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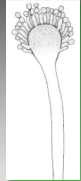
Aspergillosis in breeding turkeys:

from experimental infections...
...to field investigations

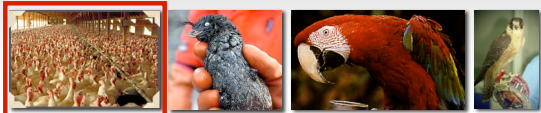





Introduction



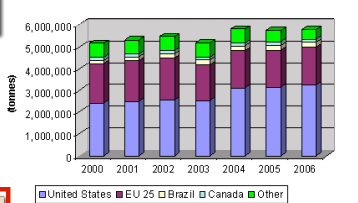
- aspergillosis in a very wide range of avian species...
- of utmost importance in turkeys




Introduction



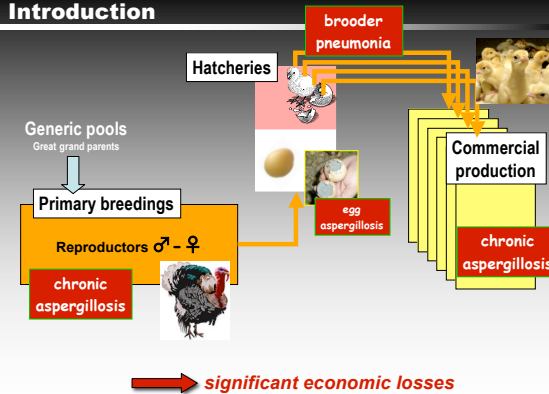
Annual production of turkeys



Year	United States	EU 25	Brazil	Canada	Other
2000	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2001	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2002	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2003	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2004	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2005	~2,500,000	~1,000,000	~500,000	~200,000	~100,000
2006	~2,500,000	~1,000,000	~500,000	~200,000	~100,000



Introduction



Generic pools (Great grand parents) → Primary breedings (Reproducers ♂ - ♀) → Hatcheries → Commercial production

Infection points: chronic aspergillosis (in primary breedings), egg aspergillosis (in hatcheries), brooder pneumonia (in commercial production), chronic aspergillosis (in commercial production)

→ **significant economic losses**

Experimental models

In different avian species

- in chickens**
Fadi Elmula et al. 1984; O'Meara & Chute, 1959; Taylor & Burroughs, 1973; Van Cutsem, 1983
- in starlings**
Atsaver & Gümüşsoy, 2004
- in ducks**
Graczyk et al., 1998
- in Japanese quails**
Chaudhary & Sadana, 1988; Gümüşsoy et al. 2004; Olson, 1969
- in pigeons**
Van Cutsem et al., 1989; Beernaert et al., 2008
- in ostriches**
Walker, 1915
- in turkeys**
Kunkle & Rimler, 1996; Kunkle & Sacco, 1998; Kunkle et al., 1999; Redig, 1986; Richard et al., 1981; Richard & Thurston, 1983; Richard et al., 1991; Femenia et al. 2007

