



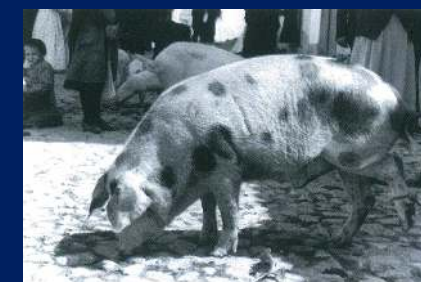
Genetic evaluation for productive traits in endangered Portuguese Malhado de Alcobaça pig

Vicente A., Bastos, J., Silveira, M., Carolino, I. & Carolino, N.



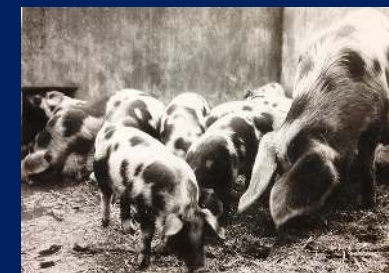
Malhado (spotted) de Alcobaça

- 3rd Portuguese native swine breed
 - From centre-west region of Portugal
 - Recognized in 2003; Herdbook since 2014;
 - Herdbook with info of more than 17,000 animals
 - ✓ From 1985 to 2022
 - Current population with more than 11 known generations, generations interval of 1,9 yr and Fx > 18%
- Very endangered breed
 - Only 244 breeding sows, 18 boars and 12 breeders



Managing the Herdbook (LGMA)

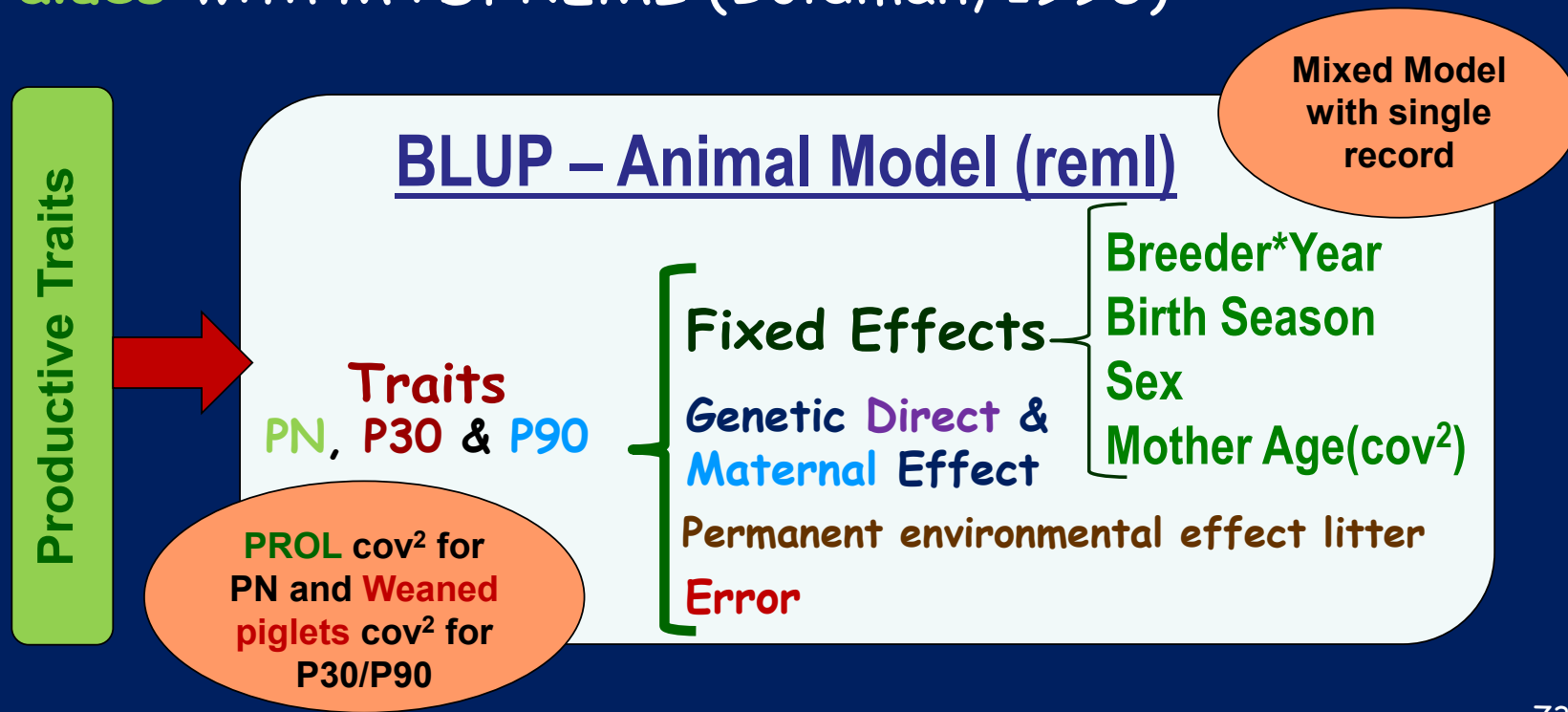
- Since 2014 all candidates for breeding are graded for morphology in 5 different scores
 - Also ear tagged and simultaneously tissue collected for DNA analysis
 - ✓ Parentage testing, stress syndrome test (HAL) and genetic characterization (PDR2020)
 - ✓ Herdbook credibility for all breeding stock



