Turkey Respiratory Complex

Involved Pathogens

Field Situation

Low pathogenic avian influenza

Current Solutions

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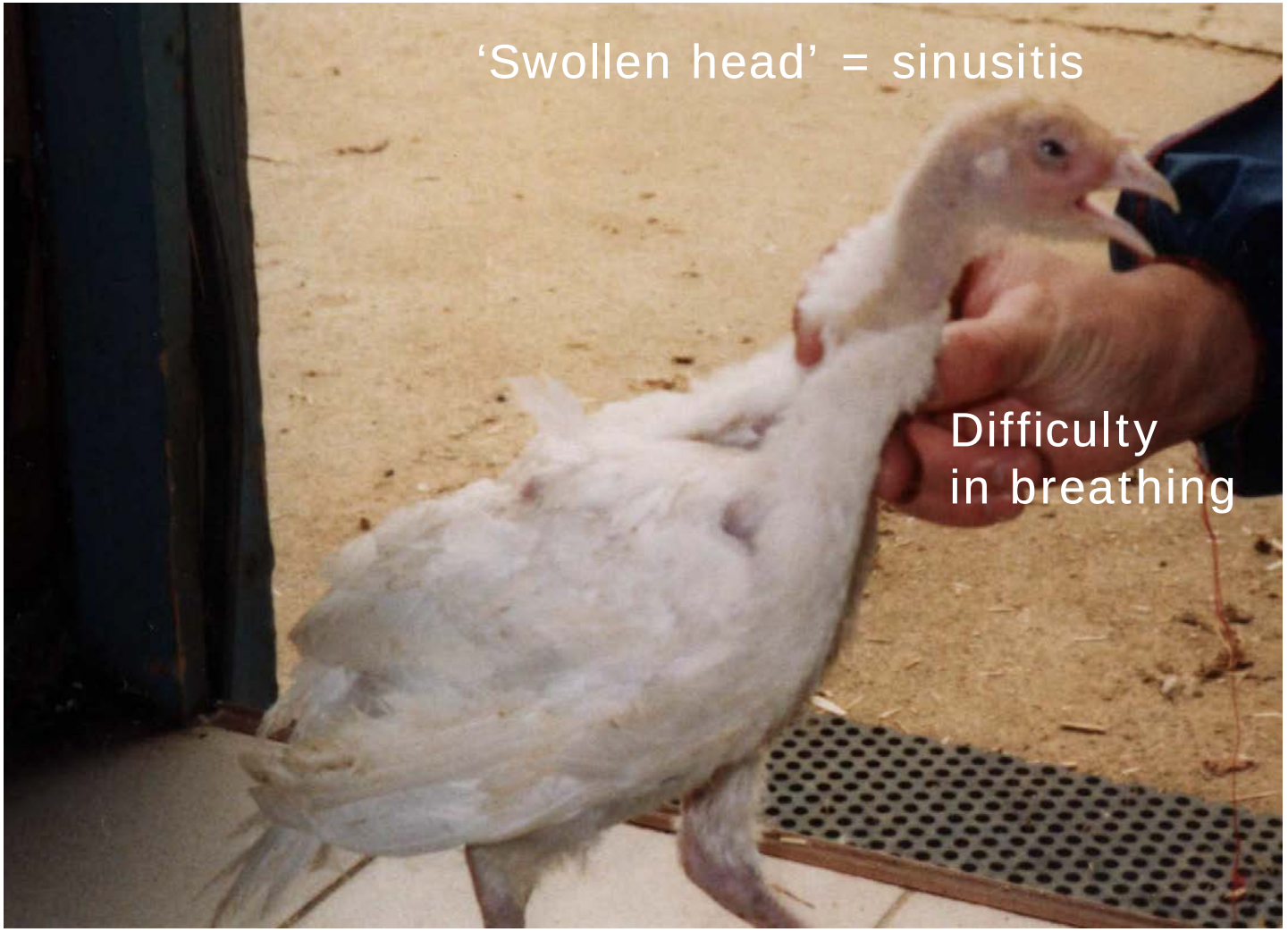
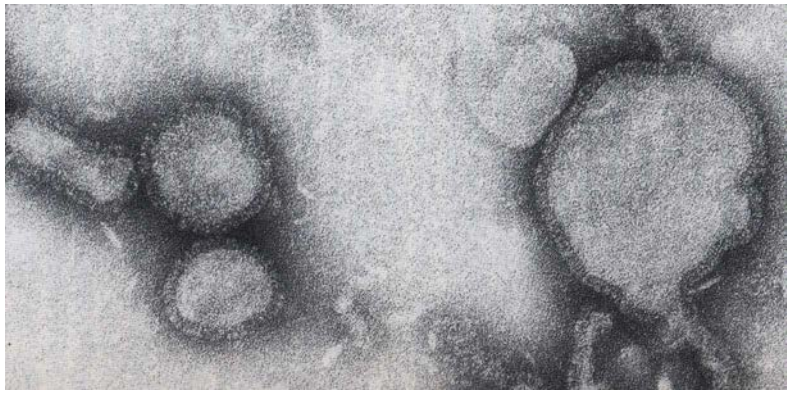
Turkey respiratory complex



Involved Pathogens

Turkey respiratory complex - causes

- Primary pathogens = viruses, mainly but not exclusively:
  - Turkey Rhinotracheitis Metapneumovirus
  - Paramyxovirus type 1
  - Etc.



