

EVALUATION OF THE MOVEMENT OF THE WELSH MOUNTAIN PONY AND WELSH PONY

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Abstract

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This work evaluates the movement of the Welsh Mountain Pony and the Welsh Pony. The aim was to evaluate the movement in walk and trot. Basic parameters were measured (length of stride in walk, length of stride in trot and the frequency). For this evaluation the following effects were chosen: sex, breed section, country of origin and scapula angle.

57 individuals of the Welsh Pony and Cob breeds were entered into the database, of which 37 animals were section A and 20 animals section B. We measured the data with a laser measure and a special pedometer between March 2010 and April 2012. The relationship between the length of stride in walk and trot was investigated in comparison to the wither height, the animal's sex, its country of origin, breed section and the angle of the scapula. A conclusive ($P \leq 0.05$) influence was also observed for the effect of section. By comparing the spaciousness in walk and trot according to the chosen effects of sex, scapula angle, adherence to section and country of origin, we proved a highly conclusive ($P \leq 0.01$) influence of the scapula angle and a conclusive ($P \leq 0.05$) influence between the Welsh Mountain Pony and the Welsh Pony. Multiple comparisons showed a conclusive difference in the effect of wither height, where the difference in wither height between the individual sections was more than 10 cm.

Welsh Pony and Cob, measuring, movement, frequency in walk and trot, scapula angle

The Welsh Pony and Cob above all is a conformationally correct and harmonious pony, of which the body is in balance in all lines (LYNGHAUG, 2009). The breed characteristics and type, together with the movement in all gaits, correspond with the purposes, for which it is used. The breed is divided into individual sections (DAVIES, 2006).

Sections of the Welsh Pony and Cob:

- Section A: the Welsh Mountain Pony, height does not exceed 122 cm
- Section B: the Welsh Pony, height does not exceed 137 cm
- Section C: the Welsh Pony of Cob Type, height does not exceed 137 cm
- Section D: the Welsh Cob, height exceeds 137 cm
- Section WPBR: the Welsh Part-Bred, unlimited height.

For the evaluation of movement, correct measuring is necessary. Taking body measurements is based on the fact that an animal is a body, of which it is possible to measure dimensions of length, height, width, circumferences, angles, weight. The measurements should be defined in such a way to be reproducible, i.e. when measuring different animals, the measure was always taken from the same point – e.g. from the joint (MAJZLÍK, 2004).

For measuring dimensions of height and length a stick is used; most often the so-called Lydtin stick. There is a large number of body dimensions, which can be measured in horses. For the practical monitoring of conformation we are however only mentioning some of these – especially those, which are recorded in the basic datasheets of breeding horses. Among the basic body dimensions are: wither height (KVH) – measured by measuring stick

at the highest point of the withers, usually the notch (DUŠEK, 1999; RICARD, 2004). In evaluating wither height, it is necessary to ensure accurate measuring, measure the pony several times and then average the given measurement. It is also necessary to focus on the position of the head. Problems of measuring are discussed by LAMAS *et al.* (2007), who states that the range of values acquired in a series of re-measurements by the same person differ by ± 1.06 cm, and is increased to ± 1.89 cm if the measurements are carried out by three different individuals. Variation in height also occurs when the position of the head is changed, but does not occur when the horse is moved.

Heart girth (OH) – is measured with a tape measure behind the withers. The circumference of the cannon (Ohol) – is measured with a short tape measure in the upper third of the length (at the weakest point of the cannon). In foals, this measurement is taken in the middle, so again at the weakest point of the circumference (DUŠEK, 1999).

In horse breeding, conformation is more important than in other species (PREISINGER *et al.*, 1991). DUŠEK (1999) states that the evaluation of conformation is of paramount importance in horse breeding, as it is one of the limiting selection criteria when selecting assessed individuals for breeding. Since horses are bred mainly for muscular work, the relationship between conformation and the purpose of use of strength in performance is evident.

Closely connected with conformation is the movement. Movement is one of the most important performance characteristics in all breeds of horses. Therefore methods of evaluating movement are receiving increasingly more attention (DUŠEK, 1981).