- Since 1985 compilation of genealogical data (n=16883) and, since 2014, productive weighing data
- PDR2020 - Animal Genetic Resources Conservation and Breeding Plan
- Estimates of genetic parameters for productive traits (weight at \neq ages) from 362 \neq litters:
 - Birth Weight (PN) (n=9198)
 - Adjusted weight at 30 days (P30) (n=5799)
 - Adjusted weight at 90 days (P90) (n=2429)
- Fixed Effects Estimates:
 - Breeder*Year of birth
 - Season of birth
 - Sex and Age of mother (linear and quadratic effect)

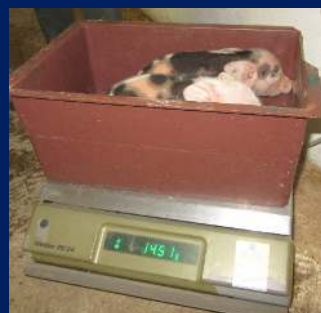


- Preliminary analyzes of the traits studied with PROC FREQ and PROC MEANS from SAS (SAS Institute, 2018)
- Estimates of **Genetic Parameters, Fixed Effects and Genetic Values** with MTDFREML (Boldman, 1995)



- Descriptive statistics :

Trait	Unit	N	Mean±δ _p	CV (%)	Min	Max
Birth Weight (PN)	kg	9198	1,32±0,28	21,21	0,50	2,40
Weight at 30d (P30)	kg	5799	7,16±1,60	22,35	3,03	11,95
Weight at 90d (P90)	kg	1044	34,1±6,40	18,77	10,50	55,30



Results

- Genetic Parameters Estimates:

Corr. Gen. Ef. a & m

Env. Perm. Ef.

Trait	$h_a^2 \pm SE$	δ_a	$h_m^2 \pm SE$	δ_m	$r_{a,m}$	C_2
Birth Weight (PN)	0,170±0,156	0,1176	0,084±0,109	0,0827	-0,344	0,395±0,056
Weight at 30d (P30)	0,145±0,161	0,6155	0,124±0,173	0,5676	-0,524	0,403±0,086
Weight at 90d (P90)	0,293±0,175	1,8881	0,250±0,186	1,7456	-0,174	0,129±0,047



Results for Fixed Effects

- Effect of sex: minor superiority was observed for ♂ comparing to ♀
 - PN+3,1g, P30+4,6g & P90+201,0g



- Effect of Prolificacy:

