

## A Novel Approach to Establish Breed Type and Standards for an Equine Breed: Persian Kurdish Horse

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### ABSTRACT

Persian Kurdish Horse constitutes a group of horses traditionally bred and used by Kurdish People who have lived and occupied today's western provinces of Iran for several millennia. Although very well-known for their unique characteristics, standards of this so-called breed of Iranian native horses have never been established. This study was designed to document and validate anecdotal information that has been passed along generations of Kurdish Horse breeders about unique physical characteristics and performances of this native horse breed of Iran. The first author traveled to provinces with larger numbers of Kurdish Horses in Iran and conducted personal interviews with 114 of well-known Kurdish Horse breeders. Questioners were completed. Then, the degree of concordance on various physical and performance characteristics of Kurdish Horses that were anecdotally considered as more important traits to identify and define Kurdish Horses was established. Based on such validated data, characteristics with a higher degree of agreement were formatted into a proposed "Breed Type and Standards" for Iranian Kurdish Horses.

**Keywords:** Breeding strategies, Horse breeder, Landrace breeds, Survey of breeds.

### INTRODUCTION

Kurdish Horse (Figure1) is considered as one of the main breeds of horse native to Iran that include Caspian, Turkoman, Assil (also known as Persian Arab) and DareShuri. The breed originates from western Iran, where the mountainous topography and moderately cold climate have sculpted a unique horse population resistant to harsh environmental conditions over millennia. Parallel to natural selection, local breeders have employed artificial selection from the gene pool of the population to achieve horses mostly suitable for mountain riding and cadenced movements.

At the current time, no studbook or form of the registry has ever been established for Kurdish Horses. No local or national breed association for this breed exists. By definition, existing population of Iranian native Kurdish Horses may be categorized as "traditional populations" (FAO, 2012) or "landrace breeds" (Petersen *et al.*, 2013).

This study was conducted as a survey to document criteria that have been passed through generations, and most Iranian breeders anecdotally consider them as the characteristics of the ideal Kurdish Horse. Traditional breeders have used these characteristics as desirable to differentiate Kurdish Horses from others. Horse breeders might, as well, use some pedigree information to identify Kurdish Horses but with questionable reliability.

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**Figure 1.** A typical Kurdish Horse, note that the picture merely presents an example and this particular horse does not set the standard of the breed.

The main problem which motivated us to conduct this study was that there have been no unified and objective recognition/selection criteria established for Kurdish Horses up until now; and the people engaged with breeding Kurdish Horses have implemented an assortment of strategies to select and breed horses, which have always been prejudiced by their personal tastes and preferences. As a result, the population of Kurdish Horses has incurred a series of fluctuations that have consequently distorted this horse and has even exposed it to the peril of extinction. Therefore, it transpired that the first step towards conservation of this breed should be bringing together

different ideas to an established, publicly harmonized and acceptable criteria about the ideal shape and the breeding future of the Kurdish Horse.

As a solution, many international equine breed associations have developed and published a text commonly called “Breed Type and Standards”, which encompasses subjective descriptions for a list of body compartments accompanied by some explanations of temperament and performance potentials for the breed of interest (Lynghaug, 2009). Type characteristics have also been mentioned as the traditional basis for characterization studies (Gómez *et al.*, 2012), and the

external animal characteristics have been identified as morphological marker for characterization of livestock breeds (Hailu and Getu, 2015, van Wezel and Rodgers, 1996). However, it seems that there has not been any scientific method implemented so far to develop these Breed Type and Standards, and it turns out that they have been merely based on the observation of a few key people in the breed association (Dalton, 2000). On the other hand, the high importance of Breed Type and Standards cannot be ignored as they draw the ideals and point out to the breeding strategies contemplated for the concerned breed. Such importance urges the necessity to establish a reliable scientific methodology for defining Breed Type and Standards. The ultimate intention behind this study was to develop and suggest a scientific methodology for authoring Breed Type and Standards and finally utilize the outcome methodology to develop a Breed Type and Standards for the Persian Kurdish Horse.

Logically, the most knowledgeable people about the ideal traits of an equine breed are the breeders; so, it turns out that a survey -as a scientific approach- from the people who are active in Kurdish Horse breeding may be an effective way to extract publicly-accepted ideas on the ideal traits for this breed.

There has also been another strategy undertaken by some research studies to scientifically characterize equine populations that have incorporated some biometric measurements to characterize the breed of interest from phenotypic aspect (Shojaei *et al.*, 2015; Gupta *et al.*, 2012; Gómez *et al.*, 2012; Komosa *et al.*, 2013; Kefena *et al.*, 2012; Lopes *et al.*, 2015; Tocci *et al.*, 2010; Zechner *et al.*, 2001; Takaendengan *et al.*; 2011). However, in the case of landrace/traditional populations, there is a challenge to recognize the animals from their neighboring populations (which are usually subject to crossbreeding with them) and to select a representative population for the studies. Such a problem seems particularly considerable in those populations that have been manipulated by

humans since there have been some selection criteria incorporated into their breeding practice. Therefore, it turns out that preliminary research should be conducted to obtain a set of recognition criteria to ensure that the sampled animals fit the characteristics of the studied breed.

