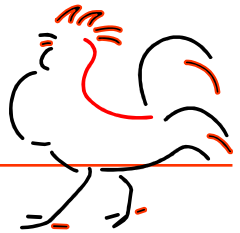

Genetic parameters for immune responses

specific and innate

in polish rural chicken line and a commercial layer line and their cross

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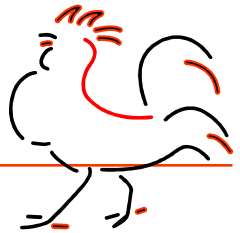
Introduction: Why immunity ?



→ Incresing demand for chicken meat

→ Increase consumption of chicken products

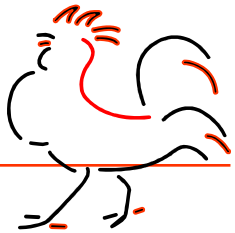
→ Big farms, intense production

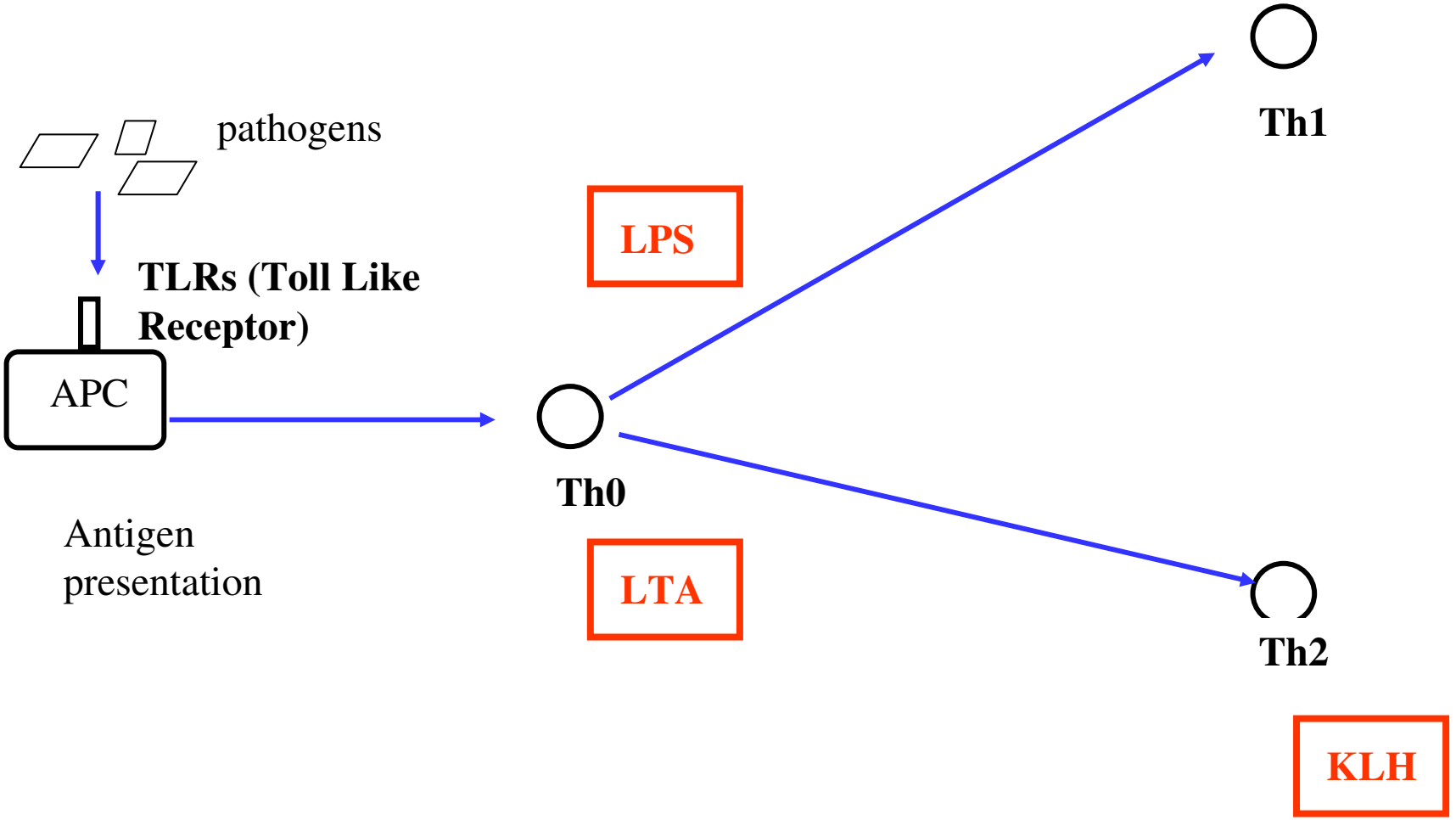
→ Pathogens threat in chicken production,