- +1 piglet = -4g on PN

- +1 piglet = -7g on P30

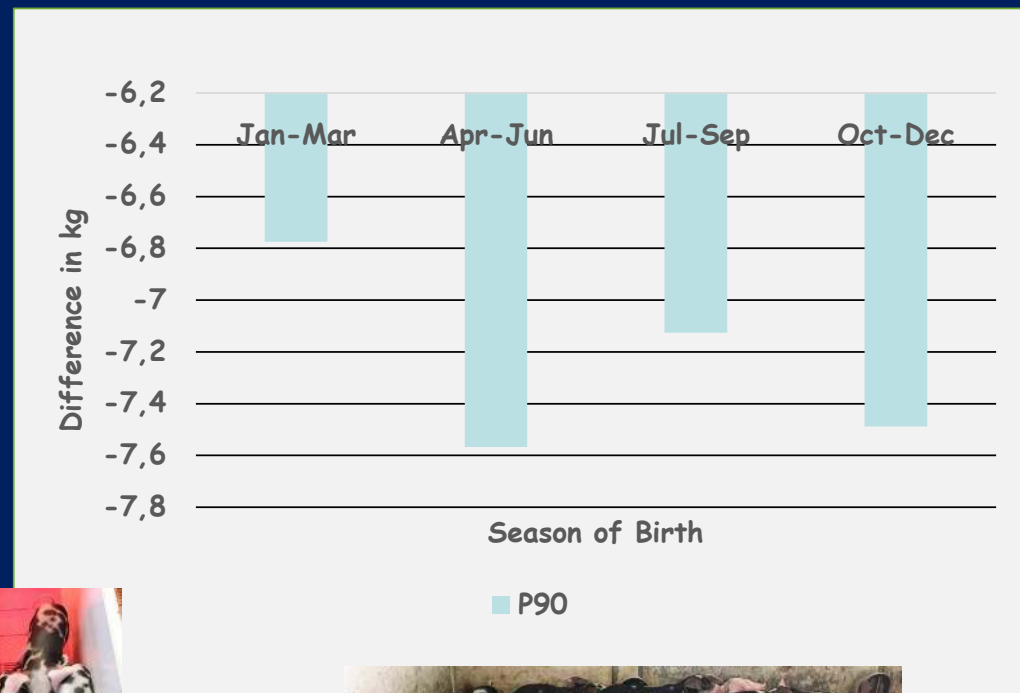
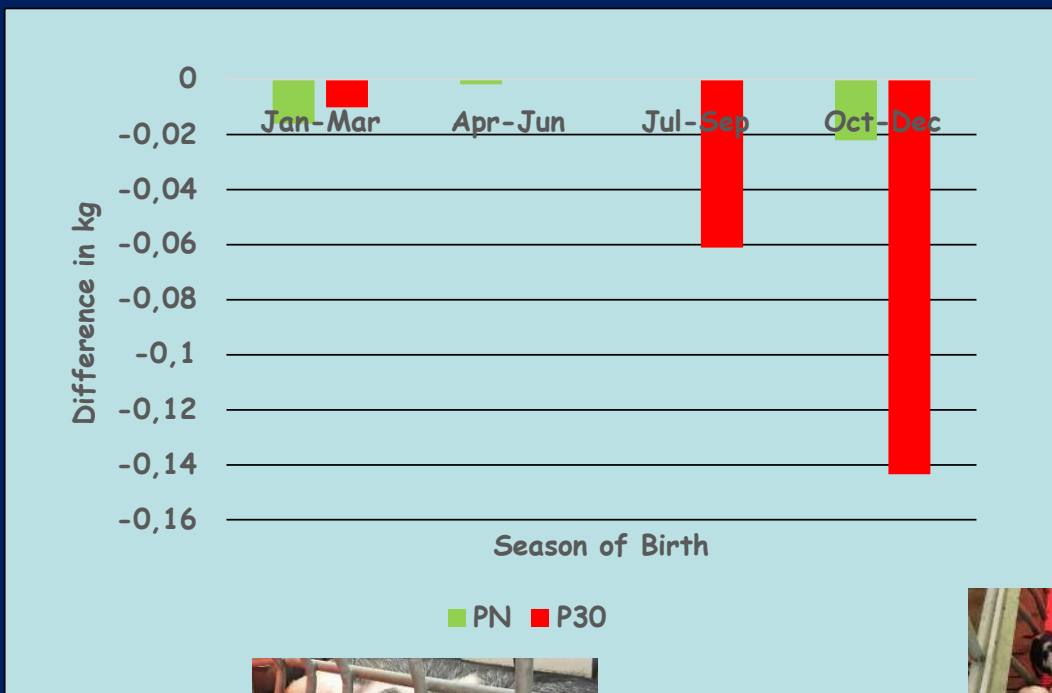
- +1 piglet = -58g on P90