This study was designed to document and validate anecdotal information that has been passed along generations of Kurdish Horse breeders about unique physical characteristics and performances of this native horse breed of Iran.

## MATERIALS AND METHODS

At the first step, the existing historical information about exterior traits specific to Kurdish Horse was gathered as much as possible through discussion with experienced experts of Kurdish Horse, literature, unpublished information, etc. Then, the gathered information was arranged in the format of a “Breed Type and Standards” that is usually authored and published by equine breed associations. The Caspian Breed Type and Standards published by the International Caspian Society (ICS) was used as a template to prepare the draft for Kurdish Horse, which encompasses descriptions for the following topics: General, Eyes, Nostrils, Ears, Head, Neck, Shoulders and Withers, Body, Hindquarters, Hocks, Limbs, Hooves, Coat, Skin and Hair, Colors, Height, Action/Performance, Temperament (Dalton, 2000).

In the next step, the prepared draft was transformed to a questionnaire in order to assess whether the gathered information was valid from the viewpoint of the majority of Kurdish Horse breeders, and at the end, gain a consensus on the criteria described in the draft for recognizing an ideal Kurdish Horse. In order to design the questionnaire, each sentence in the draft, which subjectively described an exterior trait of an ideal Kurdish Horse, was transformed to a statement; such that at the end of each



statement, there were three possible choices that the interviewed person could pick up to express his/her opinion: Agree/Remove/Amend. If he/she agreed with the statement as the proper description of one of the characteristics of the Kurdish Horse, he/she would select 'Agree'. If they disagreed with the statement and based on their opinion, the statement should be 'removed' from the list of Kurdish Horse characteristics, they would pick the second choice up. Finally, if they believed that the statement points out to a Kurdish Horse's trait but incorrectly describes it and needs amendments, they would choose the last option, and the amended statement would be written down in the last part of the questionnaire titled as "Comments". Also, additional descriptions for the Kurdish Horse offered by the interviewed person could be noted in this part.

The interviews were performed in an interactive environment, such that all the statements were narrated by the first author and additional explanations were given when necessary to assure that the concept behind the statement was uniformly understood by the interviewed people.

In order to analyze the interview results, the entire choices picked up by interviewees were entered into a datasheet in Microsoft Excel. Then, the following statistics were calculated: for each person: the percentage of the statements selected as 'agree', and the same percentage for 'remove' and 'amend'; and for each statement, the percentage of people who picked up 'agree' for the statement, and the same percentage for 'remove' and 'amend'. Finally, the total level of agreement with the entire statements (namely, "Mean Agreement") was calculated as the average of the 'agree' percentage among interviewed people.

Besides the Microsoft Excel datasheet, the entire amendments and additional descriptions offered by interviewed people (which had been written in the "comments" section), were gathered and arranged for each statement in a single document for further analysis and reconsideration of the statements.

In order to obtain the final version of the Breed Type and Standards, the following policies were implemented to apply the corrections and additional descriptions extracted from the interview results: (1) The points on which there was much contention among interviewed people were removed, (2) Those corrections or additional descriptions with a high census were applied, (3) The offered sentences that better described the same concept were substituted, and (4) The amendments that pointed out to an indisputable fact or reflected the author's absolute mistake in preparation of the draft text were applied, even if the amendment had been proposed by a single interviewed individual.

## RESULTS

A total of 114 Kurdish Horse breeders were interviewed within a period of 106 days (from 8<sup>th</sup> March 2015 to 21<sup>st</sup> June 2015). The interviews were carried out in 9 provinces, which are known to accommodate most of the activity regarding Kurdish Horses (Figure 2).

Table 1 represents the summary statistics about the 'agree', 'remove' and 'amend' percentages for the interviewed people, and the statements. As depicted in the table, the total level of agreement with the entire statements was 93.8%.

Table 2 contains the details about the proportion of the answers picked up as 'agree', 'remove' and 'amend' for the 86 statements in the questionnaire by the 114 interviewed people.

A total of 324 meaningful amendments and 175 additional descriptions were extracted from the "Comments" section, after excluding non-sense descriptions. Table 3 gives the statistics on the number of meaningful amendments and additional descriptions for each section of the questionnaire.

After a series of editions and reconsideration, it is suggested that the following text may cover more ideas and will yield more consensus:



**Figure 2.** The number of people interviewed in each province.

**Table 1.** Percentage distribution of response possibilities (Agree, Remove, and Amend) about the interviewed people and the statements in the questionnaire for the Kurdish Horse Breed.

