Past, present & future of mycoplasmas in chickens & turkeys

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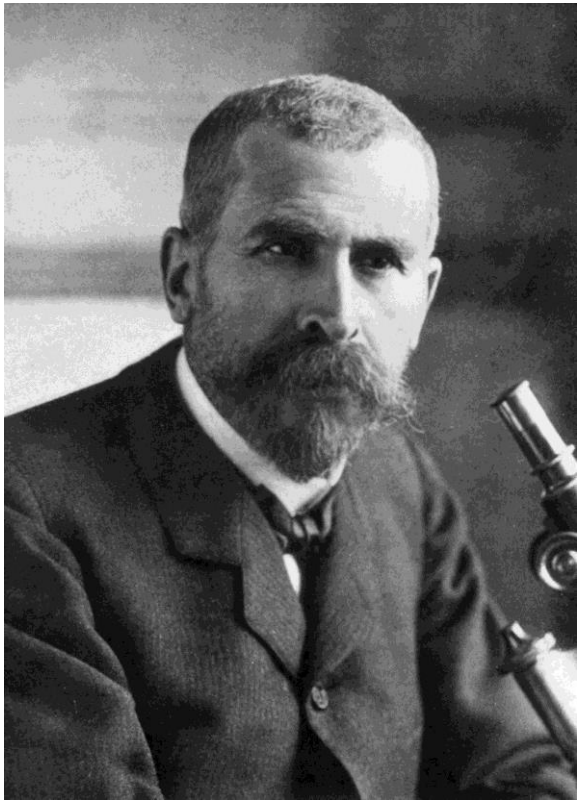
Introduction

- Edmond Nocard & Emile Roux, 1896



The microbe (virus?) of pleuropneumonia

Introduction

STUDIES ON AN UNCOMPLICATED CORYZA OF THE DOMESTIC FOWL

VI. Coccobacilliform Bodies in Birds Infected with the Coryza of Slow Onset

By JOHN B. NELSON, Ph.D.

(From the Department of Animal and Plant Pathology of The Rockefeller Institute for Medical Research, Princeton, N. J.)

Plate 38

(Received for publication, January 2, 1936)

Introduction

- Mycoplasmas are small prokaryotic organisms
- Without cell wall
- Host specific
- Affinity for mucosal surfaces
- Complex nutritional requirements (difficult to culture)

Typical morphology Mycoplasma spp (‘fried egg’ morphology)

Past (until 90's)

