

Heritability and repeatability of young stallions jumping parameters





- ◆ subjective evaluation of horses skills
- ◆ different style of judging
- ◆ no possibility to compare
- ◆ importance of different kinds of jumping parameters



Is it possible to find an easy objective way to evaluate horses jumping skills?

Can Video Image Analysis help judges or breeders?

Aim

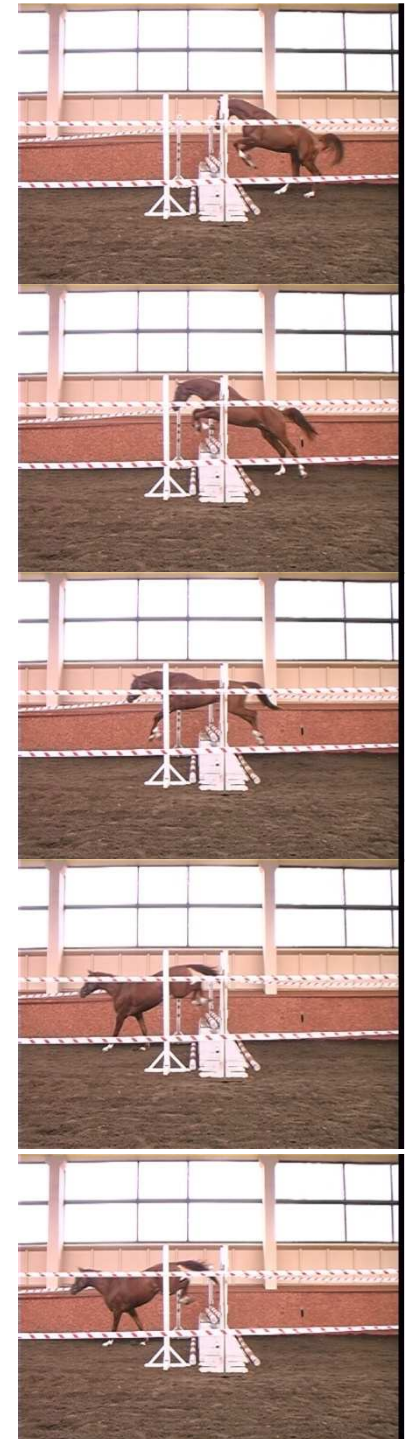
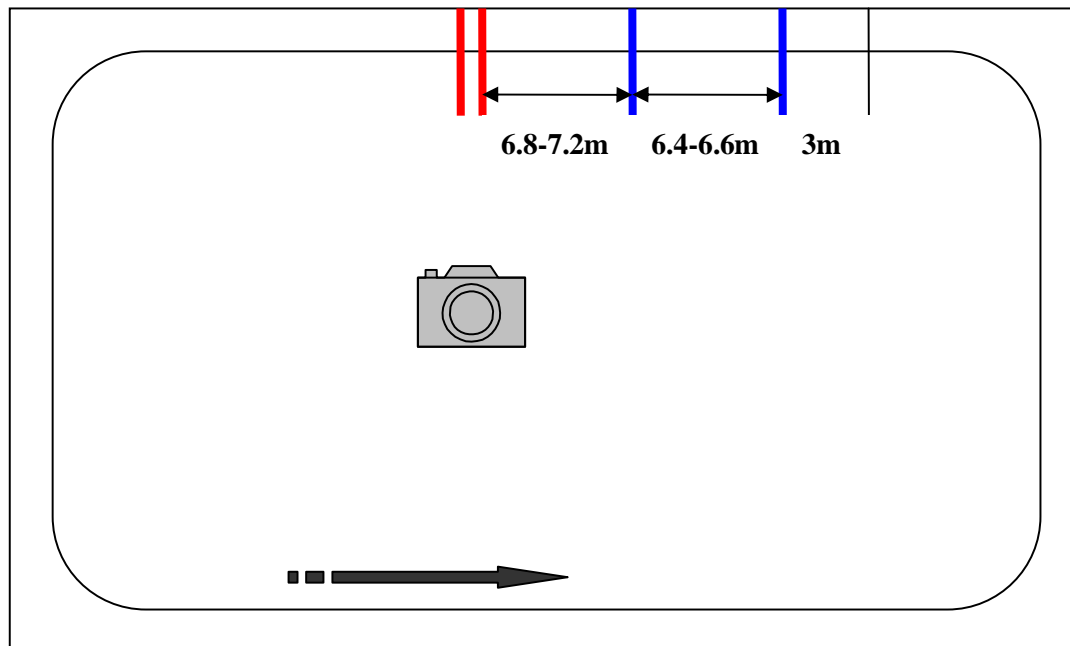
The aim of this work is the estimation of heritability and repeatability of horse jumping parameters in order to characterise usefulness of selected jumping parameters and VIA in evaluation of horse jump.