Turkey respiratory complex - causes

- Secondary infections involving bacteria, mainly but could be primary pathogens:
  - Ornithobacterium rhinotracheale
  - Mycoplasma spp
  - Escherichia coli
  - Etc.

Turkey respiratory complex - causes

- Mycoplasma gallisepticum infection:

Turkey respiratory complex - causes

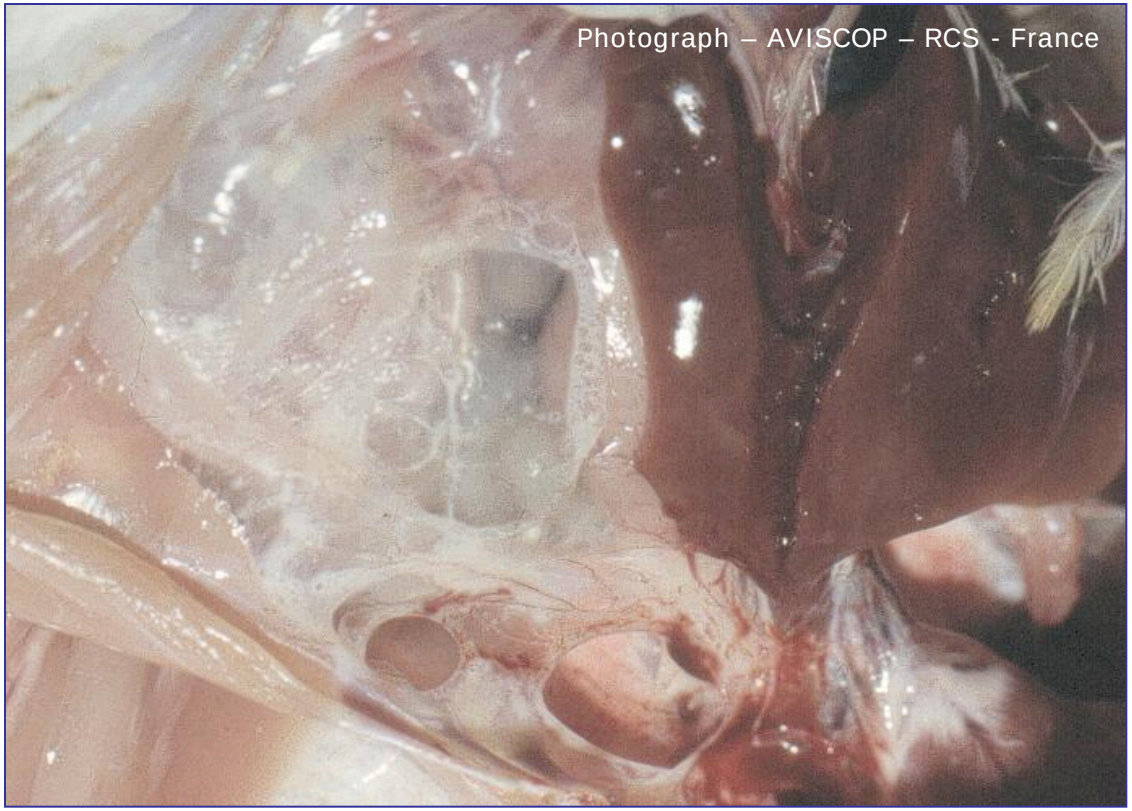
- Mycoplasma gallisepticum infection - pericarditis