The movement of the horse is driven by its hind legs, and the front legs basically support its body. An important aspect is the build of the leg and its angle. The shoulder from the point of its position and function plays a vital role in the movement. It allows the horse a forward rocking motion. The optimal position of the scapula is at an angle of 45° to a horizontal line. If the angle is wider than 50° , it is a steep shoulder. In case of a steep and short scapula, the horse's movement covers little ground. In riding horses we value a long and sloping shoulder. The humerus should be sufficiently long and sloping and form a close to right angle with the scapula.

Movement is one of the crucial characteristics being stressed in the current breeding of warmblood breeds on a broad international level. In evaluating the quantitative components of movement, the question of the relation of the wither height to the length of stride is discussed in practice. This issue is not to be neglected, because in case of a significant relationship smaller horses would be disadvantaged (DUŠEK, 1977).

Parameters used for evaluating movement can be divided into:

- Qualitative – the result of a subjective evaluation by the observer.
- Quantitative – are measurable, therefore considered objective, and have a numeric value as a result. Quantitative parameters include length of stride, speed, step frequency (stride rate).

The possibility of objective evaluation of the movement creates assumptions for the estimation of the work capacity of the evaluated horses and this fact has determined the effort of various authors to develop a method that would provide more simply interpretable, useful information on physical abilities. Efforts to improve movement in these current times of transformations of type and shape of many breeds are part of the fundamental breed work in almost all breed societies. An attempt at a transformation of the original model, with as aim to improve movement, is seen even in cold-blood breeds. Important for the practical evaluation of movement in the different gaits is the question of the mutual relations of the spaciousness in walk, trot and canter (DUŠEK, 1974).

MATERIAL AND METHODS

The supporting database contained data of measured body measurements and data for the evaluation of movement:

- wither height measured by stick
- scapula angle
- number of steps in trot
- time reached on a 30 m long track
- length of stride in walk
- length of stride in trot.

Measurements were made using the following measuring devices: a laser measure – for wither height; a laser protractor; for the length of stride in walk and trot a tape measure for horses was used; for measuring the time and number of steps a special pedometer for horses was used, which is placed either on the horse's head or on its chest area.

The measurements were all carried out on a firm, level surface.

The measurements were taken between March 2010 and April 2012 in the Czech Republic, the Netherlands and the United Kingdom.

The database included 57 animals of the Welsh Pony breeds, of which 37 animals were Welsh Mountain Ponies (section A) and 20 animals Welsh Ponies (section B).

The comparative basis included these effects:

- breed section
- sex
- country of origin
- scapula angle.

The individual data were processed in the program Statsoft STATISTICA version 9.

The relationship between the length of stride in walk and trot was investigated in comparison to the wither height, the animal's sex, its country of origin, breed section and the angle of the scapula. The data were evaluated by a statistical linear model with fixed effects (GLM):

$$y_{ijklm} = \mu + a_i + b_j + c_k + d_l + e_{ijklm}$$

where:

μ total average

a_i effect of horse's sex ($i = 1, 2, 3$)

b_j effect of wither height ($j = 1, 2, \dots, 19$)

c_k effect of breed section ($k = 1, 2, \dots, 5$)

d_l effect of scapula angle

e_{ijklm} residual effect.

By method of multiple comparisons differences were determined in effects, where a statistically conclusive influence was proved.

RESULTS AND DISCUSSION

When evaluating the length of stride in walk and trot of the Welsh Mountain Pony and Welsh Pony, we discovered that wither height has a statistically conclusive influence ($P \leq 0.01$) on the spaciousness of the gaits. The difference in wither height between the given sections is an average of 10cm. The measured average wither height in section A was 117cm and 128.6cm in section B. In section B, a section with a higher wither height, the length of stride was 74.5 cm in walk and 100 cm in trot. In section A the average values measured were 60.5 cm in walk and 80 cm in trot. In both gaits the difference was more than 10 cm.

The maximum value for length of stride was measured in section A, 126 cm (in section B the maximum was only 125 cm). This value indicates breeders focus on spaciousness in trot. In modern showing a spacious trot is a decisive aspect when choosing the best individual animal.

Exact values are given in Tab. I – Evaluation of the length of stride in walk and trot of the Welsh Mountain Pony and the Welsh Pony.