Period	Subject
1936-1965	Discovery important mycoplasma species
1962-1989	Multifactorial disease (synergism, climate, immunesuppression)
1954-1987	Transmission routes
1956-1974	First control programmes
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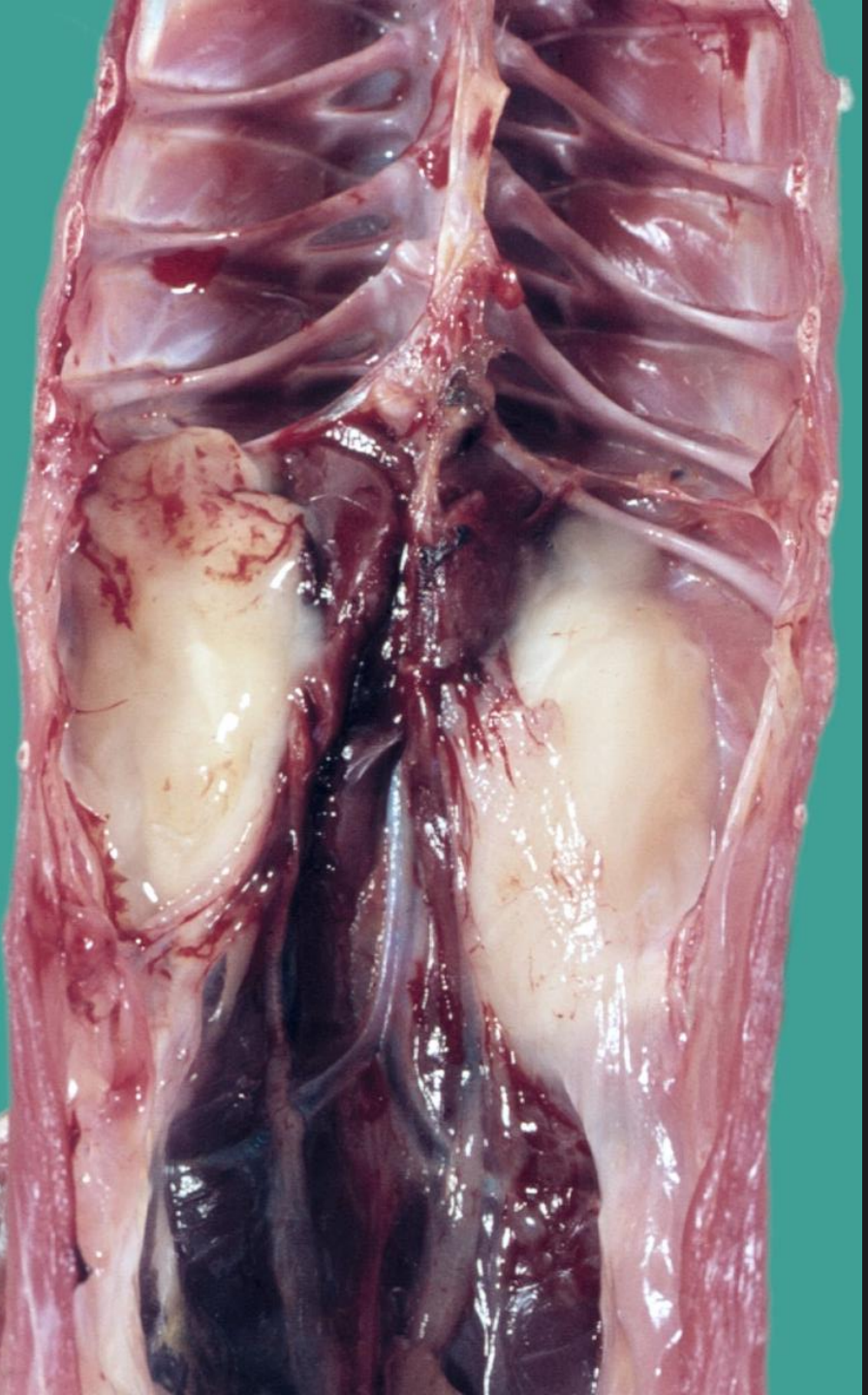
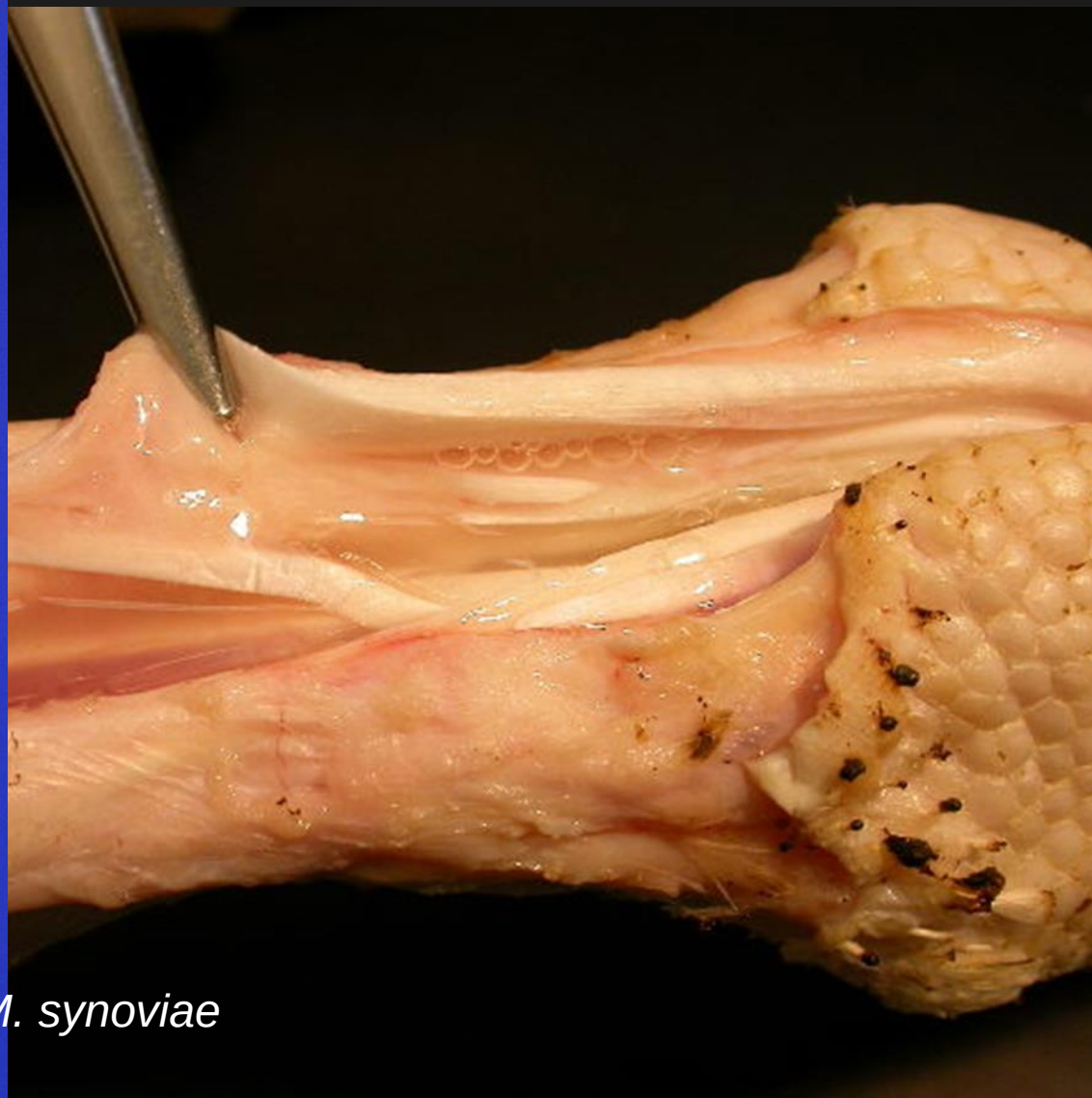
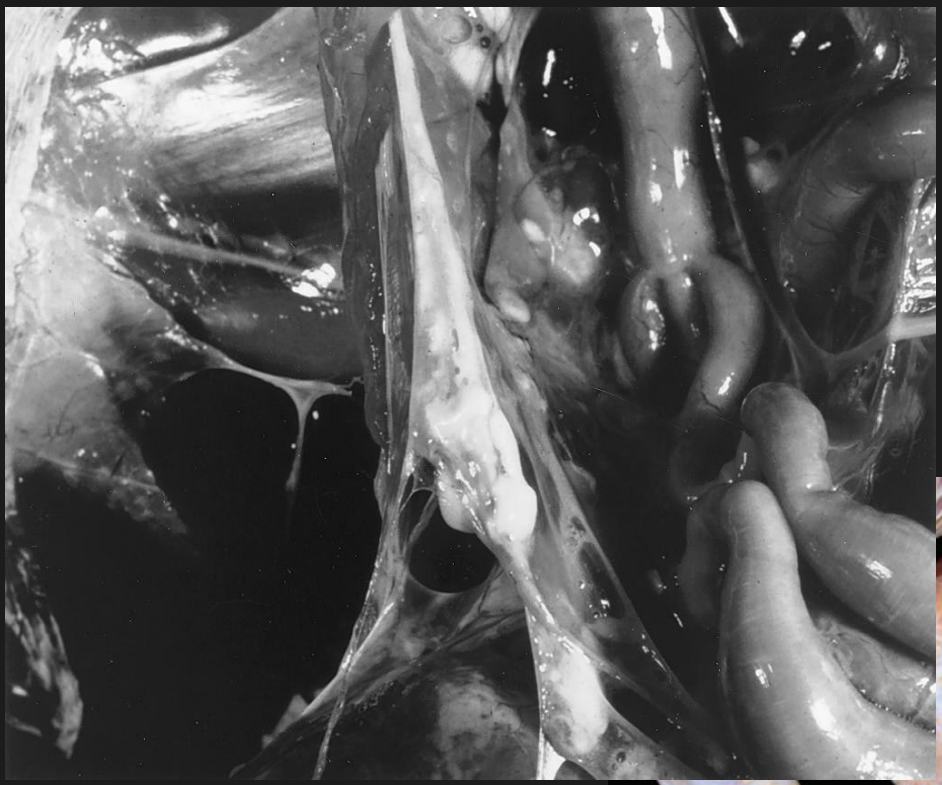
1970-1994	Immunisation studies commercial poultry
1955-1994	Diagnostic tests: from serology to molecular analysis