Turkey respiratory complex - causes

- Mycoplasma gallisepticum infection – pericarditis & perihepatitis

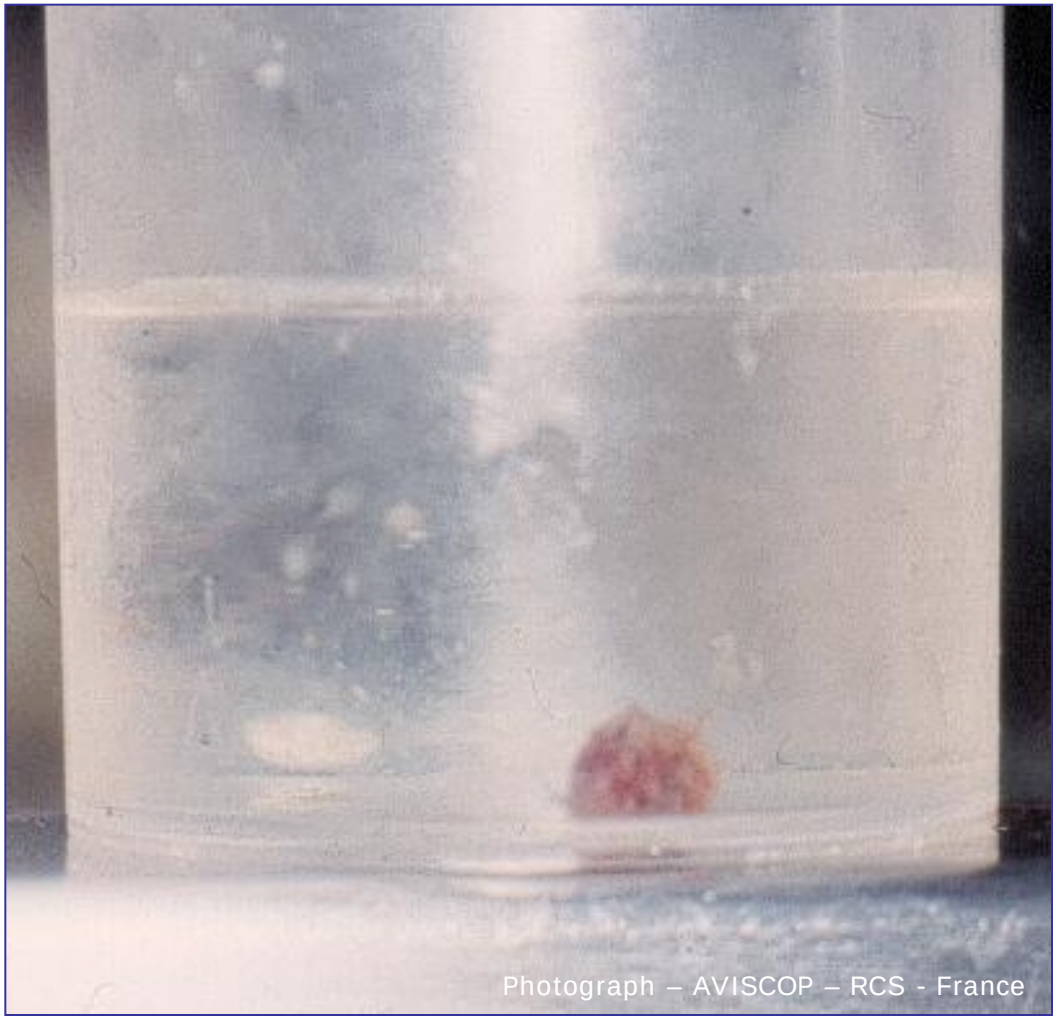
Turkey respiratory complex - causes

- Mycoplasma gallisepticum infection – airsacculitis

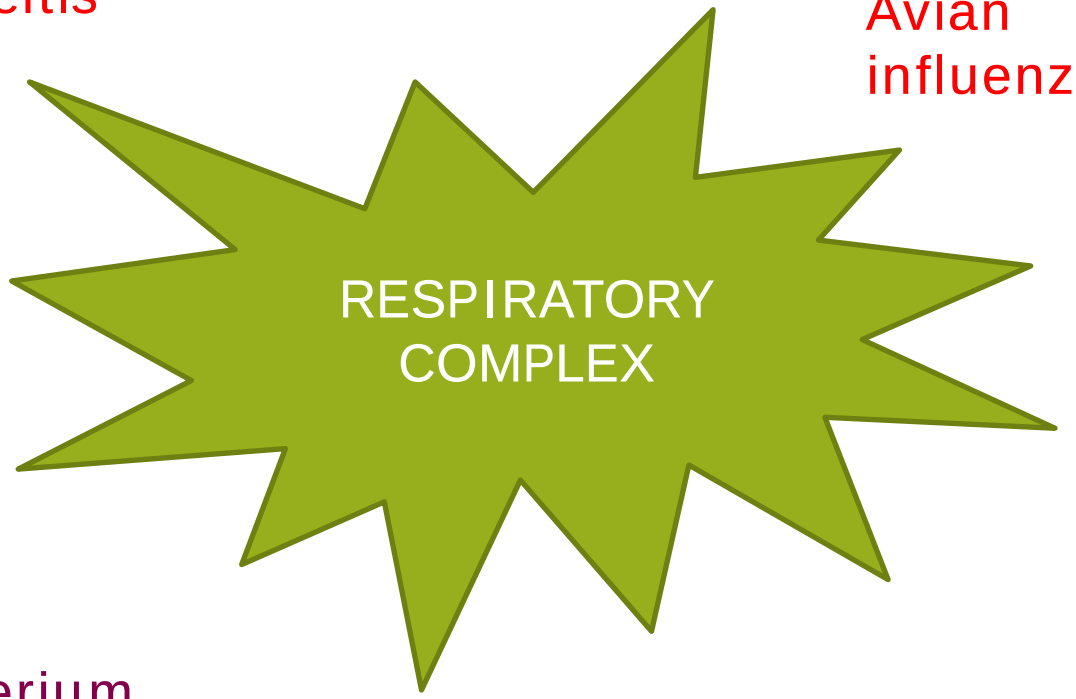


Turkey respiratory complex - causes

