **Elm Farm Research Centre**





Thank you for your attention