Mycoplasma gallisepticum

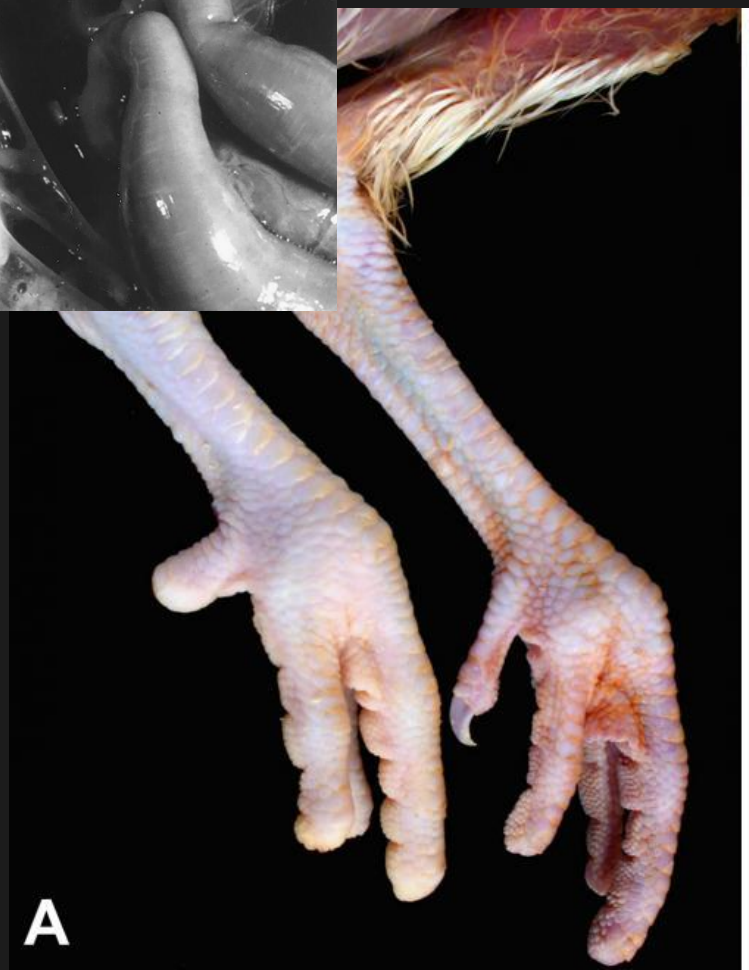


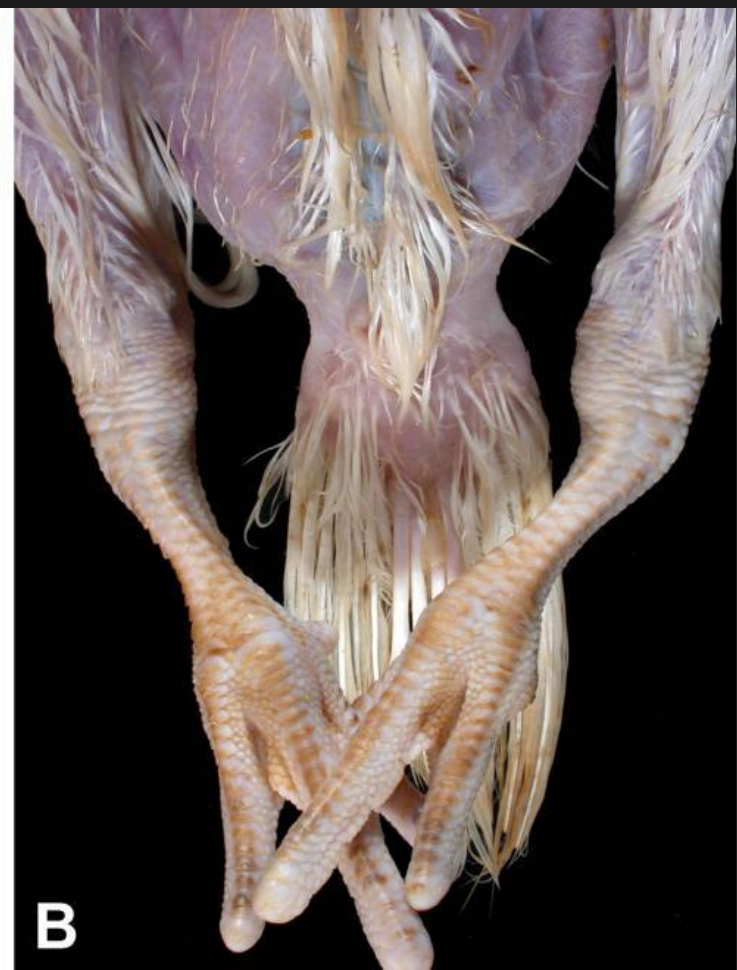
M. synoviae



M. meleagridis
Diseases of Poultry (R. Yamamoto)

M. iowae
Ley et al., 2010





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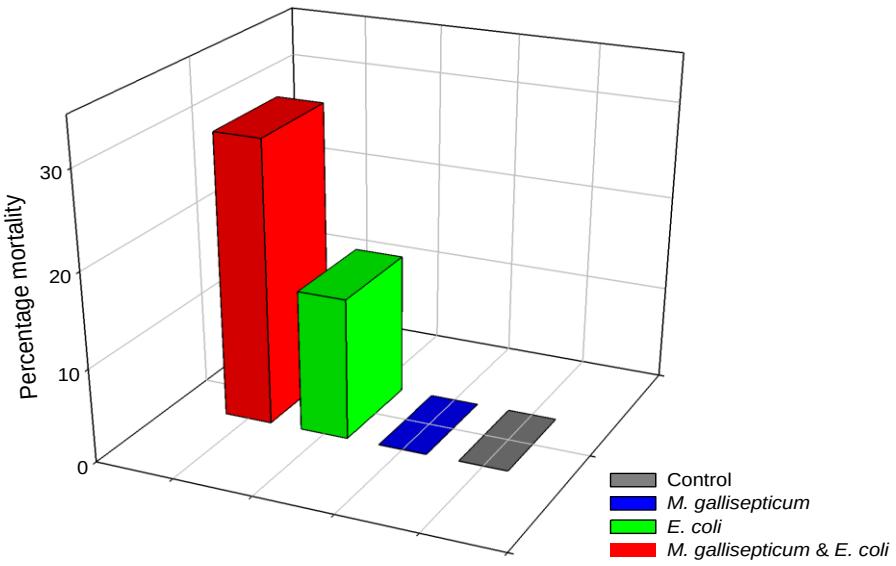
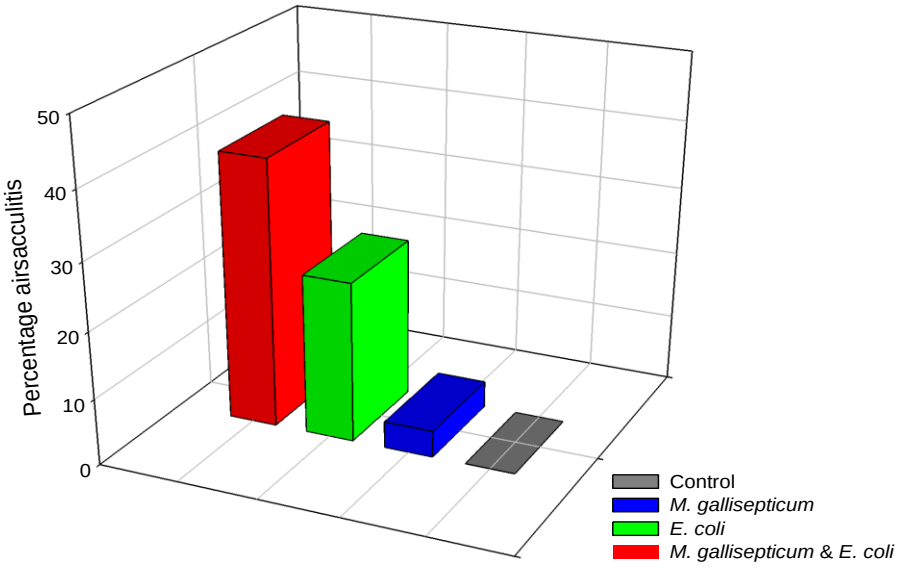
Mg & E. coli

1-day-old broilers





Bradbury, 2005.
Britisch Poult Sci, 46, 125-136

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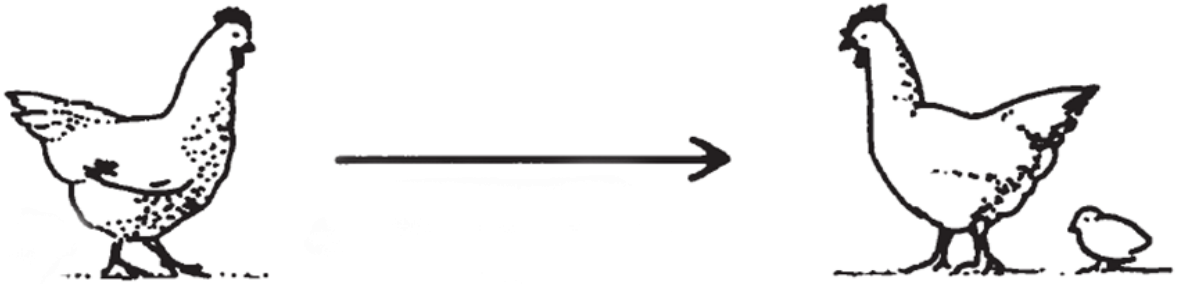
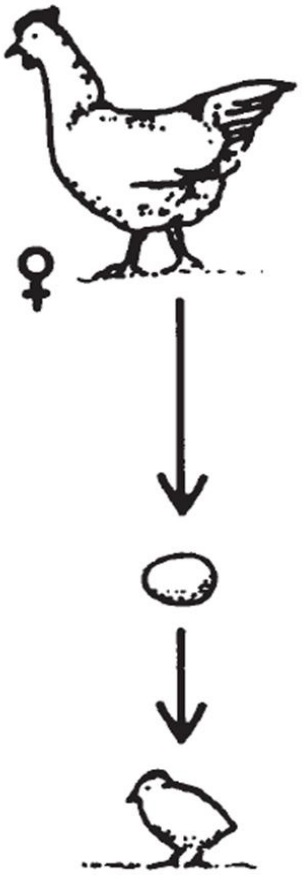
Transmission routes