- Mycoplasma gallisepticum infection – pneumonia



Turkey respiratory complex - causes



Turkey
Rhinotracheitis

Paramyxovirus
type 1

Avian
influenza

Etc.

Mycoplasma
gallisepticum,
synoviae,
meleagridis

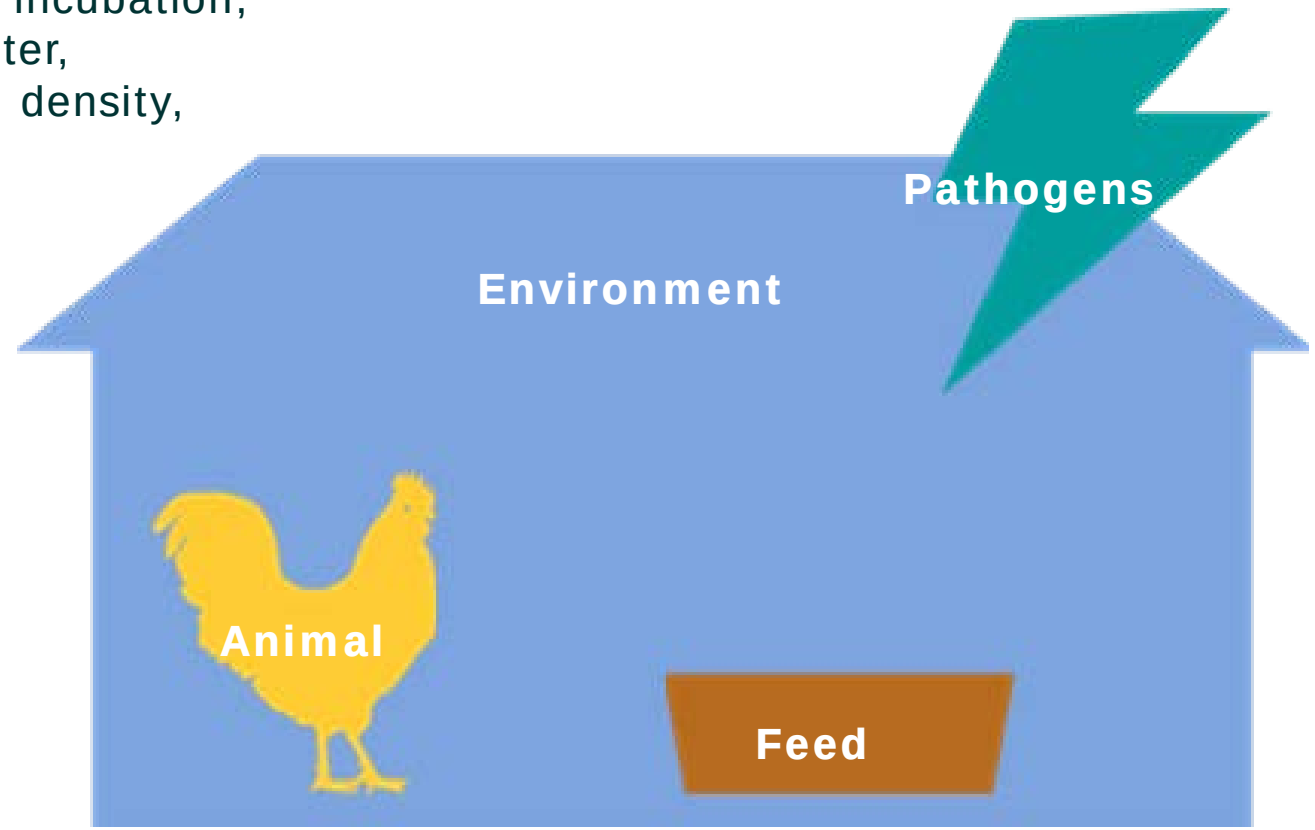
Ornithobacterium
rhinotracheale

Immuno-suppression

Etc.