◆ **repeatability**

◆ **heritability**

Material

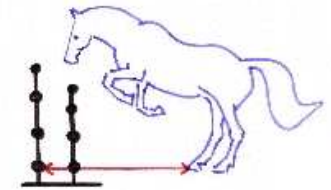
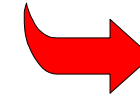
- ◆ **438** young stallions during their performance test training were filmed
- ◆ in total **1266** jumps were measured



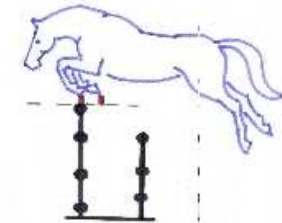
Methods

MEASUREMENTS

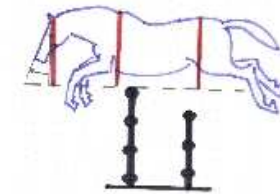
taking off distance



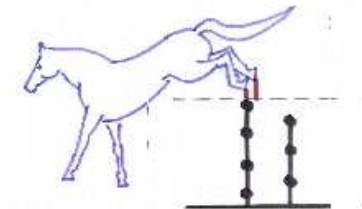
height of lifting of the front legs above the obstacle



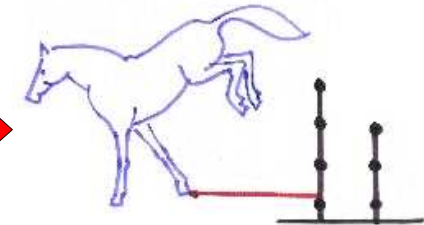
bascule points over the obstacle and the angle of head placement



height of lifting of the hind legs above the obstacle



landing distance



Results

| | mean | SD |
|------------------------------|--------------|-------------|
| taking off | 266,3 | 41,0 |
| landing | 209,4 | 46,8 |
| height of the FL | 23,9 | 11,7 |
| height of the FR | 25,3 | 11,9 |
| height of the HL | 26,3 | 14,2 |
| height of the HR | 26,1 | 13,8 |
| height of the head | 132,4 | 21,9 |
| height of the withers | 135,6 | 17,5 |
| height of the croup | 121,8 | 17,0 |
| angle of head | 26,2 | 6,0 |
| placement | | |

Results

| | mean | SD |
|------------------------|-------------|------------|
| taking off time | 8,0 | 1,3 |
| landing time | 7,2 | 1,2 |
| total time | 16,2 | 2,1 |

Considered effects

$$y = O + T + Y + a + pe + e$$

HORSE

Obstacle height

Test

age (years)

ASREML

Results

REPEATABILITY

| | r² | SE |
|----------------------------------|----------------------|-------------|
| taking off | 0,68 | 0,02 |
| landing | 0,71 | 0,02 |
| height of the front left | 0,38 | 0,03 |
| height of the front right | 0,37 | 0,03 |
| height of the hind left | 0,48 | 0,03 |
| height of the hind right | 0,44 | 0,03 |
| height of the head | 0,72 | 0,02 |
| height of the withers | 0,75 | 0,02 |
| height of the croup | 0,75 | 0,02 |
| angle of head placement | 0,61 | 0,03 |

Results

REPEATABILITY

| | r² | SE |
|-----------------|----------------------|-----------|
| taking off time | 0,42 | 0,03 |
| landing time | 0,35 | 0,04 |
| total time | 0,46 | 0,03 |