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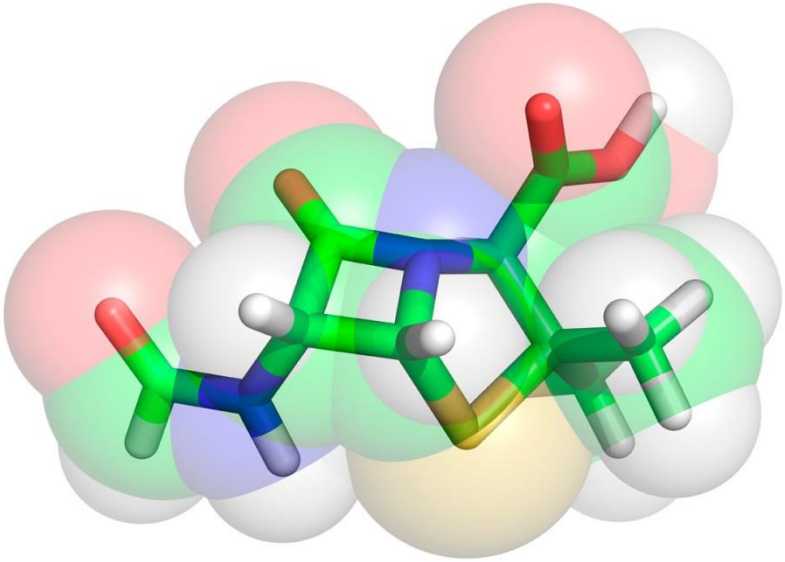

- Temporary effect
- Resistance
- Residues

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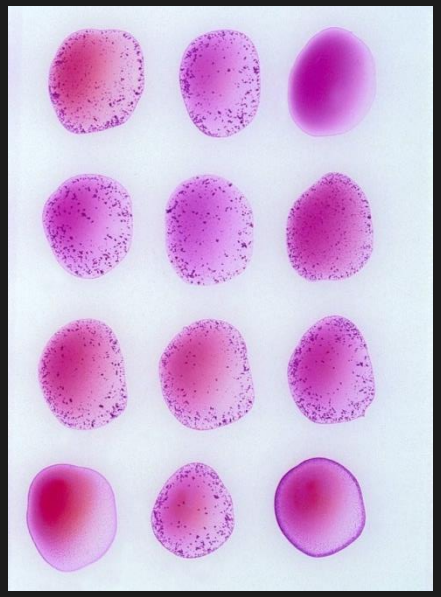

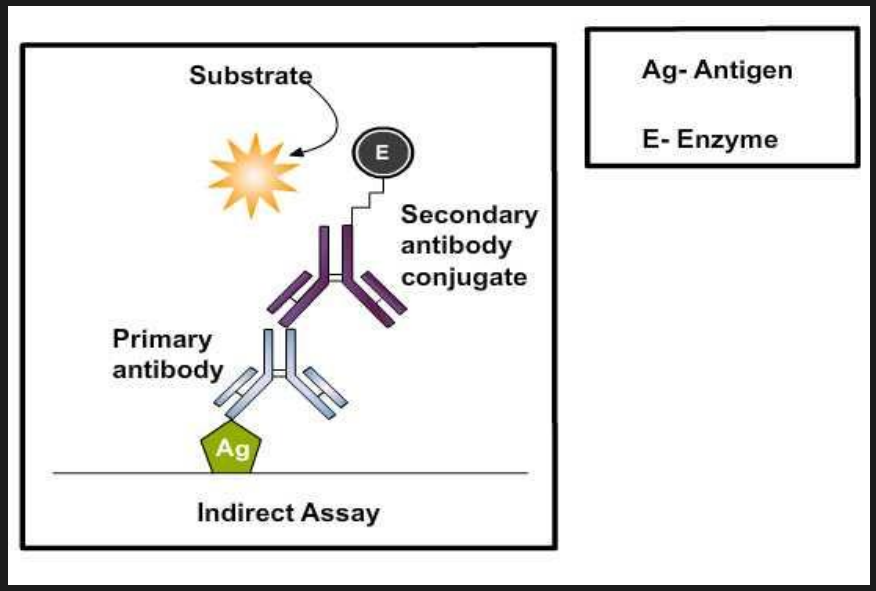

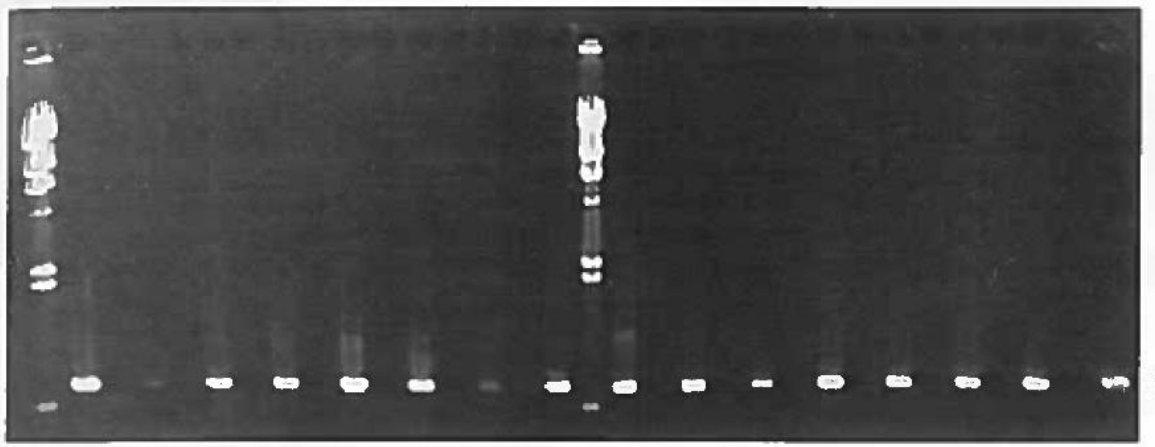

Fig. 2. Agarose gel electrophoresis of PCR products of 16 MG strains (lanes A–H and I–P). A = F-K810; B = F-F2F10; C = AAA; D = Fg38; E = F(g99); F = GM607; G = S6(208); H = S6(C4P8); I = PG31; J = A5969; K = GM747; L = K2101; M = K2101 (36P); N = R; O = V503; and P = F-Conn. Lanes marked with S represent molecular-weight standards (*Hin*dIII-cleaved lambda phage). The arrow corresponds to the 732-bp amplified MG DNA.