Items	Mean $\pm$ SD <sup>a</sup> (%)	Minimum (%)	Maximum (%)
Interviewed people			
Agree	93.8 $\pm$ 6.4	69.8	100.0
Remove	2.4 $\pm$ 4.5	0.0	30.2
Amend	3.7 $\pm$ 3.3	0.0	14.0
Statements in the questionnaire			
Agree	93.8 $\pm$ 7.6	57.9	100.0
Remove	2.4 $\pm$ 3.1	0.0	16.8
Amend	3.8 $\pm$ 6.7	0.0	41.1

<sup>a</sup> SD: Standard Deviation.

**Table 2.** Percentage distribution of response choices (Agree, Remove, and Amend) about the section/statements in the questionnaire.

Section/Statement	Agree (%)	Remove (%)	Amend (%)
<b>1-General</b>			
1-1	92.11	0.00	8.04
1-2	100.00	0.00	0.00
1-3	99.12	0.88	0.00
1-4	94.74	3.54	1.79
1-5	100.00	0.00	0.00
1-6	87.72	3.54	8.93
1-7	100.00	0.00	0.00
<b>2- Eyes</b>			
2-1	94.74	0.88	4.46
2-2	92.98	5.31	0.89
2-3	96.49	1.77	1.79
2-4	98.25	0.00	1.79
2-5	94.74	3.54	1.79
<b>3- Nostrils</b>			
3-1	94.74	0.88	4.46
3-2	92.98	4.42	2.68
3-3	84.21	11.50	4.46
3-4	91.23	3.54	5.36
<b>4- Ears</b>			
4-1	82.46	16.81	0.89
4-2	89.47	7.08	2.68
4-3	92.11	3.54	4.46
4-4	100.00	0.00	0.00
4-5	91.23	4.42	3.57
<b>5- Head</b>			
5-1	78.07	3.54	18.75
5-2	81.58	0.88	17.86
5-3	98.25	0.00	1.79
5-4	92.98	5.31	1.79
5-5	98.25	0.88	0.89
5-6	98.25	0.88	0.89
5-7	91.23	2.65	6.25
5-8	97.37	0.88	1.79
<b>6- Neck</b>			
6-1	98.25	0.00	1.79
6-2	96.49	1.77	1.79
6-3	96.49	2.65	0.89
6-4	99.12	0.00	0.89
6-5	96.49	0.88	2.68
6-6	86.84	5.31	8.04
<b>7- Shoulders and Withers</b>			
7-1	97.37	1.77	0.89
7-2	100.00	0.00	0.00
7-3	100.00	0.00	0.00
7-4	99.12	0.88	0.00
<b>8- Body</b>			
8-1	94.74	0.88	4.46
8-2	100.00	0.00	0.00
8-3	100.00	0.00	0.00
8-4	100.00	0.00	0.00
8-5	97.37	1.77	0.89
8-6	93.86	4.42	1.79

Continued ...

**Continued of Table 2.** Percentage distribution of response choices (Agree, Remove, and Amend) about the section/statements in the questionnaire.

Section/Statement	Agree (%)	Remove (%)	Amend (%)
<b>9- Hindquarters</b>			
9-1	87.72	1.77	10.71
9-2	92.11	3.54	4.46
9-3	98.25	0.00	1.79
9-4	87.72	2.65	9.82
<b>10- Hocks</b>			
10-1	95.61	0.00	4.46
<b>11- Limbs</b>			
11-1	90.35	2.65	7.14
11-2	98.25	0.00	1.79
11-3	90.35	5.31	4.46
11-4	93.86	3.54	2.68
11-5	93.86	0.88	5.36
11-6	99.12	0.00	0.89
<b>12- Hooves</b>			
12-1	93.86	0.00	6.25
12-2	86.84	9.73	3.57
12-3	94.74	3.54	0.89
<b>13- Coat, Skin, and Hair</b>			
13-1	89.47	4.42	6.25
<b>14- Mane and Tail</b>			
14-1	86.84	6.19	7.14
14-2	93.86	3.54	2.68
14-3	94.74	5.31	0.00
14-4	90.35	8.85	0.89
14-5	95.61	3.54	0.89
14-6	99.12	0.88	0.00
14-7	98.25	0.00	1.79
<b>15- Colors</b>			
15-1	76.32	14.16	9.82
15-2	57.89	1.77	41.07
15-3	96.49	1.77	1.79
<b>16- Height</b>			
16-1	57.89	2.65	39.29
<b>17- Action/Performance</b>			
17-1	97.37	0.00	2.68
17-2	99.12	0.00	0.89
17-3	90.35	1.77	8.04
17-4	99.12	0.00	0.89
17-5	99.12	0.88	0.00
17-6	99.12	0.88	0.00
17-7	98.25	1.77	0.00
17-8	98.25	1.77	0.00
17-9	94.74	1.77	3.57
17-10	94.74	4.42	0.89
17-11	98.25	1.77	0.00
<b>18- Temperament</b>			
18-1	100.00	0.00	0.00
18-2	100.00	0.00	0.00
18-3	99.12	0.00	0.89
18-4	99.12	0.88	0.00

