



Genetic analysis of temperament data of Goettingen minipigs

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The Goettingen minipig



- Development in 1960's in Göttingen



59 % Vietnamese Potbellied Pig

33 % Minnesota minipig

8 % German Landrace



→ Miniature breed for medical research

- High similarities to humans
 - Cardio-vascular system
 - Gastro-intestinal system
 - Immune system
 - Skin
 - Organ sizes and weights → xenografting
- Use in pharmacology, toxicology, surgery,...



Characteristics

- Adult body weight 35-45 kg [Bollen et al., 1998]
- 2 litters per sow and year
- 6.5 piglets per litter
- F less than 5%

[Bollen and Ellegaard, 1996]

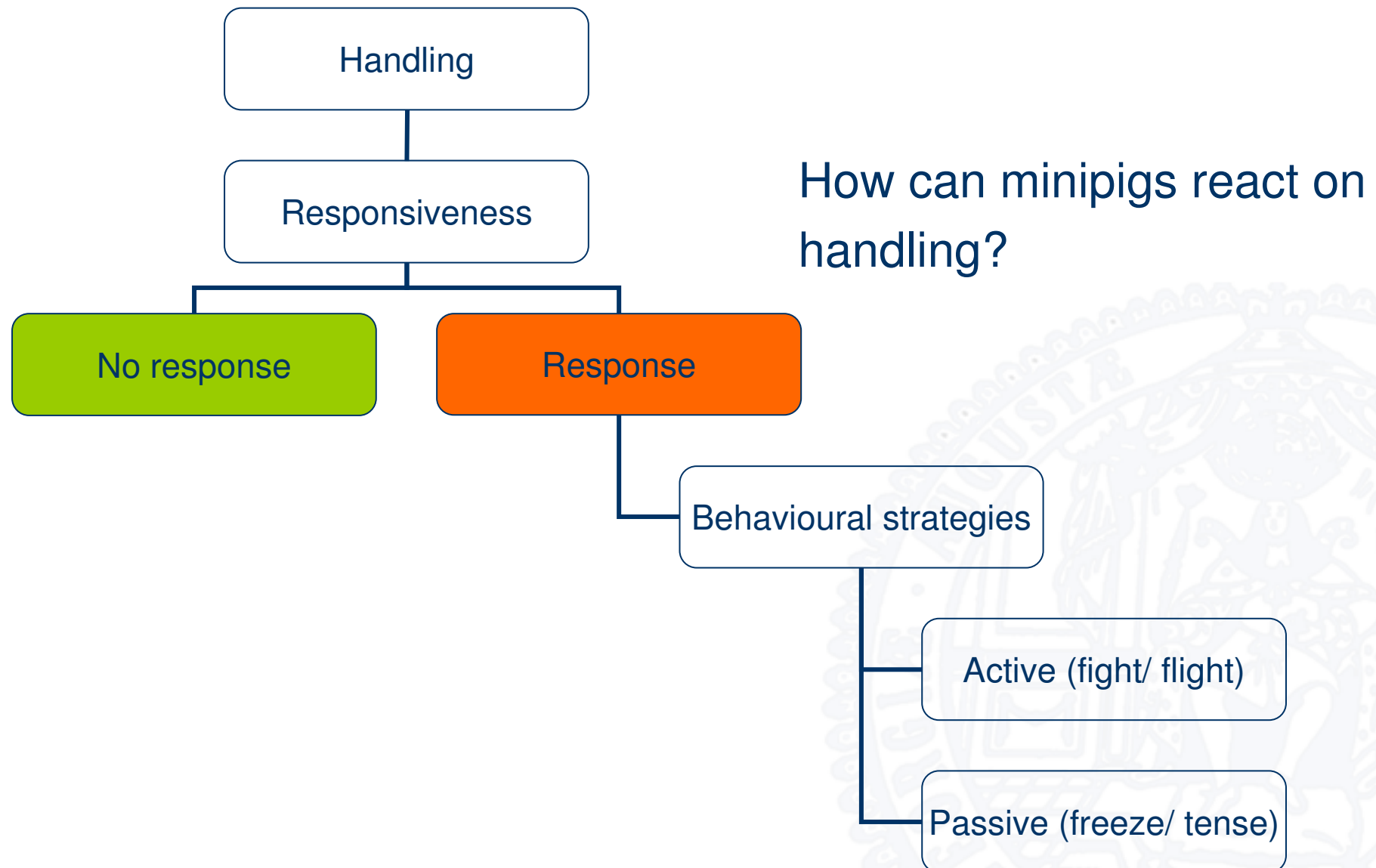


- Weight, body condition and temperament are documented on a regular basis

Why do we need calm temperament?

- Regular handling
- No struggles
- No fear
 - Easy treatments
 - no change in metabolism





Materials and methods

- Temperament scores from 10,033 animals

Situation	Age (in mo)		
	2	4	6
Catching (C)		x	x
Holding on arms (A)	x	x	
Weighing (W)	x		
Standing on table (T)		x	x
Walking on ground (G)		x	x

Scores from

1 - aggressive

to

5 - gentle, calm

Data structure

	Trait								
	A2	W2	A4	T4	C4	G4	T6	C6	G6
n records	9,166	9,166	1,510	1,557	1,559	1,556	1,116	1,173	1,174
Mean	3.37	3.34	3.25	3.08	3.02	3.14	3.22	3.08	3.18
Standard deviation	0.74	0.66	0.63	0.72	0.64	0.60	0.70	0.71	0.60

→ only 6.74 % of the animals had scores in all nine traits!

