

75th Annual Meeting of the EAAP in Florence, Italy, on 1st - 5th September 2024

Genetic parameters of summarizing performance traits for evaluating selection approaches for dressage and show jumping sport performance in riding horses

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Linear trait

Tail tone [un-toned - over-toned]

TROT Impulsion [weak - powerful]

WALK Freedom of shoulders [short - long]

TROT Freedom of shoulders [short - long]

TROT Carrying power [pushing - carrying]

CANTER Freedom of shoulders [short - long]

CANTER Direction of movement [downhill - uphill]

JUMPING Reflexes [slow, inflexible - quick, flexible]

JUMPING Jumping ability [little scope - much scope]

JUMPING Foreleg angulation [straight - angulated]

TROT Ground covering [little - much]

JUMPING Rhythm [not fluent - fluent]

JUMPING Overview [little - much]

HI = hind limb(s) FI = front limbs

JUMPING Take-off power [weak - powerful]

IUMPING Attention [inattentive - attentive]

WALK Reach of HL (overstepping) [inactive (short) - active (long)]

TROT Mechanics of FL [straight forelimb - much knee action]

TROT Thrust (HL activity) [inactive, sluggish - active, energetic]

CANTER Mechanics of FL [straight forelimb - much knee action]

CANTER Thrust (HL activity) [inactive, sluggish - active, energetic]

JUMPING Back technique (bascule) [hollow back - rounded back]

Combined dataset: (9+21) + 2x2 traits

Foals

-0.013 0.427

0.116

0.206

0.278

0.387

0.451

0.510

-0.020

0.109

std.

0.619

0.603

0.866

0.960

0.959

0.893

0.748

0.603

N mean

23.975

23,830

23,830

23.830

23,830

23.830

23,830

23.830

23.830

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Adult horses

-0.040

0.081

0.174

0.182

0.226

0.264

0.389

-0.042

0.039

0.110

0.233

0.135

0.383

0.204

0 326

0.157

0 108

0.211

0.235

-0.066

-0.033

std.

0.408

0.695

0.721

0.751

0.830

0.905

0.852

0.645

0.514

0.730

0.851

0.763

0.824

0.906

0 917

0.682

0 642

0.862

N mean

21.583

16,005

16,005

20.973

20,973

20.973

20,973

20.973

20,973

9,853

9.168

9,853

9.853

4.103

4 103

4.348

4.348

4,103

4,348

4.348

4,348



9 linear traits for young horses (yLIN)21 linear traits for adult horses (aLIN)2 summarizing performance traits for each of 2 disciplines

Cumulative sport trait	Dressage			Show jumping	
	mean	std.		mean	std.
pPS	0.161	0.569		0.191	0.606
PHEK	0.153	0.516		0.205	0.669
Tab : Distribution of the propertion of program in					

sport (pPS) and highest level achieved by progeny (PHEK) in 24,827 mares with OL/OS registered progeny

 Tab.: Distribution of selected linear traits in 35,018 horses linearly described as foals (N=23,975) and/or adult horses

 1.049
 (N=19,548) between 2012 and 2023

Genetic analyses estimation of genetic parameters uni- / multivariately in linear animal models summarizing performance traits indicator traits and summarizing performance traits PEST and VCE6 software tri- or bivariate analyses per discipline 12 gait traits (foals: N=8) and one special remark + pPS D, PHEK D dressage: 4 gait traits, 8 jumping traits and one special remark + pPS J, PHEK J show-jumping: summarizing performance traits (sport): indicator traits (linear profiling): $y_{iipg} = \mu + SBb_i + AGEs_Y_i (SB_i) + animal_p + e_{iipg}$ $y_{klmnpq} = \mu + SB_k + EVENT-TEAM_l + AGE_M_m + SEX_n + animal_p + e_{klmnpq}$ (foals) $y_{klnopq} = \mu + SB_k + EVENT-TEAM_l + AGE_Y_n + PTYPE_o + animal_p + pe_p + e_{klnpq}$ (adults) fixed effects: SBb = studbook (OL, OS) with registered progeny, AGES_Y = age in years (relative to the progeny sport statistics; fixed effects: SB = studbook (OL, OS), EVENT-TEAM = date, place, assessor, assistance, SEX = male / female, <9 ys, 9-12 ys, 13-16 ys, > 16ys); AGE_M (AGE_Y) = age in months (years), PTYPE = presentation type (assessment in hand, free, under rider); random effects: animal = additive genetic effect, e = residual random effects: animal = additive genetic effect, pe = permanent environmental effect of the animal, e = residual 3 Sept 2024 75th EAAP Annual Meeting, Florence, Italy: Summarizing performance traits in breeding programs of riding horses (K.F. Stock et al.)











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suitability of simplified, summarizing performance traits for the purpose of evaluating breeding programs of sport horses

additive genetic correlations patterns between indicator and sport-derived traits supporting the value of refined phenotyping (incl. foals) and reflecting the potential of genetic evaluation for linear traits as selection tool in breeding programs for sport horses

Thank you!