**Table 3.** Distribution of on the meaningful amendments and additional descriptions proposed for the statements.

Section	Amendments	Additional descriptions
1-General	14	18
2- Eyes	13	8
3- Nostrils	15	5
4- Ears	14	12
5- Head	52	14
6- Neck	19	11
7- Shoulders and Withers	0	4
8- Body	5	12
9- Hindquarters	28	5
10- Hocks	5	3
11- Limbs	20	10
12- Hooves	12	6
13- Coat, Skin, and Hair	7	1
14- Mane and Tail	14	16
15- Colors	44	5
16- Height	38	1
17- Action/Performance	23	33
18- Temperament	1	11

## Breed Type and Standards of the Persian Kurdish Horse

### 1-General

The Kurdish Horse is a horse of medium height with a compact, muscular body and a very powerful overall conformation with the sturdy bone structure. Strong connections are noticeable throughout the body including head-to-neck, neck-to-body, back, and loin. Proportionality is an outstanding characteristic of the Kurdish Horse. Compared to other native horse breeds with long backs such as the Turkoman, the Kurdish Horse has a body with relatively equal height and length, which gives it a square-framed body structure. The Kurdish Horse possesses a broad, thick, and massive neck with strong and muscular shoulders, and a wide chest. It has a thick mane and tail and holds its neck in an upright position. High tail and head carriage are considered as an outstanding feature of the Kurdish Horse. The Kurdish Horse is a very sharp, active, and hot-blooded breed.

### 2-Eyes

The eyes of the Kurdish Horse are large, deeply located in the socket, and not prominent. In certain strains of the Kurdish Horse, including the "JAAF", the eyes may be more prominent. Compared to some native breeds of horses such as the Arabian (known as Assil in Iran) with round eyes or the Turkoman with eyes that look stretched/almond-shaped, the Kurdish Horse has more oval-shaped ones. From a lateral view of the head, the alignment of the eyes and the forehead are of a noticeable oblique angle. From the front, the convexity of the forehead makes for a more lateral position of the eyes.

### 3-Muzzle and Nostrils

From the front, the nostrils appear elongated and oblique. The muzzle of the Kurdish Horse does not appear large and, relative to the forehead, looks slightly narrow. From a lateral profile, the nasal



bone appears elongated. From a lateral view, a slightly convex nasal bone continues to sloped nostrils and a curved muzzle.

#### **4-Ears**

Compared to other breeds of horses, the ears of the Kurdish Horse appear slightly more caudal on the head. Ears are set wide on the poll, of medium length; however, because of a thick forelock, the ears might appear small. The position of the ears in Kurdish Horses give them an alert appearance. The auricles (pinna) of Kurdish Horses' ears are wide open.

#### **5-Head**

The Kurdish Horse's head is slightly bigger than the medium and is not as refined as the Arabian's. From a frontal view of the head, the forehead appears relatively wide. The forehead of the Kurdish Horse from a lateral view has either a convex or straight outline. In general, the head's profile is straight or slightly convex. Heads with concave or dished profile (similar to what is commonly seen in the modern Arabian) are considered undesirable for the Kurdish Horse. Prominent, distinguished cheekbones are another distinctive characteristic of the Kurdish Horse. The head-to-neck connection is broad and strong. The jaws are prominent and muscular with a wide throat gullet between the mandibles. While the throat latch has a crescent-type elegance in Arabian Horses, in the Kurdish Horse it is quite muscular and massive. They hold their neck upright and set their head rather vertical, especially when bridled, a position that gives them a rather proud bearing.

#### **6-Neck**

One of the outstanding features of the Kurdish Horse is a broad, strong, and muscled neck, sometimes giving the

impression of a short neck. It is, however, very proportional to its body. The Kurdish Horse has a prominent neck crest with a slight arch ending in a strong connection to its body. From a lateral viewpoint, the neck looks like a triangle with a wide base. Well-developed muscle on the ventral side gives a slight arch to the front of the neck.

#### **7-Shoulders and Withers**

The withers is well blended into the neck and is not distinguishable from the top line. Muscular shoulders give the withers a very flat appearance from a dorsal viewpoint. Shoulders, from the side view, are covered with well-developed muscles. The shoulders have a more vertical angle.

#### **8- Body**

The Kurdish Horse has a compact, muscular body, a deep girth, and a round, cylindrical ribcage with a wide, muscular chest. Ideally, the back and loin area are flat, short and muscular.