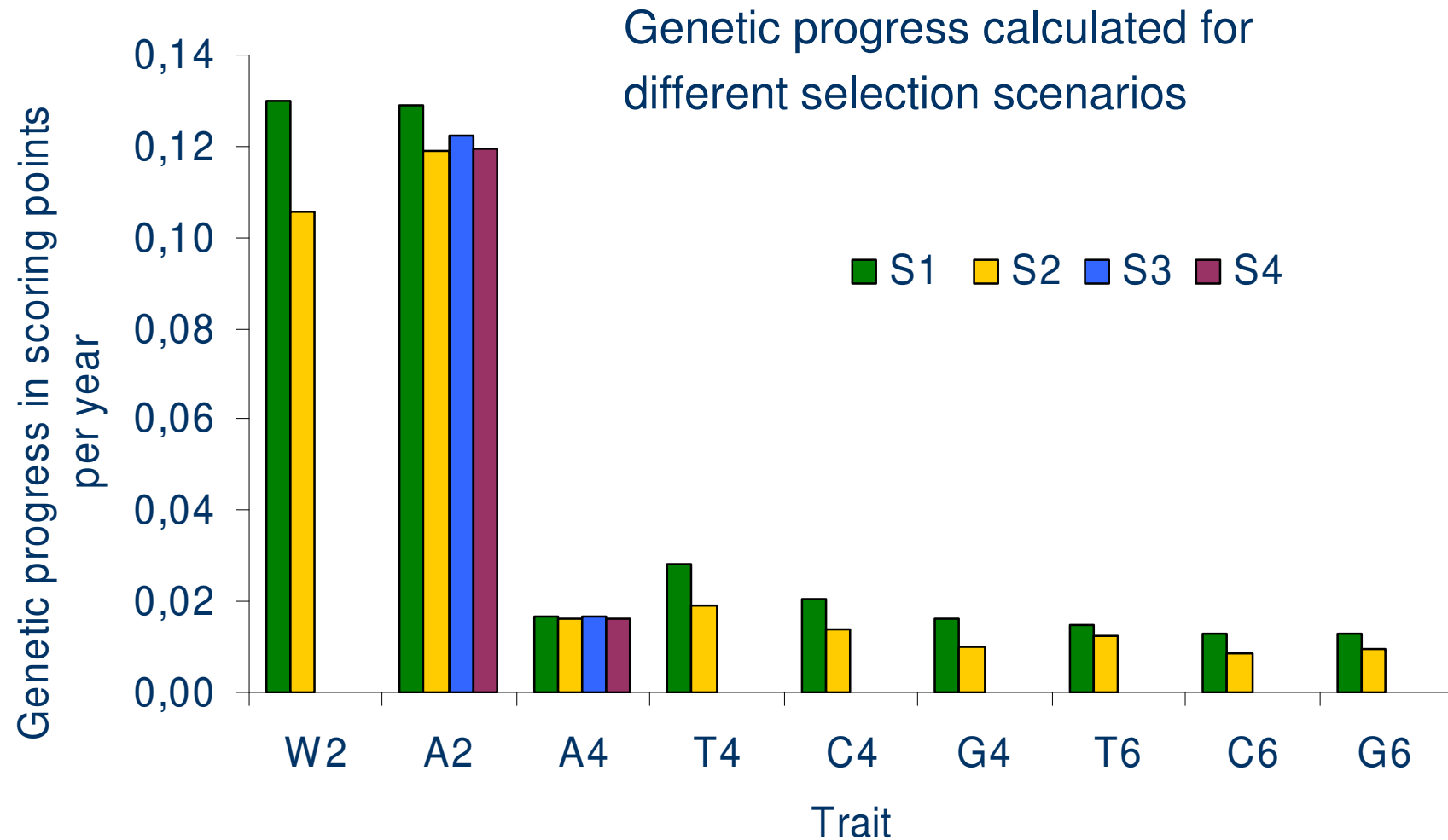
- Estimation of genetic parameters with bivariate animal models:
 - Fixed effects: sex
unit
birth month
birth year
 - Random effects: litter
animal
residual

Selection scenarios

Scenario		Traits								
		W2	A2	A4	T4	C4	G4	T6	C6	G6
S1	Selection index	x	x	x	x	x	x	x	x	x
	Breeding goal	x	x	x	x	x	x	x	x	x
S2	Selection index	x	x	x						
	Breeding goal	x	x	x	x	x	x	x	x	x
S3	Selection index	x	x	x						
	Breeding goal		x	x						
S4	Selection index		x	x						
	Breeding goal		x	x						

Results and discussion – h^2 , r_g , r_p

Trait	W2	A2	A4	T4	C4	G4	T6	C6	G6
W2	0.147	0.900	1.000	0.911	0.801	0.897	1.000	1.000	1.000
A2	0.642	0.140	1.000	0.735	0.740	0.672	1.000	1.000	0.988
A4	0.166	0.133	0.120	0.814	0.680	0.762	0.913	0.444	0.473
T4	0.337	0.166	0.480	0.216	0.878	1.000	0.655	0.817	0.840
C4	0.172	0.102	0.498	0.449	0.173	1.000	1.000	1.000	0.478
G4	0.117	0.106	0.445	0.461	0.487	0.105	1.000	0.821	0.765
T6	0.395	0.247	0.304	0.581	0.308	0.277	0.109	0.999	1.000
C6	0.186	0.144	0.309	0.315	0.490	0.251	0.462	0.089	0.560
G6	0.119	0.124	0.331	0.390	0.378	0.365	0.507	0.525	0.132



Conclusions

- h^2 values enable breeding for calm minipigs
- High number of missing values and scoring system
→ need for new evaluation system
- Difference between responding and non-responding pigs!!
- Different scoring system to facilitate statistical analyses

We are grateful for financial
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**Thank you for your
attention!**