In the assessment of movement quantitative qualities are evaluated (stride length, frequency)

(DUŠEK, 1974). The highest trot frequency was measured in the Welsh Mountain Pony. The Welsh Mountain Pony is the sections with the lowest wither height. Thus it can be anticipated that these ponies have a higher stride frequency in trot. This was also confirmed (Tab. II).

The frequency in trot depends on the spaciousness of the gait and on the speed. For instance, this is very important in driving competitions, where it is important for contestants not to exceed the time limit, which is a maximum time set for the walk and trot segments of the terrain test. This limit is the same for all pony breeds, even though there is a considerable variability, dependable on wither height. In competitions animals compete differing up to 40 cm in wither height.

In comparing the spaciousness of walk and trot according to the chosen effects: sex, scapula angle, breed section and country of origin we proved the highly conclusive influence ($P \leq 0.01$) of the effect of the scapula angle. The scapula angle therefore clearly influences the spaciousness of the individual gaits.

A conclusive influence ($P \leq 0.05$) was found for the adherence to section (wither height).

As indicated in Tab. III, we did not find a statistically significant influence for the effects of sex and country of origin.

Thus the country of origin does not have influence on the movement. Movement is influenced by the breeder, who can affect it by correctly showing the pony.

For breeders it is necessary to not only focus on the conformation, but also on the movement not just in trot, but also in walk. For a riding horse, the movement is the basis for the horse's use. It is impossible to focus only on the conformation and

III: Evaluation of movement in regard to the individual effects

Effects	F	P
Sex	0.89	0.53
Scapula angle	1.1	0.01
Section	1.16	0.05
Country of origin	0.47	0.3

I: Evaluation of the length of stride in walk and trot of the Welsh Mountain Pony and the Welsh Pony

	walk section A	trot section A	walk section B	trot section B
median	58	75,5	71	93
min	45	54	63	90
max	87	126	90	125
average	60.5	80	74,5	100

II: Frequency in trot of the Welsh Pony and Welsh Mountain Pony

section	Average frequency /min.	Sx	Average frequency/s
A	83.8	31.7	1.4
B	76.7	19.4	1.3

movement in trot. This applies to the breeding of ponies as well, as they too are used for riding and driving competitions. Especially the spaciousness of the individual gaits is very important in riding disciplines and driving competitions. Foreign breeders are especially concerned with the spaciousness in trot, and the spaciousness of this gait is a very important aspect when judging at shows. International judges do not pay attention to the walk, even though this gait is important for further use of ponies in sport as well as recreation.

CONCLUSIONS

Our objective was to evaluate the movement in walk and trot. We assessed the length of stride in walk and trot, the frequency in trot on a 30-meter-long track and evaluated the results based on the following effects: sex, breed section, country of origin, scapula angle. The database consisted of 57 individuals of the breed; 37 of which were section A and 20 section B.

From the evaluated data the largest frequency in trot was found in the Welsh Mountain Pony. The Welsh Mountain Pony is the smallest section of the breed in terms of wither height. The frequency and spaciousness of the gait is for instance important in the driving discipline, in which ponies with smaller wither heights have to be up to ponies with wither heights closer to the 148 cm limit, especially in the walk during the terrain test. In individuals with a maximum wither height of 122 cm a very important aspect is a sufficient frequency and spaciousness of the gait. The given time limit in the walk and trot part of the terrain test does not take

into account breeds with smaller wither height and is calculated for breeds with a wither height at the 148 cm limit.

The conclusions of the work show that breeders focus on the spaciousness in trot. This is especially appreciated at shows, which are the domain of these two sections (A and B) and are very popular with breeders. Judges focus on a spacious trot, but do not pay much attention to the spaciousness in walk.

By comparing the spaciousness in walk and trot according to the chosen effects of sex, scapula angle, adherence to section and country of origin, we proved a highly conclusive ($P \leq 0.01$) influence of the scapula angle and a conclusive ($P \leq 0.05$) influence between the Welsh Mountain Pony and the Welsh Pony. Multiple comparisons showed a conclusive difference in the effect of wither height, where the difference in wither height between the individual sections was more than 10 cm.

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SUMMARY

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