#### **9-Hindquarters**

From a lateral view, the croup is flat, level, and short, while from the rear, it seems prominent and muscular. The tail is set high, and the dock is level with the rump's topline. The Kurdish Horse has a high tail carriage.

#### **10-Limbs**

The limbs are heavy and relatively short. They are very strong and coarse with dense bones. The buttock muscles (Semitendinosus and Semimembranosus) are prominent. Their hocks are strong and large, with a good range of motion. Their cannon bones



are dense and sturdy. Their pastern is short but proportional and strong.

### 11-Hooves

The hooves are coarse and strong, appearing wide at the base from a dorsal viewpoint. They are high at the heels, and the color is often black (pigmented).

### 12-Coat, Skin, and Hair

The Kurdish Horse has a thick skin and a dense coat. Having feather (hair growth behind the fetlock and pastern) in the distal limb is common amongst the Kurdish Horses.

### 13-Mane and Tail

A thick mane and tail are among the main characteristics of the Kurdish Horse. Hair strands of the mane and tail are thick. In some cases, the thick mane lies on both sides of the crest. The manes and tails are shiny with long-tail hairs extending to the base of the dock. The Kurdish Horse moves with an impressive high tail carriage.

### 14-Color

White marking on the body and colors such as buckskin, dun, and palomino are rare among Kurdish Horses. In other words, they are mainly found in basic colors. Considering the dramatic decrease in the population and a certain amount of inbreeding, color variation is not a feature of the Kurdish Horse.

### 15-Height

The Kurdish Horse ranges from 140 to 155 centimeters in height (13.8 to 15.2 hands).

## 16- Action/Performance

The Kurdish Horse is a strongly athletic horse suitable for polo, exhibition dressage, and pleasure riding. Their distinctive performance attributes include:

*16-1-Cadenced Movement:* The gaits of the Kurdish Horse are cadenced, animated, dance-like, and have a distinctive style that comes from a high elevation of their forelegs during movement. Furthermore, the angle of the shoulder effectively contributes to the elevation of the front legs. This cadence is more apparent under saddle.

*16-2-Doubled Gaited Canter:* This is a canter-resembling gait in which both forelegs take off at the same time and land simultaneously. The same position can also be seen in the hind legs with a nuance in the takeoff-landing timing between the two hind limbs. Their hind feet are wide apart during this gait.

*16-3-Lowering of the Hindquarters and Flexion of the Hocks:* The Kurdish Horse can naturally lower its hindquarters and bend its hocks so that the legs extend forward and beneath the body.

*16-4-Agility:* Its compact, muscular body gives exceptional flexibility to the Kurdish Horse, which enables it to perform sudden turns at every side, even at the canter. Their agility allows them to perform highly complex turns in narrow, confined spaces very easily. This resembles the pirouette as performed in dressage (moving around the hindfoot). This agility makes the Kurdish Horse an ideal polo horse.

*16-5-Flying Changes:* The Kurdish Horse can easily perform flying changes, including every two strides or tempi (every stride).

*16-6-Lateral Movements:* The exceptional flexibility of the body enables the Kurdish Horse to move laterally with much ease. This enables the Kurdish Horse to perform the shoulder-in and the half-pass with great ease.

*16-7-Athleticism:* The Kurdish Horse's athletic agility enables him to execute transitions very quickly and in a balanced

and controlled manner. They can go from a halt to a canter and vice versa in very few strides, making them ideal mounts for polo, dressage, and "Ta'azieh" (a religious play involving actors riding horses in a relatively tiny arena).

*16-8-Balance:* The Kurdish Horse can be ridden downhill at a steady and rapid canter. Their erect head carriage and hindquarter action give them a more horizontal position. This gives the rider a more balanced feeling in the saddle. As previously mentioned, the Kurdish Horse naturally lowers its hindquarters during movement enabling it to preserve the center of gravity closer to its natural state resulting in better balance while riding downhill.

*16-9-"Croupade" or Airs above the Ground:* The Kurdish Horse is capable of performing a croupade-like movement, jumping from a raised position of the forehand straight up in the air, and leaping forward. This movement requires much power and balance.

*16-10- Dressage capabilities:* The Kurdish Horse is quick to learn a variety of complex, high-level dressage movements, including Piaffe, Passage, Pirouette, Half-pass, Capriole, and Levade. It is naturally collected in all gaits.

## 17-Temperament

The Kurdish Horse is highly intelligent and alert. As a hot-blooded breed, it is very quick and full of energy. It is, however, a very gentle, kind, and trainable horse and has a very willing disposition. It is regarded by many horsemen as being very eager to work.