Present (90's until now)

Period	Subject
≥1993	Other *spp.*& strains identified
≥1994	Understanding mycoplasma survival
≥1994	Mycoplasma disease in wild birds
≥1988	Advances in diagnostics
≥1996	Vaccines as control measure
2017	Current situation

M. imitans

M. synoviae

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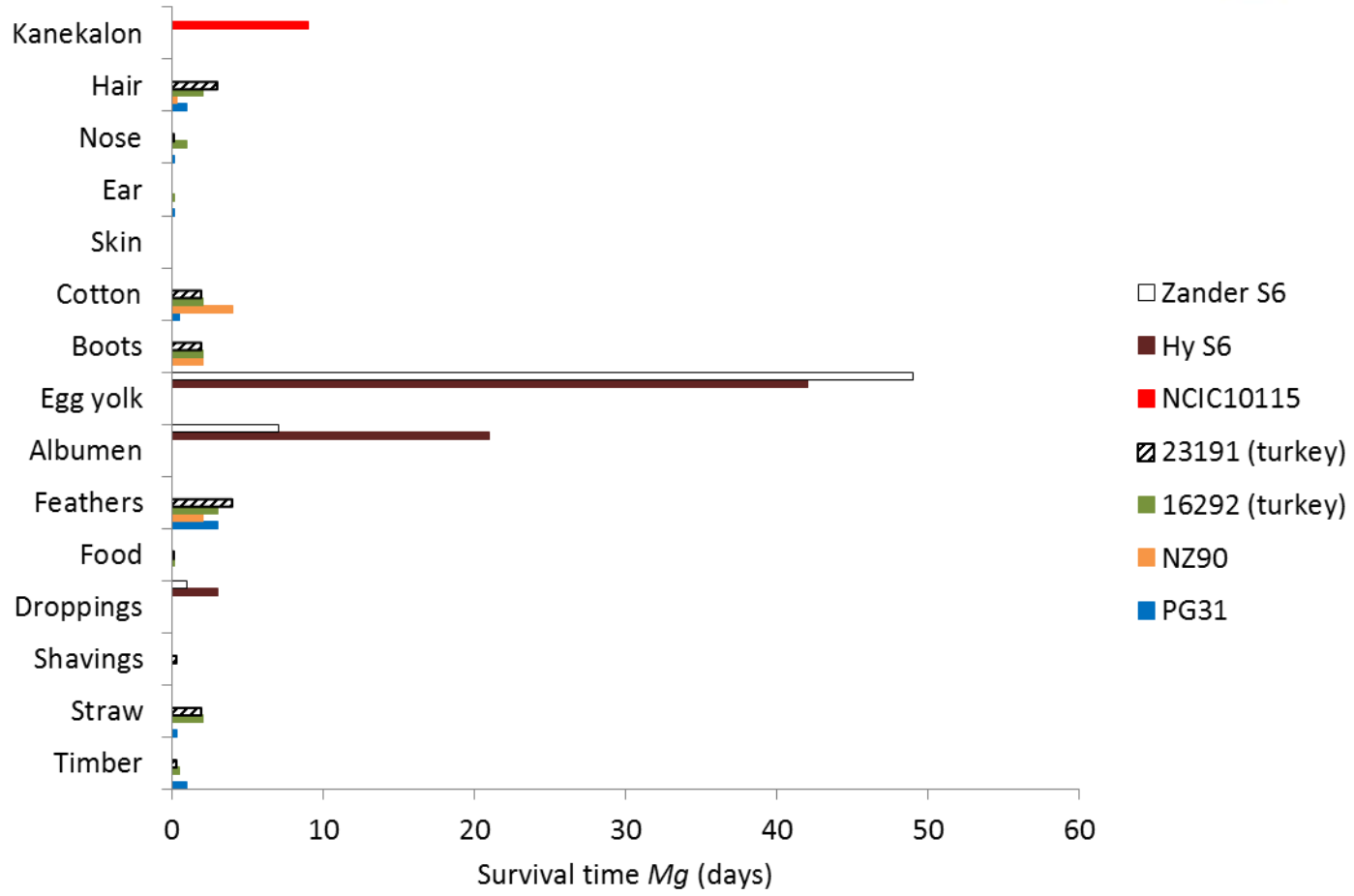

Chandiramani et al., 1966; Christensen et al., 1994; Abolink & Gouws, 2014

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journal homepage: www.elsevier.com/locate/vetmic

Identification of biofilm formation by *Mycoplasma gallisepticum*

Hongjun Chen [1], Shengqing Yu [1], Meirong Hu, Xiangan Han, Danqing Chen, Xusheng Qiu, Chan Ding *

Shanghai Veterinary Research Institute, Chinese Academy of Agricultural Sciences, 518 Ziyue Road, Shanghai 200241, PR China

- Variation between strains
- Biofilm forming *M. gallisepticum* strains seems more resistant to antibiotic treatment and desinfectance
- Suvival advantage outside the host

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House finch
(*Carpadocus mexicanus*)

1ary host, 60% †

American goldfinch
(*Spinus tristis*)

