STUDIES ON SOME MEASURES ON THE ARABIAN HORSES

BY

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ABSTRACT

Ahmad Zuhier Al-Abooud, Studies on some measurements on the Arabian horses, Unpublished Master thesis, Animal Production Department, Field of Animal Breeding, Faculty of Agriculture, Ain Shams University, 2005. Data of thirteen body measurements have been analyzed from 280 purebred Arabian horses, 123 mares and 43 stallions and their 114 foals, ranged from one to 298 months old. General linear model was used to study age and gender effects on these measures. Gender was a significant source of variation for most studied traits, but not for neck girth, cannon bone circumference of fore and back legs, and pastern girth of fore and back legs. Age significantly affected pastern girths of fore and hind legs and cannon bone circumference of fore legs, while there was no significant effect on the other measurements. Pearson correlations adjusted for age effect between measurements were estimated and ranged from 0.02 to 0.84 for mares and from -0.05 to 0.90 for stallions. Factor analysis by *Promax* rotation was carried out to all body measurements, girth measurements and linear measurements for each gender to study the relationships among the mentioned traits and produce fewer mutually common factors. Three factors were extracted and accounted for 66% and 67% of the total variance in mares and stallions, respectively. The first, second and third factors in mares tended to describe body thickness, leg thickness and general size, respectively; while in stallions they tended to differentiate among, general size, leg thickness and body thickness, respectively.. Results of factor analysis for girth measurements in mares were similar to stallions. Two factors were extracted and accounted for 76% of the total variation. They seemed to represent leg thickness and chest thickness. The extracted factors for linear measurements in mares tended to differentiate between general body structure and body thickness and accounted for 61 % of common variation, while in stallions they tend to represent general body structure and chest width and accounted for 57 % total variation. The extracted

factors for each sex determine the main sources of shared variability controlling body conformation in purebred Arabian horses. These factors could be considered in selection programs to get highly coordination bodies in pure Arabian horses by using fewer measurements.

Key words: Arabian horses, Body measures, Factor analysis, Promax rotation.

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1. Introduction

The horse is a gift from Allah. It has been mentioned in the Holy Quraan and the Hadith of Prophet Mohammed (peace upon him). The Arabian horses played a dominant role in the Arab culture and Islamic civilization.

Of all animal species, non-has such a diversity of size, breeds, uses and owners as the horse. Horses range in weight from less than 50 Kg to 1000 Kg. They range in value from less than $100 to $50,000,000. Their uses include companionship, racing, pulling, jumping, entertaining and in some areas meat production.

The Arabian horse is thought to be the foundation for most horse breeds such as the English Thoroughbred, Orlofftrootter, Holinger and Leptsano. Some schools believe that Arabs founded the science of horse husbandry. It has been indicated that the purebred Arabian horses originated from the Arabian Peninsula and spread to adjacent countries and hence all over the world.

The Arabian horse is the most beautiful and noble of all the breeds. No other horse has such a perfect combination of courage, stamina and speed, along with loyalty and gentle affection. Its hot-blooded nature and stunning good looks have been admired for hundreds of years.

Part of the beauty of the Arabian horse depends on its body conformation, body measurements and the relationships among these measures.

The objectives of the present investigation were to study different body measurements in purebred Arabian horses, factors affecting them and the relationships among them, and to define through the principle components and factor analyses methods which of the body measures best represent the body conformation.

2. Review of literatures

2.1 Body measurements

Body measurements of the horse are useful to judge its beauty and condition and are used in evaluating and comparing breeds. Comparisons between normal and abnormal growth rates can be done using some of these measurements. **Thompson (1995)** reported that comparing body measurements is necessary to predict the occurrence of orthopedic diseases in young horses. Many researchers reported breed, gender and age differences in body conformation, such as **Medvecky (1985), Jakubec *et al* (1999) and Miserani *et al* (2002).**

Several investigators studied some body measurements for many famous breeds in the world **(e.g. Oki, 1989; Sasimowski *et al*, 1991; Seidlitz *et al*, 1991 and Al-Aboud, 2001).**

The **Canadian Arabian Horse Registry** published a characterization chart that described the specifications of the pure Arabian horse body parts (figure 1). The head is comparatively small, profile straight or preferably slightly concave below eyes. The ears are short and fine. The eyes and muzzle are comparatively with short distance between them (eye and muzzle), deep jowl, small muzzle, large nostrils, broad forehead and large prominent eyes. The neck is long, arched, set high and running well back into wither. The Arabian horses have moderately high wither with short back and comparatively long horizontal croup. The shoulders are long and well laid back with deep chest and deep through flank. They have Straight hind legs, knees and hocks well let down, short cannon, flat bone , large strong hocks , round and heels open hoofs , moderately long pastern well sloped and naturally high tail carriage.