## DISCUSSION

The 93.8% total agreement can be an indication of high consensus on the gathered criteria, and that the finalized text derived out of corrections offered can be a reliable reference for recognition and selection of

Kurdish Horses. It may draw a harmonized picture from the breeders' mind about what the Kurdish Horse should look like and, hence, it may have the ability to plan a route towards the future of Kurdish Horse breeding. The present study can substantiate something that has been a common saying among breeders for a long time and has thus been subject to many fluctuations derived from interference of personal tastes and preferences. By this way, the criteria would be somewhat pushed from subjectivity towards objectivity, which would finally lead to a clearer criteria for addressing the fundamental question of "what is a Kurdish Horse" and which would hopefully contribute to upgrading the "Traditional Population" of Iranian Kurdish Horses to a "Standardized Breed" (FAO, 2012).

Among the 86 statements in the questionnaire, 71 earned above 90% agreement, within which, there were 11 statements with 100% agree, 33 statements had the range of 95% to 99.99% agreement, and 27 statements were in the range of 90 to 94.99%; which again demonstrate the high level of consensus obtained from the interviews.

As shown in Table 2, there were only four statements that earned an 'agree' percentage of lower than 80%, which are the statements 5-1 (78.07% agree), 15-1 (76.32% agree), 15-2 (57.89% agree), and 16-1 (57.89%). Even for these statements, the majority of opinions proposed by interviewed people point out minor corrections on them.

The interviews were performed in an interactive manner, which enabled the author to identify the words that may cause misunderstanding, or conversely, to find sentences that may convey the meaning more effectively. Then, all the statements (not only the statements with considerable levels of disagreement) were taken under several series of precise reconsideration to become more understandable and acceptable.

The majority of breed standards published so far have been descriptive texts that may not have been based on scientific work. It



turns out that they may be based on the observation of stakeholders in the breed association; something that may defer from what the majority of the breeders desire about the appearance of the concerned breed. This work has strived for the suggestion of a scientific objective method to define breed standards based on the collective wisdom and to account for the breeding community's preference rather than a single person or a small number of key people.

This research also suggests putting a step before conventional methods of characterization studies on traditional populations (landrace breeds), particularly those that have been subject to human manipulation. Up until now, many research studies aimed to phenotypically characterize landrace (traditional) equine populations have merely employed a number of biometric measurements to characterize the concerned breed (Takaendengan *et al.*, 2011; Gupta *et al.*, 2012; Kefena *et al.*, 2012; Lopes *et al.*, 2015; Shojaei *et al.*, 2015). On the other hand, it is obvious that landrace populations (for which there is no strictly-controlled registration/studbook) are usually subject to a constant mixture with their neighboring populations. Hence, if there are no reference criteria to recognize fairly true members of the breed, many of the sampled animals for the study may be crossbreds and, consequently, the biometric values may reflect the biometric aspects of a mixed population rather than the breed under question. Therefore, it turns out that preliminary research should be conducted to determine reference criteria for selection to ensure that the sampled animals fit the characteristics of the studied breed. This idea is also supported by the scientific definition of *animal breed* that has been proposed by FAO: "Either a sub-specific group of domestic livestock with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species or a group for which geographical and/or cultural separation from

phenotypically similar groups has led to acceptance of its separate identity" (FAO, 1999).

The definition emphasizes the presence of distinctive traits that are specific to breed and could differentiate the breed members from their neighboring populations. Therefore, developing a "Breed Type and Standards" that is specifically dedicated to give a clear description of the externally observable traits, can be a good means to recognize members of a breed from other populations.

It is emphasized that the criteria developed here should not be considered as a strict scaffold to cull horses. This work has strived for giving a general (but clearer) picture of what Kurdish Horse is in its breeders' mind. In essence, breed standards should evolve over time and their contents should be continuously updated (Anderson *et al.* 2008).

In general, the following premises are applicable to the finalized Breed Type and Standards and they are suggested to be considered prior to taking any practical decision based on the developed criteria:

- The traits described in the text are only "breed specifications" and they are not supposed to cover the ideal characteristics of a sound horse; it is obvious that every horse, regardless of its breed, should ideally possess a sound conformation and be clear from any vice common among horses; for instance, being toed-out or toed-in is considered a vice for any type of horse, regardless of what its breed is.
- According to the genetic model for quantitative traits (Bourdon, 1997), any trait observable as a phenotypic value in an individual is the combined result of its genetic merits and the environmental effects. Hence, all of the traits described in the text are subject to variations caused by the environment or may need an environmental factor for their expression. However, the text describes the innate capacity of Kurdish Horses to express the traits. For example, the

“performance” section of the text points out to some innate abilities in Kurdish Horses to perform dressage gaits, but as mentioned, they are merely congenital capabilities in these horses and trainer’s effect as an environmental factor is necessary for such traits to become observable.