2ary host

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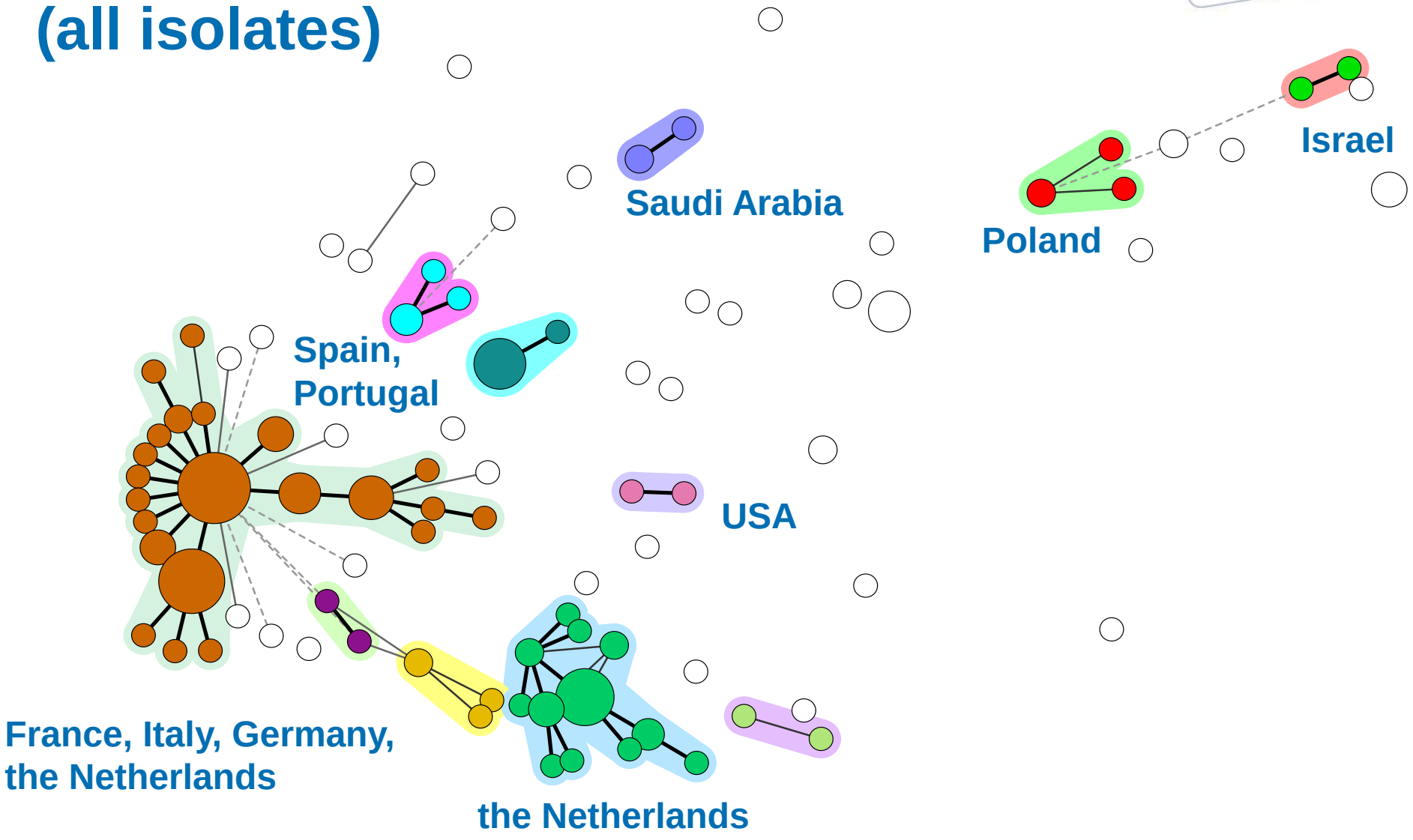
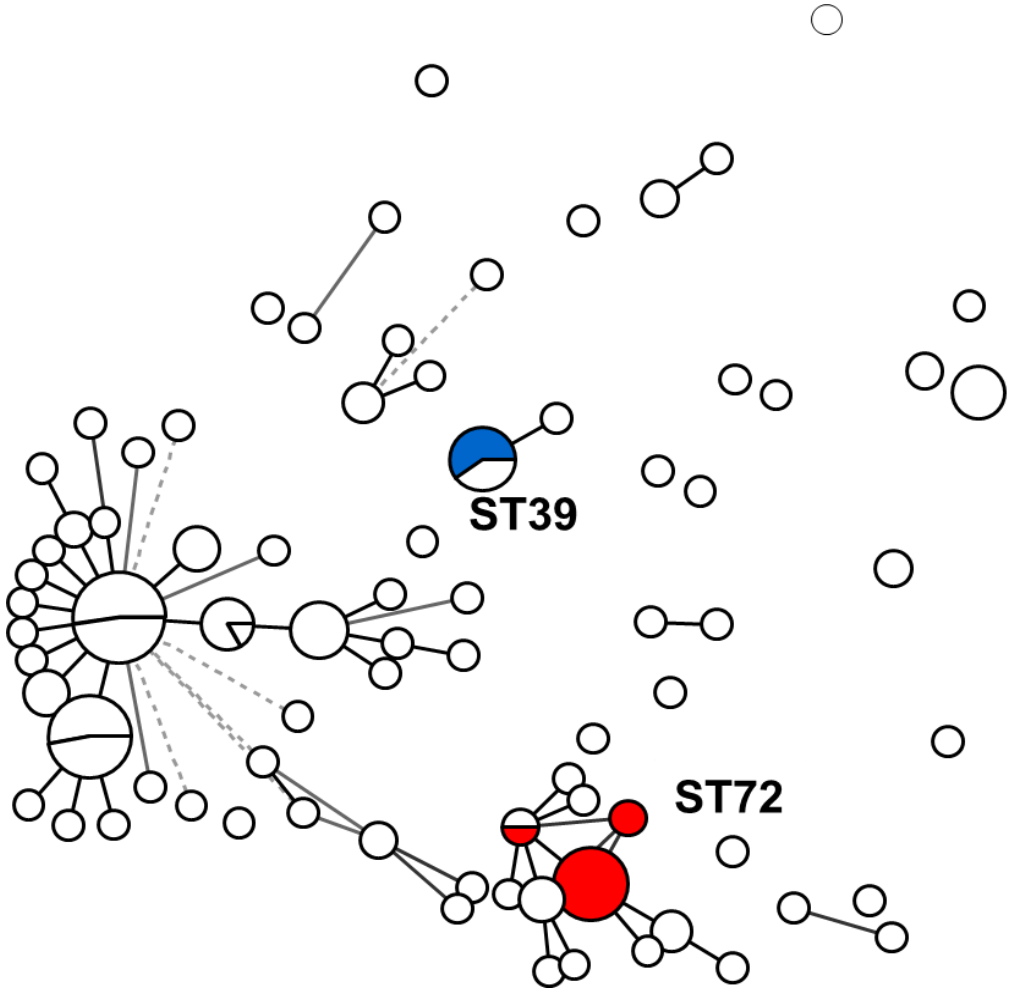
Molecular typing techniques