Turkey respiratory complex – Immuno-suppression

Environment: incubation, ventilation, litter, management, density, temperature



Animal: maternal antibodies, genetics, stress, age

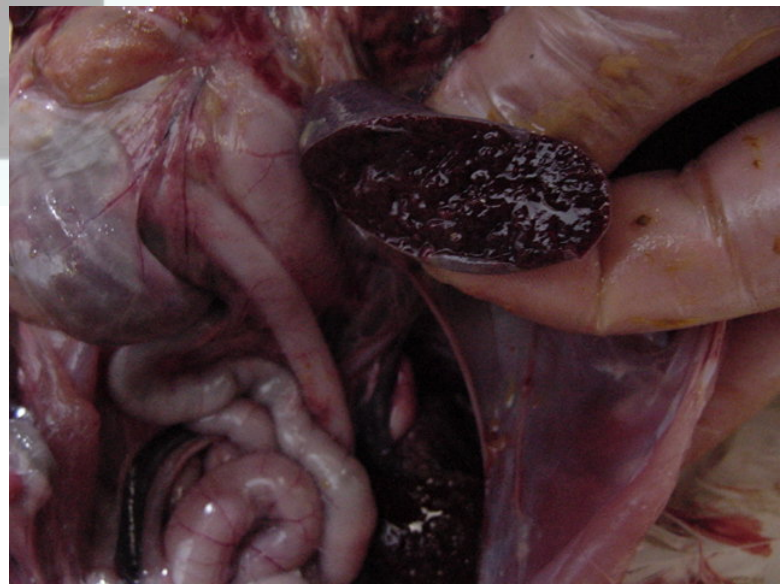
Feed: unbalanced diet, mycotoxin contamination, environmental toxin contamination

Turkey respiratory complex – Immuno-suppression

PATHOGENS

Hemorrhagic Enteritis Virus – Adenovirs Type II

+ TRT



Turkey respiratory complex – Mixed infections

- TRT viral infection followed by Ornithobacterium rhinotracheale
- Enhanced clinical score further to mixed infection

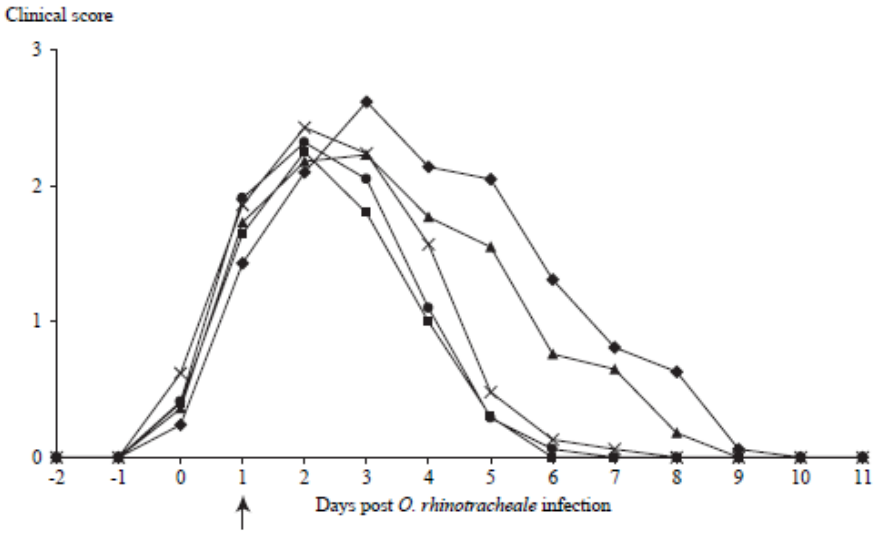


Figure 1. *Mean clinical scores in turkeys inoculated with APV and* O. rhinotracheale *and subsequently treated with different antimicrobial agents:* ■*, group E3, 3 days of enrofloxacin (10 mg/kg);* ●*, group E5, 5 days of enrofloxacin (10 mg/kg);* ▲*, group A, 5 days of amoxicillin (20 mg/kg);* ×*, group F, 5 days of florfenicol (20 mg/kg);* ◆*, no treatment, control group. Arrow indicates first day of antibiotic treatment.*

[Marien M & Al, Avian Path, 2006]

Turkey respiratory complex – Mixed infections

- AI H9N2 viral infection followed by Ornithobacterium rhinotracheale + other pathogens including viruses
- Detection from field samples

Table 4. Laboratory diagnosis of turkey pathogens other than AIV in birds from field outbreaks and experimental infection.