Trait	<u>Ef. Breeder*Year (kg)</u>		
	Min	Max	Range
PN (44)	-0,37	0,56	0,93
P30 (40)	-1,71	3,51	5,21
P90 (24)	-4,28	14,98	19,25

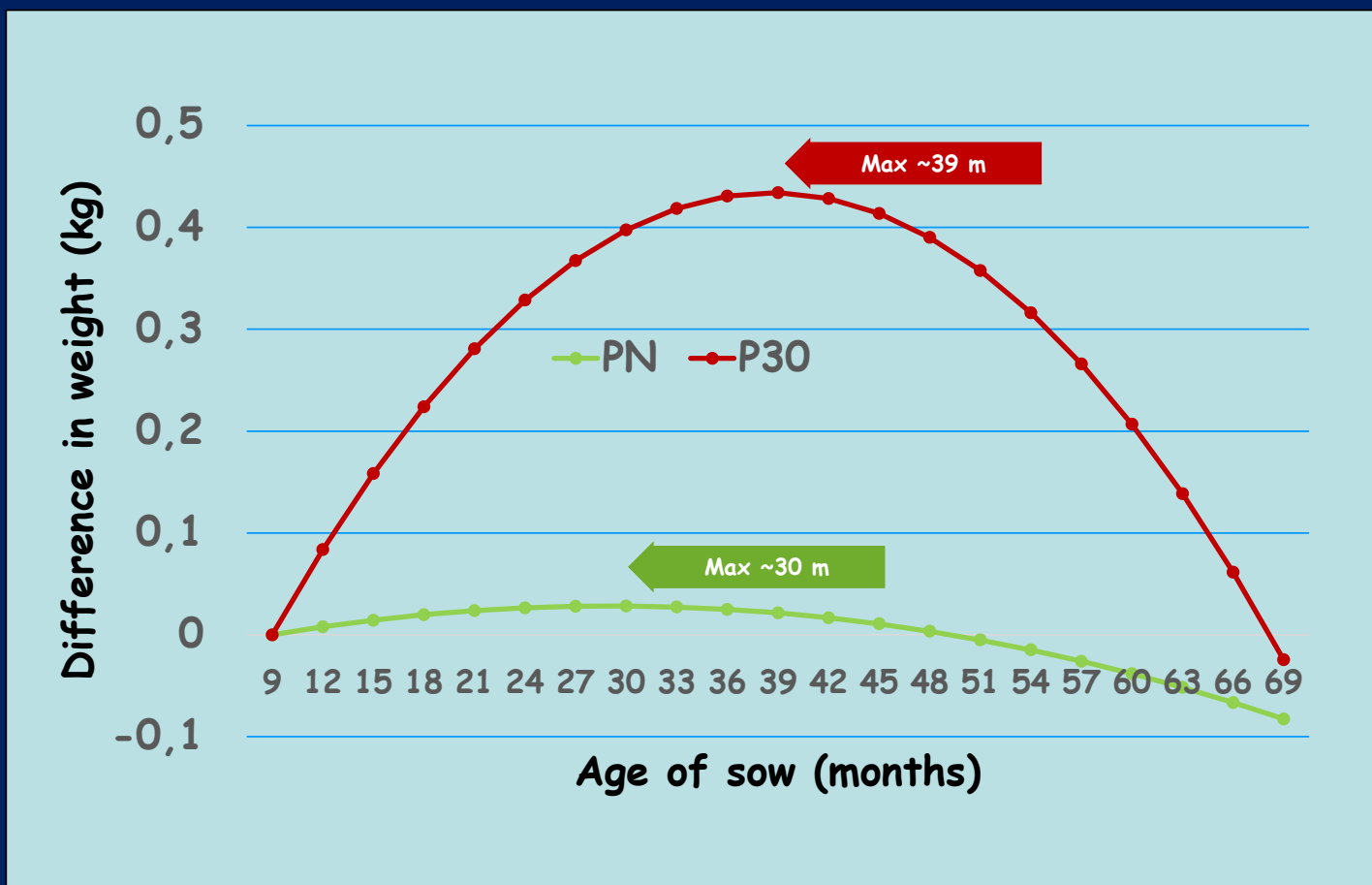
Results for Fixed Effects

- Season of Birth:



Results for Fixed Effects

- Influence of sow's age at farrowing



Conclusions

- Very endangered breed
- Very important its study, characterization and success of the conservation plan approved
 - Fundamental to continue conservation actions, with compilation of more data that is still scarce!
- Interesting growth data for a native breed
- Intermediate values for h^2
