Estimated heritabilities for conformation traits in Slovenian population of Lipizzan horse

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Background

- Slovenian population of Lipizzan horse

BO / Category	Stud Farm Lipica	Breeders Association	Total
Population	400	830	1231
Brood mares	76	176	252
Stallions	30	5	35

- Main selection criteria
  - Prevention of related maitings
  - Conformation trait scores - phenotype

The aim

- Breeding value estimation

  &

- use of BV as the main selection criteria!

Material

- Conformation traits:
  - 3 measured
  - 11 scored according to Breeding Goals
    - 9 conformation
    - 2 gaits
- Scoring system
  - Group of experts
  - Each trait is combination of several ‚linear' traits
  - Preselection – potential breeding animals

Material

- Animals
  - Age of 4 to 5 years (Studbook inspection)
  - 291 horses
  - Birth year from 1996 to 2011
- Pedigree
  - 945 individuals
  - 5 generations
  - 484 inbreeded (avg F=0.026, max F=0.26)

Methods

- Variance components & BV estimation
  - VCE 6.0.3
- Statistical model
  - Sex
  - Age at scoring
  - Birth year
  - Additive genetic effect
- Multi-trait and single-trait models
  - Convergence problems!

Heritabilities

Trait	$h^2 \pm SE$		Trait	$h^2 \pm SE$
Wither height	0.30±0.20		Breed type	0.07±0.08
Chest girth	0.58±0.17		Head	0.21±0.10
Cannon bone girth	0.64±0.18		Neck	0.59±0.16
Front legs	0.39±0.18		Front part	0.47±0.15
Rear legs	0.26±0.15		Middle part	0.31±0.11
Gaits correctness	0.31±0.15		Rear part	0.25±0.09
Gaits efficacious	0.16±0.14		Overall score	0.45±0.12

Animal
Breed
Inbreeding
Birth date

Žival 705002971000213 FAVORY TROMPETA XXXV
pasma LIP lipicanski konj
inbriding 0,0178
datum rojstva 13.04.1997

Breeding values Stallion

Traits

Offspring

BV12

telesne oc

KodPV	Lastnost	Enota	Pop	Sel	TipPV	Obr.	N	Pov	Pv	Pv12	Rang	%Rang	64	Graf	136
2	Obseg prsi	cm	LIP	N	CBV	1501	11	182,1	1,81	108,3	48	14,4	majhen		velik
7	Obseg piščali	cm	LIP	N	CBV	1501	11	20,1	0,623	119,4	21	6,3	majhen		velik
8	Pasemski tip	točka	LIP	N	CBV	1501	8	7,1	0,129	117,8	12	4,3	slab		odličen
9	Glava	točka	LIP	N	CBV	1501	8	7,3	-0,012	97,3	172	61,2	slaba		odlična
10	Vrat	točka	LIP	N	CBV	1501	8	7,3	0,136	101,4	81	28,8	slab		odličen
11	Sprednji del	točka	LIP	N	CBV	1501	8	7,8	0,377	114,2	21	7,5	slab		odličen
12	Srednji del	točka	LIP	N	CBV	1501	8	7,4	0,408	117,6	14	5,0	slab		odličen
13	Zadnji del	točka	LIP	N	CBV	1501	8	6,9	0,084	105,3	58	20,6	slab		odličen
14	Točke	točka	LIP	N	CBV	1501	8	69,3	2,254	112,2	26	9,3	slab		odličen
15	Prednje noge	točka	LIP	N	CBV	1501	8	5,6	-0,495	67,8	273	98,6	slabe		odlične
16	Zadnje noge	točka	LIP	N	CBV	1501	8	6,5	0,188	117,4	18	6,5	slabe		odlične
18	Izdatnost hodi	točka	LIP	N	CBV	1501	8	7,3	0,210	124,0	9	3,3	slaba		odlična
20	Viher palica	cm	LIP	N	CBV	1501	11	152,6	0,319	106,7	70	21,0	majhna		velika

indeksi

KodPV	Lastnost	Enota	Pop	Sel	TipPV	Obr.	N	Pov	Pv	Pv12	Rang	%Rang	64	Graf	136
101	Ind VVP OPI	-	LIP	N	CBV	1501	10	13,1	0,4	118,5	25	7,6	slab		odličen

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Animal
Breed
Inbreeding
Birth date

Žival	705002101000657 THAIS XIII
pasma	LIP lipicanski konj
inbriding	0,0481
datum rojstva	21.03.2010

Breeding values Mare

Traits

Own scores

BV12

telesne ocene in lastnosti

KodPV	Lastnost	Enota	Pop	Sel	TipPV	Obr.	N	Pov	Pv	Pv12	Rang	%Rang	64	Graf	136
2	Obseg prsi	cm	LIP	N	CBV	1501	1	193,0	3,39	116,0	54	8,8	majhen		velik
7	Obseg piščali	cm	LIP	N	CBV	1501	-	-	0,534	116,4	39	6,4	majhen		velik
8	Pasemski tip	točka	LIP	N	CBV	1501	1	8,0	0,167	123,9	19	3,2	slab		odličen
9	Glava	točka	LIP	N	CBV	1501	1	7,0	-0,137	84,2	538	91,8	slaba		odlična
10	Vrat	točka	LIP	N	CBV	1501	1	8,0	0,335	108,5	136	23,2	slab		odličen
11	Sprednji del	točka	LIP	N	CBV	1501	1	8,0	0,436	117,1	56	9,6	slab		odličen
12	Srednji del	točka	LIP	N	CBV	1501	1	8,0	0,470	120,8	31	5,3	slab		odličen
13	Zadnji del	točka	LIP	N	CBV	1501	1	8,0	0,336	121,7	31	5,3	slab		odličen
14	Točke	točka	LIP	N	CBV	1501	1	73,0	3,833	123,5	16	2,7	slab		odličen
15	Prednje noge	točka	LIP	N	CBV	1501	1	6,0	-0,004	101,1	261	45,2	slabe		odlične
16	Zadnje noge	točka	LIP	N	CBV	1501	1	6,0	0,122	110,2	95	16,4	slabe		odlične
17	Pravilnost hodi	točka	LIP	N	CBV	1501	1	6,0	6,041	94,5	101	56,4	slaba		odlična
18	Izdatnost hodi	točka	LIP	N	CBV	1501	1	8,0	0,274	132,7	5	0,9	slaba		odlična
20	Viher palica	cm	LIP	N	CBV	1501	1	157,0	0,770	113,4	68	11,1	majhna		velika

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Discussion & Conclusions

- Breeding values
  - More efficient selection criteria than P
  - Need to be routinely used although large SE
- Population
  - Have to be enlarged
- Scoring system
  - Have to be improved

Future work

- Use of breeding values!
- Population enlargement
  - More scored animals – ‚no preselection‘
  - Joint evaluation (CRO, AUT, HUN, …)
- Scoring system improvement
  - Linear system – individual traits
  - Harmonisation among populations

Thank you for

your attention!