



Genetic parameters for resistance to infectious diseases in two french paternal meat rabbit lines

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► To cite this version:

Mélanie Gunia, Ingrid David, Jacques Hurtaud, Mickaël Maupin, Hélène Gilbert, et al.. Genetic parameters for resistance to infectious diseases in two french paternal meat rabbit lines. 11. World Rabbit Congress, Jun 2016, Qingdao, China. 417 p. hal-01578243

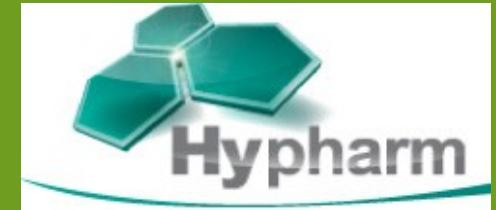
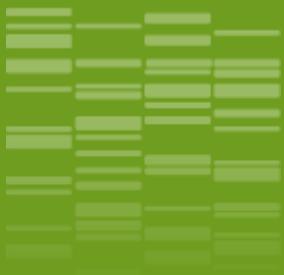
HAL Id: hal-01578243

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Submitted on 2 Jun 2020

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Genetic parameters for resistance to infectious diseases

in two French paternal meat rabbit lines



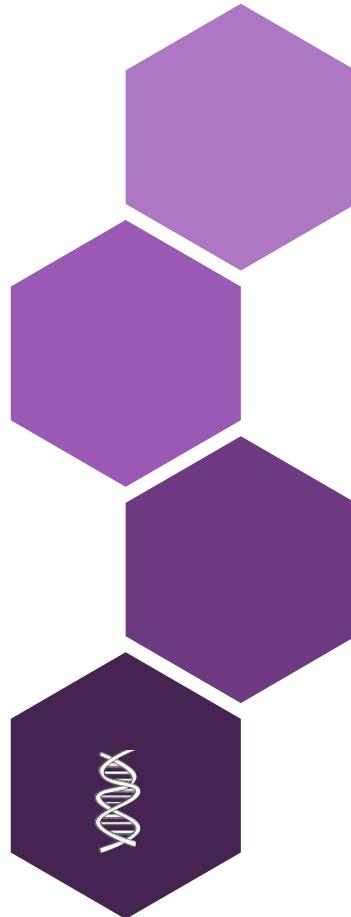
World Rabbit Congress
18/06/2016

Gunia M, David I, Hurtaud J , Maupin M , Gilbert H , Garreau H

Introduction

Antimicrobial
resistance

Genetic
selection



Diseases in rabbit
farms

Improve health
AND
reduce antibiotic use

Aim of the study

Heritability of resistance to infectious diseases

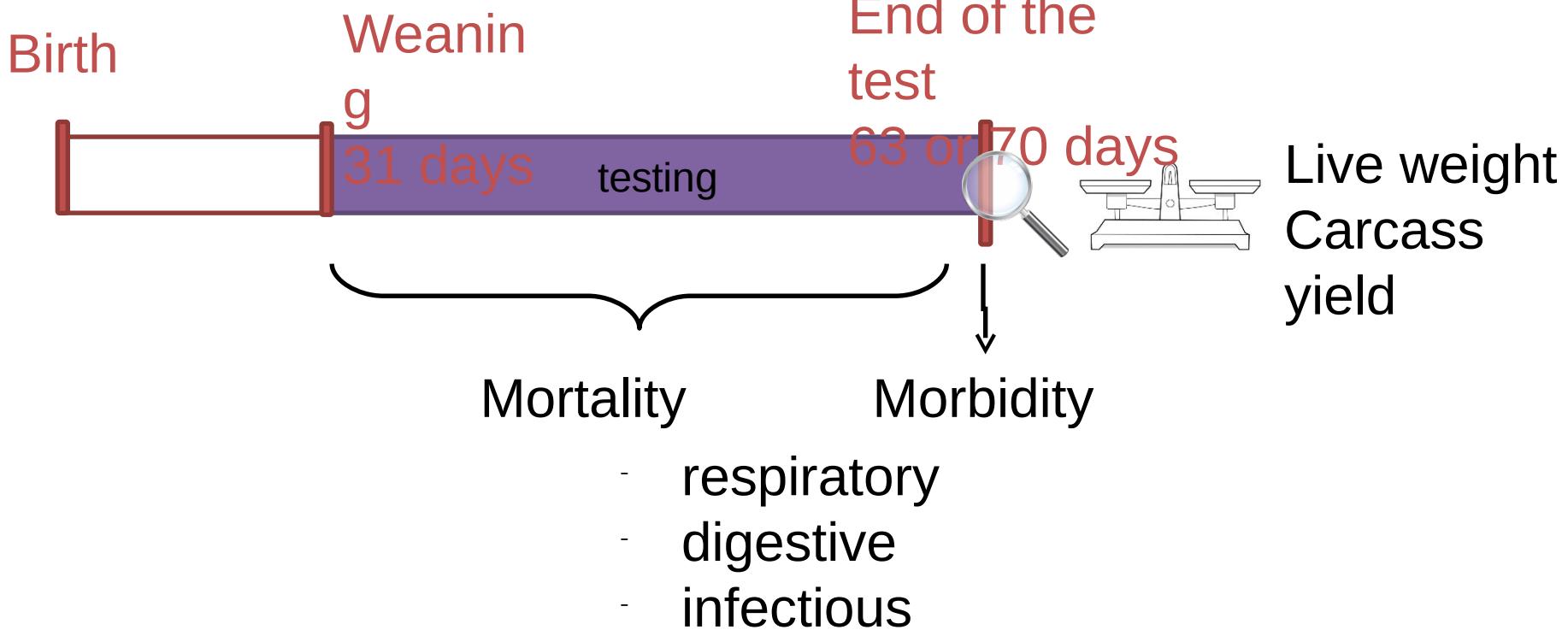
Genetic correlation between disease and production traits