 - Between 0.084 (h_{mPN}) and 0.290 (h_{aP90})
- Some dispersion and variability in genetic parameters and fixed effects obtained
 - Possibility of selection and genetic improvement



Malhado de Alcobaça Pig



Overview and discussion of posters #1

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In this slot posters relating to the Portuguese Bisaro and other local breeds, will be shortly overviewed by the chair, with the opportunity for the audience to discuss with the authors.

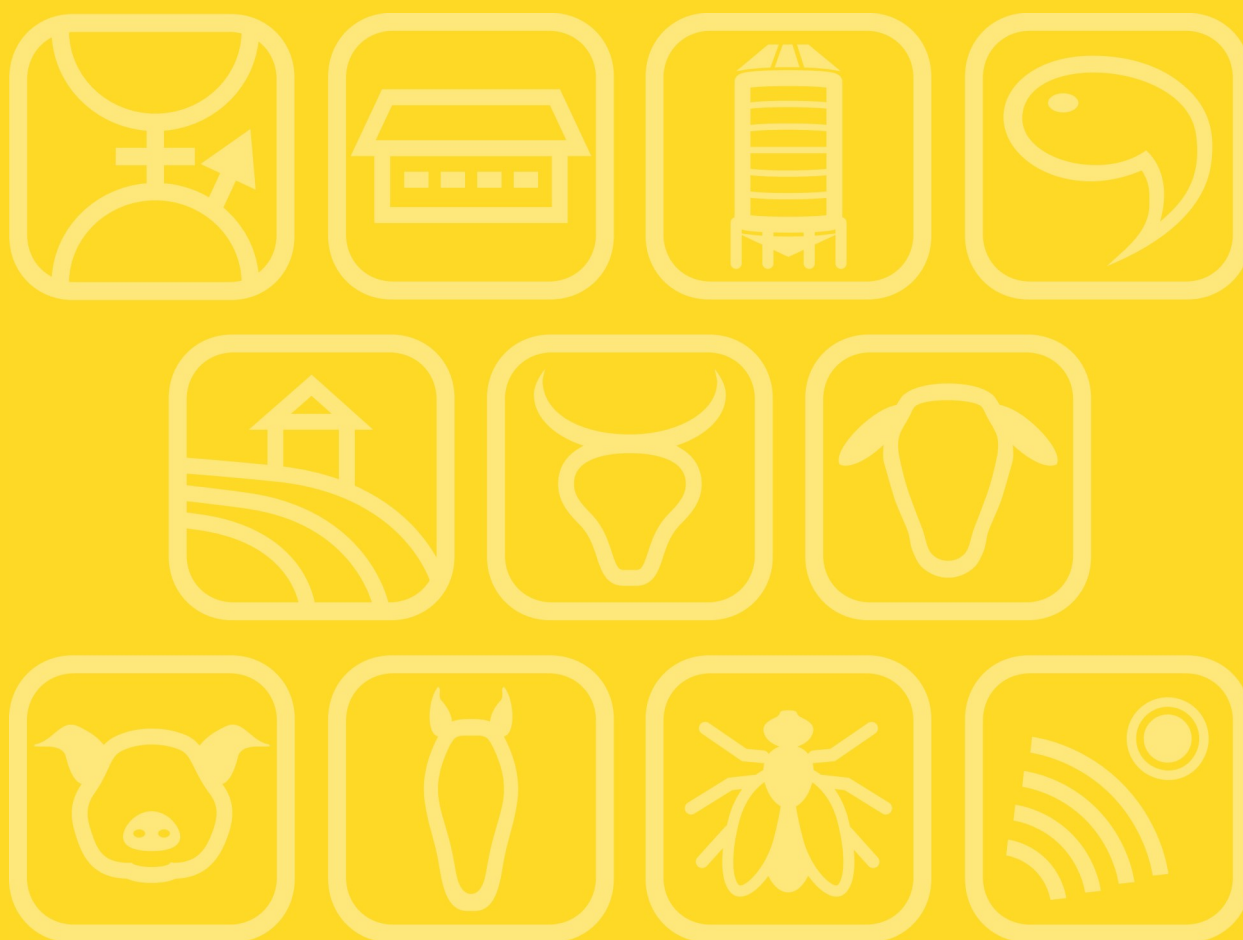
Genetic evaluation for productive traits in endangered Portuguese Malhado de Alcobça pig