→ Risk for human health, close contact between humans and chickens

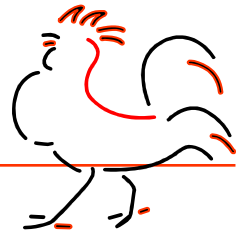
Solution: improved overall immunity of chickens

Relation between innate and adaptive immunity





Research questions:

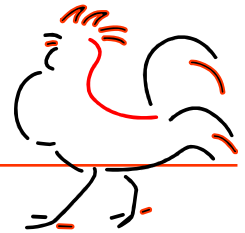


→Validate genetic basis for immune responses

→Validate QTL for (specific) immune responses to KLH

→ Detect QTL for innate immune responses

Materials & Methods: chicken lines



→ Green-Legged Partridgelike (GP)

* native polish layer
* closed since 50 generations
* high resistance to low temperatures and diseases

→White Leghorn (WL)

* commercial layer
* extensively selected for egg production ability
* assumption: low resistance against temperatures and diseases

Materials & Methods: cross

F_0: GP WL

→ Birds challenged with KLH antigen

↓

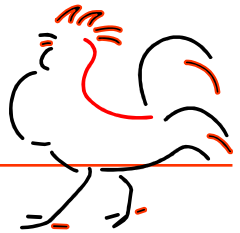
F_1: (GPxWL) x (GPxWL)

→ Parents selection based on response to KLH at day 7 (High /Low)

↓

F_2: **500 animals**

Materials & Methods: antigens



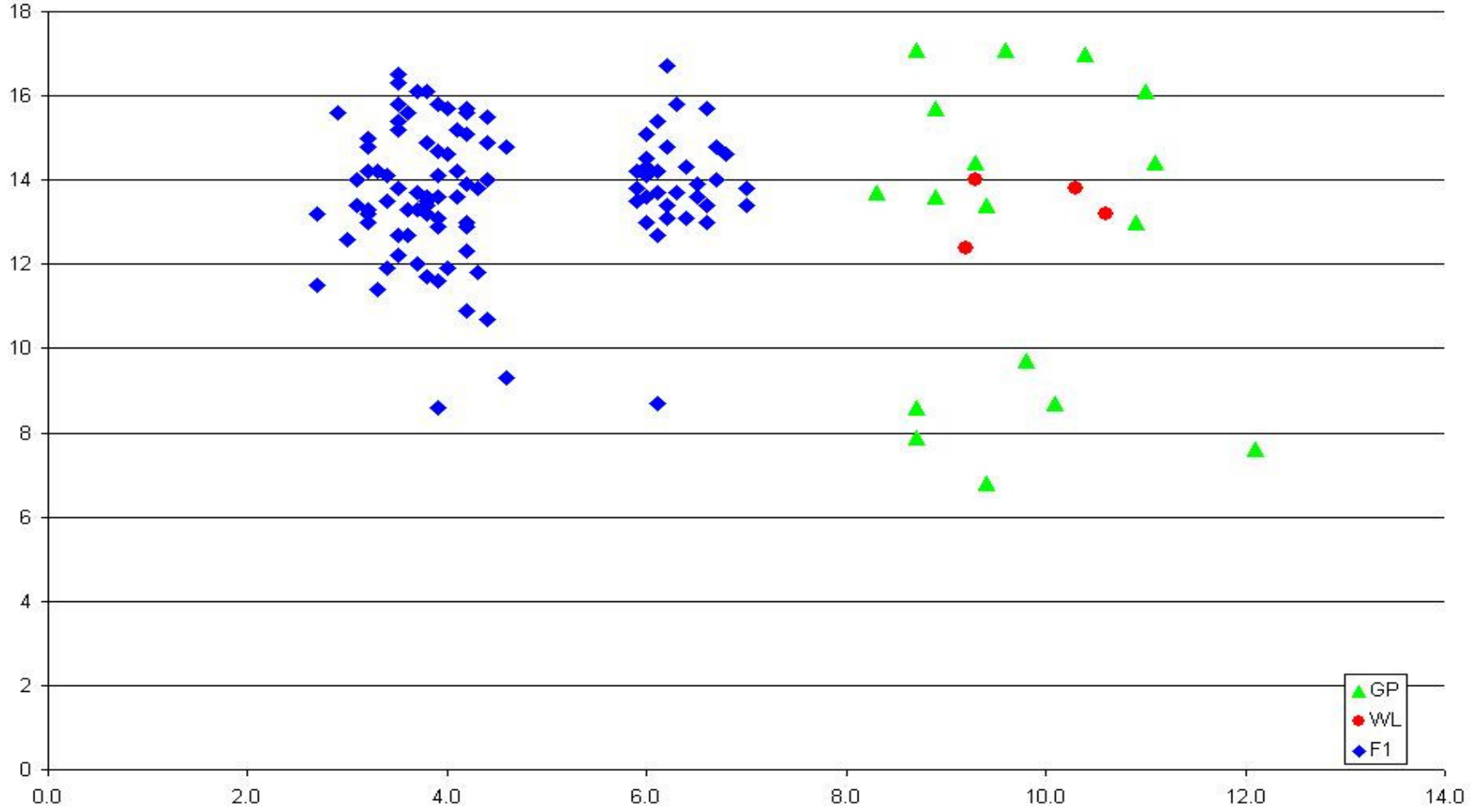
Immune responses were measured as:

→specific immune response for a Keyhole Lympet Hemocyanin antigen (KLH)

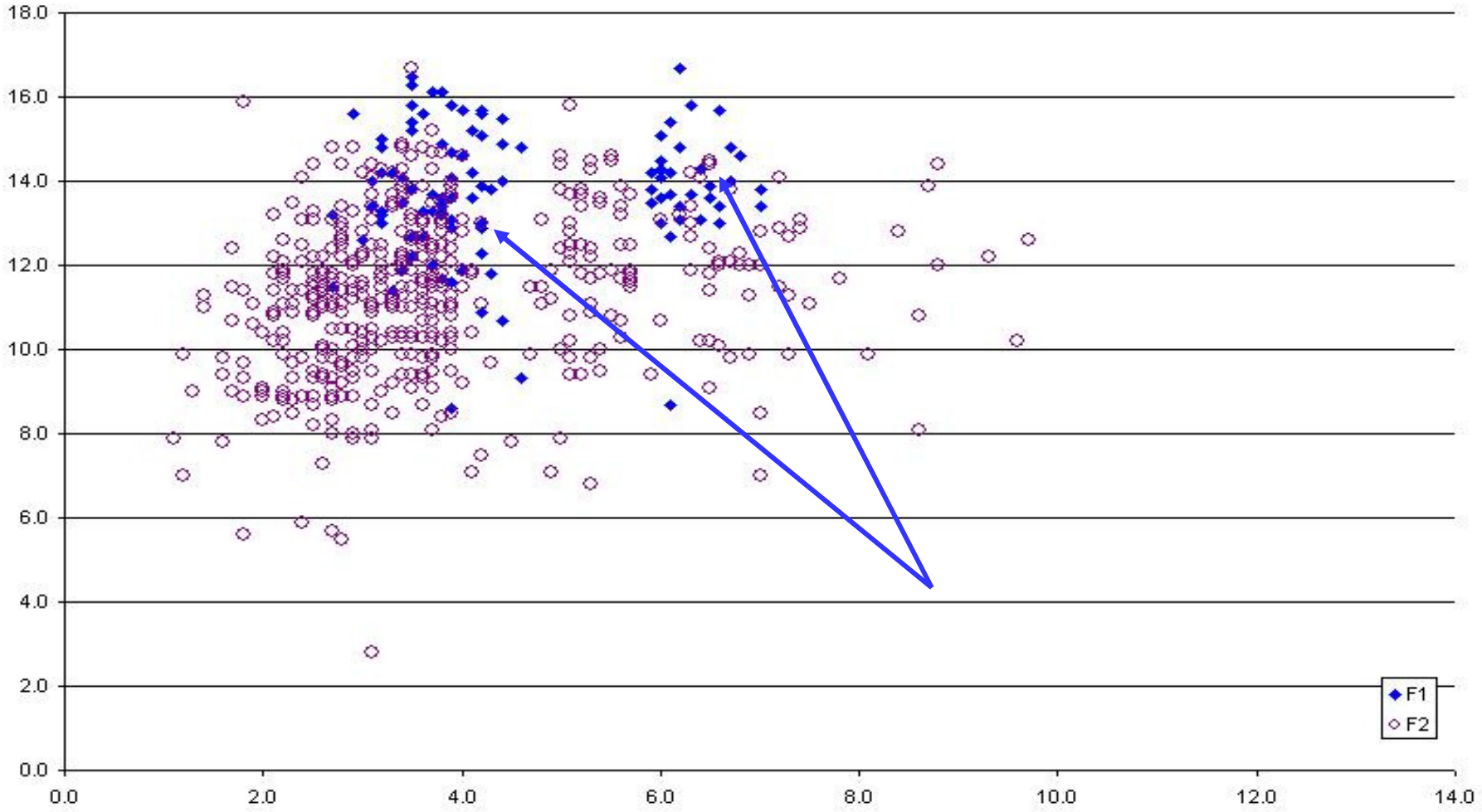
→non specific, innate immune responses for

