

GENETICS OF MELANOMA IN THE OLD KLADRUBER HORSE



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OBJECTIVE

THE AIM OF THIS STUDY WAS TO ASSESS THE PREVALENCE OF SKIN MELANOMA TO INVESTIGATE A POSSIBLE GENETIC VARIATION OF THIS TRAIT IN THE OLD KLADRUBER HORSE.

MATERIAL AND METHODS

An overall of 702 grey variety of Old Kladruber horse (238 males and 326 females) were analyzed.

Melanoma was detected visually and by palpation on every horse and classified using 5 grade scale in accordance with *Sölkner et al. (2004)* – see table 1 and figure 1.

Two different analyses were conducted:

- linear animal model (LM) with melanoma classified into five categories,
- threshold animal model (TM) with melanoma classified into five categories.

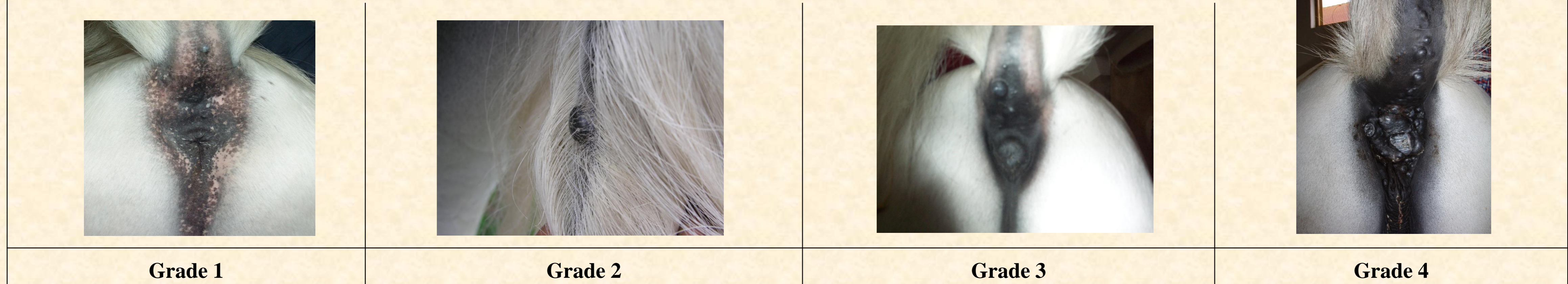
$$y_{ijk} = Year_i + b_1 Age + b_2 L + b_3 vitilF + b_4 vitilA + a_j + pe_k + e_{ijk}$$

where: y_{ijk} – grade of melanoma development, b_1, b_2, b_3, b_4 – coefficients of fixed regression, Age – age at evaluation, L – greying level, $Year$ – fixed effect of the year of evaluation, $vitilF$ – grade of vitiligo F development, $vitilA$ – grade of vitiligo A development, a – the effect of animal ($k = 1, \dots, 702$) with $N(0, \sigma_a^2)$, pe – permanent environment of animal, e – residual error with $N(0, \sigma_e^2)$.

Table 1: The occurrence and quantification of melanoma

Melanoma grade	Description
0	Absence of melanoma.
1	Early stages of plaque type or nodules 0.5 cm in diameter.
2	Several nodules 0.5 cm in diameter or one nodule 2 cm in diameter.
3	One nodule or more 5 cm in diameter, or subcutaneous melanoma.
4	Extensive melanoma covered with skin, skin destruction, metastases.
5	Extensive melanoma, moist surface, metastases, cachexia, health disorders.

Figure 1: Melanoma grades (foto Sölkner, 2004; Majzlík, 2006)



RESULTS

Table 2: Estimations of variance components and genetic parameters with standard errors

	LM	TM
σ_a^2	0.02 (0.01)	0.23 (0.17)
σ_{pe}^2	0.16 (0.02)	0.53 (0.27)
σ_e^2	0.05 (0.00)	0.07 (0.03)
σ_y^2	0.23	0.84
h^2	0.09 (0.04)	0.27 (0.16)
c^2	0.70 (0.05)	0.64 (0.17)
R	0.79	0.91

Table 3: Pearson's (above) and Spearman's (down) coefficients of correlation between LM and TM

	Entire		Partial	
	LM	TM	LM	TM
LM	-	0.86	-	0.78
TM	0.84	-	0.78	-



CONCLUSION

RESULTS SUGGEST THAT ADDITIVE GENETIC VARIATION OF MELANOMA OCCURRENCE SEEMS LARGE ENOUGH IN OLD KLADRUBER HORSE TO BE EXPLOITED IN SPECIFIC BREEDING PROGRAM.