Results

HERITABILITY

| | h² | SE |
|----------------------------------|----------------------|-------------|
| taking off | 0,07 | 0,17 |
| landing | | |
| height of the front left | 0,04 | 0,09 |
| height of the front right | 0,05 | 0,10 |
| height of the hind left | 0,41 | 0,16 |
| height of the hind right | 0,24 | 0,14 |
| height of the head | 0,11 | 0,15 |
| height of the withers | | |
| height of the croup | 0,06 | 0,14 |
| angle of head placement | 0,31 | 0,17 |

Results

HERITABILITY

| | h^2 | SE |
|-----------------|-------------------------|-----------|
| taking off time | 0,04 | 0,11 |
| landing time | 0,28 | 0,12 |
| total time | 0,26 | 0,13 |

Conclusions

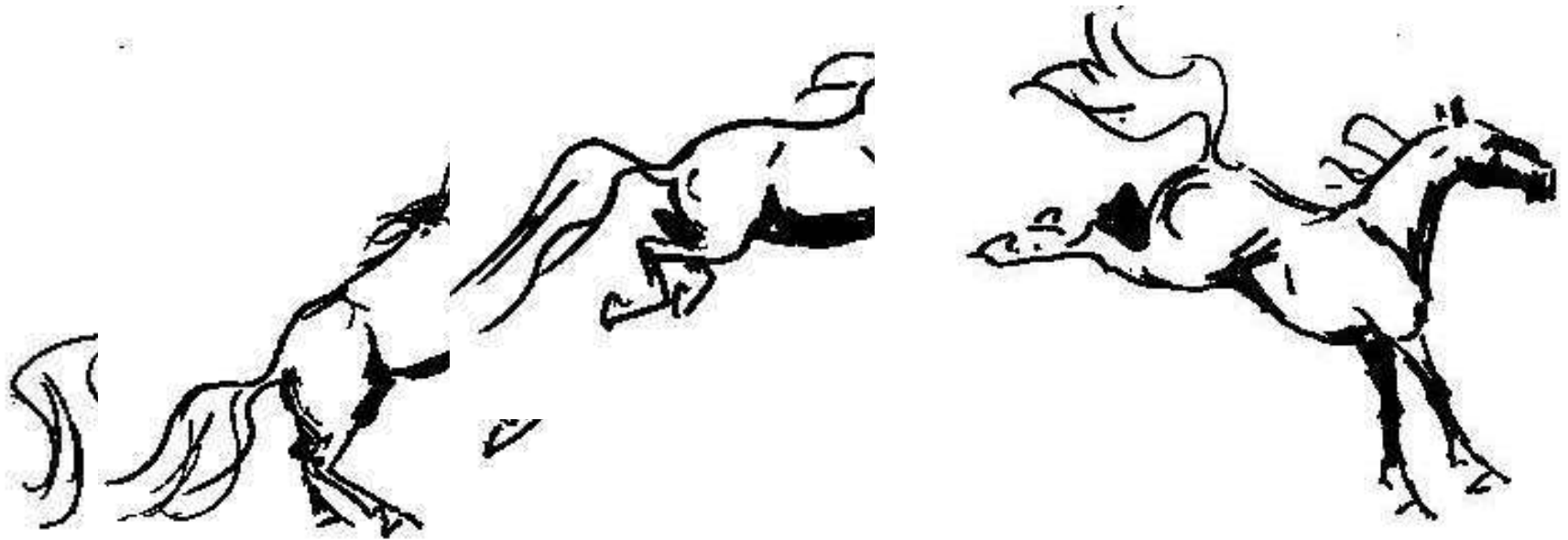
- ✦ the **repeatability** was high (above 0.4) for almost all measured parameters
- ✦ lifting of legs above the obstacle is the least **repeatable** parameter of jump
- ✦ the **repeatabiliy** of time parameters is almost equal

Conclusions

- ✦ the **heritability** was low (below 0.2) for almost all measured parameters
- ✦ lifting of hind legs above the obstacle is the most **heritable** parameter of jump
- ✦ the **heritability** of time parameters is different

CONCLUSIONS

- ✦ **The jumping parameters being thought as important for jumping evaluation seem to be low heritable. As a consequence, selection based on these traits seems not to be effective.**
- ✦ **Time parameters being different heritable should be investigated more detailed.**



Thank you !