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Malhado de Alcobça (MA) is a swine breed from center west Portugal, recognized in 2003. Herdbook (LGMA) has information of >17,000 animals (1985-2022). It's a very endangered breed with only 244 sows, 18 boars and 12 breeders. Within the scope of MA's genetic conservation plan, for genetic evaluation, genetic parameters and fixed effects were estimated for birth weight (PN), for adjusted weight at 30 d (P30) and at 90 d (P90). Pedigree records (n=16,883) and weighing records (nP30=9,198; nP30=5,799; nP90=2,429) from LGMA of 362 litters were compiled. Genetic parameters and fixed effects, genetic values and precisions were predicted for PN, P30 and P90, through BLUP, with a mixed model including fixed effects of breeder × year of birth, season of birth, sex, age of mother (linear / quadratic effect) and as random effects genetic value of animal, maternal genetic effect and permanent environmental effect of litter. Fixed effects of prolificacy and number of weaned piglets were included as covariates, respectively, in PN and P30/P90 analyses. Mean values for PN 1.32±0.28 kg, 7.16±1.6 kg P30 and 34.1±6.4 kg P90 were recorded. For PN, P30 and P90, respectively, a heritability for direct effects of 0.170±0.156, 0.145±0.161 and 0.293±0.175; a maternal heritability of 0.084±0.109, 0.124±0.173 and 0.250±0.186 and a genetic correlation between direct and maternal effects of -0.344, -0.524 and -0.174 was estimated. Permanent environmental effect of litter was 0.395±0.056 PN, 0.403±0.086 P30 and 0.129±0.047 P90. In fixed effects, a superiority was observed for males of +0.031 kg PN, +0.046 kg P30 and +0.201 P90. Breeder × year effect showed maximum differences of 0.93, 5.21 and 19.25 kg for PN, P30 and P90, respectively, with Spring being the best season of birth. Sow age at farrowing had a quadratic effect for all traits. For each increase of 1 piglet in prolificacy, PN, P30 and P90 were reduced by 4, 7 and 58 g, respectively. Ack: Proj CIISA UIDB/00276/2020.LA/P/0059/2020-AL4AnimalS.

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