- The majority of the morphological specifications described in the text are only observable in mature horses being kept under normal management conditions, especially in the Body Condition Score of 5 (Henneke *et al.*, 1983). As an example, the structure of the withers, which is mentioned for Kurdish Horses to be blended into the body topline (statement No. 7-1), cannot be seen in an extremely emaciated horse (in the Body Condition Score of 1) which will, of course, have distinct, protruding withers.
- The whole traits mentioned may not be observable in a single horse, rather, the ideal condition for each trait is described; the more desirable traits the better the quality.
- No single criterion should be referenced to cull any horse. The criteria should be considered as a whole, and they will only be meaningful if they are considered in relation to one another.
- A keen, experienced eye is needed to be able to recognize these traits and make the distinction between horses. This is particularly important for distinguishing Kurdish Horses from their neighboring breeds, which in many cases and traits are highly similar but distinguishable from them.
- The traits explained here are more obviously seen in mature stallions. For example, the thickness mentioned for the neck is more outstanding in stallions than mares, which may have a more delicate neck.
- Exceptional cases from what has been described for each of the traits can be certainly found; however, the main intention is that the explained qualities

are found with the highest frequency in the population of Kurdish Horses.

- The population of Kurdish Horses is anecdotally believed to be divided into strains (subpopulations) in the past, namely, Jaaf, Sanjabi, Afshari, etc. and that there had been a few phenotypic differences among these strains. In preparation of the text, the focus has been put on the traits shared by all of the Kurdish Horses (regardless of any strain they may belong to), then, in case of a special strain with considerable outstanding characteristics it has been mentioned as a minor point. However, as it is observed in the finalized text, the majority of these cases has been removed: firstly because of considerable controversy among interviewed people about them, and secondly, because the high level of mixture within the Kurdish Breeds has caused the strains to disappear nowadays.
- In this “Breed Type and Standards”, many traits have been described through comparisons to their counterparts in neighboring breeds of Kurdish Horse, including Assil (Persian Arab) and Turkoman.

To enlist a number of practical applications of this work, it can be noted that the definitions developed as Kurdish Horse Breed Type and Standards can be incorporated into breeding strategies, they may be of good utility as reference for judges in breed shows, and as a reference guide to select foundation stock for studbook and monitoring their offspring (a set of criteria for assessing eligibility of registration in the studbook)

By this work, we have taken the first steps to upgrade the Persian Kurdish Horse from a “traditional population” to a “standardized breed”. It can be a good idea for future studies to select a representative population of Kurdish Horses with the closest traits to the qualities established here and conduct biometric studies on them and compare them with neighboring breeds to figure out if these criteria are meaningful within the context of the objective measurements.



Also, future studies may try to narrow down the traits and include more details to upgrade this first edition of Breed Type and Standards developed for Kurdish Horse. In particular, as this work has tried to define the ideals for Kurdish Horse, it will be of great interest if the next works develop methods to define the extent to which horses can depart from the ideal.

## CONCLUSIONS

This study clearly demonstrates that survey can be an effective method to define recognition and selection criteria for a breed and suggests a scientific approach to develop 'breed type and standards' for equine breeds that are in transition from traditional/landrace populations to standardized breeds, which would be of great utility for newly-founded equine breed associations.

## ACKNOWLEDGEMENTS

We want to express our best appreciation for financial support from Ava Tejarat Saba Co. and critical help and advice from Dr. Ernest Bailey, Mr. Mohammad Farzanehfard, Mrs. Ateshe Firouz Larsson, Dr. Mohammad Moradi Shahrbabak, Mr. Soheil Yousefnia, and Yekrun Horse Industry Development Co. Ltd.

