Genetic analyses of linear conformation and performance traits in Warmblood horses

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Linear descriptions of equine conformation and performance allow standardized recording of detailed information on traits of breeding relevance. With an innovative documentation approach, linear data for a broad spectrum of traits could be collected in connection with regular breeding events of the Oldenburg horse breeding societies in 2012. In this first broad praxis, test linear profiles were compiled in addition to the official evaluations for in total 832 foals, 441 mares and 271 stallions. To investigate the usability of linear traits for selection in the Warmblood, genetic parameters were estimated for 25 traits in juvenile horses (J) and 70 traits in adult horses (A) using VCE6. Pedigree information on at least 3 ancestral generations was considered, resulting in a relationship matrix with 7.731 animals. Uni- and bivariate analyses were performed for the 25 traits included for J and A, revealing mostly consistent and moderate heritabilities, with averages of 0.14 in J and 0.20 in A for conformation and 0.23 in J and 0.17 in A for movement. Among the movement traits, elasticity in free trot had the highest heritability (0.41 in J, 39 in A). Between analogous linear traits in J and A, we found mostly moderately to highly positive additive genetic correlations of ≥ 0.4. According to the results of this study, conformation and performance data collected with the new Oldenburg system of linear profiling are suitable for genetic analyses, regardless of age and evaluation conditions. Compared to the traditional system of valuating scoring, linear trait definitions are much more specific, implying opportunities for targeted improvement of breeding goal characteristics in Warmblood riding horses.