	Testing for the presence of:											
	aMPV	TCoV	ASTRO	ROTA	REO	PARVO	ADENO	MG/MS/MM	HA		ORT	
Outbreak flock	rRT-PCR	rRT-PCR	RT-PCR	RT-PCR	rRT-PCR	PCR	PCR	rPCR/rPCR/PCR	PCR	ELISA	PCR	ELISA
1/A	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	POS	nt
1/B	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	neg	nt
1/C	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	POS	nt
1/D	neg	neg	neg	neg	POS	neg	neg	neg	nt	POS	neg	nt
1/E	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	POS	nt
2/A	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	POS	nt
2/B	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	neg	nt
3	neg	neg	POS	POS	neg	POS	neg	neg	nt	neg	POS	nt
4	neg	neg	neg	neg	neg	neg	neg	neg	nt	POS	POS	nt
Turkeys infected experimentally	neg	neg	POS	neg	POS	neg	POS	neg	neg/POS*	nt/POS*	POS/POS*	nt/POS*

*before start of the experiment (14 dpi).
aMPV, avian metapneumovirus; TCoV, turkey coronavirus; ASTRO, astrovirus; ROTA, rotavirus; REO, reovirus; PARVO, parvovirus; ADENO, adenovirus; MG, *Mycoplasma gallisepticum*; MS, *Mycoplasma synoviae*; MM, *Mycoplasma meleagridis*; HA, *Bordetella avium*; ORT, *Ornithobacterium rhinotracheale*; nt, not tested.

[Smietanka K & Al, Avian Path, 2014]

Diagnostic

- Routine testing for monitoring:
  - Serology: mainly ELISA commercial kits for TRT; IHA for PMV1; Etc.
  - Bacteriology: mainly for E. coli, O. rhinotracheale (blood agar), Etc.
  - PCR from tracheal swabs: mainly for M. gallisepticum, M. synoviae, TRT, Etc.

Field Situation

Field monitoring - Example of France

- Primary criterion of evaluation:
  - Respiratory virus circulation
    - Serology
    - PCR
- Secondary criterion of evaluation:
  - Immunosuppressive virus circulation
    - Rhinotracheitis virus
    - Paramyxovirus type 1
    - Hemorrhagic enteritis virus

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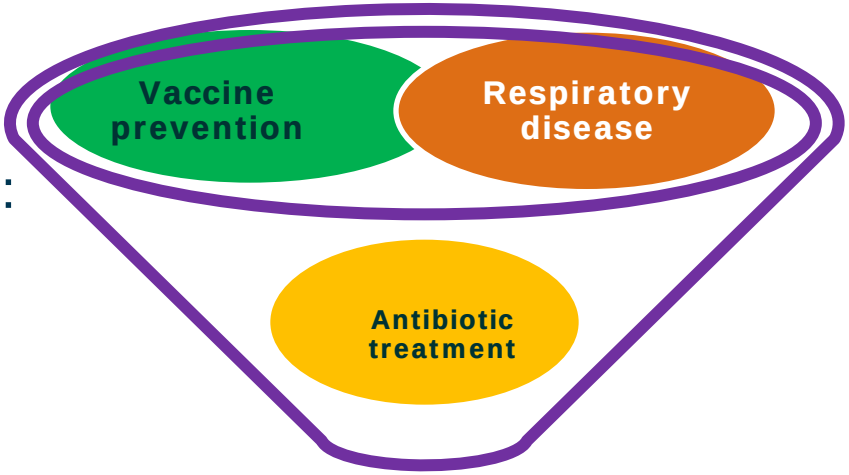
Réduire l'utilisation des antibiotiques vétérinaires : diminuer, c'est possible



Decrease of performance

Field monitoring - Example of France

Infectious diseases

Complexity of diagnostic

- Complications
- Mortality
- Arthritis
- Breast skin lesions

Slaughter Transformation

- Total condemnation
- Abnormalities originating partial condemnation
- Microbiological counts

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Réduire l'utilisation des antibiotiques vétérinaires : diminuer, c'est possible