Data

- Nucleus farm of the French breeding company Hypharm
- 2 purebred paternal lines selected for meat production traits
 - AGP39 and AGP59
- 150 000 rabbits
- 1998 - 2014



Recording



Disease traits

Trait	Description	Prevalence
Digestive syndromes	Diarrhea, bloated abdomen...	7.1 %
Respiratory syndromes	Nasal discharge, lung lesion, wry neck...	4.0 %
Infectious syndromes	Digestive + respiratory syndromes	12.1 %
Infectious mortality		4.7 %

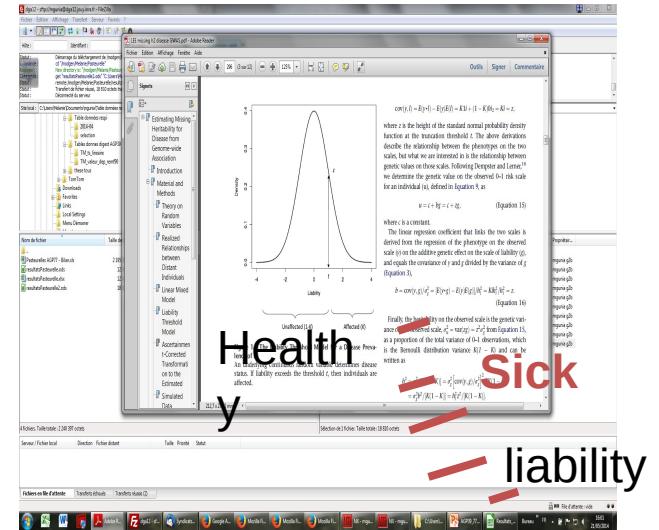
Production traits

Trait	Mean	Standard deviation
Carcass yield (%)	57.69	1.92
Live weight (kg)	2.88	0.39