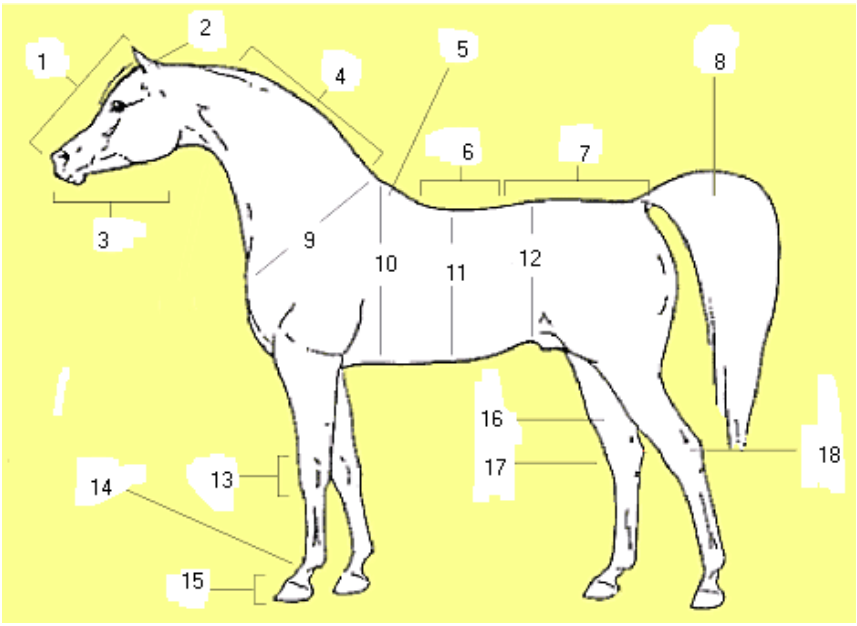

Figure 1. The versatile of pure Arabian horse.

(1)head; (2)ears; (3)eyes and muzzle; (4)neck; (5)wither; (6)back; (7) croup; (8)tail; (9)shoulder; (10)chest; (11)ribs; (12)flanks; (13)knees; (14)pasterns; (15)hoofs; (16)hind legs; (17)knees; (18) hocks.

Equestrian Federation of Australia, EFA, **(EFA, 2002)** issued a national scheme of measuring official EFA certificates. These certificates provide good information for horses that could be used in horse's shows. There are two types of certificates available, annual and limited certificates. The annual certificate is valid for 12 months from the date of measurement. While limited certificate is valid for six months. The certificate is automatically cancelled immediately when a new one is issued.

EFA registered horses that compete in EFA horse show. Classes must carry a valid EFA measurement certificate. Horses are only eligible to compete in the respective height class according to the height that recorded in the measurement certificate.

2.1.1 Colts and Fillies

The knowledge of body measurements of colts and fillies are very important. They provide a good idea about the conformation of the horse early in his life. To strengthen our understanding of body conformation during the growing period, it is necessary to collect accurate data on body measurements.

Thompson (1995) studied some body measurements in Thoroughbred horses. The wither height gains from birth to 19.6 months old were 44.0 cm and 43.9 cm for colts and fillies, respectively. **Medvecky (1985)** showed the role of Arabian horses in developing body conformation of other breeds. A Welsh Pony stallion was mated to Arabian mares. The wither height for offspring averaged 92 cm at birth and 121 cm at 6 months of age. It averaged 136, 141, 146, 148, 152 and 154 cm at 12, 18, 24, 30, 33 and 36 months of age, respectively. There was a significant difference between Arabian horses and their crosses at one year old. These results showed the importance of the body conformation of Arabian horses, their ability to change the shape of other breeds and transfer their external appearance to their offspring.

Thompson (1995) reported that wither height in Thoroughbred horses at 19.6 months of age averaged 152.2 cm and 152.1 cm in colts and fillies, respectively. Hip height growth followed a similar pattern as wither height. Both colts and fillies averaged 109.0 cm in hip height at fifteen days old. Hip height at 19.6 months old was 153.2 and 152.9 cm for colts and fillies, respectively. Chest width at half month old was 23.1 and 24.4 cm, and increased to 37.2 and 36.6 cm at 19.6 month old for colts and fillies respectively. The growth rate of hip height was very similar to the growth rate of wither height, although hip height remained slightly larger (2 to 3 cm). **Al-Aboud (2001)** reported the averages of body measurements in pure Arabian foals. Colts averaged 149.60, 135.20, 96.00, 160.30 and 18.40 cm for wither height, body length, back line length, chest girth and pastern girth, respectively. While the fillies