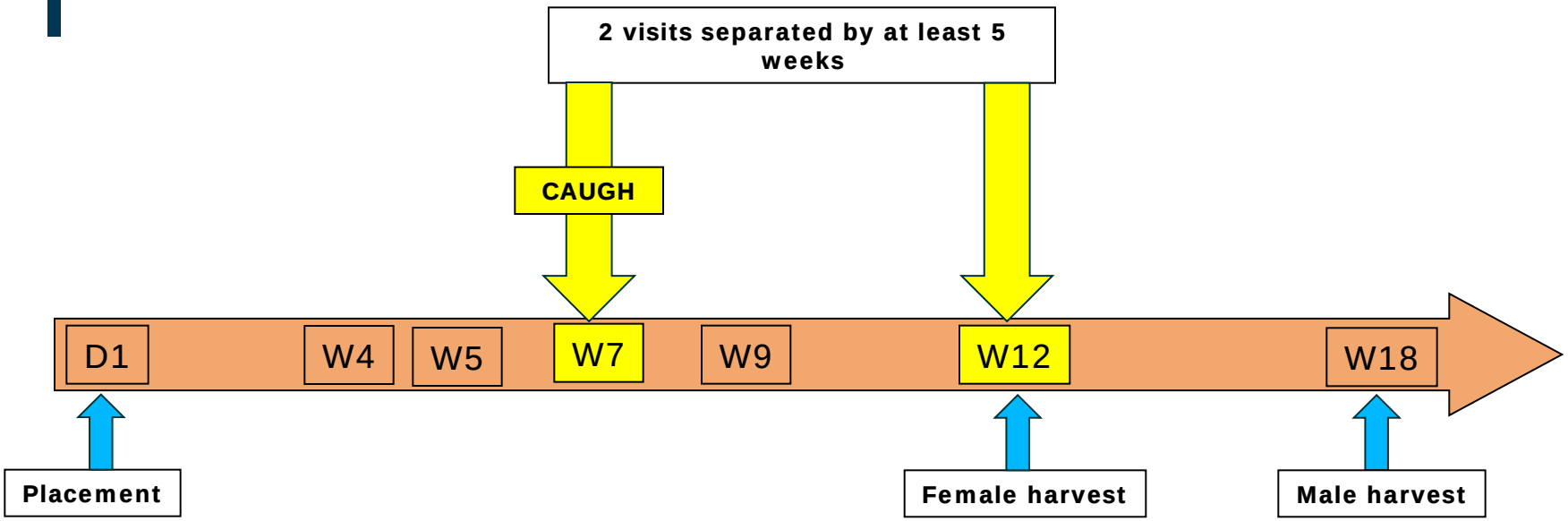
ONE HEALTH

Respiratory complex

Partial condemnation

High quality transformed meat

Field monitoring - Example of France



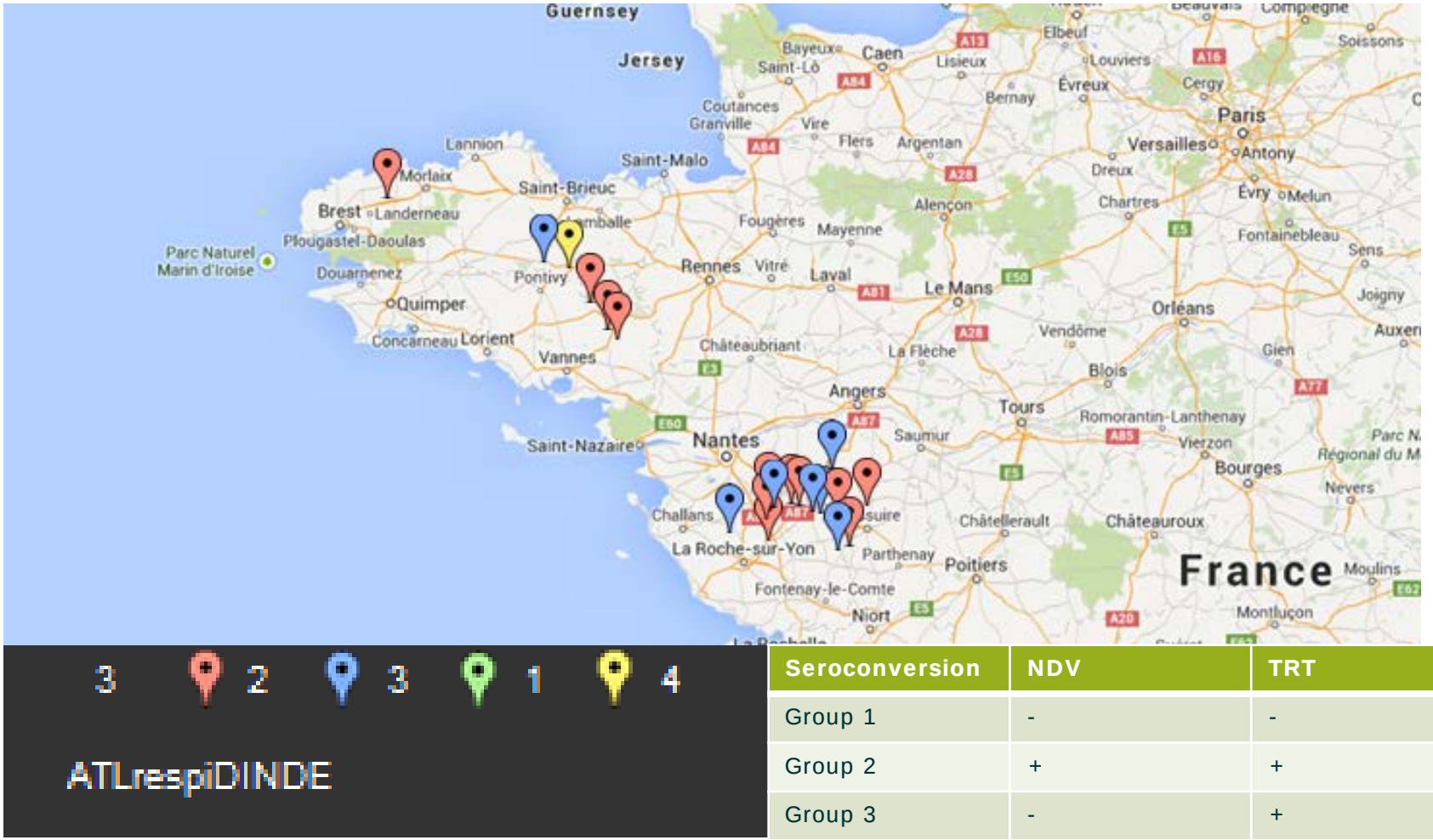
FIRST VISIT	SECOND VISIT
First signs of respiratory disorders - caugh Sampling: blood for serology & tracheal swabs	5 weeks after first visit Sampling: blood for serology