Data from 1998 to 2014

Statistical analysis

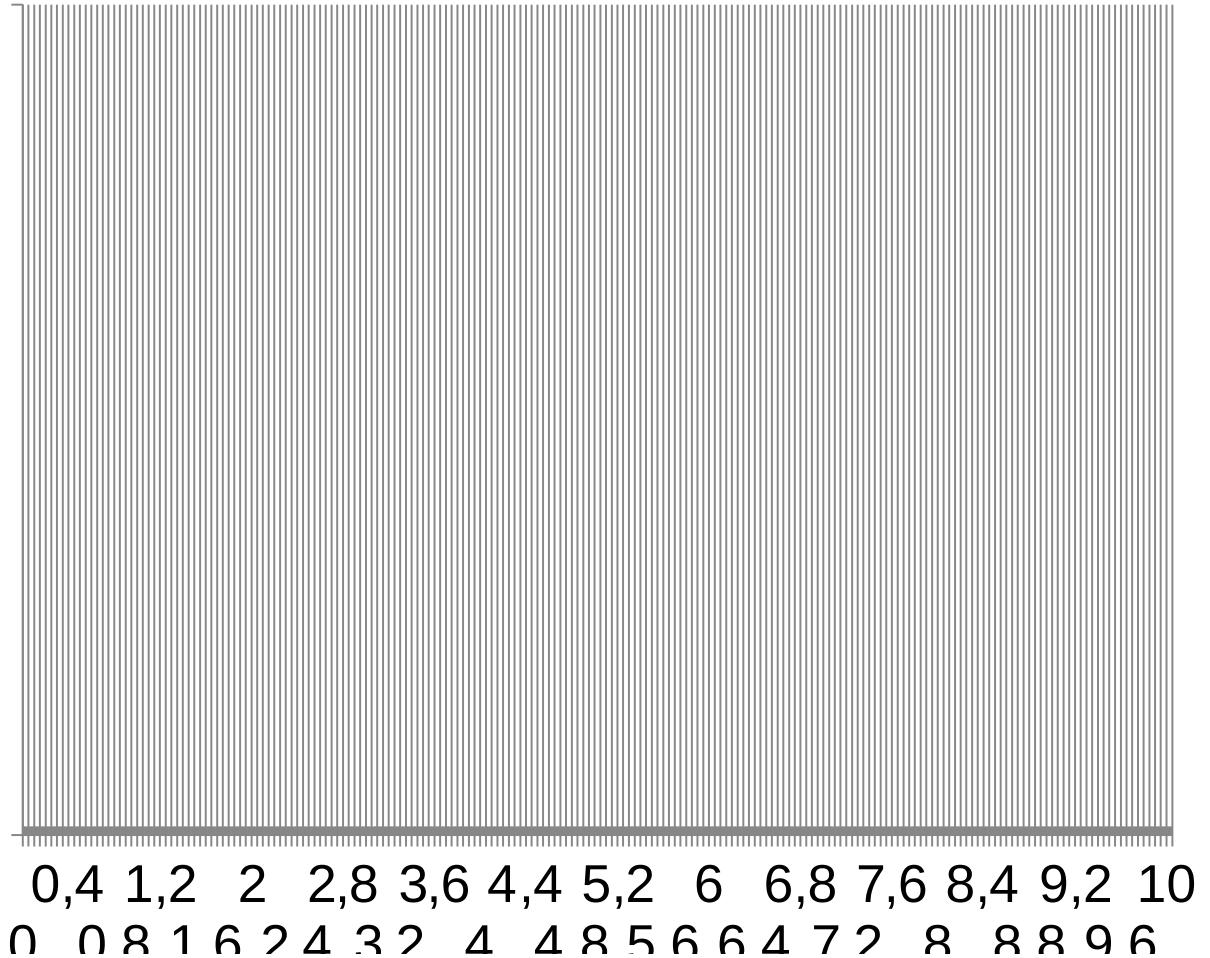
- ❖ Threshold model creates an underlying continuous unobservable trait, the liability
- theoretically better for binary trait



Threshold

- ❖ Linear model for continuous normally distributed traits
- ❖ ASREML software

Heritability estimates



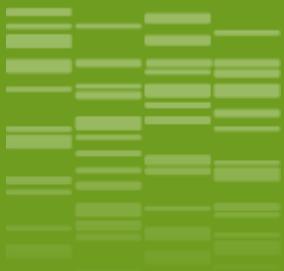
Genetic correlations

	Respirator y syndromes	Infectious syndrome s	Infectious mortality	Carcass yield	Live weight (direct)	Live weight (maternal)
Digestive syndromes	-0.18	0.65	0.92	-0.40	0.11	-0.11
Respirator y syndromes		0.61	-0.27	-0.10	0.01	-0.06
Infectiou s syndrome s			0.52	-0.35	0.06	-0.25
Infectious mortality				-0.18	0.00	0.14
Carcass yield					-0.21	0.23
Standard deviations ~ 0.07						-0.10



Take-home messages

- ✓ Low but significant heritability for disease traits
- ✓ Favorable genetic correlations between disease and production traits
- ✓ It is possible to select rabbits for general disease resistance

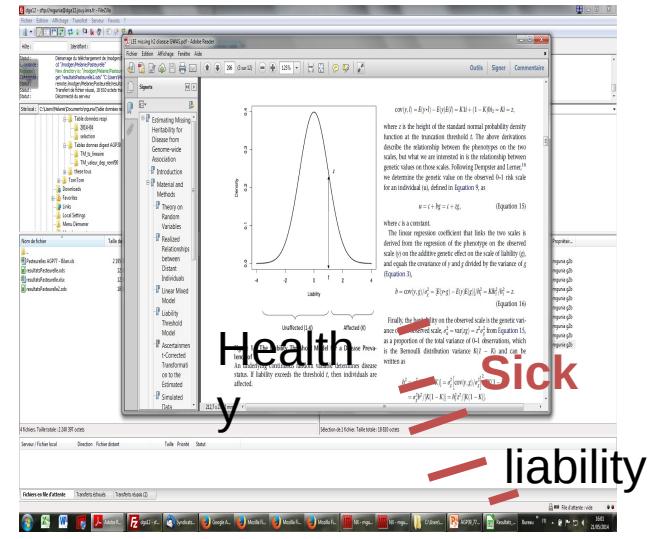


Thank you



Statistical analysis

- ❖ Threshold model create an underlying continuous unobservable trait, the liability
 - ⇒ theoretically better for binary trait
- ❖ Linear model for continuous normally distributed traits



$$\mathbf{y} = \mathbf{Xb} + \mathbf{Zu} + \mathbf{Wm} + \mathbf{QI} + \mathbf{e}$$

Performance or liability

Fixed effects

Random genetic animal effects

Random genetic maternal effects

Random common litter effects

Random residual effects

- ❖ ASREML software