## REFERENCES

1. Anderson, J., Krieger, M. and M., Safly, M., 2008. A Comparative Analysis Of Alpaca Breed Type and Standards. *The Alpaca Library from Northwest Alpacas* [Online]. Available: [www.alpacas.com](http://www.alpacas.com).
2. Bourdon, R. M. 1997. The Genetic Model for Quantitative Traits. *Understanding Animal Breeding*. Prentice-Hall, Inc., Upper Saddle River, New Jersey, U. S. A.
3. Dalton, B. 2000. *The Caspian Horse*, J. A. Allen. PP 24.
4. FAO. 1999. The Global Strategy for the Management of Animal Genetic Resources: Executive Brief. Initiative for Domestic Animal Diversity, Rome.
5. FAO. 2012. *Phenotypic Characterization of Animal Genetic Resources*. FAO Animal Production and Health Guidelines No. 11, Rome.
6. Gómez, M., Azor, P., Alonso, M., Jordana, J. and Valera, M. J. L. S. 2012. Morphological and Genetic Characterization of Spanish Heavy Horse Breeds: Implications for Their Conservation. *Livest. Sci.*, **144**: 57-66.
7. Gupta, A. K., Tandon, S. N., Pal, Y., Bhardwaj, A. and Chauhan, M. 2012. Phenotypic Characterization of Indian Equine Breeds: A Comparative Study. *Animal Genetic Resources/Ressources Génétiques Animales/Recursos Genéticos Animales*, **50**: 49-58.
8. Hailu, A. and Getu, A. 2015. Breed Characterization Tools and Their Applications. *Int. J. Genet.*, **5**: 7-14.
9. Henneke, D. R., Potter, G. D., Kreider, J. L. and Yeates, B. F. 1983. Relationship between Condition Score, Physical Measurements and Body Fat Percentage in Mares. *Equine Vet. J.*, **15**: 371-372.
10. Kefena, E., Dessie, T., Han, J. L., Kurtu, M. Y., Rosenbom, S. and Beja-Pereira, A. 2012. Morphological Diversities and Ecozones of Ethiopian Horse Populations. *Animal Genetic Resources/Ressources génétiques Animales/Recursos Genéticos Animales*, **50**: 1-12.
11. Komosa, M., Frackowiak, H., Purzyc, H., Wojnowska, M., Gramacki, A. and Gramacki, J. 2013. Differences in Exterior Conformation between Primitive, Half-Bred, and Thoroughbred Horses: Anatomic-Breeding Approach. *J. Anim. Sci.*, **91**: 1660-1668.
12. Lopes, M. S., Mendonca, D., Rojer, H., Cabral, V., Bettencourt, S. X. and Da Camara Machado, A. 2015. Morphological and Genetic Characterization of an Emerging Azorean Horse Breed: The Terceira Pony. *Frontiers in Genetics*, **6**.
13. Lynghaug, F. 2009. The Official Horse Breeds Standards Guide: The Complete Guide to the Standards of All North American Equine Breed Association. Voyageur Press, MN.
14. Pe, J. L., Mickelson, J. R., Cothran, E. G., Andersson, L. S., Axelsson, J., Bailey, E., Bannasch, D., Binns, M. M., Borges, A. S.

- and Brama, P. 2013. Genetic Diversity in the Modern Horse Illustrated from Genome-Wide SNP Data. *PLoS One*, **8**: e54997.
15. Shojaei, B., Sajjadian, S. M. and Moghadam, M. S. 2015. Biometric Study of the Head Region of the Darehshori Horse. *J. Vet. Res.*, **70**: Pe95-Pe99.
16. Takendengan, B., Noor, R. and Adiani, S. 2011. Morphometric Characterization of Minahasa Horse for Breeding and Conservation Purposes. *Media Peternakan-J. Anim. Sci. Technol.*, **34**.
17. Tocci, R., Sargentini, C., Degl'Innocenti, P., Bozzi, R. and Giorgetti, A. 2010. Morphological Characteristics of "Monterufoli Horse". *Italian J. Anim. Sci.*, **6**: 657-659.
18. Van Wezel, I. L. and Rodgers, R. J. 1996. Morphological Characterization of Bovine Primordial Follicles and Their Environment *in Vivo*. *Biol. Reprod.*, **55**: 1003-1011.
19. Zechner, P., Zohman, F., Solkner, J., Bodo, I., Habe, F., Marti, E. and Brem, G. 2001. Morphological description of the Lipizzan Horse population. *Livestock Prod. Sci.*, **69**: 163-177.

## روشی نوین برای ثبت ویژگی‌ها و استانداردهای نژادی از اسب: نژاد کُرد ایران

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### چکیده

اسب کُرد ایران، نژادی است که طی هزاران سال توسط اقوام کُرد ساکن غرب ایران پرورش یافته است. علی‌رغم ویژگی‌های بارزی که اسب کُرد دارد، استانداردهای نژادی آن تا کنون به ثبت نرسیده است. هدف از پژوهش حاضر، راستی‌آزمایی و ثبت معیارهایی است که پرورش‌دهندگان اسب کُرد برای شناسایی ویژگی‌های ظاهری و عملکردی این نژاد به کار گرفته و برای سالیان دراز میان آنان به صورت سینه‌به‌سینه نقل گشته است. بدین منظور، مولف اول این مقاله با سفر به استان‌هایی از ایران که جمعیت قابل توجهی از اسب کُرد در آن‌ها موجود است، مصاحبه‌هایی با ۱۱۴ نفر از پرورش‌دهندگان شناخته شده‌ی اسب کُرد به انجام رساند. این مصاحبه‌ها در قالب تکمیل یک پرسش‌نامه صورت پذیرفت. سپس بر اساس میزان توافق افراد مورد مصاحبه، آن دسته از ویژگی‌های مختلف ظاهری و عملکردی که به عنوان صفات مهم برای شناسایی و احراز اسب کُرد در نظر گرفته می‌شوند، ثبت گردیدند. بر اساس این اطلاعات تایید شده، ویژگی‌هایی که مورد توافق اکثریت بودند، در قالب ویژگی‌ها و استانداردهای نژادی اسب کُرد ایران تدوین گردیدند.