Experimental models

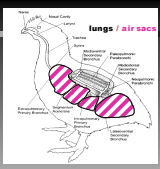
In different avian species

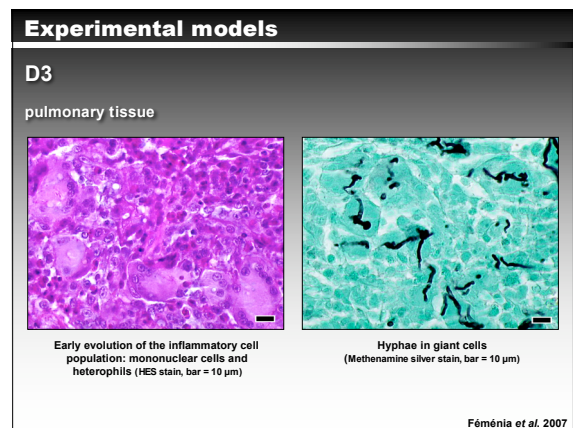
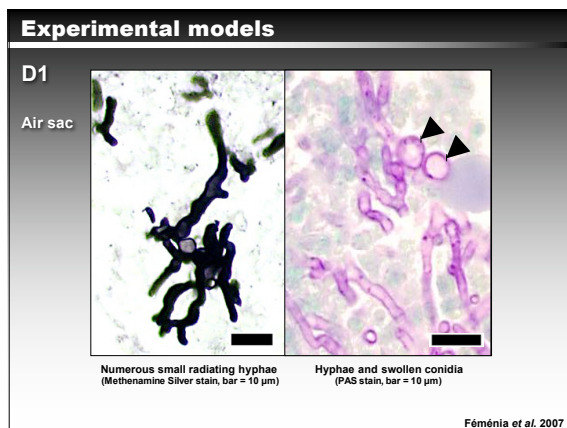
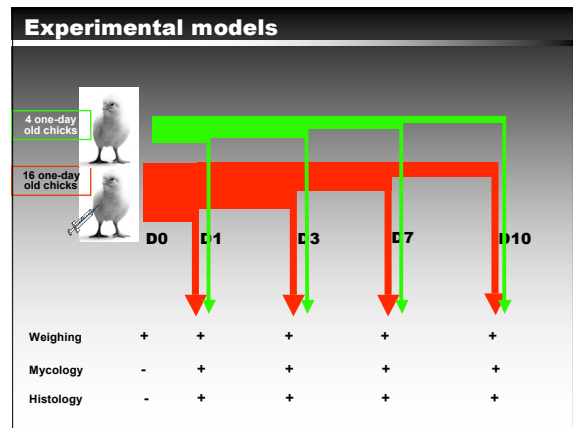
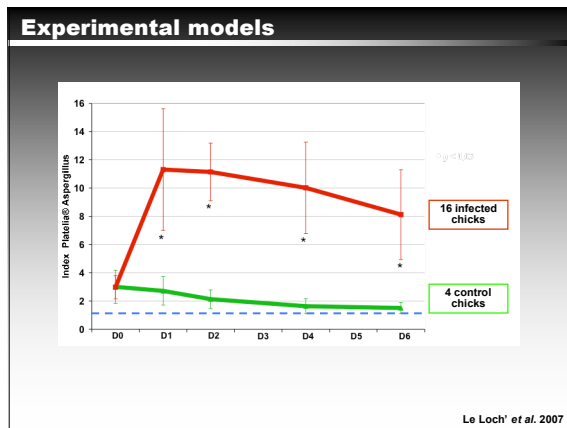
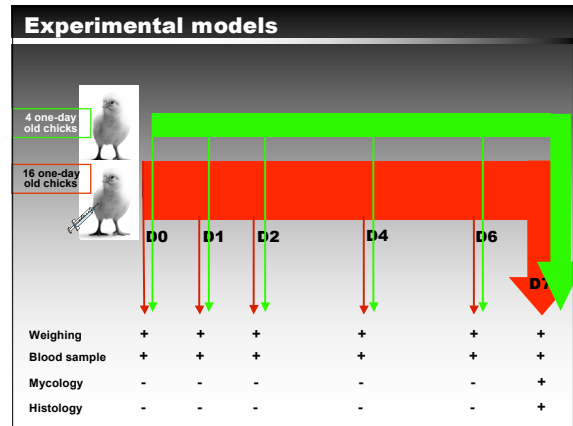
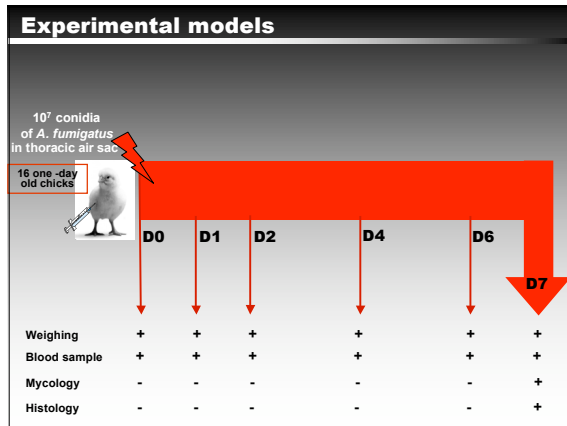
With different protocols

- inoculation routes
 - inoculation in the thoracic air sac, in the lungs, in the trachea
 - inhalation models
- with or without immunosuppression

With different objectives...

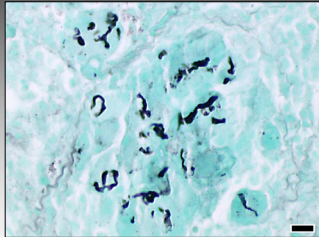
- to study host-pathogen interactions
- to develop diagnostic tools
- to test the efficacy of antifungal drugs
- to evaluate vaccines...





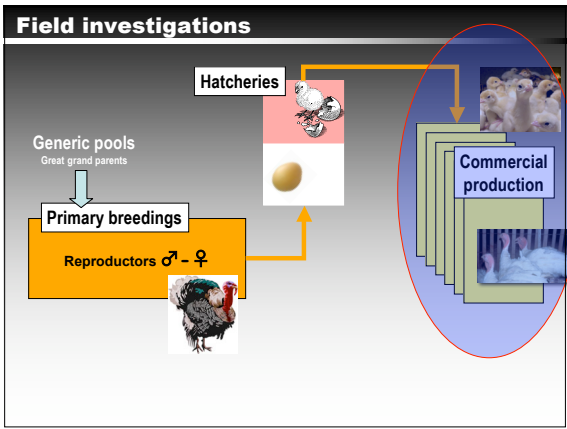
Experimental models

D7
pulmonary tissue




Intra-granulomatous fungi, phagocytized by multinucleate giant cells
(Methenamine silver stain, bar = 10 μm)