* Lipopolysaccharide (LPS)
* Lipoteichoic acid (LTA)

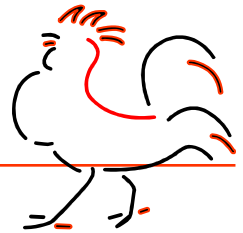
Results: F0 and F1 generations: KLH responses



Results: F1 and F2 generations: KLH responses



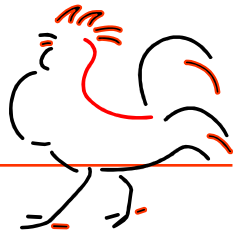
Results: descriptives for KLH



Line / cross	KLHd0	KLHd7
WL	9.20 ± 1.58a	12.62 ± 1.75ab
GP	9.58 ± 1.21a	12.64 ± 3.64ab
F1	4.58 ± 1.48b	13.55 ± 2.35a
F2	3.81 ± 1.55b	11.37 ± 1.92b

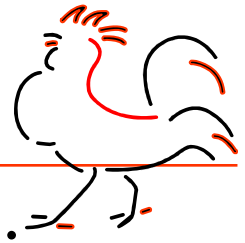
a-b: Means in the same column and with no common letter differed significantly ($P \leq 0.05$).

Results: heritability and rg



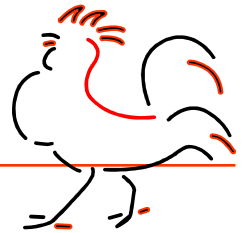
Trait	LPS	LTA	KLHd0	KLHd7
LPS	0.10 (0.07)	0.713	NE	-0.59
LTA		0.23 (0.11)	NE	0.02
KLHd0			0.07 (0.07)	NE
KLHd7				0.11 (0.07)

Discussion



- There is no difference in KLHd7 responses in parental lines
- There is more variation for KLHd7 in GP line what might be supported with genetic background
- There is genetic background for immune traits measured but heritabilities are considered low

Discussion



negative heterosis between pure line and crosses for KLHd0 response

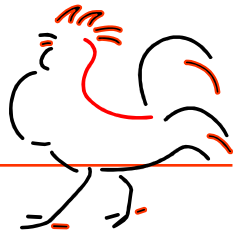
↓

crossbreds are known for better disease resistance

↓

negative heterosis for an immune trait is indeed advantageous

Future plans:



1. QTL study – validation of association between genetic markers and antibody level in rural (GP) x commercial chicken (WL) cross

2. Gene expression study – comparison of Toll-like receptors expression in rural (GP) & commercial chicken (WL) parental lines

Acknowledgement

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