Field monitoring - Example of France

- 21/30 flocks: evidenced wild virus circulation
  - 70% in Pays de Loire region
  - 50% in Brittany

	Sero-conversion	Brittany	Pays de Loire	Negative or vaccine
ND & TRT positives	6	3	3	10
ND positives	5	1	4	/
TRT positives	10	0	10	/
Total positives	21	4	17	/
Total flocks	31	7	24	/

Field monitoring - Example of France

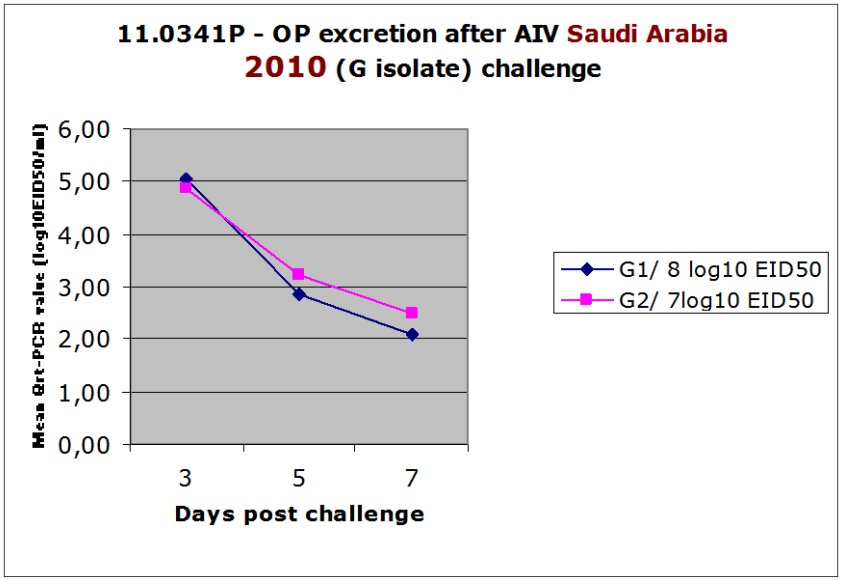


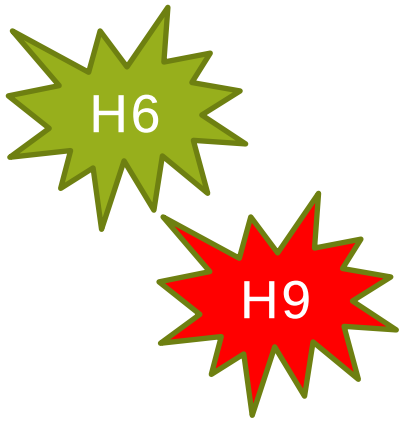
Seroconversion	NDV	TRT
Group 1	-	-
Group 2	+	+
Group 3	-	+
Group 4	+	-

Low pathogenic avian influenza

Low pathogenic Avian Influenza

- Virus with low pathogenicity in laboratory conditions:
  - Virus shedding
  - Poor clinical signs in chickens, unless model of co-infection
  - Turkey species more susceptible





Low pathogenic Avian Influenza

Low pathogenic Avian Influenza

Low pathogenic Avian Influenza

Low pathogenic Avian Influenza

Low pathogenic Avian Influenza

Low pathogenic Avian Influenza

+ pancreatitis associated with AI H9N2

Current Solutions

Current solutions – Optimized vaccination programs

- Respiratory diseases:
  - TRT live vaccine – 3 time application from day old during the rearing period (for instance D1-D17-D56)
  - PMV1 live vaccine – 2 time application during the rearing period (for instance D28-D56)
- Immuno-suppressive diseases:
  - Adenovirus type II live vaccine application around D28 of age further to maternally-derived antibody waning

Current solutions – Rational use of antibiotics

- Antibiograms + strategy of use:
  - More & more antibiotic resistance
  - Selection of the efficient antibiotic
- Macrolides:
  - Mostly efficient against O. rhinotraeale – newer generation
  - Efficient against Mycoplasmas

Current solutions – Biosecurity

Thank you for your attention!