- Band-based
  - PFGE-RAPD-AFLP
- Sequence-based
  - Single gene (*vlhA typing)*
  - More genes (MLST)
  - Whole genome

STs & complexes per country (all isolates)



Ms outbreak



- Farm V (*n* = 8) 09/2003 ST72
- Farm E (*n* = 3) 10/2003 ST72
- Farm W (*n* = 1) 10/2003 ST72
- Farm M (*n* = 1) 03/2004 ST39
- Farm V (*n* = 2) 10/2004 ST72
- Farm S (*n* = 5) 11/2004 ST39
- Farm F (*n* = 2) 06/2005 ST72

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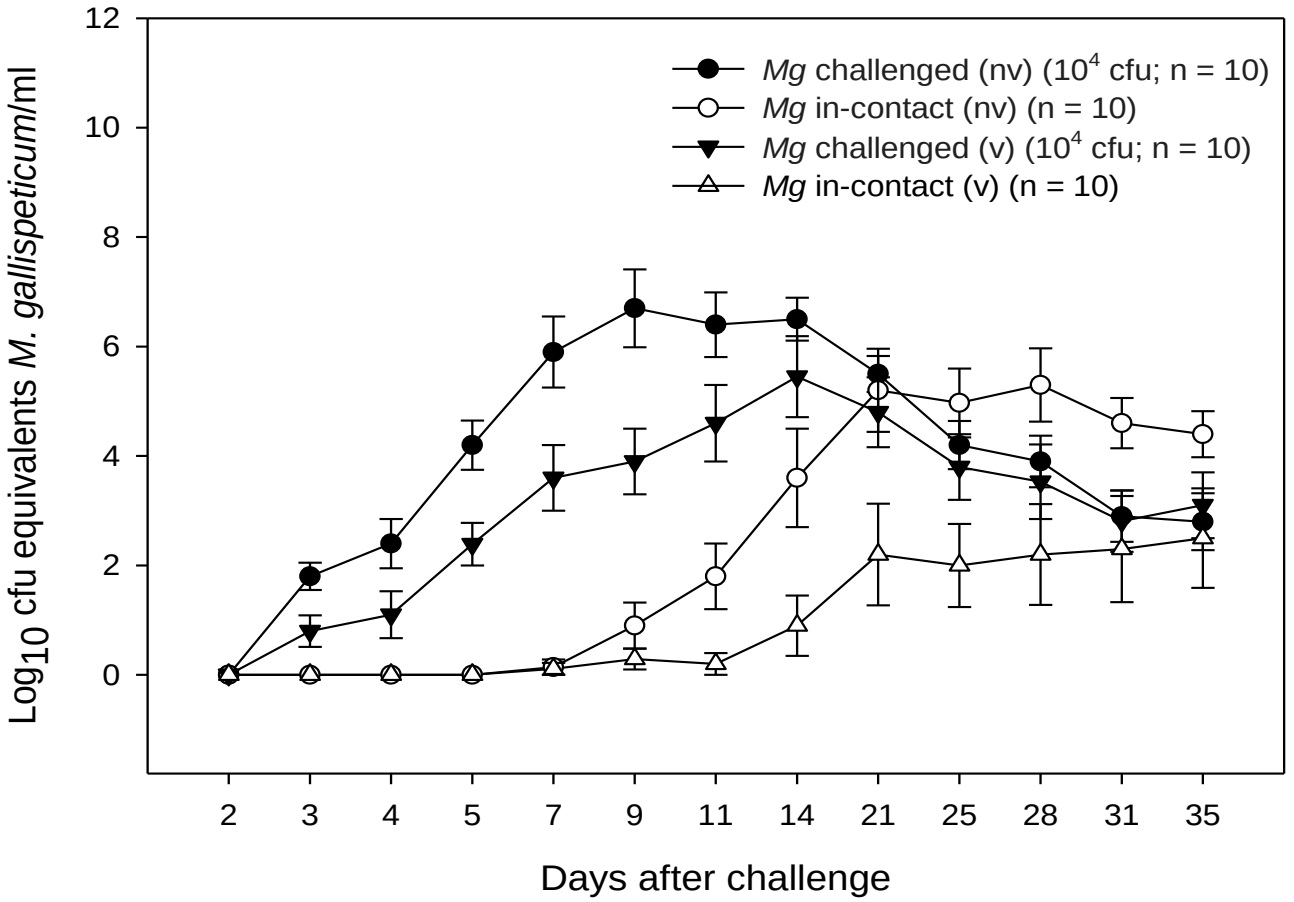

Effect MS-H vaccine

Shedding (cfu eq./g trachea mucus)	Transmission rate β
8.3×10^6	0.022 (0.015-0.031)
⇩	⇩
1.0×10^6	0.0012 (0.00048-0.0024)

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Current situation

- Low prevalence *M. gallisepticum & M. meleagridis*
  - Control programmes
  - Primary breeding stock free
- High prevalence *M. synoviae*
  - Primary breeding stock free
- *M. iowae*
  - sporadically reported in commercial poultry

Future

- Reduction prevalence
  - *M. gallisepticum* developing countries
  - *M. synoviae* worldwide
- Shift to molecular-based tests
  - Earlier/accurate detection infections
- Prudent use antibiotics (MIC)
- Whole genome sequence
- DIVA tests
- Biosecurity

Thank you for your attention