Féménia et al. 2007



Field investigations


- a 600 m² confinement building in the Center of France
- a flock comprising 4500 turkeys
females slaughtered at the age of 12 w and males at the age of 16 w




Genotyping of environmental and clinical *A. fumigatus* isolates
(2 microsatellite markers)

Bart-Delabesse et al. J. Clin. Microbiol. 1998

Field investigations



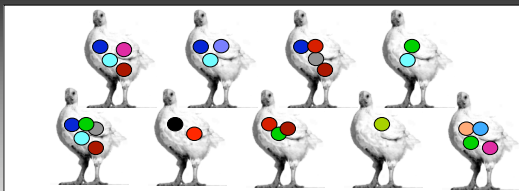
5 males 5 females




10 healthy chicks,
23 isolates,
1 unique genotype ●

Lair-Fullerger et al. J. Clin. Microbiol. 2003

Field investigations





9 healthy turkeys, 55 isolates, 17 genotypes



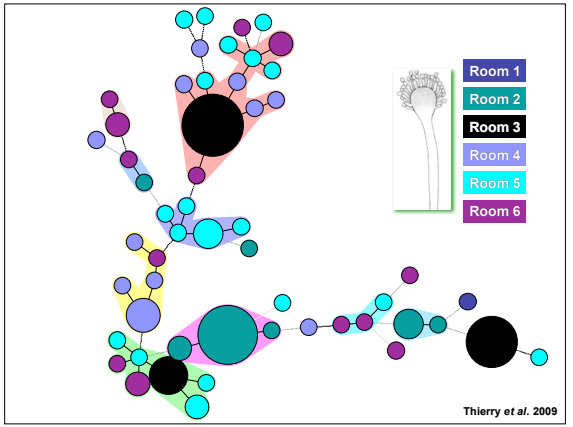
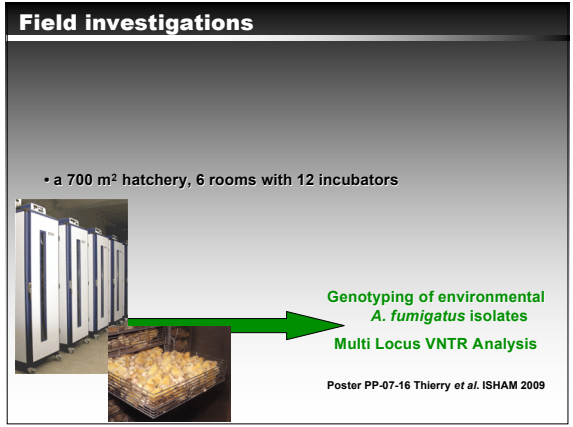
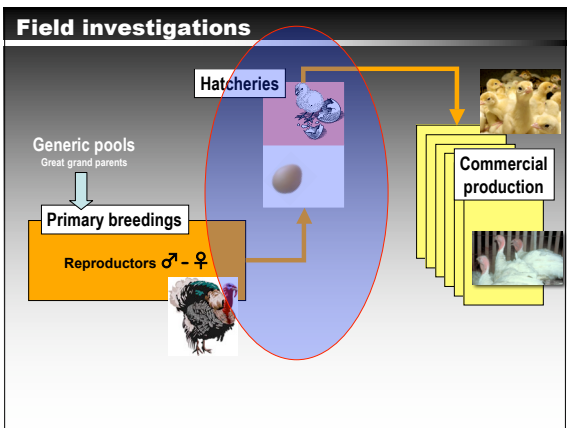
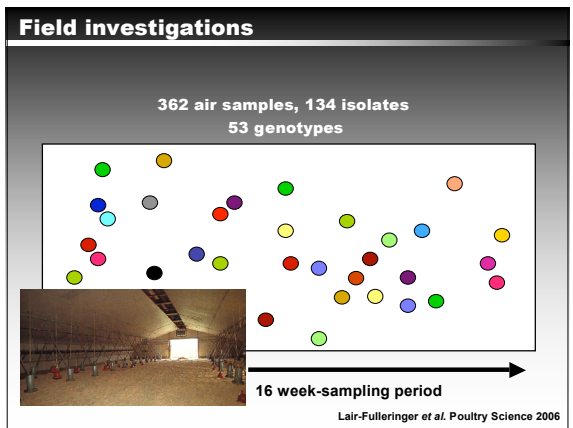
Lair-Fullerger et al. J. Clin. Microbiol. 2003

Field investigations

2 carcass condemnations,
36 isolates,
2 genotypes ● ●

Lair-Fullerger et al. J. Clin. Microbiol. 2003



Conclusion

Aspergillosis in turkeys

= not a single entity but a complex of several diseases...

- host-pathogen interactions ?
- circulation of *A. fumigatus* in animal facilities ?
- prevention program ?

Acknowledgements

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